Introduction

[I have a refrigerator and live near 5 supermarkets. Why bother to preserve food?]

If you have a successful garden or orchard, have a hunting or fishing license, like to gather wild foods, or know friends and neighbors that do, you will eventually be presented with an abundance of free foodstuffs. Check out the zucchini and the green tomato recipes in pickling for two common surpluses. U-Pick sites, roadside stands, and farmers markets sell unusual varieties of produce at close to perfect ripeness, ready to be preserved. Even supermarket produce in season is abundant, cheap, and can be worth preserving.

If you have ever walked into an upscale food store, you might have noticed that dried foods, exotic jams, chutneys, marmalades, flavored vinegars and oils, pickles, cheeses, cured and smoked meats, etc, all are expensive preserved foods. However, these items can be all be duplicated at home, given the ingredients, expertise, and time. And all of these foods make terrific gifts.

Commercially processed food can contain many ingredients that you might want to avoid, anything from MSG, BHA, BHT, to salt, sugar, or starchy thickeners.
By preserving food yourself, you can control your diet AND take back a lot of control. In a stressed life, shutting out technology, kids, husbands, wives or SO by going into the canning kitchen is an absolute balm. Into recycling and reducing your garbage? If you can, you reuse your glass jars and rings, throwing away just the lids. However, most techniques require a fair amount of fresh clean water and take some electricity and time, so they aren't quite as cost saving as you might think.

Waiting for the apocalypse? What if you get hungry? On a different note, wouldn't you have wanted some home-preserved stuff while you were waiting out that last blizzard/hurricane/natural disaster?

Some folks speak of the feeling of security that comes from knowing there is "food in the house". Viewing the bounty on the pantry shelves whenever one is stressed out or feeling over-taxed has a very therapeutic effect.

Another excellent reason for preserving is visitors. A well stocked pantry means one can put on a feast of pretty fancy food almost any time. There is nothing quite like a gang of family or friends and being able to sit with them as they enjoy your offerings. If the preparation was done months ago ...

Food preserving is fun. Many preserving recipes are family traditions,

passed on through many generations. Often, the foods we preserve can tell us much about our past, so trading recipes can tell us about each other.

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Unfortunately the FAQ parts and the relevant section of the Table of Contents do not coincide.

Sections 1 through 1.2.5 are in Part1

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Rec Food Preserving FAQ

The Techniques of Food Preserving

1. Preserving - where do I begin?

Pour a cup of coffee or tea and put your feet up. Now, think about the food you would like to have on hand all the time. Pay particular attention to childhood memories. You may want to start with jams, jellies and vinegar pickles. This is an excellent way to start. It also has a low-cost threshold.

Spend some time doing Acid - Vinegar pickles and Sweet - Jams/Jellies to asess whether you want your life to be inundated by preserving. You might then go to dehydration at the fruit level and graduate into the more complex stuff of jerky, curing meats, smoking fish, etc. Pressure Canning ...

It is important to think about where you want to go and the path you will take as serious budget planning may be called for. If you want a serious canning kitchen and storage pantry, a long view complete with spousal agreement is very desireable and usually required.

Read this FAQ all the way through. Get a copy of Putting Food By - read, read and then read it again. Surf the Web and browse the resources listed in section 16. Internet. There are many fine books on the various aspects of food preserving read asmany as you can. Subscribe to rec.food.preserving, introduce yourself and put your plan into action.

1.1. Canning general Questions

1.1.1 [What do I *really* need to know about canning?]

The right skills and equipment for a given food. Freezing is best where a person does not have skills, equipment and time. Pressure canning is not complex but it is often done incorectly. Myth #1 in home pressure canning is that a little bit of leakage from jars is normal - it is not. Leakage is a contaminated seal resulting from improper procedure.

Canning food is preserving food by: 1) placing it in an hermetically sealable container, then 2) applying a heat treatment that will destroy microorganisms and inactivate enzymes that would spoil the product or render it unsafe. (from Jean Bergeron, foodchemist,). A partial vacuum is created by a change in pressure caused by heating, then cooling said sealable cans and jars--Boyle's Law in action. The heat is generally created by either a boiling waterbath or a pressure canner (Boyle's Law again).

What you absolutely need to know is whether your product is highly acidic (low pH) or not. High acid foods, like fruits and pickles, can be canned in a boiling waterbath; relatively low acid foods, like vegetables and meats, need to be pressure canned. You also need to know what your altitude is, because the higher you are, the lower the boiling temperature of water. Since you are creating an anerobic state, you need to be concerned about _C. botulinum_ toxin.

Fish falls into the most absolute category of all. Frozen is simplest and in most instances is next best to fresh. Dried fish from a salt/brine state is next less toxic. Then we have smoked fish. The touchy end on the fish preserving scale is occupied by canned fish. You will need excellent skills in pressure canning before attempting fish. Use a recipe from a reputable source like Putting Food By.

1.1.2 [What about air in jars when canning?]

All air must be exhausted from jars and cans or the unit may fail to develop a good vacuum seal. The absence of air is critical also for simple food safety as free oxygen is eliminated and the plethora of possible bacteria which need oxygen do not have the where-with-all for life. The deadly c.Botulinum which is anerobic (does not require oxygen to sustain its life cycle) is handled in its own class.

"Hot-pack" is used for a good reason other than utility. When heated, food expands and expels air. When we put hot food into a jar, spatula the air bubbles out and lid it up, we have created an environment where "a" vacuum will develop. As the food cools it will contract and create a partial vacuum. We

"process" even with hot-pack as we strive for a strong vacuum and sufficient heat to kill toxins. It behooves a canner to use sterile vessels for food no matter what will be the processing method because initial sterility reduces the bacteria count. It is a well established fact of food science that the number of bacteria at the origin has a huge bearing on the outcome.

Headspace was not the answer here. Headspace (a valuable tool) is required so that the food may expand and thus drive the air out. Getting headspace correct is necessary so that the food expansion is just right so that the food then occupies the entire vessel. If the headspace is too large the air will compress on top of the food with a weak vacuum. Canners new to wide mouth jars see this problem. eg. They are used to 1/2" - vertical height in a standard mouth jar. When usng a wide mouth jar of dsame size and same 1/2" height of headspace there about 30% more volume in the wide mouth 1/2" headspace than in the standard mouth jar. The solution here is adjust the headspace properly - reduce the headspace by 30%.

Last word on getting the air out has to do with storage. Processed jars which develop a good vacuum may still contain (trapped bubbles) residual air. This air may rise to the surface and release the seal. If the product is viscous enough it will remain internal and simply cause premature oxygenation - browning.
Canned foods held for several years may be seriously oxydized and be relatively unrecognizable. Do process jars properly coming OUT of the pantry as well as prior to going in. - ED.

1.1.1.1 [How can I test a dial gauge?]

USE OF A MAXIMUM THERMOMETER TO TEST A DIAL GAUGE

Pressure canning equipment needs to be checked yearly to be sure it is proper operation condition. Canners with dial gauges can get out of adjustment and no longer give an accurate reading of the pressure inside of the canner. This happens as the gauge gets old; with heavy use the gauge which results in expansion and contraction of the metals parts causing them to become brittle.

The gauge of a dial gauge canner SHOULD BE CHECKED EVERY

YEAR to be sure it is accurate. If it is inaccurate, you may not be processing low-acid foods at a high enough temperature to make them safe to consume.

We use a MAXIMUM THERMOMETER to check the temperature (which reflects the pressure) inside a pressure canner. A maximum thermometer works like a fever thermometer.

Procedure #1:

Get a .1C Checktemp and use that to bench mark your maximum thermometer. You may find it seriously in error. Temperature lags pressure so processing can be out of whack by 10% or more.

Procedure:

1. Before each use, shake down the maximum thermometer to 200 F or lower.

2. Place the thermometer inside an unsealed pint jar and add 2 inches of water to the jar. Place jar in the pressure canner.

3. Place 1 inch of water in the canner.

4. Adjust canner lid, lock and exhaust canner for 10 minutes. Close vent.

5. Allow pressure to build to desired level (10 PSIG or 11 PSIG).

6. Once pressure is built up and holding stable, time for 10 minutes.

7. Turn off heat. Allow canner to cool until gauge reaches "0". Before opening lid, tough safety vent to be sure no pressure (live steam) escapes. Remove lid.

10. Check the temperature on the maximum thermometer. The maximum thermometer will stay at the highest temperature which was achieved in the canner until you shake it down.

11. A gauge which is inaccurate by 1 pound, high or low, should be replaced. For every 1 pound of pressure the gauge is "off", it will be off by 2-3 F. If the maximum temperature thermometer reads 2 F high or low (at the corresponding pressure), replace the gauge.

Desired temperatures:

Pressure	Accurate	Acceptable Range
5 pounds	228 F (109 C)	226 to 230 F
10 pounds	240 F (115 C)	238 to 242 F
15 pounds	250 F (121 C)	248 to 252 F

Vapor Pressure of Water Above 100 C

Temp., C	Pounds per Square Inch	Temp., F
100	14.696 (atmospheric)	212.0
105	17.521	221.0
110	20.779	230.0
116	25.330	240.8
120	28.795	248.0
125	33.664	257.0
127	35.789	260.6

(Table adapted from the Handbook of Chemistry and Physics.)

The difference in pressure between atmospheric and 10 pounds pressure (25.330 - 14.696) results in a temperature (degrees F) difference of 28.8 F (240.8 - 212) or about 2.9 degrees F for every pound of pressure.

The difference in pressure between 10 pounds and 20 pounds (35.789 - 25.330) results in a temperature (degrees F) difference of 19.8 (260.6 - 240.8) or about 2 degrees F for every pound of pressure.

What this tells us is that the change in the temperature is not the same over the entire range of pressures. To be on the safe side, we will use the lesser value--if the temperature on the maximum temperature thermometer is high or low with respect to the expected temperature at that pressure by 2 degrees Farenheit or more the gauge should be replaced as it is

inaccurate by at least one pound pressure.

If the temperature is high or low by less than 2 degrees F, we can adjust the pressure at which we process in order to achieve the correct temperature. For example, if at 10 pounds pressure, the maximum temperature thermometer reads 238 F, our gauge is reading high by 1 pound--we are actually processing at 9 pounds pressure. To get the temperature up to 240 F, we need 1 more pound of pressure, so we adjust our processing pressure to 11 pounds (10 lb present + 1 lb needed = 11 lb).

In Illinois we are above sea level by about 1,000 feet, so we will need to process at 11 pounds per square inch by gauge (PSIG) to get the internal temperature of the canner up to 240 F. If we find that at 11 pounds pressure the maximum temperature thermometer reads 238 F, our gauge is reading high by 1 pound--we are actually processing at 10 pounds pressure. To get the temperature up to 240 F, we need 1 more pound of pressure, so we adjust our processing pressure up to 12 pounds (11 lb present + 1 lb needed = 12.

Pressure-Temperature Chart

Pounds Pressure (gauge)	Temperature, F
0	212
1	215
2	218
3	222
4	224
5	228
6	230
7	232
8	235
9	238
10	240
11	242
12	244
13	246
14	249
15	250
16	252
17	253
18	255
19	257

Take the temperature inside your canner at several pressures, compare the temperatures with the temperatures in the table above to see how close to accurate your canner is. If you have questions about testing a dial gauge, call your local Cooperative Extension Service office.

Prepared by Susan Brewer
Foods and Nutrition Specialist
July, 1990
EHE-68

1.1.2 [I made/got some home-preserved foods as a gift. How do I check them for safety?]

EXAMINE ALL HOME-CANNED FOODS BEFORE USING THEM.

1. Inspect the can before opening: Glass jars: metal lids should be firm and flat or curved slightly inward. There should be no sign of leakage around the rubber sealing compound. If there is mold growth around the exterior neck of the jar--there may be mold growth inside. Check for signs of "gassiness"--floating food, bubbles rising in the food, swollen lid.

2. As the jar is opened, notice whether there is an inrush or an outrush of air. Air rushing out or liquid spurting out indicates spoilage.

3. Smell the contents at once. The odor should be characteristic of the food. An "off" odor probably means spoilage (acid, acrid, sour, putrid, etc.).

4. Check the food carefully to see that it appears to have a characteristic texture and color. Liquids in all foods should be clear. Any change from the natural texture and/or color indicates spoilage. DO NOT TASTE ANY QUESTIONABLE FOOD.

5. Discard canned food with signs of spoilage.

a. High acid foods (fruit) may be discarded in the garbage or disposal.

b. Low acid food (vegetables, meat, fish, poultry) must be discarded more carefully because it could contain botulinal toxin. Discard the spoiled food carefully using one of the following methods. Be careful not to contaminate your work area by spilling the food. Wear rubber gloves before handling food or containers.

c. Boil meat, fish and poultry for 15 minutes.

1. Boil at full rolling boil for 20 minutes. Discard.

2. Burn.

3. Mix with 1-2 Tbsp household lye *or* 1 cup chlorine bleach in non-metal container and let stand over- night. Flush down the toilet, discard in garbage or garbage disposal. Note: any containers or utensils that come in contact with spoiled canned foods should be carefully washed. Use soap and water to wash containers used for high acid foods. Containers that come into contact with low acid foods should be sterilized with chlorine bleach or boiled for 20 minutes. Discard all lids, screw bands, wash cloths, sponges and rubber gloves used during detoxifying low acid foods.

6. As a safety precaution, boil all low acid foods (meats, fish, poultry, vegetables) BEFORE TASTING. Boiling destroys the botulinal toxin should it be present. a. Boil most vegetables for 10 minutes (full rolling boil). b. Boil thick vegetables (spinach) for 20 minutes. [Louis Nagel, professional canner from Embarcadaro Canning, suggests that thick vegetables like spinach and chard should *not* be home canned in the first place.]

Prepared by Susan Brewer/Foods and Nutrition Specialist/July, 1990 EHE-682

1.1.3 [Is home canning safe?]

Yes. As long as you know the limitations. Only two home-canning (processing) techniques are considered safe. The boiling waterbath process is used for high-acid (low pH) foods like fruit, while pressure canning is

used to process low-acid foods such as vegetables.

All other methods are considered by USDA, Ag Canada and reputable canning firms to be obsolete and are not recommended:

Open kettle canning, oven canning, crockpot canning, compost canning, canning with pills, microwave canning, dishwasher canning, atmospheric steam canning. (don't confuse with pressure canning)

1.1.4 [What foods can be home canned, and what foods shouldn't be?]

Foods considered high acid (pH lower than 4.6/4.7) can be boiling waterbath canned. This next chart is reworked from _Putting Food By_.

Foods at pH 2.0-3.0 - lemons, gooseberries, underripe plums

Foods at pH 3.0-3.5 - ripe plums, underripe apples, ripe oranges and grapefruit, strawberries, rhubarb, blackberries, cherries, raspberries, blueberries, very underripe peaches and apricots

Foods at pH 3.5-4.0 - ripe apples, oranges, grapefruit, overripe blackberries, cherries, raspberries, and peaches, ripe apricots, under-ripe pears, pineapple, sauerkraut, (other pickles?)

Foods at pH 4.0-4.6 (BORDERLINE) -tomatoes, figs Above 4.6 or so, must be pressure canned.

Foods at 4.6-5.0 - some tomatoes, depends on the variety. (Green tomatoes are below 4.6). pimentoes, pumpkin. USDA suggests that pumpkin butter cannot be canned safely.

Foods at 5.0-6.0 - carrots, beets, squash, beans, spinach, cabbage, turnips, peppers, sweet potatoes, asparagus, mushrooms, white potatoes

Foods at 6.0-7.0 - peas, tuna, lima beans, corn, meats, cow's milk, salmon, oysters, shrimp.

Above 7.0 - hominy, black olives (each are lye cured). Leave these to the pros.

Check the list of pH readings for common foods and condiments below. Need to also consider the size of your jars (half gallon size jars are made, but you probably shouldn't can with them), the physical properties of your food and the gooeyness of what you are canning. Pumpkin/squash purees and

butters, and refried beans probably shouldn't be home canned--it will take a long time to get the center of the jar hot enough. However, squash and pumpkin chunks (raw pack) can be pressure canned. [Interestingly, spinach and chard shouldn't be home canned because the leaves will condense into a mass, insulate the center of jar, and form a dangerous cold spot--Louis Nagel.] Also, cream soups and cream-style vegetables shouldn't be home canned for the same reason that pumpkin butter shouldn't be canned.

1.1.5 [pH determinations of common foods and condiments.]

Remember pH 4.6 is the cutoff. Above pH 4.6, a recipe must have enough added acid to be waterbath processed, or must be pressure canned. If you still don't find your food here, citations are listed for still more of them. From http://vm.cfsan.fda.gov/~mow/app3a.html

VEGETABLES	pH	VEGETABLES	pH
Artichokes	5.6	Peas	5.8 - 7.0
Canned	5.7 - 6	Frozen	6.4 - 6.7
Asparagus	4 - 6	Canned	5.7 - 6.0
Canned	5.2 - 5.3	Dried	6.5 - 6.8
Buds	6.7	Pepper	5.15
Stalks	6.1	Pimiento	4.6 - 4.9
Beans	5.7 - 6.2	Potatoes	6.1
String	4.6	Tubers	5.7
Lima	6.5	Sweet	5.3 - 5.6
Kidney	5.4 - 6	Pumpkin	4.8 - 5.2
Beets	4.9 - 5.6	Radishes (red)	5.8 - 6.5
S	4.2 - 4.4	(white)	5.5 - 5.7
Canned	4.9	Rhubarb	3.1 - 3.4
Brussel sprouts	6.0 - 6.3	Canned	3.4
Cabbage	5.2 - 6.0	Rice (all cooked)	
Green	5.4 - 6.9	Brown	6.2 - 6.7
White	6.2	White	6.0 - 6.7
Red	5.4 - 6.0	Wild	6.0 - 6.4
Savoy	6.3	Sauerkraut	3.4 - 3.6
Carrots	4.9 - 5.2	Sorrel	3.7
Canned	5.18-5.22	Spinach	5.5 - 6.8
Juice	6.4	Cooked	6.6 - 7.2
Cauliflower	5.6	Frozen	6.3 - 6.5
Celery	5.7 - 6.0	Squash (all cooked)	
Chives	5.2 - 6.1	Yellow	5.8 - 6.0
Corn	6.0 - 7.5	White	5.5 - 5.7

Canned	6.0	Hubbard	6.0 - 6.2
Sweet	7.3	Tomatoes (whole)	4.2 - 4.9
Cucumbers	5.1 - 5.7	Paste	3.5 - 4.7
Dill pickles	3.2 - 3.5	Canned	3.5 - 4.7
Eggplant	4.5 - 5.3	Juice	4.1 - 4.2
Hominy (cooked)	6.0	Turnips	5.2 - 5.5
Horseradish	5.35	Zucchini (cooked)	5.8 - 6.1
Kale (cooked)	6.4 - 6.8		
Kohlrabi (cooked)	5.7 - 5.8	FRUITS	
Leeks	5.5 - 6.0	Apples	
Lettuce	5.8 - 6.0	Delicious	3.9
Lentils (cooked)	6.3 - 6.8	Golden Delicious	3.6
Mushrooms (cooked)	6.2	Jonathan	3.33
Okra (cooked)	5.5 - 6.4	McIntosh	3.34
Olives (green)	3.6 - 3.8	Winesap	3.47
(ripe)	6.0 - 6.5	Juice	3.4 - 4.0
Onions (red)	5.3 - 5.8	Sauce	3.3 - 3.6
(white)	5.4 - 5.8	Apricots	3.3 - 4.0
(yellow)	5.4 - 5.6	Dried	3.6 - 4.0
Parsley	5.7 - 6.0	Canned	3.74
Parsnip	5.3	Bananas	4.5 - 5.2

FRUITS (contin.)	pH	MEAT, POULTRY	pH
Cantaloupe	6.17-7.13	Beef	
Dates	6.3 - 6.6	Ground	5.1 - 6.2
Figs	4.6	Ripened	5.8
Grapefruit	3.0 - 3.3	Unripened	7.0
Canned	3.1 - 3.3	Canned	6.6
Juice	3.0	Tongue	5.9
Lemons	2.2 - 2.4	Ham	5.9 - 6.1
Canned juice	2.3	Lamb	5.4 - 6.7
Limes	1.8 - 2.0	Pork	5.3 - 6.9
Mangos	3.9 - 4.6	Veal	6.0
Melons		Chicken	6.5 - 6.7
Cassaba	5.5 - 6.0	Turkey (roasted)	5.7 - 6.8
Honey dew	6.3 - 6.7		
Persian	6.0 - 6.3	FISH	
Nectarines	3.9	Fish (most fresh)	6.6 - 6.8
Oranges	3.1 - 4.1	Clams	6.5
Juice	3.6 - 4.3	Crabs	7.0
Marmalade	3.0	Oysters	4.8 - 6.3
Papaya	5.2 - 5.7	Tuna fish	5.2 - 6.1
Peaches	3.4 - 3.6	Shrimp	6.8 - 7.0
In jars	4.2	Salmon	6.1 - 6.3
In cans	4.9	Whitefish	5.5

Persimmons	5.4 - 5.8	Freshwater (most)	6.9 - 7.3
Pineapple	3.3 - 5.2	Sturgeon	5.5 - 6.0
Canned	3.5	Herring	6.1 - 6.4
Juice	3.5		
Plums	2.8 - 4.6	DAIRY PRODUCTS/EGGS	
Pomegranates	3.0	Butter	6.1 - 6.4
Prunes	3.1 - 5.4	Buttermilk	4.5
Juice	3.7	Milk	6.3 - 8.5
Quince (stewed)	3.1 - 3.3	Acidophilus	4.0
Tangerines	4.0	Cream	6.5
Watermelon	5.2 - 5.8	Cheeses	
BERRIES		Camembert	7.44
Blackberries	3.2 - 4.5	Cheddar	5.9
Blueberries	3.7	Cottage	5.0
Frozen	3.1 - 3.35	Cream cheese	4.88
Cherries	3.2 - 4.1	Edam	5.4
Cranberries		Roquefort	5.5 - 5.9
Sauce	2.4	Swiss Gruyer	5.1 - 6.6
Juice	2.3 - 2.5	Eggs	
Currants (red)	2.9	White	7.0 - 9.0
Gooseberries	2.8 - 3.1	Yolk	6.4
Grapes	3.4 - 4.5	Egg solids, whites	6.5 - 7.5
Raspberries	3.2 - 3.7	Whole	7.1 - 7.9
Strawberries	3.0 - 3.5	Frozen	8.5 - 9.5
Frozen	2.3 - 3.0		

BAKERY PRODUCTS	pH
Bread	5.3 - 5.8
Eclairs	4.4 - 4.5
Napoleons	4.4 - 4.5
Biscuits	7.1 - 7.3
Crackers	7.0 - 8.5
Cakes	
Angel food	5.2 - 5.6
Chocolate	7.2 - 7.6
Devil's food	7.5 - 8.0
Pound	6.6 - 7.1
Sponge	7.3 - 7.6
White layer	7.1 - 7.4
Yellow layer	6.7 - 7.1
Flour	6.0 - 6.3

MISCELLANEOUS

Caviar (domestic)	5.4
Cider	2.9 - 3.3
Cocoa	6.3
Corn syrup	5.0
Corn starch	4.0 - 7.0
Ginger ale	2.0 - 4.0
Honey	3.9
Jams/Jellies	3.1 - 3.5
Mayonnaise	4.2 - 4.5
Molasses	5.0 - 5.5
Raisins	3.8 - 4.0
Sugar	5.0 - 6.0
Vinegar	2.0 - 3.4
Yeast	3.0 - 3.5

(a)pH values were derived from the following references:

Anon. 1962. pH values of food products. Food Eng. 34(3):98-99.

Bridges, M.A., and Mattice, M.R. 1939. Over two thousand estimations of the pH of representative foods. Am. J. Digest. Dis. Nutr. 9:440-449.

FDA Bacteriological Analytical Manual, 6th Ed. 1984. Chapter 23, Table 11.

From Richard Webb

The following chart comes from The Curious Cook by Harold McGee.

Fruit	Sugar Content %of fresh weight	Acid Content %of fresh weight
Lime	1%	5.0%
Avocado	1	0.2
Lemon	2	5.0
Tomato	3	0.5
Cranberry	4	3.0
Red Currant	6	1.8
Grapefruit	6	2.0
Guava	7	0.4
Cantaloupe	7	0.2

Strawberry	7	1.6
Raspberry	7	1.6
Blackberry	8	1.5
Papaya	8	0.1
Apricot	9	1.7
Watermelon	9	0.2
Peach	9	0.4
Black Currant	10	3.2
Pear	10	0.1
Honeydew	10	0.2
Orange	11	1.2
Plum	11	0.6
Blueberry	11	0.3
Gooseberry	11	1.8
Passion Fruit	11	3.0
Prickly Pear	11	0.1
Mango	11	0.5
Pineapple	13	1.1
Pomegranate	13	1.2
Apple	13	0.8
Cherry	14	0.5
Kiwi	14	3.0
Persimmon	14	0.2
Fig	15	0.4
Grape	16	0.2
Banana	17	0.3
Litchi	17	0.3

1.1.6 [What does home canning entail?]

These are two sample recipes, just to give a general idea of what is involved, one is for a waterbath treatment, the other involves pressure canning. Some comments of special interest have been added (in [with initials]), to benefit the canning newbie. Both of these recipe files are taken from Susan Brewer's fact sheets.

CANNING FRUITS (PEACHES)

Fresh fruit for home canning should be at the peak of ripeness--they should have lost their greenish color and should yield slightly when squeezed. [The peak-ripe fruit has the most dependable amounts of acid and pectin--LEB]. Fruit should be prepared (peeled, trimmed), treated to prevent browning, and hot-packed to exhaust air and make fruit more pliable. Hot packing will help prevent fruit from floating in the syrup.

Prepare syrup, hot pack fruit and water bath can. Use USDA Complete Canning Guidelines or "Canning Card" (EHE-660) for processing time.[The USDA Canning Guideis on- line, check part 16 under Internet Sites.--LEB] Recommended Quantities: Peaches, apples, pears: 17 1/2 lb fresh = 7 qt. ll b = 9 qt. 1 bushel = 48 lb = 16-24 qt (2 1/2 lb per quart) Berries: 1 1/2-3 lb (1-2 qt) fresh = 1 quart canned Plums: 1 1/2-2 1/2 lb fresh = 1 quart canned Preparing Jars 1. Wash jars by hand or in dishwasher. Rinse well. [Please remember that the dishwasher cleans the jars a little, and keeps them warm--it does not sterilize them.--ED, LEB] 2. Prepare lids according to manufacturer's directions. [Take a careful look at the rims, the counterpoint to the lids.--LN] Preparing Peaches [0. Wash your hands.--everybody, your mom :)] 1. Wash peaches under running water. [Important to remove dust and dirt. Soil bacteria are important source of spoilers.--LEB] 2. Skin removal (peaches, apricots): [Blanching step.] a. Dip peaches in boiling water for 30-60 seconds. b. Dip in cold (ice) water to stop heat treatment. Do not soak-- remove immediately. 3. Cut peaches in halves, remove pits, slice if desired. 4. To prevent darkening put slices in any of these antidarkening solutions: a. a solution of 1 tsp or 3000 mg. of vit. C/ gallon of water. [From Tips 'n Tricks--can use a Vitamin C tablet] b. a citric acid or lemon juice solution (1 tsp citric acid USP grade or 1/4 cup lemon juice / gallon of water. [Check below for a list of citric acid sources.] c. a commercial antioxidant solution. [Fruit Fresh, et al.] 5. Remove from antidarkening solution and drain just before heating or raw packing. 6. Syrup a. Sugar [Granulated] (a) Thin: 2 cups sugar to 4 cups water Medium: 3 cups sugar to 4 cups water Heavy: 4 1/2 cups sugar to 4 cups water (fruit may float) b. Honey: 1 1/2 cups honey to 4 cups water Thin honey: 3/4 cup honey, 3/4 cup sugar, 4 cups water. [Test the flavor of your honey before using it your jars.--LN] c. Corn syrup: Thin: 1 c corn syrup, 1 c sugar, 4 c water Medium: 1 1/2 c corn syrup, 1 c sugar, 4 c water Heavy: 2 c corn syrup, 2 1/2 c sugar, 4 c water d. Fruit juice: pineapple, apple, etc. h. Water: fruit may fall apart during processing. (b) a. [For ease of use, sugar may be added directly to the jars, then processed --LN, Embarcadero Home Canning] b. [Need the sugar to maintain plant cell osmotic pressure-LEB.] 7. Pack a. Hot pack: heat fruit and syrup or water to boiling, then pack. b. Raw pack: do not heat fruit prior to filling jars. c. Pie pack: heat fruit in sugar only, no sugar, until juice drawn from fruit nearly covers fruit. Heat slowly to prevent scorching. Fill jars with hot mixture and process as for hot pack fruit. 8. Overlap fruit pieces in jars to minimize air spaces. 9. Work out air bubbles with plastic or wooden utensil. (a) 10. Add liquid (syrup, fruit juice, water) leaving 1/2 inch of headspace.(b) 11. Wipe off jar rims thoroughly to make sure the sealing surface is clean and free from fruit or sugar which would prevent sealing. (c) 12. Add lids to the top, using tongs or a lid lifter. (d) 13. Screw ring bands onto the jars finger tight, plus a quarter turn more. a. [If large amounts of air remain after processing, you get less of a vacuum and weak seals.--LEB Plastic/stainless steel utensils best, wood

can put splinters in food, thus is verboten.--LN] b. [Headspace is where the seal will develop. Too much/too little will pro- duce weak seals.] c. [Very important for a beginner to remember to do.] d. [Don't touch the inside rim with your fingers.]

Processing Procedure: 1. Place filled jars on rack in canner so they don't touch sides. 2. Add hot water until the level is 1-2" over jar tops. (a) 3. Place the lid on the canner and bring to a boil. 4. Start timing the canner when the water returns to a full boil. 5. Add more boiling water as needed to keep level 1-2" over jar tops. 6. Process according to USDA Guidelines, see "Canning Card" (EHE-660) (b) a. [2" far better than 1", because the water will boil off. Too little water will leave an underprocessed jar.--LN Should add boiling water instead of just hot water, to keep the water boiling.--ED, LN If you are a newcomer to all this, might want to measure the water depth.--LEB] b. [Remember that you need to know your elevation, and convert accordingly. Recipe times assumed for sea level. Check part V for way to determine your elevation.]

Cooling Jars: 1. At the end of the processing time, remove the jars from the waterbath canner without disturbing lids or bands. 2. Place jars right side up on towel or rack away from drafts. 3. DO NOT tighten screw bands. 4. Lids will seal in 12-24 hours as they cool. [Hot glass can break or crack if cooled too quickly. BTW, If you hear a loud pop or click, the vacuum seal formed very quickly. This is the nicest sound in all canning.--LEB]

Checking Seals: 1. Jar is sealed if lid is depressed in center and does not move. (a) 2. Remove screw bands from sealed jars, wash off any syrup which may have boiled out during processing, and store jars. (b) 3. Unsealed jars should be reprocessed with new lids, or refrigerated and used within a few days. (c) a. [Another seal test: hold the jar up by the lid w/o the ring. If the jar falls, the seal was bad. Catch the jar. :)] b. [If the jars are very sticky, might want to reprocess, because some of this is trapped in the seal.--LN] c. [Must do the reprocessing within 24 hrs of original processing time.]

Storing Home-Canned Fruits: 1. Remove screw bands from sealed jars. 2. Wipe jars with warm, sudsy water and dry (do not disturb lid). 3. Label and date. 4. Store in clean, cool (less than 90F), dark, dry place. [Under 65F if possible.--LN] [Want to be able to use your canned goods within a year or so.] Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992 EHE-663 ---- Tomato-Vegetable Juice Blends Tomatoes are a somewhat acid food. To make them safe for home canning ACID MUST BE ADDED. To each quart jar of tomatoes or tomato juice, 2Tbsp of lemon juice, or 4 Tbsp of 5% vinegar, or 1/2 tsp of citric acid must be added. When adding vegetables, which are low in acid, the instructions must be followed

exactly. You may add less vegetable, but you must not add more vegetable than the re- cipe calls for. You may adjust the spices and seasonings to your taste, for example more or less pepper, add a little tabasco, or more sugar. And, you may vary the kinds of vegetables as long as you do not add more than three cups total vegetables to 7 quarts of juice. For example, you may use 2 cups of onions and 1 cup of celery, or 1 cup each of green pepper, onion, and carrots. But no more than 3 cups total of vegetables will be safe. [Check out the V. Recipe Caveats and Troubleshooting Guide for the vegetable/acid rules.] An average of 22 pounds of tomatoes is needed per canner load of 7 quarts.

Preparation for Canning: 1. Wash jars by hand or in dishwasher. Rinse well. [Check the dishwasher question 1.3.6 for more info.--LEB] 2. Prepare lids according to manufacturer's directions. 3. Put 2 to 3 inches of water in pressure canner, or 5 to 7 inches of water in boiling water bath canner. Be sure canner has rack. 4. Start water heating. It should be hot but not boiling when the jars go in.

Prepare juice: [0. Wash your hands. :)] 1. Wash tomatoes and vegetables under running water. Trim and discard any bruised or discolored sections. 2. Chop carrots, onions, celery and green peppers, or your preferred com- binations. For 7 quarts of juice you may add up to 3 cups of chopped vegetables. 3. To prevent juice from separating, quickly cut about 1 pound of fruit into quarters and put directly into saucepan. Heat immediately to boiling while crushing. Continue to slowly add and crush fresh tomato quarters into the boiling mixture. Make sure the mixture boils constantly while you add the remaining tomatoes. 4. Add the chopped vegetables to the boiling tomatoes. 5. Add sugar, salt, and spices. For 7 quarts of juice, a mixture of 1/3 C sugar, 1/4 C salt, 1 Tbsp celery seed and 1/8 tsp cayenne pepper is a good combination. 6. Simmer mixture for 20 minutes. 7. Press hot mixture through a sieve or food mill to remove skins and seeds. 8. Reheat juice to boiling.

Fill jars: 1. Add 2 Tbsp lemon juice (or alternatives-see above) to each quart jar. 2. Fill boiling juice into jars, leaving 1/2 inch headspace. 3. Wipe top sealing edge of jar with a clean damp towel. 4. Adjust 2-piece canning lids. Tighten ring bands using thumb and two fingers until just snug, then using whole hand, tighten 1/4 turn fur- ther. [Don't tighten further especially if pressure canning, need the interior of the jars to equilibrate with the pressure during processing.]

Processing: 1. Place jars on rack in canner so that they do not touch sides. 2. Add hot water to boiling water bath if necessary to bring water 1-2 inch over tops of jars. 3. Cover canner, or lock pressure canner lid into place. 4. Turn up heat. 5. Process: Boiling water bath canner: when water reaches full boil, begin to count processing time. Set timer for

specified time. Add water to boiling water canner if necessary to maintain proper depth. [Your *accurate* timer is important here. Should be clock wound or use an electronic battery.--LN] Pressure canner: When steady stream of steam issues from vent, set timer and allow to exhaust steam for 10 minutes. After 10 minutes, close petcock or put weighted pressure regulator on vent. When dial gauge reads 11 psig, or when weight begins to rock or hiss at manufacturer's stated rate, set timer for specified processing time, and gradually reduce heat to maintain proper pressure. [Gradual is important here--don't cut the heat so radically to lose pressure, otherwise have to retime.] PROCESSING TIMES for canning in Illinois: Boiling Water Pressure Canner (10/11 psig) Pints 35 minutes 15 minutes Quarts 40 minutes 15 minutes [Check your p.canner gauge at least once/year.--LN] [Remember to alter times/pressure for your elevation. If you live in the US, check the geographical nameserver listed in part V.--LEB] After processing time is complete: 1. Remove canner from heat. Allow pressure to drop to zero. Wait 3 more minutes. Open canner with lid away from you to avoid steam in your face. [Don't try to speed this up; just simply turn off the burner and allow to cool. Even moving a canner to a cool burner can be a bit dangerous.--LN] 2. Remove jars from canner. Place upright on rack to cool away from drafts. 3. Do Not Tighten ring bands. They will tighten as they cool. 4. After 12-24 hrs check seals. Center of lid should be depressed and not give when touched. A tap with a spoon should give a clear ring. 5. Remove ring bands, wipe with warm sudsy water, rinse, label and store. 6. Unsealed jars may be reprocessed, or refrigerated. Prepared by Mary A. Keith, Foods and Nutrition, July, 1991 Revised by M. Susan Brewer, Foods and Nutrition, June, 1992 EHE-692 ----

1.1.7 [Where do I get the Ball Blue Book? And the USDA Canning Guide?]

Most of the food preservation sources are in the back of this FAQ, but the Ball Blue Book (BBB) is the great canning classic of all time (unless you have the Kerr Canning Guide). First time canners are *well* advised to pick up a copy. Places where you can order or find the BBB are: order form on the lid box in a fresh case of Ball canning jars; sometimes the hardware store or the Walmart where you picked up the case of jars will also have a copy for sale nearby. I got mine in a used bookstore (check the copyright date, you want one less than ten years old). New info from hjbe@conch.aa.msen.com; can order the BBB by phone, the number is 1-800-859-2255. From the Great Pump- kin; a reliable address for ordering the BBB is: Direct Marketing, CB/ All- trista Corporation/ P.O. Box 2005/ Muncie IN 47307-0005. The USDA Canning Guide is online. Check under Internet Sources (part 6) for the exact addresses.

1.1.8 [What if my recipe doesn't have processing instructions?]

Check out the section in this FAQ entitled Recipe Caveats and

Troubleshooting. Or follow the recipe, *don't* process, and simply refrigerate the results.

1.1.9 [How can I find out my elevation so I can alter my processing times?]

A geographic nameserver is listed for your convenience. This convenience works only for folks in the United States. If you know of a Canadian and a world-wide one, please let me know.

1.2.1 [Recipe Templates and Tricks]

1.2.2 [Sweet Spreads 101, from Barb Schaller]

These are templates which can give you ideas for unusual gifts, or really unusual jams and jellies. Fruity,cannable things 101 as taught by Barb Shaller, Famed Fruit Spread Preserver.

Preserves: The broad category AND a specific product: Whole fruits (or similar-sized cut pieces of fruit too large to be done whole) preserved in a thick sugar syrup varying in viscosity from that of honey to soft jelly, so that the fruit retains its shape.

Jelly: The jelled *juice (only)* of the fruit or vegetable. A prize-winning one will be clear, lacking crystallization, and will be firm enough to hold its shape outside the jar, yet will be soft enough for easy spreading.

Jam: Will contain fruit bits. Fruit prepared for jamming is typically crushed or chopped and cooked with sugar. Pectin may be added to assist the jel. A little softer than jelly.

Butter: The smooth pureed pulp of the fruit, cooked and sweetened until very thick. Often enhanced with sweet spices. Must be cooked slowly. Refer to FAQ for sad stories and a couple good recipes [look down :)--LEB].

[The very best butters are made with nothing but the fruit. Slow cooked over many hours - one MUST keep stirring constantly - an exquisite flavour is derived - ED]

Conserves: Jam-like combinations of two or more fruits, traditionally without added pectin and traditionally containing nuts and raisins. YMMV. A good one is on the soft side.

Marmalades: Soft fruit jellies, typically citrus products, containing small pieces of fruit or peel evenly suspended in the transparent jelly. Good definitions from the Ball Blue Book.

1.2.3. ["Scientific" low sugar Jams]

>From Sandy Fifer : I have a very general formula that works well for me. First, I check _Putting_Food_By_ to see what the acid content is for the particular fruit and use lemon juice to increase the acidity accordingly. (If it's not acid enough [pH 4.6] I add up to 3 Tbsp. lemon juice per 5 cups of fruit.) Second, I use Pomona's Universal Pectin so that the jelling does not depend on the amount of sugar used. So, for jam, here's my recipe: (check the Proportions list for quantities) Prepare fruit: pit cherries, de-stone and remove cores from nectarines, pears, etc., de-skin by dipping in boiling water if necessary. Puree fruit--shorter time if you like some lumps (fruit identity), longer if you like it smoother. Since this is jam and not jelly it will have body and not be the translucent jell commercially available. Combine 5 cups of fruit, 1/2 to 3/4 cup sugar, 2T lemon juice, and use 1 1/2 to 2 1/2 tsp. each of pectin and calcium, prepared according to the package. This yields 4 to 5 1/2 cups jam, depending on loss during cooking: some fruits foam up (raspberries), some are thick and spit all over the kitchen while heating (nectarines and pears). Remember, this is a very general recipe. Also, I like a minimum of sugar, just enough to bring out the taste of the fruit.

With some fruits I add ginger (e.g. pears) or lemon zest (e.g. blueberries). I cook the puree until it reaches a full boil--this can take 10 to 20 minutes depending on how high the heat is and how thick the fruit. I'm cooking to heat it thoroughly, not to reduce it or develop pectin. You bring the jam to a full boil. This means that you stir the puree around and as soon as you remove the spoon all the puree immediately starts to boil again. At this point there's no need to cook it further--you can proceed to the pectin step. When it reaches the full boil, add the pectin, sugar and calcium according to the directions. You have to experiment to determine how much sugar you want, and how thick you want the resulting jam. Then I water-bath can the jam for six minutes. Having brought the jam to a full boil allows you to process it for such a short time. I believe that if you follow this recipe you will end up with, at the mini- mum, a really good batch of jam, even taking into account the variation in tastes. You might want to tinker with it some to suit your own particular taste. I've never had an inedible failure. In the beginning I had some jams that were too thick or thin, but they tasted fine, and I kept notes and corrected the recipe the following year. I buy high quality fruit and use it when it's just ripe. I don't care about the cost of the fruit because it's more important to me to have a delicious end-product. Using fruit that's moldy or past its prime is a bad idea. Some mold can survive the canning process. Once opened, low-sugar jams have a shorter shelf-life than high-sugar com- mercial jams, even when refrigerated. My raspberry jam lasts about three weeks (not sure why) and the other fruits last about four

to six weeks. Basically my jam tastes like pureed fruit (in fact to make fruit sauce for toppings I use the same recipe and just leave out the pectin and calcium) and is as close as I can come to preserving summer. ---Proportions, from Sandy Fifer --- I decided to type in my recipes for all the jams I've made. Remember, these depend on using Pomona's Universal Pectin, which doesn't require sugar to set the jam. And one box of Pomona's will last for 3 to 5 batches of jam (where one batch equals 5 cups of fruit). Pureed fruit Sugar Lemon juice # tsp. *each* of Optional pectin & calcium Strawberries: 5 c. 7/8 c. 2 Tbsp. 2 tsp. Raspberries: 5 1/2 c. 2/3 c. 2 Tbsp. 2 tsp. Cherries: 5 c. 1/2 c. 2 Tbsp. 1 3/4 tsp. Marionberries: 6 c. 3/4 c. 2 Tbsp. 1 3/4 tsp. Blueberries: 5 c. 1/2 c. 2 Tbsp. 1 1/2 tsp. lemon zest Peaches: 5 c. 1/2 c. 2 Tbsp. 2 tsp. Plums: 5 c. 3/4 c. 2 Tbsp. 2 tsp. Apricots: 5 c. 1/2 c. 2 1/2 Tbsp. 2 1/4 tsp. Pears: 6 c. 1/2 c. 2 1/2 Tbsp. 2 1/2 tsp. 1 tsp. fresh ginger, grated Yield: 4 to 6 cups of jam, depending on conditions.

1.2.4 [Fruit butters in general, and apple butter in particular..] From: Barb Schaller Re cooking and doneness of fruit butters, this from Farm Journal Freezing and Canning Cookbook, Doubleday, 1964: "1). Measure the pulp and sugar into a large kettle; add the salt. Boil rapidly, stirring constantly to prevent scorching. As the butter becomes thick, lower heat to reduce spattering. 2). Add spices and lemon juice, if used. 3) ***Continue cooking until but- ter is thick enough almost to flake off the spoon, or as Grandmother used to say: "Until it is thick enough to spread." Another test for consistency is to pour a tablespoon of the hot butter onto a chilled plate -- if no rim of liquid forms around the edge of the butter, it is ready for canning.*** 4) Pour into hot jars and seal. Process pints and quarts in hot-water bath 10 minutes. That said, let me say this about that: This is not a fast project. Time and patience are everything. I do not bring my pulp to boil over high heat; med- ium high at best, watching and stirring diligently to it won't stick and scorch. Then reduce the heat! A mesh spatter shield is invaluable to me when I do this because the pulp thickens as the liquid evaporates; as the pulp thickens the spattering increases; covering the pan to protect from spattering hinders evaporation. The closer you think you are to "done," the more attention you'll want to give it. Too-fast cooking at too high a heat will caramelize the sugar in the recipe and leave you with something akin to jam. Trust me on this; I've ruined more than one batch of apricot butter in my time. Additionally, I'd process them longer than the 10 minutes, espec- ially if the butter is less than boiling when it's put into the jars -- I had a couple of jars not seal. The butter is dense and takes longer to heat through to ensure the seal. The butter can also be baked (a fine alternative, especially if you're in a cool climate and welcome the warmth of the oven). Pour the seasoned and sweetened pulp into a shallow (9x13 inch pan minimum) pan -- or a shallow roasting pan. Bake at about 325 degrees F until thick, stirring every 20-30 minutes so an evaporation-induced crust doesn't form

on the top. Not as complicated as it might look. Wonderful treat. Worth the effort. Apple Butter Recipe It's what I did. And I actually *measured* things. :-)

* 12 cups apple pulp (I used locally grown Haralsons)
* 3 to 4 cups sugar (begin with 3, I added the 4th to my taste)
* 3 tsp. ground cinnamon
* 1/4 tsp. ground nutmeg
* 1/8 tsp. freshly ground allspice
* 1/2 tsp. ground ginger
* 1/4 tsp. ground cloves (do not overdo cloves; taste can be overwhelming)
* 1/4 cup white vinegar

Make pulp: Core but do not peel apples. Cook slowly with about an inch or two of water added, stirring to prevent sticking. Put through a food mill to make pulp. If you use more water and boil the heck out of them, do drain in a colander to eliminate the extra liquid. Measure pulp into at least a 6-quart dutch oven, stir in remaining ingredients and cook slowly, uncovered, for several hours to desired thickness. Feel free to correct the spices to your taste; adding in cautious amounts. Can in hot, sterilized jars, process in boiling water bath maybe 20 minutes. If my schedule requires it, I make it a two-day project. It sits fine overnight, covered. Use imaginatively: I use as a condiment as often as a bread spread; we like it with roast pork or chops. I swirl it into my cream cheese coffee cake filling. If it's thick enough, fill a cookie with it.

1.2.5. [Conserves] From: Leslie Basel Conserves are multi-fruit preserves, sometimes with nuts and/or raisins. My grandmother once told me that anything more than three different fruits in anything is a waste--you can't taste them all, or they taste like tutti fruitti... But I really like making conserves--you can do almost any combination of fruits, as long as they are acid enough (check the FAQ above for general pHs of different fruits)-- and they're perfect for using up weird amounts of fruit, or cleaning up the leftovers from different jam projects. I suspect that name "conserve" is derived from that little operation. So without further ado, here's my:

Kitchen Sink Conserve 3-4 cup whole strawberries 1 large stalk rhubarb 4 nectarines 3/4 cup raisins 1/2 cup fresh orange juice slivered almonds (optional) sugar Hull, wash, and mash strawberries. Peel and chop rhubarb. I like a very fine chop, as it keeps the rhubarb from becoming dental floss. Pit and chop nectarines. Combine strawberries, rhubarb, nectarines, orange juice, and raisins. Simmer fruit until tender (strawberry bits will not be seen in this), then take off the heat, and measure the amount of fruit/juice. The trick for nearly any conserve recipe: Add sugar to fruit

mixture on a 3/4-1vol:1vol basis. (I got 5 cups of fruit, so I add 4-5 cups of sugar). And if you add a citrus juice (or even a fruit juice) instead of water, you add a little extra acid and pectin. Put fruit/sugar mix on high heat, boil, stir constantly. When it passes the jelly test, add the chopped nuts, stir and jar it up. I put this hot into sterilized pint jars, so I boiling waterbath-processed this for 15 minutes. Hot half pints, do this for 10. (Note, this is for sea level.) If you try this with almonds or any other kind of nut, be stingy with them. Nuts are not acid, so too many will invite spoilage. If you like raisins, add as many as you want. Spices are great, if you have a light touch. Fruits that do not work well in a conserve of this type: Bananas, they get brown. Soft fruits work alright if don't expect them to be intact afterward, otherwise they should be added last, perhaps to float to the top of the jar :-). Figs are tasty in a conserve, but they are borderline acid, so you need extra citric acid or be stingy with them. Citrus works okay *with* a little advance planning; you need to prepare peels like you would in a marmalade (see recipe below). Raw citrus peels are very bitter and icky. Stone fruits work great, I always add at least one into a conserve. And its always great to have a few slightly underripe fruits in the conserve for pectin and acid. So here's a place where you can be creative, and one-up your grandmother. Who knows what family recipe you'll brew up?

1.2.6. [Fruit preserves]

From: edecker@inforamp.net (Eric Decker) Subject: Pear preserves Wash. Cut the pears lengthwise in halves or quarters. Remove stems, core. Peel the sections. Treat pieces against oxidation with a solution of 1 tsp of ascorbic acid per cup of water. Make enough so the effectiveness of the solution is not exhausted. Make a thin or medium syrup according to taste.

Syrups: Thin: 4 cups water to 2 cups sugar Medium: 4 cups water to three cups sugar Heavy: 4 cups water to 4 and 3/4 cups sugar Combine the sugar and water, bring to a boil, skim off the froth as required. If using a sweet pear use thin, medium syrup for a less sweet pear. Simmer the fruit in syrup for 2 minutes. Remove from heat. Remove the pears from the syrup; put the syrup back on to boil. Fill sterile jars with pears leaving 1/2" of headroom. Add boiling syrup, leaving 1/2" of headroom. Wipe down the jar lips with a clean damp cloth. Apply lids and bands finger tight only. Process in Boiling-Water Bath: Pints for 20 minutes, quarts for 25 minutes. These preserves can be enhanced by the addition of whole cloves,

caraway seed or cardamon seed prior to filling with boiling syrup.

1.2.7 [Marmalade]

From: Patricia Hill . My recipe for blood oranges or for any of the citrus fruit marmalades is easy. Citrus marmalade Use lemon, limes, grapefruit, kumquat, oranges, tangerines, ugly fruit, tangelos Mix the fruit if you please or keep separate. Cut the fruit in halves or quarters and add water to barely cover. Simmer for 1 1/2 hours, adding water as needed. Remove the fruit from the water. Cut into thin shreds, chop or however you like it. I like thin shreds and find it is easier for me to do it AFTER cooking. My sister-in-law likes to cut it BEFORE cooking. Add the fruit shreds back into the water. Measure the fruit and water mixture. For every cup you have add 3/4 cup sugar Cook over a hot flame until it reaches the jelly stage. Put in clean jars and seal. After it has jelled, you can add a little flavor. Lime marmalade with a little Club Raki (a licorice flavored liquor) is great. Lemons with a bit of scotch is good. Orange with a little Kirsch. This makes a firm marmalade so you can actually dilute it a little. If you want more flavorings, add them to the pot before it jells. Once we went to the store and bought some of every different type of citrus fruit they had. We cooked each fruit in a separate pot. After cutting we mixed the shreds in all sorts of combinations. We made some chunky and some thin shred. We put all sorts of flavorings in. They were all good.

1.2.8 [Tea jelly.] from Michael Teifel : I made a half litre Earl Grey tea 4 times stronger than normal. And I simply added 500 grams of a commercially available sugar/pectin mixture and followed the instructions for making jelly out of juices. It tastes real good, nearly the same taste of the jelly from the mail order tea shop I tasted before. The next time I will reduce the amount of sugar so that the tea flavour will be stronger. for a second batch: I made 250 ml of green gunpowder tea with mint flavour (4 times stronger, it means 4 times more tea, not 4 times longer brewing). Then I added 150 grams of a 1:2 mixture of the sugar/pectin box (1:2 means that you have more pectin and less sugar in the mixture, so the jelly results in more fruity flavour) and added a few pine nuts. (This tea is my favourite, in Tunisia it is very common drink: chinese green tea with mint and pine nuts.) Then I followed the instructions, and it gave a very good tea jelly with a fresh flavour of mint!

Add 1 TB of lemon juice for each liter.

1.2.9 [Flower jellies]

>From Bess Halle : Basic flower jelly Make an infusion from edible flowers. 1 pint of flowers to 1 pint of boiling water. Most flowers have a bitter

bit where the petal joins the flower so you must cut that part off. I use scissors and just trim the petals of flowers, leaving the points attached. (though once I actually snipped the points off 2 quarts of rose petals.... tedious beyond belief!) 2 C flower infusion 1/4 C lemon juice 4 C sugar 6 oz liquid pectin *optional; few drops food coloring Mix infusion, lemon juice and sugar in stainless steel or enamelware pan. Bring to hard boil you can't stir down. Add liquid pectin and return to hard boil. Boil at this temp. 2 minutes. Pour immediately into hot sterilized jars and seal. Turn jars upside down for 5 minutes and revert [or process for 5 min in waterbath]. Makes 4-4.5 cups of jelly. I've found liquid pectin works better with flowers (and herbs) than the powdered kind. You CAN make jellies with flowers and juice and I often make an apple mint jelly with apple juice and apple mint. My favorite herb combination, though, is lemon mint, made with 1 cup lemon verbena infusion and 1 cup spearmint. I never use the food coloring because I like the pale yellow and gold and pink and ruby colors.

P.S. The word from the wine making group (where I first got the idea to make honeysuckle jelly) is to wash the blossoms first. This is probably a good idea because I made a batch of honeysuckle jelly over the weekend and there was an awful lot of pollen in the flowers. The jelly tasted like honey, btw, and quite good...not at all lemony, but not enough of the actual honeysuckle flavor I was aiming for. I'll probably increase the proportions next time. Here's another rose petal jelly recipe which makes more jelly. 2 quarts rose petals **see note below 2 quarts water 1/4 cup lemon juice 7 cups sugar 6 oz liquid pectin Boil petals in 2 quarts of water with the lid on, till 1/2 liquid is gone. Measure out 3 cups liquid. (save the remaining cup!!) mix with lemon juice and sugar. Bring to rolling boil. Add liquid pectin (this will be 2 packages of the liquid certo brand) and bring back to hard boil. Boil 2 minutes and pour into hot sterilized jars. Seal in preferred manner. I use the little 4 oz jelly jars so that I can give away a lot. This makes about 15 little jars. The remaining cup can be mixed with a 1 cup infusion of a favorite herb like mint or lemon balm and used in the previous recipe. I also boiled a cinnamon stick in with the jelly-making part (not the first boiling of petals) I think because I heard of a restaurant called Cinnamon Rose and the name stuck. Anyway, at first the cinnamon seemed a little strong. A friend said the jelly tasted like the apple pie from heaven. BUT after opening a sealed jar a few days later I DID detect both the rose and the cinnamon flavor. Be sure to discard the cinnamon stick before bottling. **I've used less and I've used more, so the exact proportions probably don't matter. In fact, even when I pick them at night when I get home from work, and they have little scent, cooking them brings it out a lot. Just remember, for a good red color you will need some red roses and also remember.. ..the rose brew will stain your hands, your sink, your clothes!!!

1.2.10 [Canning Cake]

Not Reccomended. Be safe - freeze or "use a recipe which contains enough sugar or alcohol" to inhibit bacteria.

1.2.11 [Canned Bread 101]

The information following is presented as Canned Bread 101. The data is copyrighted as noted. Specific permission has been given for its replication here in RFP FAQ. See Part 1 of RFP FAQ for further details of usage regarding Copyright information in this FAQ.

Special thanks go to Fadi M. Aramouni for providing both the information and permission for inclusion in the RFP FAQ.

---------- begin Canned Bread 101 ----------

Journal of Food Protection, Vol. 57, No. 10, Pages 882-886

Growth of Clostridium sporo genes PA 3679
in Home-Style Canned Quick Breads

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(Received September 10, 1993/Accepted April 4, 1994)

ABSTRACT

The safety of a home-style canned quick bread was investigated using spores of Clostridium sporo genes putrefactive anaerobe (PA) 3679. Baking was done at 177 C for 30, 40 and 50 min, at l91 C for 45, 50 and 55 min, and at 204 C for 40, 45 and 50 min. Products were analyzed for pH, water activity (a) and vacuum level. The microbial quality of the products was determined

before and after baking. Of the products baked at 177 C, some were stored for 90 days at room temperature (23 to 25 C) or in an incubator at 35 C to study their shelf-life. Inoculated and endogenous vegetative cells and their spores were counted before and after baking and after storage using Fungs Double Tube method. Results showed germination of endogenous spores in uninoculated products after baking at 1770C for 30 min and storage at 35 C for 90 days. Survival of inoculated C. sporogenes PA 3679 was detected for all baking and storage treatments. Further work is recommended to determine safe processing procedures for this type of product.

Key Words: Clostridium sporo genes PA 3679, home-canned breads, botulism.

Home-style canned quick breads have been featured in popular magazines and promoted through mail order brochures and specialty shops. They are typically manufactured by small home-based operations and the process consists of oven-baking a batter in a wide mouth glass jar. Once baked, the jars are removed and immediately covered with a two-piece lid. As the product cools, a hermetic seal is created. The jars undergo no further heat treatment and are stored at room temperature until purchase and consumption. Two commercial samples purchased from a local gift shop exhibited pH values of 7.2 and 7.4, and a of 0.95. Such conditions coupled with favorable temperatures and the absence of a chemical preservative could lead to the survival and growth of Clostridium botulinum and production of toxins in the jars.
Dack (4) reported that white bread dough with an initial pH of 5.4 and 37% moisture inoculated with spores of C. botulinum prior to baking and hot sealing developed toxin after 6 months of storage. Although C. botulinum is the most critical microbial hazard in canning, many inoculated pack studies used C. sporo genes PA 3679 as the test organism. Clostridium sporogenes PA 3679 is a spore-forming putrefactive anaerobe whose spores are more heat-resistant than those of C. botulinum and its testing in such studies is safer because this organism is non-pathogenic. The objective of this study was to investigate the safety of a home-style canned quick bread by inoculating the product with spores of C. sporogenes PA 3679 and challenging survival and growth of the organism under different baking treatments and storage conditions.

MATERIALS AND METHODS

Quick bread formulation.

A banana nut bread recipe was adapted from a professional baking book(5). It consisted of pastry flour (700 g), sugar (280 g), baking powder (35 g), baking soda (4 g), salt (9 g),chopped walnuts (175 g), eggs (280 g), banana

(700 g) and shortening (230 g). Dry ingredients were mixed together. All liquid ingredients were combined with the shortening and added to the dry ingredients while mixing in a HobartTM mixer (Hobart Manufacturing Co., Troy, OH). Portions of batter (250 g) were placed in a wide-mouth, pint-size glass jar and assigned to either a non-inoculated or inoculated group. For inoculated samples, the batter was put in a StomacherThi bag and transferred to the room assigned for microbiology work where 1 ml of the spore-inoculum (to be described) was aseptically dded and the bag was stomached for 2 min in the StomacherrM (Tekmar, Cincinnati, OH). After stomaching, the bag was placed back in the jar and was cut to the jar size before baking. Baking the batter in the StomacherrM bag did not result in any change in the temperature profile at the center of the cakes when compared to baking without the StomacherTM bag. The bag remained intact after baking.

Baking treatments and storage conditions.

A preliminary study showed baking at 177 C (350 F) for 30 min and at 204 C (400 F) for 50 min to be respectively the minimum and maximum treatments that would result in an acceptable product. Acceptability, defined as any product that was not underbaked (grayish crust, doughy) or burned (black crust, dry), was determined by a consensus of four taste panelists. Gisslen (5) recommended baking of the product at 1910C (3750F) for about 50 min. However, given the possibility of temperature gauges and human preference as to degree of doneness, different baking treatments with regard to product acceptability were investigated: baking at 1770C for 30, 40 and 50 min, at 191 C for 45, 50 and 55 min and at 204 C for 40, 45 and 50 min. Baking was done in a rotary type Hearth oven (National Manufacturing Co., Lincoln, NE) calibrated with a mercury thermometer and preheated to the desired temperatures. Baking times were measured from the time the oven was equilibrated to the desired temperature. Because use of thermocouples was not possible in the rotary oven, product temperature at the center of the bread was monitored in representative jars by inserting a mercury thermometer in the batter and taking readings through the oven's glass window at 10 min intervals. After baking, the jars were immediately sealed and allowed to cool at room temperature (23 to 25 C). Because of their greater acceptability by preliminary evaluations of taste panelists, samples of products baked at 177 C were stored for 90 days at room temperature (23 to 25 C) or in a LablineTM incubator (Labline Co., Chicago, IL) at 35 C for extended evaluation. The latter storage condition was chosen to mimic extreme summer weather conditions that would result in temperature abuse of the product.

Vacuum level, pH and A,a

Vacuum level inside the jars was measured using a Ametrex U.S. Gauge Division vacuum gauge (Metek, Sellersville, PA). With an AccumetlM pH meter (Fisher Scientific Co., Pittsburgh, PA) final pH of the bread was measured using a suspension of 10 g sample mixed with 90 ml of distilled water. Water activity of the center portion of the bread was measured using an AquaLab Model a~ meter (Decagon Devices, Inc., Pullman, WA). All readings were taken in duplicates.

Microbiological study.

Stock culture and spore harvesting. A stock culture of C. sporogenes PA 3679 American Type Culture Collection (ATCC) 7955 maintained in cooked meat medium (Difco Laboratories, Inc.) was used in this study. The culture was obtained from the Food Microbiology Laboratory culture collection of Kansas State University (Manhattan, KS). One-tenth milliliter of the stock culture was transferred to a tube containing 10 ml of sterile cooked meat medium (Difco) and the tube was placed in an anaerobic jar with GasPak Plus (BBL Microbiology Systems, Cockeysville, MO) and incubated at 37 C for 18 to 20 h. This procedure was repeated three times to insure active growth of viable vegetative cells of C. sporo genes PA 3679. After the third incubation, a loopful of the suspension was streaked onto Tryptose Sulfite Cycloserine (TSC) agar plates (1). The TSC agar consisted of Shahidi-Ferguson-Perfringens agar base (Difco) supplemented with 8% (vol/vol) filter-sterilized solution of D-Cycloserine (400 j.tglml final concentration). Streaked TSC agar plates were placed in an anaerobic jar, which was set as described previously and incubated at 37 C for 18 to 20 h. Following incubation, an isolated colony, typically round, black and smooth, 0.5 to 1.0 mm in diameter, was tested biochemically using the diagnostic kit of RapID ANA II system (Innovative Diagnostic Systems, Inc., Norcross, GA). One isolated colony was also transferred to 10 ml of fresh cooked meat medium in a test tube, which was vortexed for 5 s (high speed). The suspension was then transferred (2 ml/tube) to five tubes containing 10 ml fresh cooked meat medium. These tubes were incubated anaerobically at 37 C for 18 to 20 h then the tubes were removed and kept in refrigerator at 40C as stock culture. With the purified stock culture, spores were harvested according to the method described by Vareltzis et al. (11), in which the stock culture is added to fluid thioglycollate medium (FTG), heated, cooled and then incubated overnight. The FTG medium is then added to the sporulation medium and incubated again for 10 days rather than 7 days as done by Vareltzis et al. (11), since preliminary studies indicated it resulted in higher recovery of spores. Spores were harvested by a series of centrifugation and resuspension steps and kept in freezer. Prior to use they were thawed for 1 to 2 h at room temperature.

Spore titer determination and inoculum preparation. After thawing, spores were homogenized by shaking the bottle up and down about 5 to 8 times. One milliliter of this homogenized spore suspension was then serially diluted in 99 ml sterile phosphate buffer to obtain the desired inoculum level (ca. 106 colony forming units (CFU)Iml) to be used for the inoculated group. The spore titer was determined by serially diluting 1 ml of spores in phosphate buffer. Each dilution was then tested in duplicate using Fungs Double Tube (FDT) method (1). Presence of black colonies in the FDT indicated germination of spores in the plating medium (TSC agar) and such colonies were referred to as viable spores of C. sporo genes PA 3679. One black colony was picked with a needle and transferred in a buffer solution. This solution was then used to identify the colony with a RapID ANA II diagnostic kit (Innovative Diagnostic Systems). Count of viable spores of C. sporogenes PA 3679 was determined during a preliminary study by two detection methods, direct agar plating and FDT, using TSC agar and brain heart infusion agar (BHI) supplemented with 0.05% ferric ammonium citrate and 0.1% sodium sulfite (Difco). The preliminary study showed that TSC agar in the FDT system recovered higher numbers of C. sporogenes PA 3679 and was, therefore, used for enumeration of the organism in this research. If present in the FDT, Clostridium perfringens would also show black colonies, which within the same incubation period are much larger than those formed by C. sporo genes PA 3679 (<1 mm in diameter). Regardless of size, any black colony in the FDT using TSC agar was presumptive Clostridium and since the inoculum was C. sporo genes PA 3679, blackening was associated with this organism in inoculated samples. In non-inoculated samples, blackening was associated with Clostridium-like organisms and biochemical tests using RapID ANA II kit (Innovative Diagnostic Systems) were performed to identify black colonies observed in FDT prepared from non-inoculated samples.

Bread sampling and testing of samples.

Product sampling was done by aseptically removing 25 g of unbaked or baked bread samples and diluting in 225 ml sterile phosphate buffer in a stomacher bag with filter. The sample was stomached for 2 min using a Stomacher 400Th1 (Tekmar). The suspension was serially diluted and 1 ml of each dilution was used for microbial analyses(1,2).

Eight samples were collected before baking and analyzed for their microbial quality. Eight samples were also collected from each baking treatment for microbial analysis. The experiment was replicated twice and all samples were analyzed in duplicates. Samples were either uninoculated or inoculated with spores at a level of I0~ CFU/g and were tested for total aerobic plate count (APC) and C. sporo genes PA 3679

count before and after heat treatment at 177 C (350 F), 191 C (375 F) and 204 C (400 F). After baking, jars were allowed to cool at room temperature for several hours (about 8 h) before sampling and microbial analysis. In the shelf-life study only bread baked at 177 C was stored for 90 days and used to evaluate for APC and C. sporogenes PA 3679. Aerobic microorganisms in the sample were counted using plate count agar (PCA) for APC (2). All agar plates as well as FDT (a self-contained anaerobic system) were incubated aerobically, with PCA plates at 32 C for 48 h (2) and FDT at 37 C for 10 h or longer (1).

RESULTS AND DISCUSSION

Physical and chemical measurements.

The heating profile indicated that temperatures at the centers of the breads reached 106, 107 and 108 C for baking temperature set at 177, 191 and 204 C, respectively, after 50 min in the preheated oven (Table 1). Although temperature increased at a faster rate for the more drastic baking treatments, final internal temperatures were not significantly different ($P>0.05$). Vacuum level in the jars averaged 25.0 min of Hg for all treatments; a ranged from 0.95 to 0.93 and pH from 7.6 to 7.9 (Table 2).

TABLE 1. Heating profile at center of quick breads*.

Oven temperature** (0C)	Batter temperature*** (0C)	Baking time (min)
34		10
70		20
177		94
30		
106	40	
106	50	
46		10
78		20
191		96
30		
106	40	
107	50	
65		10

94 20
204 101
30

106 40

108 50

* Breads baked in pint-size, wide-mouth glass jars.
** Rotary type Hearth oven, preheated to designated temperature.
*** Average of three readings.

TABLE 2. pH and a of quick breads.

Oven temperature**(0C)	pH*	a **	Baking time (min)
			7.7
0.95	30		
177		7.9	
0.95	40		
			7.7
0.95	50		
			7.7
0.94	30		
191		7.9	
0.94	40		
			7.7
0.94	50		
			7.8
0.94	30		
204		7.7	
0.93	40		
			7.6
0.93	50		

* 10 g sample mixed with 90 ml of distilled water and the pH read using an AccumetTM pH meter.
** Small center piece section of a baked bread read in an AquaLab, Decagon a~ meter.

Microbiological study before storage.

Microbial quality of samples before baking. Uninoculated and inoculated samples with APC of 4.08 and 4.24 log10 CFU/g, respectively, were not

significantly different (P>0.05). Before baking, black colonies were not detected in uninoculated samples. However, black colonies were detected in inoculated samples, which had C. sporogenes PA 3679 at level of 3.23 log10 CFU/g, immediately after inoculation. Microbial quality of samples after baking and before storage. After baking, uninoculated and inoculated samples had APC at non-detectable levels. Similarly, after storage at room temperature and at 35 C for 90 days, counts were still non-detectable by our methods (data not shown). These results indicated that vegetative cells of non-sporeforming microorganisms were either irreversibly injured or totally destroyed by the baking treatments applied. Levels of C. sporogenes PA 3679 in bread samples after baking. In uninoculated samples, black colonies were not detected before baking. Following all baking treatments, no black colonies were detected in any of the uninoculated samples either (Table 3), suggesting no activation of endogenous spores of clostridia prior to storage.

In inoculated products, counts of C. sporo genes PA 3679 were significantly reduced (p>O.OS) for all baking treatments with the exception of 191 C for 45 min (Table 3). Reductions from the initial load of 3.23 log10 CFU/g generally ranged from 1.24 to 1.52 log, with the 177 C, 50 min treatment unexpectedly resulting in the lowest count (<1 log10CFUfg). The reductions in levels of C. sporo genes PA 3679 were not significantly different (P>0.05) among the baking treatments of 177 C for 30 and 40 min, of 191 C for 50 and 55 min and of 204 C for 40, 45 and 50 min. These data seem to support the heating profile study at the center of breads, which showed no significant difference (P>0.05) among the ultimate internal temperatures after baking treatments. Inconsistencies in survival rate of spores for different baking treatments (higher counts after 50 min of baking at 204 C than at 177 C) could be partly due to errors in enumeration, because of the nonhomogeneous nature of the product or to faster setting of the dough at higher baking temperatures, providing better protection to the spores from heat effects in the surrounding environment.

Although these treatments reduced the level of inoculated spores of C. sporo genes PA 3679, they did not completely destroy them in the baked products. Whether or not endogenous spores in the products were totally destroyed by the temperature-time combinations used in this study was not certain. Storage studies should elucidate the existence of surviving spores. Only uninoculated and inoculated products baked at the low temperature (177 C) were further investigated during the storage study, because these products were more desirable from a consumer acceptance standpoint.

Microbiological study after storage.

Levels of Clostridium-like organisms and C. sporogenes PA 3679 in bread samples baked at 177 C and stored for 90 days at room temperature (RT).

Uninoculated products baked at 177 C for 30, 40 and so min (Table 4) initially contained undetectable levels of Clostridium-like organisms. When stored for 90 days at RT the levels of Clostridium -like organisms were still undetectable (Table 4).
Therefore, with respect to C. botulinum and other sporeformers, these products would be safe for human consumption if the initial spore levels are low and if they are stored at room temperature (23 to 25 C) or lower for no longer than 90 days.

Clostridium sporo genes PA 3679 were detected in inoculated products stored at RT for 90 days and counts were 2.29, 1.71 and <1 log10 CFU/g in products baked at 177 C for 30, 40 and 50 min, respectively, (Table 4). If present in home-canned quick breads at the inoculation level (3.23 log10 CFU/g), endogenous spores will resist low temperature baking. The significance of this finding on product safety needs to be further investigated.

Levels of C. sporogenes PA 3679 in bread samples baked at 177 C and stored for 90 days in the incubator at 35 C

Uninoculated samples. Clostridium-like organisms counts obtained for uninoculated products stored in the incubator at 35 C were significantly higher ($P>0.05$) for the 30 min baking treatment (2.19 log10 CFU/g) than counts obtained for similar products stored at RT (Table 4). Several gassy jars (about 50%) from the same treatment (177 C for 30 min) were found and had to be autoclaved and discarded before 90 days. Counts were determined only using the remaining jars and may not totally reflect actual levels of C. sporo genes PA 3679 in these products. For uninoculated products baked at 177 C for 40 and 50 min, when stored for 90 days in the incubator at 35 C the levels of Clostridium-like organisms had remained at non-detectable levels. These data show that 35 C was more favorable to repair and germination of injured endogenous vegetative cells or their spores.
This incubation temperature ranges in the optimum growth temperature range (35 to 42 C) for C. sporo genes PA 3679. Product prepared and stored under these conditions may not be safe to consume. Gombas (6) reported that low or inefficient heat treatments often result in survival of spores of clostridia, and their subsequent germination and growth in food systems.

Inoculated samples. As expected, most inoculated products stored in the incubator at 35 C were gassy and spoiled even faster than similar products stored at room temperature. Several gassy jars, from the 30 (about 80%) and 40 (about 75%) min treatment, which could not be kept safely until

end of storage period were autoclaved and discarded. Therefore, counts were determined only using the remaining jars and may not totally reflect actual levels of C. sporo genes PA 3679 in these products.

In inoculated products, counts of C. sporo genes PA 3679 were <1 log10 CFU/g after baking at 177 C for 50 min (Table 4). Counts of C. sporo genes PA 3679 remained at levels of <1 log10 CFUIg when stored for 90 days at room temperature and 35 C, respectively, (Table 4). The ability of spores to repair is related to factors, such as composition, pH, and a of the medium (6). These factors are also dependent upon the intensity of heat injury, structure of spores and storage conditions, particularly storage temperature and sodium chloride (NaCl) (6,7). Heat resistance of spores can be affected by various factors including spore structure, composition and pH of the sporulation medium (6,7,10).

TABLE 3. Counts (log10 CFU/g) of viable vegetative cells of C. sporogenes PA 3679 in bread samples before and after baking.

Samples	Before baking	After baking	
Baking temp.	177 C	191 C	204 C
Baking time (min)	30 40 50	45 50 55	40 45 50
Uninoculated	<1 <1 <1	<1 <1 <1	<1 <1 <1
Inoculated			
	3.23a		
	1.99c 1.77c <1		
		2.99a 2.21c 1.75c	
			1.83c 1.99c 1.71c

Eight samples studied; two replicates; FDT plating in duplicates.
a.b.c Means with same superscripts are not statistically different (P>0.05).

TABLE 4. Counts (log10 CFU/g) of viable vegetative cell of C. sporogenes PA 3679 of bread baked at 177 C and stored for 90 days at RT and at 35 C.

	Uninoculated			
Bake Time	Before bake	After bake	After storage	
		RT	35 C	
30 min	<1	<1	<1	2.19c
40 min	<1	<1	<1	<1
50 min	<1	<1	<1	<1

Bake Time	Innoculated Before Bake	After Bake RT	After Bake 35 C	After Storage
30 min	3.23a	1.99b	2.29b	1.73b
40min	3.23a	1.77b	1.71c	2.59b
50 min	3.23a	<1	<1	<1

Eight samples studies; two replicates~ plating or FDT in duplicates.
a,b,c Means with same superscripts are not significantly different (P>0.05).

From a food safety standpoint, results of this study showed that inadequate heat treatment (177 C for 30 min) of this type of product coupled with favorable storage conditions (35 C for 90 days) could lead to a health risk from consumption of these foods. The significance of the survival of inoculated C. sporo genes PA 3679 for all baking and storage treatments evaluated needs to be further investigated. Baking at a temperature of 177 C, even though resulted in highly desirable product appearance, did not result in a safe product (totally free of inoculated Clostridium after storage) for human consumption, especially when baked products were stored under conditions (35 C), which favor spore germination. High baking temperatures (191 and 204 C) were not usually desirable from a consumer acceptance standpoint because these temperatures affected the texture and appearance of the products. During these treatments, excessive crust formation occurred after 55 min baking and this would affect consumer's acceptability, even though desirable to enhance the microbial quality of the products. The standard procedure for home-canned quick bread (5) recommends baking at 191 C for 50 min. This treatment resulted in non-detectable levels of sporeformers in uninoculated breads after 8 h of storage at room temperature. An extended storage study of this and other temperature-time combinations will be of critical interest to determine safer baking and storage procedures for this type of product.

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---------- end of Canned bread 101 ----------

More on Canned Bread ....

From: Bruce Carpenter

My day gig is as a chemist and I looked very closely at the study that everyone is quoting. You must read all of it very closely. They found no detectable bateria after 3 months in a quick bread in a jar. The only time they did find bateria was when they put it in there to start with. The only logical conclusion from this is that the processing does not kill all of the harmfull bateria if it is present to start with. This is only one study and the conclusion the researchers reached is that more study was needed.

So - it is dangerous ? - probably not very if you start with clean high quality ingredients. Is it smart ?? probably not - the parameters seem to be quite tight and the risk possibly high for such a small return.

Since I save so much freezer space by canning everything else in sight all of which have excellent track records and safety guidelines) I choose to put all of my breads up in the freezer and thus eliminate any risk.

1.3. GENERAL INGREDIENT QUESTIONS

1.3.1 [why do some recipes call for a little butter/margarine?]

From: Anna Welborne. My dad always told me it kept the foam quantity down. That seems to be pretty much true, as I tried leaving it out of the strawberries this last summer, and had more foam. [BTW, for a beginner, cutting down on the foam is helpful. Less foamy jam gives a more accurate reading for your candy thermometer; too much foam is hard for a beginner to control.]

From: Eric Decker. Let the jam rest after cooking. Now the scum can be easily skimmed off. Adding butter will foul the flavour to a degree you may or may not like.

1.3.2 [Sugar]

Unless specified otherwise, sugar is granulated sugar. Dissolves easily, easy to pour and measure, and all the recipes are calibrated to its volume to weight.

prograftaker@hotmail.com (Prograf) writes:

what are the precautions I should take when storing white sugar for long periods of time? Is there a way to keep it from getting hard? I've checked the FAQ but couldn't find any information about it. [thank you for your question. The info is NOW in the FAQ - ED]

For longggggg term storage of sugar you can use honey rather than refined sugar. Honey needs to be stored in food grade poly pails. Guard against water penetration. If you wish to keep white sugar from lumping you will need to keep it absolutely and perfectly sealed from moisture. Use poly food pails and seal well to keep moisture out. Sugar has an immense affinity for a water molecule.

If you wish the flavour of refined white sugar there is another way. Make a 50% solution of sugar (use filtered or distilled water) and bottle it off. Yeah I know it is sugar but if you want to preserve it

for a long time you will need a vacuum. Oxidized sugar solution is yucky. You should Pressure Can it to exhaust the jar. 50% sugar solution doesn't need pressure but by using a pressure canner you can get the high vacuum that BWB cannot produce. For shorter term storage you can store 50% sugar solution in gallon bottles of the type used for laboratory reagents. Typically the glass is dark brown [mandatory imho] and the stopper has a plastic seal [highly recommended] not cardboard.

Using a funnel, fill right up to the narrow neck. Leave at least 1 inch for expansion. Make sure there is no sugar solution around the rim - wipe it with a clean damp cloth to be sure. The stoppers are equally clean and used straight from a pot of lukewarm water. Apply the stopper tight. Store in a cool, dry dark place.

How to get a 50% solution?

Weight of sugar and water to make one gallon.

US gallons:
To make a 50% solution put 1,892 grams of sugar into a pot with 3,785 grams of water.

Imperial gallons

To make a 50% solution put 2,272 grams of sugar in a pot with 4,545 grams of water.

Note:

It will be more than one gallon but by working this way you get the correct solution. You WILL need to heat the solution to get that much sugar to dissolve. Do not overheat or you will scorch the sugar and induce a bad taste which will magnify with time in storage.

The idea behind making a defined solution is you know exactly its strength which will allow using it in nearly any recipe.

1.3.4 [I need some good sources for pectin]

Bulk pectins, low sugar pectins, citric acid, from Dirk W. Howard : Pacific Pectin Products/ P.O. Box 2422/ 40179 Enterprise Dr., 7B-D/ Oakhurst, CA 93644 (209) 683-0303. Low sugar pectin, from Sandy Fifer : Pomona's Universal Pectin/ Workstead Industries/ P.O. Box 1083/ Greenfield, MA 01302 (413) 772-6816. Another source for bulk pectin, from both Zlotka and Kai : Home Canning Supply & Specialties/ PO Box 1158/ Ramona,

California 92065 (619) 788-0520 or FAX (619) 789-4745. 1 (800) 354-4070 for orders.

1.3.5 [Where can I find me some citric acid?] From Jeff Benjamin , rec.food.baking: If there's a home brewing shop in your neck of the woods, try there. From Joel Ehrlich , rec.food.baking: King Arthur's Flour. Most places which sell it for baking identify it as "Sour Salt". From several in rec.food.preserving: Safeway. Food Lion. Ask around.

1.3.6 {Where can I find Clear Gel/Jel A?]
>From Carol Nelson : Here are some sources for Clear Jel in western Oregon. I have no idea if they will mail order, but it won't hurt to give them a call. Our local Extension offices sell Clear Jel for $2.00/pound for an idea on price. Captain Albert's Good Things/ 254 Commercial/ Salem, Or (503) 364-6511 Friedman's Microwave Store/ 1120 Lancaster Dr NE/ Salem, Or 364-0538 or 1-888-380-4372 Burrow's Country Store/ 635 Wallace Rd NE/ Salem, Or (503) 585-2898

1.3.6 - [How do I make and use homemade pectin? aka pectin 101]

Putting Food By so lovingly know as PFB in RFP has the answers here.

If you are serious about preserving you do owe yourself a copy of PFB. If you can afford only one preserving book this is it. It is also known in rec.food.preserving with good reason as "the Bible of food preserving".

"Pectin is highest in lightly underripe fruit, and diminishes as the fruit becomes ripe; overripe fruit, lacking adequate pectin of its own, is responsible for a good deal of runny jams and jelly.

...

This natural pectin in the fruit can be activated only by cooking -- but COOKING QUICKLY, both in heating the fruit to help start the juice, and later when juice or pulp is boiled together with the sugar. And TOO-SLOW COOKING or BOILING TOO LONG, can reduce the gelling properties of the pectin, whether natural or not.

...

Testing for pectin content. There are several tests, but the simplest one uses ready-to-hand materials. In a cup, stir together 1 teaspoon cooked fruit juice with 1 tablespoon non-methyl alcohol. No extra pectin is needed if the juice forms one big clot that can be picked up with a fork. If the fruit is too low in pectin, it will make several small daubs that do not clump together. DON'T EVER TASTE THE SAMPLES.

Homemade Liquid Pectin

Liquid pectin is especially helpful in making peach, pear, strawberry, or those other jellies whose fruit is low in pectin.

Four to 6 tablespoons of homemade pectin for every 1 cup of prepared juice should give a good gel: but experiment! These pectins can be frozen or canned for future use. To can, ladle hot into hot [sterile - ED] jars, leaving 1/2 inch of headroom; process at a simmer, 185F/85C, for 15 minutes. remove from canner, cool upright and naturally.

Crab Apple Pectin

2 pounds sliced unpeeled crabapples
3 cups water

Simmer, stirring, for 30-40 minutes adding water as needed. Plop into colander lined with one layer of cheesecloth [or muslim - ED] and set over a bowl; press to force the juices. To clear, heat the collected juice and pour through a stout jelly bag that has been moistened in hot water. The result is the pectin you will
can, or freeze, or use right away.

Tart Apple Pectin

4 pounds sliced apples with peels and cores.
8 cups water

Simmer, little stirring needed, for three (3) minutes. Press apples through a sieve to remove cores, etc. Return liquid to a heavy kettle [or use a heavy wide mouth pot to enhance reduction] to cook briskly, [and quickly] stirring, until volume is reduced to one-half. Clarify by pouring though a stout jelly bag that has been moistened. Use, can, or freeze as above.

1.3.7 - [What can I do with all these peels and cores - the waste?]

Make pectin. Use as few seeds as possible and crush none to preclude ingesting alkaloid and cyanide compounds which are present in lima bean, citrus and apples seeds.

The pomace from apple crushing / pressing can be used to generate cider vinegar.

Compost is a great way to solve the by-product problem. Your garden will benefit enormously in the years to come. Do make sure the compost works fully so that the seeds are digested. Add a sprinkle of powdered lime to each layer in the compost heap to assure strong action.

--

Ivan Weiss has some good words:

I don't mean to get into an off-topic thread, but it is inconceivable that there would be enough pesticide residue in any fruit peels to withstand a proper composting process. I can tell you this authoritatively from five years of annual inspections by the Washington state Department of Agriculture for certification as an organic grower. I compost anything that will rot (within reason), and the state, which takes a whole lot of core samples, has never found trace #1 of any pesticides on my place.

1.4 GENERAL EQUIPMENT QUESTIONS

1.4.1 [Don't you need a lot of stuff?]

If you cook, you probably already have most of the stuff that you need to can (jar) high-acid foods. Basically, you need canning jars and 2-piece lids (lids and rings), a large kettle or stock pot that you can boil water in, several saucepans, measuring cups and spoons, light tongs (to pick up the lids and rings), ladles, stirring spoons (stainless steel the best), an accurate timer, clean towels, a cake rack, and canning tongs. As you get more involved, other helpful tools are: canning funnel, clip-on candy thermometer, lid lifter (a plastic rod with a magnet at the end of it), boiling waterbath canner, preserving pan, and a pressure canner (not a cooker). 2-piece jars can be found in the grocery, supermarket, and

hardware stores, while canners, canning tongs, jar lifters, and canning funnels can be gotten at the local hardware store (or Walmart). Lots of equipment can also be obtained at yard sales, check out the Specific Equipment Question section for more information. What you really need is a desire to can food, and a bit of a perfectionist streak. Carelessness, disorganization, and inattention cause most problems.

* * * and a stove that can do the job:

From Robb (rd39462@earthlink.net)
Let's first say that there are probably as many preferences for gas or electric as there are cooks who truly utilize their equipment.

That said, my own personal preference is ALL electric. My current configuration is a glass top cooking surface containing two traditional underglass coils and two quartz-halogen units. Newer glass top units are far more responsive to rapid control changes than their predecessors. The quartz-halogen units are virtually "instant-on/instant-off". All four of my surface units are capable of bringing a stockpot of liquid to a boil more quickly than the average home gas range, discounting the ultra-high BTU output of commercial or semi-commercial units. I also like the glass enclosed surface units because they contribute less heat to the air in the kitchen, keep the bottoms of all cooking vessels as clean as possible, and are infinitely easier to care for than the myriad parts of any gas range, regardless of quality or cost. In short, it's a terrific pleasure to cook and clean up after a meal. I will admit that complete cooldown of the cooktop is somewhat longer than gas, but that factor doesn't bother me. By the time we've eaten our meal, the cooktop is ready for cleaning.

Electric ovens are frequently noted for having more accurate temperature control with less fluctuation. Because they are sealed, they also contribute far less heat to the kitchen area than their gas counterparts. One advantage I particularly like is that food of any kind has less of a tendency to dry out than it does in a gas oven. Many professional bakers prefer electric convection ovens for the above features as well as the temperature stability throughout the entire oven. I've read that there are sometimes hot spots in the gas models. While I'm not at all fearful of gas ovens, my preference for performance is decidedly for electric. In conjunction with that, you might also consider the addition of a warming oven (less space than two wall ovens, or could be mounted under your cooktop), which I have found particularly helpful in maintaining some completed dishes while continuing to cook those that require more time.

If I had the room, one concession to gas I would certainly make is including a down-draft gas grill. Nothing beats the flavor of flame grilling.

1.4.3 [What's a preserving pan?]

A wide heavy-bottomed pan but with relatively shallow sides.

No longer recommended. Use a BWB canner for thorough heating.

1.4.4 [My grandmother always reused commercial jars and sealed her jars using paraffin. Should I do this too?]

Nothing against your grandmother, but usually you don't want to use "one-trip" commercial jars for canning. Sealing jars with paraffin is also counterindicated, because mold and other spoilers can slip in between the paraffin and the side of the jar. Even a common trick of turning the jar upside down to "sterilize" the top is not advised. [More on this below.] (Use a boiling waterbath for about 5-10 minutes instead.) Food preserving technique "rules" tend to change every few years, due to new knowledge about microbiology and mycology, and due to rigorous testing of food preservation recipes and techniques by many state extension services. Keep up to date!

1.4.5 [Can I invert my jars instead of using that nasty waterbath thing? (Nope).]

From: edecker@inforamp.net (Eric Decker) PFB (Putting Food By) says: "and NEVER invert processed jars in the mistaken idea that you're helping the seal - quite the contrary!" Page 264 of PFB, 4th edition debunks (in my opinion) the 1/8" Inversion theory. My comments will be indicated as [ED] "Unsaid in the news release but voiced by staff responding to telephoned queries to the GF Consumer Center in White Plains, New York, the benefits are that the jam/jelly - being still at a temperature to destroy spoiler micro-organisms - will sterilize the underside of the sealing disk, and the little amount of air trapped under the lid. [How filthy are the lids and jars before use? E.D.] A vacuum can form if the jars are hot and the contents are about 165F/ 74C. But it won't be a STRONG vacuum, because any amount of air left in the jar will invite growth of mould eventually - even though the jar is technically sealed. While a vacuum formed for us at PFB using the "inversion" method, the "inversion" vacuum was not so strong as the vacuum seal on the B-W treated jars. This fact is a reminder that the "finishing" Boiling-Water bath was welcomed by scientists in the South, to counteract heat and humidity of storage in the region; and soon it was adopted for dryer and more temperate climates. [I'd vouch for this: I've canned in Seattle, where seals

formed easily, and in Tucson and North Carolina, where the seals took their own sweet time in forming. Give me that finishing waterbath every time-- LEB.] At the same time, food scientists determined that 5 minutes in a B-W bath was adequate (instead of a longer time advocated earlier) to strengthen the seal and drive air from the headroom, and sanitize the surfaces where micro-organisms could have lit. Presumably the reason for standing the jars on their heads is to hold the hot contents against the head and the sealing disk to equal the action of the 5 minute B-W Bath. A further help would be to deal with floating fruit as the medium gels; turned back upright, the contents would shake down by themselves. The same results can be got by giving the jars a twirl several times after they're set aside to cool upright after their bath." (Note: in filing and capping the jars, we at PFB must have left the bands a bit loose. After we inverted it, one jar spurted hot, hot jelly over a hand in a mean scald. This indirect hazard can also make "inversion" less than foolproof.) [Since the writers of PFB know how to tighten a band properly, if bands have to be applied that tight, deformation of the gum is almost certain unless the lids were applied without a sterilization process which softens the gum. E.D.] "PFB is not gainsaying General Foods just to be tiresome; we, too, used to advocate the quick "inversion" with almost non-existent headroom - (though never setting the jars upside-down, regarding this practice as harking back too far to old-time ways with preserving) - so we reverse our own recommendations, too.

Postscript: extension food scientists whose work we admire have expressed their worries over the "inversion" technique used at high altitudes and they are against it.

Post-Postscript: General Foods shows fairness in their news release in saying they will continue to mention B-W Bath method as an alternative on all their printed materials." [Conclusion: I feel it gives a false security to the user of the "inversion" method. Neophytes especially are at risk with this method for they do not have the experience to make valid food judgements. It is far better then, to master the basic proven techniques that work under all circumstances. Safe, reliable canning is more of a procedure than just a recipe - ED]

1.4.6 [The dishwasher sterilizes jars, right? (Nope)]

An argument against thinking the dishwasher sterilizes, paraphrased from Sandy Fifer : The water in the dishwasher is only as hot as the hot water setting in your water heater. Most are set at power saver settings, 130F or so, hottest settings are at 145F. Unless you set your water heater to 212F, you're deluding yourself.

And from Eric Decker : The typical dishwasher has an accumulation of crud in the bottom that you don't even know is there. Unless the bottom spray device is removed you have not seen the scraps of food which have not yet dissipated to nothingness and passed through the filter. The dishwasher is not a suitable device for preparing canning jars for use unless one adds an active anti-germ agent such as chlorox [bleach]. Develop good habits. The processes for sterilization of jar and lid must be inviolable and independent of the canning process itself. My grandmother didn't have a dishwasher so she scrubbed her bottles in a hot lye solution, rinsed them in soft running water, then plucked each one of them from a pot of simmering water to use immediately. It may seem silly to iterate it but she always put the mouth of the jar to the bottom - the inside was sealed from the outside and kept full of steam. Talk about a simple way to maintain sterility!

[Since you have to use your boiling waterbath, I wash, then boil jars, hold them when I need them, then I have a ready 2/3 canner of hot boiling water. --LEB]

1.4.7 [Can I use unlined copper pots in preserving?]

Sue Harris wrote:

I have recently seen some unlined "copper jam pans" for sale, supposedly to be used in making jam. I am wondering if anyone here has had any experience with these - - are they safe? I thought that unlined copper reacted with acidic foods (which fruit jam certainly would be!).

Arno Martens replied:

I always thought copper MUST be tinned (led, cadmium and antimony free) before it could be used for ANY food, liquid or solid.

On Food and Cooking, Harold McGee
"In 1753 Sweden outlawed the used of copper (unlined is meant) cooking pots in its armed service. In the early 19Th century Britain issued health warnings of the health hazards posed by pickles, beer, bakery products and candies that had been prepared in copper vessels.

Copper About 1/10 gram of this element is incorporated into the body, with the highest concentrations in the liver and brain. It plays a role in the formation of hemoglobin and of phospholids, an is also involved in bone development and energy production. Organ meats, shellfish, grains, and most other seeds are good sources. Dietary deficiency of copper is rare, and excessive intake can cause damage to the liver, kidney, and

brain. For this reason, and because copper metal readily reacts with many foods, the use of unlined copper utensils in not recommended."

Eric writes:

Consider that canned foods may be eaten by persons on medication. This presents a great potential for unwanted, unknown and possibly very dangerous side effects.

Certainly a copper load uptaken by a child from food prepared in an un-lined copper pot would be more toxic than the same amount to an adult. No doubt the symptoms in that child would be never be seen as copper poisoning but would be called colic, stubborn or something else. In the middle aged and older adult the degeneration from accumulation of copper would be seen as aging, the effects of having lived life of consumption or simple dementia.
Live long, live well - use utensils which are safe.

1.4.8 - Can I use a propane "Cajun Cooker" style burner for canning?

Ross Reid wrote:

There are various makes of propane cookers on the market but they basically fall into two types. There is a "ring" style burner and a "jet" style burner. They are available with various Btu/hr ratings, right up to 200,000+ Btu/hr. The "ring" burner style normally falls into the lower end of the range. I have one of each but, the "ring" burner is the one I use almost exclusively. It has an input rating of 68,000 Btu/hr. The average kitchen range surface burner runs from 8,000 to 12,000 Btu/hr so you can see the advantage of the outdoor propane cooker in this respect. Flame control on the "ring" style burner is excellent, from very low for maintaining a nice simmer right up to a very energetic full rolling boil. Ring burners also make far more efficient use of propane and, a big plus, they are very quiet in use.

My "jet" burner is rated at 135,000 Btu/hr but, its flame is much harder to control. Trying to maintain a nice gentle simmer is impossible. It is far less efficient with respect to propane use and, if operated anywhere near full output it sounds similar to an F-18 ;-(.

If you go shopping for a burner, it is quite easy to tell the two types apart. The "ring" style is just like its name, the burner itself is a ring, (sometimes more like a starfish), about 8 inches in diameter with

upwards of 100 small holes. They usually fall in the range of 35,000 to 70,000 Btu/hr ratings.

The burner in a "jet" style is only about 3 or 4 inches in diameter and has a cast iron flame diffuser in the centre. This diffuser can best be described as a multi-tiny-pointed star, usually with one screw in the centre to hold it in place. These are the ones that can run up over 200,000 Btu/hr ratings.

I purchased my ring-style burner at a home improvement outlet here in town called The Building Box. It was CDN $49.97 complete with regulator and hose. The name plate on the unit lists the manufacturer as:
S.R. Potten Limited,
1645-50th Avenue,
Lachine, Quebec, Canada H8T 3C8
Phone 1-800-667-7313

Zxcvbob (not an anonymous name, per se - Bob's particulars is known to this FAQ Maintainer) wrote:

In a welding class I took in college, I learned to only crack open the valve on compressed fuel welding tanks, so you can shut off the valve quickly in case of an accident. This would be good advice when working with portable propane tanks for operating these "Cajun Cooker" burners. (Valves on high pressure non-fuel tanks, like oxygen, nitrogen, 3000 psi air, carbon dioxide, are opened all the way becuase the valve has a second seat that seals the packing when the valve is fully opened to prevent a slow leak).

Best regards,
Bob

P.S. Butane has about twice the BTU rating per pound as propane, so if you can buy butane instead of propane for summer use, it is usually a good deal. In cold weather, butane does not have enough vapor pressure to be useful.

1.5.1 [What about zinc rings, rubber sealed jars, and other great, but antique, canning equipment?] A great question. Check out the answer under Specific Equipment Questions.

1.5.2 [Ball or Kerr?] People have used both, and people have had problems with either. In other words, whichever works for you. from Wendy Milner :

Canning jars such as those made by Kerr or by Ball, have special two-piece lids. You should only use lids and jars made by the same company. While in most cases you will get a seal when mixing brands, it is not guaranteed. Additionally, if you are using an oil mixture in your recipe do not use Kerr lids as the sealing compound on the lids has been shown to loose its effectiveness as the oil seeps into it. [As of 3/96, the point is moot. Ball bought out both Bernardin and Kerr. Soon the lid gum composition and amounts on the lid will be similar.]

[1998 - the Kerr lids and Bernardin are still different in use]

1.5.3 [Rings on the jar, or off?]
Pros and cons of each side:
Pro ring: "looks" more natural, secures the lid if you are mailing canning jars or storing leftovers in the refrigerator. I like the ring on when I mail/give something. [Absolutely - there must be some _insurance_ the lid will not be loosened with the result of untold ruination - ED]

Con ring: can reuse ring quickly, rings don't rust on jar, doesn't hide dirty threads or a weak seal. Other ring facts: rings have to be off if the canned good is to be judged at a county/state fair. Rings shouldn't be removed until the seal is allowed to fully develop, about 12-24 hrs. Gamut of opinions: From edecker@inforamp.net (Eric Decker) ... "the best canners will NEVER store food with bands on". It is a point of pride with those canners that their process does not need "nails and glue" to maintain its integrity. Get thee to an Amish or Mennonite food/bake sale... Yes, removing bands is the default condition in serious canning. Heck my grandmother canned a lot of meat and fish. Never did I see a banded jar in her cellar. Take a peek in my cellar: I have bottles of fruit in alcohol that have been there since 1986 without bands. sandy@chinook.halcyon.com (Sandy Fifer) wrote: What's all the hubbub about leaving the bands on after canning? When I'm done canning my jam I remove the bands, wash the jars (sometimes they're sticky from some jam leaking into the canning water), dry them, test the seal by lifting by the lid, and then loosely replace the bands. Once the jar is opened you need the band to seal it anyway, don't you? And don't you give a band with each jar when you're giving the jars away? And when I'm done with the jam I wash the jar and store it with the band. All of you who remove the bands--where do they spend the winter? From: adhdmd@scc-uky.campus.mci.net (Jackee) After our canned goods have sealed we always remove the bands, wash and use again. My father says that was what his grandmother always did, so we just do the same. They did it because they were dirt poor, why we do I am not sure. From: jpnan@prairienet.org (Jean P Nance) I find that removing the screw caps, washing them, and storing them dry pre- vents rust. It seems if I leave them on, they are much more apt to rust and rust interferes with a seal. Rust and corrosion are especially bad in rings on pickles, where some

of the acid seems to seep out and collect on the ring.

1.5.4 [What if I don't hear a pop from my jars?] [And is there a way to be sure they are sealed since I didn't hear that magic noise? --Nancy Delly >From George Shirley < >: Nancy: Be sure the center of the lid is depressed, generally that means they are sealed unless some mean person pushed them all down while you weren't looking. I've found that if the lid didn't seal it will usually fall off when you remove the band, but is sealed if the center is depressed. I don't have time to listen to each individual jar. >From Mary Delamater <>: My jars often don't pop, so I just check to see if the lids are concave. It usually happens pretty quickly after water bathing. Also, if I'm not sure, sometimes I will remove the ring and hold the jar by the lid--if it stays on, it's sealed! (Be sure to put your other hand under the jar in case it is not sealed, or you will have a big mess to clean up :-))

1.5.5 [I'm really cheap. How can I reuse my canning lids?] Penny-wise and pound-foolish. The botulism antiserum shot costs a *lot* more than the $10-$20 cost of a few dozen lids. As a public service, from the home office in Grand Rapids MI, the top ten Things You Can Do With Old Canning Lids.

10. Windchimes
9. Coasters for the vacation house
8. Really boring mobiles
7. Palm protectors for smashing garlic cloves
6. Train your pet Chihuahua to catch teeny metal frisbees
5. 2 canning lids + 1 HD disk = yummy sandwich for your favorite USENET FAQ maintainer
4. With tin snips, create several dollhouse-sized cookie sheets
3. Sharpen the edges, make the business end of a pizza cutter
2. Glue several canning lids into 1 slinky to contact those pesky Venusians
1. Several hundred canning lids, stitched together make the perfect dress for your Oscar acceptance speech... (those brass ones look great, much better than AMEX cards!)

Seriously, there are some things you can do with old canning lids. You might not realize this, but lids and the mouths of jars/cans are of a fairly standard size. The Kerr lids for the narrow neck pints/half pints fit many commercial jars, like spaghetti sauce and mayonnaise jars, even those medium size salsa jars. I've found that the wide mouth ones fit large tomato sauce cans. It means that if you store dried peas, lentils, beans, pasta, sugars, flours, nuts, seeds, your dried vegetables, dried fruit, jerky, dried herbs, fruit leather, etc. in reused commercial glass jars, you always have a lid. Poke many large holes in an old canning lid, use the lid/ring/jar as a jar strainer for bean and alfalfa sprouts. If you're like

me, and you cut the can lid off completely but you don't use all the contents, you still always have a lid. If your jars have great seals, and you have to completely des- troy the lid of a particular home-processed can, you've still got a spare lid when you put it in the refrigerator. If your SO has a workshop, and organ- izes screws, nails, loose change, spare RAM chips, matches, etc in glass jars, your SO has a lid. Just don't can with them, and if you save old lids, mark 'em well so you don't get confused. Scratches on the top with a corkscrew do it for me, you even get planned obsolescence that way. And for god sakes, don't pawn 'em off at a yard sale.

1.5.6 [How do I use a pressure canner safely and effectively?] from Wendy Milner : As with the boiling water bath, you prepare your food according to a tested recipe, place the food in the jar, put on the two piece lid, and place the jars in the canner which has 2 to 3 inches of water in it. The water should be hot but not boiling. Place the lid on the canner. The petcock or vent of the lid is open. As the water boils, steam will rise out of the petcock. When steam is steady, wait 10 minutes before closing the petcock. There are two types of gauge: weighted and dial. The weighted gauge has three positions: 5 pounds, 10 pounds and 15 pounds. Always use the higher weight if the recipe calls for a weight in between one of these values. For example, the recipe calls for 12 pounds of pressure, use 15 pounds. With a weighted gauge, place the gauge on the vent using the correct weight. Leave the temperature on high until the weighted gauge begins to rock. Lower the temperature. You will have to experiment a little with the temperature. You want the weighted gauge to rock lightly throughout the processing time. Start the processing time when the gauge is rocking at about 2 to 3 times a minute. [N.B. If your gauge refuses to rock, check to see if your stove is perfectly leveled.-the gang at r.f.p] The dial gauge canner has a dial which registers from zero to 20 pounds. You should have your gauge tested every year by the local extension office. The advantage to a dial gauge is that you can see exactly what the pressure of the canner is during processing. With a dial gauge, close the petcock and watch the dial. When the dial has reached the proper pressure, reduce the temperature. Maintain the pressure throughout the processing time. Start the processing time when the correct pressure has been met. If you live above 1000' feet you must increase the pressure for processing. For every 1000' feet add 1/2 pound of pressure. You do NOT add time to the processing, only pressure. At the end of the processing time, turn off the heat. Do not open the lid or vents. It will take about an hour for the pressure to drop inside the canner. Wait till pressure reaches zero, or the safety valve drops before opening the lid. Open the lid away from you. There will still be steam rising from the water and it is easy to scald yourself. Remove the jars from the canner. Place them on a towel on the counter and leave them alone for 12 to 24 hours before checking the seal. Do not check before the 12 hours as this could cause the jars

to not seal. Sealing is the result of heating and then cooling the jars.
[For more about pressure canners especially information about the
vagaries of the gauges, please checkout the Equipment Section in part
4 of this FAQ.]

1.5.7 [I'd like some sources for non-standard size jars, decorative
bottles, unusual size rings, and other items that I just can't find in the
usual places.] Zlotka : Berlin Packaging has a great catalog of containers
for all manner of things. 1-800-4-BERLIN will get you a free catalog. Good
customer service, too. lost the attribution here, sorry.. You might try
Glashaus. They have some big jar sizes, the largest rings I have from them
are 4.25" at the outside. They are at Glashaus Inc./ Crystal Lake,IL
(815) 356-8440.

1.5.8 [Pump N Seal, Has anyone used these?]

Connie TC wrote:

"Pump and Seal (the hand operated vacuum pump, right?) I found that it
did seal jars fine but I didn't like putting a hole in lids-they seemed
to rust easily. But for plastic bags, while it could draw a vacuum it
was hard to get the bag closed before you lost it and the vacuum wasn't
as good as one from the Tilia vacuum and bag sealer machine, which I got
last year and really like."

Jay Heyl wrote:

"It does fine on jars, assuming you have a good seal around the rim. I
use it all the time for dry goods stored in canning jars.

With bags I would recommend going some other way. The Pump-n-Seal pulls
enough vacuum, but you need to be an octopus to work the pump, maneuver
the hose inside the bag, and then seal the top of the bag. There's also
the small problem that Zip-Locks are not vacuum tight."

1.6 TROUBLESHOOTING

1.6.1 [My jars refuse to seal! Some of my preserved food is turning colors!
What is happening?]

---- PROBLEMS WITH HOME-CANNED FOODS----------

Even when you follow directions, occasionally you may have problems with
home-canned foods. Many of these problems can be traced to use of

non-standard canning jars, lids and rings or use of other-than-recommended canning equipment or procedures. Checking your equipment and reviewing current canning recommendations can go a long way towards preventing potential problems. If you do have a problem, you may be able to determine the cause and prevent its reoccurrence by consulting this "trouble-shooter's guide".

1. Jars do not seal

a. Off-standard jars and/or lids.
b. Chipped or uneven sealing edge.
c. Using one-piece caps instead of two-piece lids.
d. Screwbands are rusty or bent providing poor contact.
e. Bands not screwed down tightly enough before processing.
f. Sealing edge not clean. Wipe edge well before placing lid on rim.
g. Liquid siphons out of jar during processing taking food particles on to the sealing edge.
h. Insufficient heat during processing. Air is not evacuated from jar, so a vacuum seal never forms. [In pressure canning the EXHAUAST phase is critical -ED]
i. Lids were improperly prepared before placing them on rims. Most lid manufacturers require some pretreatment (heating, boiling, etc.). [Use lid strictly according to the manufacturers specifications. There are significant differences between the lids of various manufacturers. -ED]
j. Rapid, forced cooling of a pressure canner can cause a rapid pressure and temperature change inside the canner causing the liquid to "boil" out of the jars, leaving particles on the sealing rim and unsealing the jars. Canners should not be "forced" into cooling rapidly by submerging [no dousing or spraying either - ED] them in water or by adding ice.
k. Insufficient processing of raw-packed food; the air may not have been completely driven out of the food leaving residual air in the jar so the seal does not form. l. Use of canning procedures which are not recommended such as open kettle canning, microwave canning, and oven canning. Use USDA recommended procedures.

2. Food spoils

a. Processing at an incorrect temperature. Can occur with:

1. Inaccurate pressure canner gauge.
2.Failure to exhaust canner.
3. Failure to make altitude adjustment.
4. Heat source fluctuates--inaccurate pressure or fluctuating pressure.
5. Water not at a rolling boil when jars are put into canner.
6. Water not covering jar caps by 2" throughout processing.

7. Water not at full boil throughout processing.
8. Insufficient processing time.
9. Use of canning procedures which are not recommnended. Recommended procedures (USDA) are based on the time it takes to achieve a temperature which will sterilize the food in the jar.

b. Improper cooling of jars after processing.

1. Failure to remove jars from canner when processing time is up (or when pressure gauge reads 0).
2. Failure to set jars at least 1" apart during cooling.
3. Covering jars which retains heat. Vacuum does not develop.
4. Attempting to cool either the canner or the jars very rapidly.

c. Using damaged (freeze damaged), spoiled, under ripe or over ripe food. The pH may not be correct for the type of processing you used (water bath versus pressure).

d. Very large number of microorganisms due to spoilage, bruising, etc. A very large number of microorganisms present on the food which are not destroyed in the usually recommended amount of processing time.

3. Food loses liquid during processing

a. Jars filled too full.
b. Fluctuating pressure in a pressure canner.
c. Forced cooling of a pressure canner.

4. Food turns dark (not spoiled)
a. Insufficient processing time.
b. Processing temperature too low (water not at a full boil at beginning of processing or drops below full boil during processing).
c. Water not 2" over jar lids.
d. Packing foods raw that should be precooked (pears).
e. Liquid loss during processing causing fruit at the top to be out of the liquid.
f. Lack of appropriate pretreatment for light-colored foods.

5. Fruit or tomatoes float or separate from the liquid
a. Using overripe fruit. b. Packing fruit too loosely.
c. Syrup too heavy.
d. Processing too long. Pectin is damaged.
e. Processing at too high a temperature (pressure canner).
f. Raw packing. Raw food contains a lot of air.
g. Smashing or pureeing food prior to heating it activates enzymes which break down pectin in the juice so the food pieces are lighter and rise to

the top. Heat or crush while heating any foods to be pureed or food to be packed in its own juice to help prevent separation.

Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992 EHE-665 ----

PROBLEMS IN HOME-CANNED FRUITS

Fruit darkens at the top of the jar:
a. Liquid didn't cover the fruit--pigments become oxidized.
b. Fruit not processed long enough to destroy enzymes.
c. Air left in jars permits oxidation (bubbles or too much headspace). Fresh fruit exposed to air oxidizes.
d. Exposure to high temperatures and light during storage.
Color changes in canned apples, pears, peaches, quinces: Pink, red, blue or purple color--natural enzymatic reaction (not harm- ful) which may occur during cooking, or a result of a chemical reaction between fruit pigments and metal ions (iron and copper). Use soft water, stainless steel cookware, plastic or wooden utensils.

Fruit floats in the jar:
a. Fruit is lighter than syrup. Use lighter syrup, cook fruit before packing.
b. Improper packing. Pack fruit tightly without crushing. Use hot pack method.
c. Fruit is overprocessed. Too much heat destroys pectin and acid, so the fruit loses its shape and floats.
d. Fruit is packed too loosely.

Fruit Spoilage:
a. Overpacking. Heat penetration is poor and food does not become sterilized.
b. Poor selection of fruit (over ripe, wrong pH, large bruises).
c. Underprocessing. Food is not sterilized.
d. Unsanitary conditions. Microorganisms are not removed from the food or larger numbers are added during preparation. Clean up as you go. Wash equipment, utensils and hands in hot soapy water.

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COLOR CHANGES IN HOME-CANNED FOODS

The pigments in food which are responsible for their colors are sensitive to a variety of things which they may come into contact with during home

food preservation. Acids (lemon or other fruit juices), anti-caking ingredients in table salt, minerals in water, metals in water and from cooking utensils, heat, and light are a few things which can affect these pigments causing them to change color. Most color changes which occur during home food preservation do not make the food unsafe to consume. Hhowever, if the food looks or smells bad or odd, do not take a chance, dispose of it without tasting it.

1. Blue garlic: Occurs in pickled products. Caused by using immature garlic or because table salt was used in place of canning salt. Not a safety hazard.

2. Yellow cauliflower: Cauliflower (or other white vegetable pigments) are white in acid but yellow in alkaline medium. Minerals in the water may have created a more-than-normal alkalinity. Not a safety hazard.

3. Yellow crystals in canned asparagus: the crystals are glucosides (rutin) which were in the asparagus cells before canning. The high temperature of pressure canning causes them to come out of the vegetables into solution, but when the food cools, the pigment precipitates out of solution onto the the asparagus. Occurs mainly in asparagus in glass jars. If asparagus is canned in tin cans, a pigment-tin complex form so the yellow pigment stays in the liquid. Not a safety hazard.

4. Pink pears: the light colored pigments in the pears convert to pink pigments due to overprocessing or due to enzymatic reactions. Not a safety hazard.

5. White crystals on tomato products: home-canned pureed tomato products may have crystals of calcium nitrate on the surface. They are hard and scaly unlike mold spots. Not a safety hazard.

6. White crystals on spinach leaves: calcium oxalate - not a safety hazard.

7. White or pink crystals in grape jelly: Grapes are high in tartaric acid which goes into solution during cooking but precipitates as crystals during cooling. Prevent crystals by extracting grape juice, cooling overnight in the refrigerator and filtering juice before canning or using for jelly-making. Not a safety hazard.

8. White, yellow, or pale red beets: the red pigments in beets (anthocyanins) are sensitive to high temperatures. Some beet varieties are especially sensitive. The pigments are converted to white or colorless derivatives. Not a safety hazard.

9. Blue pickled beets: the pigments in beets are pH-sensitive. They are

red in acids and blue in alkalis. If the pigments are blue, the pH is too high for water-bath canning to be safe. Throw the beets away (handle according to spoiled food procedures).

10. Brown green beans: enzymatic color changes occurring before the enzymes are inactivated by heat cause the green-to-brown color change of chlorophyll. Blanching or hot-packing will inactivate the enzymes and help preserve the green color. Not a safety hazard.

11. Brown potatoes: storage of potatoes at temperatures below 45F causes the potato starch to be converted to sugars. During high heat treatment of pressure canning, these sugars form dark brown pigments. Not a safety hazard.

12. Colorless crystals which look like broken glass in canned sea foods. Not harmful.

Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992
EHE-666

1.6.2 [My jams and jellies didn't set. How can I reprocess them?] From: Barb Schaller Here are three ways to rescue syrupy jams or jellies. From General Foods, makers of Sure Jell pectin products and Certo liquid pectin.

USING SURE JELL FOR LOWER SUGAR RECIPES: Prepare containers as you normally
would have (hot jars and lids). Prepare Pectin Mixture: Slowly stir contents of 1 package Sure Jell for Lower Sugar Recipes (SJ-LSR) into 1-1/2 cups cold water in small saucepan. Bring to a boil over medium heat; continue to boil 2 minutes, stirring con- stantly. Remove from heat. Prepare Trial Batch: 1 cup your jam or jelly, 2 Tbsp. sugar, 1 Tbsp. Pectin Mixture. Measure jam or jelly, sugar, and the Pectin Mix into small (1-qt) saucepan. Bring to a full rolling boil on high heat; continue to boil 30 seconds, stirring constantly. Remove from heat. Skim off any foam with metal spoon. Quickly pour into prepared jar. Cover jar and let stand up to 24 hours to check set of Trial Batch. Store remaining Pectin Mix in fridge. Prepare Remainder of Batch: DO NOT TRY TO REMAKE MORE THAN 8 CUPS OF JAM OR
JELLY AT ONE TIME. If Trial Batch sets satisfactorily, follow the recipe above, using the listed amounts of Pectin Mixture and sugar for EACH 1 cup of jam or jelly. (Not going to repeat previous instructions.--BS) For convenience in measuring larger amounts of Pectin Mixture and sugar: 8 Tbsp. = 1/2 cup. 16 Tbsp = 1 cup. (Even I could do that math! :-) "Remember, if your jam or jelly still doesn't set, you can always use it as a glaze or syrup.

" USING SURE JELL POWDERED FRUIT PECTIN: Prepare Containers as usual (hot jars and lids). Prepare Pectin Mixture: Slowly stir contents of 1 package SJ and 3/4 cup cold water in small saucepan. Bring to a boil over medium heat; continue to boil 2 minutes, stirring constantly. Remove from heat. Prepare Trial Batch: Same as for SJ-LSR instructions, above. Prepare Remainder of Batch: Same as for SJ-LSR above. (Same comment about glaze, too. :-) USING CERTO Liquid Fruit Pectin: Prepare Containers: Same as usual (hot jars and lids). Prepare Trial Batch: (Pay attention, this is different.....) 1 cup your sorry jam or jelly, 3 Tbsp. sugar, 1-1/2 tsp. fresh lemon juice (I do use fresh), 1-1/2 tsp. Certo. Measure jam or jelly into small saucepan. Bring to full rolling boil on high heat, stirring constantly. Immediately stir in sugar, lemon juice and Certo. Bring to full rolling boil on high heat, stirring constantly. Remove from heat. Skim off foam, blah, blah, blah. Quickly pour into prepared jar, blah, blah, blah. Store opened pouch of Certo in refrigerator. (Blah, blah, blah - follow standard procedure for sealing the jars, and for g'sakes, don't sneeze in the jar.--LEB) Prepare Remainder of Batch: Do not try to make more than 8 cups of jam or jelly at one time. If Trial Batch sets satisfactorily, follow the recipe above, using the listed amounts of sugar, lemon juice, and Certo for EACH 1 cup of jam or jelly. Measure jam or jelly, sugar, lemon juice and Fruit Pectin into large (6 to 8-quart) saucepot. Bring to a full rolling boil on high heat; continue to boil 1 minute, stirring constantly (this is DIFFERENT than trial batch.) Remove from heat, skim foam, ladle into jars, blah, blah, blah. After pre- paring remainder of batch, discard Certo in opened pouch. (Same commentary about glazes and syrup.) For convenience in measuring larger amounts of sugar, lemon juice and Fruit Pectin: 3 tsp. = 1 Tbsp., 8 Tbsp. = 1/2 cup, 16 Tbsp. = 1 cup. There! From "Gifts from the Harvest, Homemade Jams and Jellies, from the makers of SureJell and Certo." A 62-page booklet with beyond-the-basics recipes for sweet spreads. Got it as a freebie at our State Fair one year.

1.6.3 [Anybody have a way to loosen up stiff jelly?]

From: kate@rigel.econ.uga.edu (Kate Wrightson) If it's jelly, try to maneuver a biggish glob (ooh, technical term) out of the jar and into a small Pyrex custard cup. Add a tablespoon or so of warm water and microwave it until the jelly begins to melt; stir and add extra water if needed to make a smooth semi-thick liquid. This becomes a glaze for whatever sorts of meats you might cook: chicken, game birds, roasts, turkey breasts.... The obvious combos are peach glaze on pork, cherry on pork, apple on pork (oops, and we don't even eat all that much pork; suffice it to say that pork goes well with any fruit glaze), strawberry or any berry on cornish hens, kiwi on chicken breasts, etc.

2. FREEZING

2.1 GENERAL QUESTIONS

2.1.1 [What do I *really* need to know about freezing?]

Freezing is preserving food using low temperatures--generally at temperatures around 0 F/-18 C. Freezing generally inhibits both microbial growth (doesn't generally kill, though) and many protease/enzyme actions in the food itself.

You need to decide whether or not to blanch or process food, how to wrap food to prevent freezer burn, what foods freeze well, and what to do when the power goes out.

FROZEN FOODS

Food is safe from spoilage AS LONG AS IT STAYS FROZEN. Microorganisms can start to grow as soon as food begins to thaw. To keep microbial growth at a minimum, frozen foods should be thawed in the refrigerator. Thawed food may be refrozen IF ICE CRYSTALS ARE STILL PRESENT IN THE FOOD. Refreezing often changes the quality of food (texture, color, flavor). Foodborne illness causing microorganisms may not be killed by freezing, so the safety of the food will be no better than the condition of the food which was frozen.

(section taken from Susan Brewer, from cesgopher.ag.uiuc.edu). [Symptoms of food poisoning are discussed in Section IV. Spoilage--LEB]

2.1.1.1 - Tips on how to choose a freezer

From Blanche Nonken

Get the biggest you can afford and have room for. I've never heard anyone complaining of TOO MUCH freezer space. Before you shop, look through the large appliance section of your sunday paper. You never know what special deals any number of manufacturers might be offering.

Mine's a GE, and GE was offering a "12 Month No Interest Charge!" deal. I took a nice, leasurely 12 months to pay for my $400 chest freezer, because there was no interest involved.

Stay away from "Self Defrosting." Emptying it once a year or so for defrost is a great way to spend the hottest day of the year, and you never know just what you'll find.

Chest freezers are harder to organize, but are more energy efficient. Uprights, just the opposite - great for organizing, but everytime you open it all the cold air goes flooooosh all over the floor.

[Bulk it up with bags of ice { keep the freezer nearly full at all times} to decrease the running cost. The thermal mass of the ice also aids greatly in getting foods frozen quickly. - ED]

2.1.2 [So what foods can be frozen well?]

from Wendy Milner

Freezing is not for all produce. Freezing will make mush of many soft fruits and vegetables. Depending on what you want to do with these soft fruits and vegetables, freezing may work. For example, you can freeze tomatoes and later use them to make a sauce, but you would not want to try and use the tomatoes whole after thawing. You can freeze apple slices and later make apple sauce or apple pie.

Harder vegetables such as green beans and corn do well in the freezer. These vegetables should be blanched first to kill mold spores and yeasts, dried well, and then placed in freezer bags or freezer containers. The vegetables should be cooled before placing in the freezer to prevent the freezer temperature from rising.

All meat can be frozen. If you are butchering your own meat, make sure it is clean of hair, feathers, blood shot meat, and any foreign matter. Meat should be cut into small slices such as you find in the grocery store. Do not attempt to freeze large sections of meat, such as a quarter of a beef, unless you have a commercial sized and very cold freezer. Meat should be wrapped in butcher paper to prevent freezer burn. You must thaw meat in the refrigerator. Meat left on the counter to thaw allows for the growth of bacteria which could be harmful.

Corn freezes well

>From Robb Dabbs:

My freezer book says 9 minutes of blanching followed by 9 minutes of ice water. Dry corn, package tightly and freeze.

Corn to be cut off the cob requires only 4 minutes of blanching.

2.1.3 [What's this blanching stuff, anyway?]

Blanching is plunging your item(s) in boiling water for a short amount of time (30 sec to 5 min, check your recipe), cooling the items quickly, then drying off the items. You don't cook the item, but you kill off the surface bugs and you destroy several important enzymes that brown and degrade foods.

2.1.4 [How do I freeze (your item here), and how long can I reasonably expect it to keep?]

From Bobbi Zee

RECOMMENDED STORAGE TIMES IN MONTHS

Months

Appetizers

: Cheese wafers and straws 2

: Deviled ham puffs 1

Baked Products

Cakes

: Angel food -- baked 4

: Chocolate -- baked 3

: Chocolate -- batter 2

: Frosted 3

: Fruit -- baked 4

: Plain -- baked 3

: Plain -- batter 2

: Sponge -- baked 4

Cookies

: Brownies -- baked 4

Cookies

: Brownies -- baked 4

: Chocolate chip -- baked 4

: Filled -- baked 4

: Peanut butter -- baked 6

: Peanut butter -- dough 4

: Refrigerator -- baked 6

: Refrigerator -- dough 6

: Sugar -- baked 6

: Sugar -- dough 6

Pies

: Apple -- baked 4

: Apple -- unbaked 4

: Blueberry -- baked 4

: Blueberry -- unbaked 4

: Chocolate chiffon 2

: Lemon chiffon 2

: Mincemeat -- baked 2

: Mincemeat -- unbaked 2

: Mincemeat -- baked 2

: Mincemeat -- unbaked 2

: Pumpkin -- baked 2

: Pumpkin -- unbaked 2

Quick breads

: Boston brown -- baked 4

: Nut -- baked 2

: Orange -- baked 4

Yeast breads

: Rolls -- baked 4

: Rolls -- dough 1 week

: Swedish tea ring 2

Combination Dishes

: Bakes beans with tomato sauce 4

: Beef or veal stew 2

: Chicken a la king 4

: Italian rice 2

: Rice Pilaf 4

: Italian rice 2

: Rice Pilaf 4

: Shrimp Creole 4

: Spanish sausage 2

: Tomato sauce and meat balls 2

Combination Dishes - General Directions

INGREDIENTS AND COOKING TIME: Use only ingredients of the best quality. Prepare foods in the usual way but shorten the cooking time for most of them. Cook meat and vegetables until barely tender and take from the heat at once.

The tissues will soften further during the cooling, freezing, and reheating. If completely cooked before they are frozen, meat and vegetables may be too soft when served. Long cooking also causes unnecessary losses of flavor and aroma.

DO NOT INCLUDE POTATOES OR SOME TYPES OF RICE. Potatoes are not satisfactory in combination dishes which are to be frozen. The texture is poor after freezer storage and reheating. It is better to cook and add them when the frozen food is prepared for serving.

In certain combination dishes quick-cooking rice and regular rice tend to be mushy when they are reheated after being frozen. Converted rice has been found to retain its shape and texture better.

COOL COOKED FOODS QUICKLY. After a food is cooked, cool it quickly to room temperature. Place the cooking pan in a larger pan of ice water or cold running water and stir occasionally. If the food is in a heavy kettle, you can cool it more quickly by transferring it to one of the lighter weights.

CLEANLINESS IS VERY IMPORTANT. Since freezing does not kill all microorganisms, strive to keep the number in the food as low as possible during preparation. Use clean utensils and sanitary methods of handling food.

Keep the food covered during cooking, and loosely covered during cooling. Package the product as soon as it reaches room temperature and freeze immediately.

PACKAGE CAREFULLY. Several types of containers are suitable for combination dishes. However, the longer the product is to be held in freezer storage the more moisture- and vapor-proof the package must be. Cylindrical cartons with slip-on lids and tub-type containers are easy to fill but they may not be air-tight. Rectangular cartons with plastic or plastic laminated foil bags which can be tightly sealed with paper-covered wire closures, rubber bands, or heat are more moisture and vapor-proof. Glass jars designed as containers for freezing, tin cans, or plastic containers with tight-fitting lids afford good protection against moisture loss and are easy to use. Freezer-to-table cookware can be overwrapped with plastic or aluminum foil for a tight seal.

Some of the heavier plastic wraps now available are suitable for

freezer storage. Those made with polyvinylidene chloride (such as Saran wrap) have been rated as excellent and are suitable for long-term storage. Those made with polyethylene (such as Glad and Handi-Wrap) are suitable for short-term storage. Those made with polyvinyl chloride (such as Reynolds Plastic) are poor choices because they are not moisture and vapor proof. Plastic-coated paper freezer wrap is suitable for solid foods. (Formore details, see Consumer Reports, March, 1983.)

For food that is packaged solid be sure to leave space at the top of the container for the contents to expand during freezing. Leave 1/2 inch for a pint container, 1 inch for a quart.

FREEZE IMMEDIATELY. Put packaged foods in the home freezing unit without delay. The temperature in the home freezing unit should be 0 F or lower.
DO NOT STORE TOO LONG. The shorter the period of freezer storage, the more appetizing these foods will be. (See table of recommended storage times - LEB) While some foods usually do maintain quality longer than is indicated, undesirable changes may take place during freezer storage. Some fats tend to become rancid rather quickly. Separation may occur in sauces and gravies. Onion and black pepper become stronger and salt loses flavor. With all foods there is a gradual loss of flavor, aroma, and natural texture. Be sure to write the date of preparation on every package and make a record of the packages you put in the freezer so you will not leave them there too long.

PREPARE FOR SERVING. To reheat frozen cooked food, use the method which will affect its appearance and texture the least. A double boiler is best for combination dishes. A saucepan can be used if the food is partly defrosted and then heated carefully. With either method do not stir food more than necessary. Plastic wraps can be used in microwave reheating only with foods that are low in sugar and fat. High-fat and high-sugar foods can become hot enough to melt the plastic.

Use all defrosted and reheated foods at the current meal. Further holding and reheating is not recommended.

COOKED MEAT AND VEGETABLES

Freezing cooked meat, except in combination dishes where a solid pack can be prepared for freezing, is not recommended. Work carried on in the foods research laboratory of the University of Illinois as well as in other foods laboratories indicates that higher quality is obtained if uncooked rather than cooked poultry and meat are frozen. Carefully controlled experiments have shown that this is true for deep fat and oven fried chicken, braised beef round steaks, ham patties and loaves, and rib and loin pork roasts. In general, poultry and meat roasted or

fried have a more attractive appearance and better flavor than that cooked before freezing.

Precooked frozen vegetables have been rated as being inferior to freshly cooked and to blanched frozen vegetables. The few exceptions are products that can be solidly packed such as vegetable purees and mashed potatoes. In the latter case freezing is not recommended because it takes almost as long to thaw and reheat mashed potatoes for serving as it would to prepare them fresh.

BAKED GOODS - GENERAL DIRECTIONS

Among the baked foods that can be frozen successfully are certain appetizers, breads, cakes, and pies. Freezing and freezer storage preserve the freshness of these products and having them at hand for emergencies is a convenience. The recipes included here are those which were found to give good results when they were tested in the University of Illinois laboratory.

Probably many other products besides those described can be frozen satisfactorily.

PREPARING BAKED FOODS. Use standard recipes and methods for appetizers, breads, cakes and pies and select only ingredients of the best quality. Several of these products can be frozen before they are baked, the following precautions are necessary:

For cakes frozen in the batter state, use double-acting baking powder (SAS-phosphate) in order to assure good volume. Package batter and place in freezing unit immediately.
For fruit pies frozen before baking, use a little more flour to thicken juice, and do not prick the top crust. Apple slices should be blanched before they are put in a pit, so they will keep their color, texture, and flavor better.

Dough for rolls must be wrapped and frozen as soon as the rolls are shaped.

DIRECTIONS FOR PACKAGING. Except for cake batter, these products can be satisfactorily wrapped for freezing in moisture- and vapor-proof plastic wrap, heavyweight aluminum foil, or plastic freezer bags. Heat-sealable plastic bags are excellent. Tight seals prevent loss of moisture and flavor during storage.

If you use aluminum foil, place product in center of sheet and fold two edges together over it. Roll or fold the seam tight against the product, taking care not to crush the product. Then press the ends of the package

together and fold them close to the product.

Pressure or cold-storage tape can also be used to seal plastic wrap or aluminum-foil packages.

Plastic of waxed cylindrical freezer cartons with slip-on lids or glass freezer jars are suitable for packaging cake batter. The quart size holds enough batter for an 8-inch square cake and six cup cakes or for two 9-inch layers.

DO NOT HOLD TOO LONG IN FREEZER. As soon as baked products, batters, and doughs are packaged, place them in the home freezing unit. Do not, however, keep them in the freezer for long periods because quality is lost gradually during storage. The freezer space probably can be used to better advantage.

APPETIZERS

Questions about the advisability of freezing canap,s or tea sandwiches are frequently asked. Such products can of course be frozen and held in the freezer for about a week but the results are usually only fairly satisfactory.

Freshness in appearance and flavor are apt to be lost, moisture content of bread may no longer be evenly distributed, and crackers or toast rounds tend to lose crispness. However, two appetizers which are baked after freezing can be recommended. Similar types among your favorite recipes may give equally good results.

ANGEL-FOOD AND SPONGE CAKES

Frozen baked angel-food and sponge cakes, when defrosted, are very similar in quality to freshly baked cake. Angel-food cakes seem a little more moist after they have been frozen and thawed. However, both angel-food and sponge cakes are likely to shrink a little in freezer storage. (Angel food) cake made from frozen and defrosted batter is not as fine-grained as cake baked before it is frozen.)

Delicious angel-food cake can be made from frozen egg whites. Often freezing the whites is more practical than freezing the cake. A pint container will hold the right amount of whites for one cake. After defrosting by holding them overnight in the refrigerator or at room temperature for about 5 hours, use them in the same way as fresh egg whites.

FRUIT CAKE

Fruit cake can be baked and frozen. After freezer storage the thawed cake will be more like a freshly baked cake than if it had been stored at room temperature.

PLAIN AND CHOCOLATE CAKES AND FROSTINGS

These cakes can be frozen after they are baked or the batter can be frozen. Storing batter has several advantages: it is easier to package, requires less freezer space, and the cake seems more moist, with a flavor more like that of a freshly mixed and baked cake. A frozen baked cake, however, required less time to prepare for serving after it is taken from storage.

In addition a baked cake can be frosted before it is frozen and stored.

COOKIES

Freezing baked cookies and cookie doughs makes it easy to keep a variety on hand at all times. Many types of baked cookies can probably be frozen, as well as refrigerator cookie doughs. The enclosed recipes give good products, or you may use favorite recipes and methods to prepare cookies for the freezer.

PIES

Frozen pastry, ingredients for pie fillings, and certain frozen pies make excellent products. Apple, blueberry, mincemeat, and pumpkin pies can be baked either before or after they are frozen. A pie baked after it is frozen is more like a freshly prepared and baked pie, and less time is needed to prepare it for freezing. But a pie that is baked and then frozen takes less time to prepare for serving.

Another possibility is to freeze the chief ingredients of fillings and pieces of rolled pastry of appropriate size separately. This procedure is more economical of freezer space than freezing unbaked or baked pies and may in some instances be more practical. Cherries and sugar or pumpkin puree can be frozen satisfactorily for use in pies.

Chiffon pies are completely prepared before freezing. Only lemon and chocolate pies have been tested but it seems probable that other chiffon pies will freeze equally well.

FREEZING PASTRY.

Pastry may be frozen separately and used later. One way to package rolled-out pastry is to cut a piece of cardboard of the same size as the

pastry and cover it with waxed paper. Two pieces of waxed paper are put between each two pieces of pastry and several can be wrapped together. Use aluminum

foil or plastic wrap for packaging or seal in a large plastic bag with as little remaining air space as possible. Pieces of frozen pastry can be removed as needed and allowed to that 10 to 15 minutes before using in the preparation of a pie.

QUICK BREADS

A few kinds of quick breads have been baked and frozen with satisfactory results. Probably others will freeze equally well. One advantage of freezing quick breads is to have several kinds available at one time without spending many consecutive hours in their preparation.

YEAST BREADS

Bread and rolls that are frozen and held in freezer storage do not stale at the usual rate. Yeast rolls may be frozen after baking, or the dough may be frozen. The former method of preparation is preferred because it is more convenient and because the quality of the rolls is higher. The volume, texture, and flavor of the baked rolls are maintained for several months of freezer storage. Frozen dough should be thawed and baked within

one week after it is frozen. Swedish tea ring, baked before freezing, was rated good after freezer storage. Other baked products made with sweet roll dough will probably be found to be suitable for freezing.

Source: Freezing Cooked and Prepared Foods. Frances O. Van Duyne.

University of Illinois at Urbana - Champaign, College of Agriculture, Cooperative Extension Service. Circular 835. July, 1984

Typos by Bobbi Zee 1:230/73

MMMMMMM

2.1.5 [Specifics about freezing meats, especially wild game.]

Subject: Preserving Frozen Poultry & Other Meats

From: pleasure@netcom.com (Tanith Tyrr)

Somebody asked a question about "freezer burn"....here's what I do about it. Works admirably for me, and since I hunt and slaughter livestock, I always have a goodly stack of meat of all sorts needing a

deft hand with the long term preserving.

Poultry, especially delicate items like wild duck or quail, keeps best when frozen either in a solid block of water (best for the small game birds; use milk cartons) or when frozen completely covered with fat or oil. The key here is "no oxygen interaction".

If you can afford one (and if you know how to use it properly), a vacuum sealer is also helpful for processing meats you want to freeze. I'm currently shopping models; input is solicited.

I freeze larger game birds, specifically wild duck, crocked in rendered duck fat and wrapped tightly in plastic wrap and a ziplock so that no surface is exposed. It works admirably and "freezer burn" just doesn't happen. The outside fat might lose some moisture and texture if exposed to air, but you can simply melt off the fatty layer and discard. You can also used rendered chicken or goose fat for this purpose, depending on what is in your pantry at the moment. I always save jars of rendered poultry fat of all kinds in the freezer, for this and other culinary purposes. Confit, anybody? ;>

[Yep, check out the Meat Potting Section in this FAQ.--LEB]

I freeze good cuts of beef and lamb in a solid layer of olive oil, as it does not impart that savory and unmistakable "poultry flavor" that rendered duck, goose or chicken fat does. Any good quality, fresh and not rancid vegetable oil will do, but I prefer olive oil for its weight, durability and flavor.

Extra virgin is best, but the medium weight stuff you can buy by the bucket load will do. It depends on how much you value that piece of meat you're putting in the freezer. And taste your oil first to make sure it won't impart unpleasant qualities to the meat; oil or fat can go rancid or "off" if you (or the shopkeeper) leave it on the shelf too long.

You can even "freezer marinade" by adding seasonings to the oil or fat and heating briefly, then allowing to cool before adding to the meat to be frozen.

You can use a fairly thin (1/4") of fat or oil, so long as you are certain that the meat is covered on all sides and no actual meat surface is exposed to air. Personally, I tend to go for a deep crock when it comes to precious items of wild game; I buy rendered duck fat in 5-pound tubs from specialty stores such as D'Artagnan (NY) or The Game Exchange (SF).

Gently melt off all the grease before cooking, and you should end up with

a nice piece of well preserved meat even after many, many months in your freezer.

Don't forget to invest a small amount in an accurate freezer thermometer, if your model doesn't come with one. It's worth it as fluctuations in temperature or too high a temperature can destroy products inside even if they are properly preserved.

2.1.6 [I'm looking for an appliance to vacuum seal food. Any recommendations?]

From: Ross Reid

Over the years I've tried several so called vacuum sealers and gave up on them. Most had a tiny little fan which couldn't pull as much of a vacuum as I can by using a drinking straw. However, about a year ago I decided to bite the bullet and spend the extra for a Tilia FoodSaver™ and don't regret it for a minute. The Tilia has a true vacuum pump and, IMO is the only one worth considering as a home vacuum sealer.

From: Barbara Rogers :

I have a Compact Foodsaver and really like it. I only use it to seal lids on glass jars. I don't use the plastic bags. I have never used anything else so can't compare. This one cost about 200 dollars and I have had it several years with no problems.

From: pbyrnes@ix.netcom.com (Patricia C. Byrnes):

I also use a FoodSaver. I rarely use the bags, but have a whole collection of containers that work with it (including Mason jars). These are easily sealed. If I were freezing something I wanted to last a long time I would use the bags.

From: elva@sos.on.ca (Elva Allen)

I have a Phillips vacuum sealer and it works just fine. It seals the plastic to make a bag, and none have split on me yet! It was $35 at Zellers in Ontario, CA. Extra plastic for bags is readily available.

From: Buddy McIlwain

I have owned a Foodsaver made by a company named Tilia for about 6 years. I have been very pleased with it and with Tilia. They have an 800 number which I used once when my machine quit pulling a complete vacuum on the

bags. They correctly diagnosed my problem and shipped the parts overnight. The parts consisted of two strips of heavy duty weather stripping that is used to seal the bags. [snip.] My machine seals plastic bags sold by Tilia, but will also vacuum seal mason jars.

From: Paul Hinrichs

Tilia, Inc. / 568 Howard St. / San Francisco, CA 94105

415-543-9136 / FAX: 415-777-2634

From: Barb Shaller

Bags for Bag Sealers:
5305 Parkdale Drive
Minneapolis MN 55416-1681
1-800-KAPAK-57
(1-800-527-2557)

I do not know if these bags are usable with the Tilia products.
Kapak has a boatload of sizes available.

2.1.6.1

Vac sealing flour:

Marie Martinek wrote:

I put my circle of waxed paper *inside the jar*. So it keeps the powdery stuff from sucking up into the space between the jar and the lid. Which, of course, also keeps it out of the pump parts.

Ross Reid wrote:

I put a wad of cotton batting (actually a single cotton ball) up inside the recess in the very top of both my jar adapters. The cotton is held there by a very narrow strip of Scotch™ tape. I've never had flour or anything else get past the cotton and the vacuum still works as well as if the cotton wasn't there.

Eric Decker wrote:

Test jars done to the methods given here fail. The vacuum held for a couple of months but one by one all twelve test jars lost the seal. The seal at

process time was solid. A test removal at process time deemed the FoodSaver's vacuum was adequate. Unfortunately a microscopic level of flour must have been present in all instances. There appears to be no way to guarantee flour will not contaminate the lid. The curent reccomendation is: Do not use vacuum sealing in glass jars for flour. Vacuum bagging flour is effective for those who buy flour in large quantities at infrequent cycles and have a need to exclude pests. Sugar and other higher density, more coarse, items should continue to do okay.

2.1.7 [Now that we found out that a seal-a-meal is worth having...where in the world do you find supplies? Diane M. Ferrell].

Seal-A-Meal Source

..was called at old number circa Feb/99 and was told that they sold the Seal-a-Meal division to the Rival Company.

The Rival Co
1001 Golden Dr
Clinton, MO 64735-1195
toll free number (660) 885-5564

Many thanks to Russ Allen for investigating and reporting the info - ED]

>From Jenny S. Johanssen :

Here in Alaska, we can get the seal-a-meal bags and machine both at Sam's wholesales and Costco. Payless Super Drugs also carries them. I think that Costco is on the West coast - California through Arizona at least.

2.1.8 [How would I go about preserving baked goods (cookies,

pastries...) from both going bad and breaking up into crumbs? Gloria]

>From Joan :

When I am shipping things, I either freeze them or pack them very well. For example, with yeast breads, rolls, etc., I generally freeze them and ship them off with express delivery. That obviously works best if it will be delivered within 48 hours.

For items like cookies or tender pastries, I generally find an airtight container for them and then pack them very carefully with lots of waxed paper between the individual items. Make sure they're packed snugly but not enough to crush the items when you put on the lid. Cookies travel very well this way, and some cookies also freeze pretty well so you can ship them in that state to help preserve them.

2.1.9 [Mushroom duxelles.]

What's the best way to preserve mushrooms?

From: Longhair

paulhinr@nando.net (Paul Hinrichs) wrote:

The local grocery had some portabellos marked down yesterday and I threw a whole slew of them into my smoker along with the leg of lamb I was smoking at about 130 F. After about 4 hours they were completely dried and smoked and tasted delicious even dry. I suppose you could do the same without smoke in a dehydrator or in the oven.

From: jpdion@odyssee.net (Jean-Pierre Dion)

I agree, but personally I prefer a duxelle.

Steps:

1. Chop your mushrooms as small as possible, a robot does a nice job.
2. Saute the mushrooms in oil or butter (to taste) at low to medium heat. The purpose is remove as much water as possible. They'll shrink and get a concentrated mushroom taste.

3. Cool. Pack tight and freeze. Yes, I wrote freeze. A duxelle is the only way you can freeze mushrooms. Use for soups or sauces. Remember, they will taste much more than ordinary mushrooms.

From: edecker@inforamp.net (Eric Decker)

Larousse Gastronomique '76 says, and I paraphrase:

1. Chop mushrooms coarsely, put in a bag, express as much moisture as possible by applying a twisting motion to the bag.
2. Saute mushrooms in oil and butter with chopped onion, chopped shallots, salt, pepper, nutmeg, moistened with white wine, with chopped parsley added.

3. Stir over a lively flame so that any surplus moisture in the mushrooms is evaporated - to the degree of a thorough cooking.
4. Allow the duxelles to get quite cold - store in a cold place.

Freezing is quite a good option for a large amount of Duxelles. One could add a splash, just a splash, of just about any good brandy instead of white wine. Less is more here. Beware of liqueurs, they will caramelize the duxelles' subtle flavours.

2.1.10 [Is there any way to freeze cheese so it does not become "crumbly?"]

>From Annette Bowser:

After you take cheese out of the freezer, let it sit at room temperature 24 hours and then put it in the refrigerator to chill. When you cut it or grate it, it will be like the day you bought it. The oils need to mix back in and it is great and it grates great.

--

>From Dawn Crowley:

I buy already shredded cheese in 5 lb bags. When my family was smaller, we could not use it fast enough. Therefore, I would flash-freeze it and then put it into ziploc bags in the freezer. To flash-freeze, just spread a layer on a cookie sheet and place it in the freezer for a few minutes. It prevents the cheese from defrosting into one giant clump.

3. DEHYDRATION

3.1 [Dehydration 101]

The URL of this firm is included in setion 16 - Internet.

On behalf of RFP I express the gratitude of the RFP family to Mr. Dave Stone of Commercial Dryer Systems Inc for the permission to include Dehydration 101 in our FAQ.

---------- begin here ----------

Dehydration 101:
A Basic Look at Dehydration

Dehydration 101 (A primer for new Tray Dryer Operators.)

Revised: 5/1/97

Regardless of how brilliant the design, or how skilled the fabricators might be, it is the operators of a Tray Dryer that will make it a success, or failure. The following information is offered as a starting point from which you will be able to jump-start your introduction into the fascinating technology of dehydration. Throughout this lesson, every effort has been made to follow the K.I.S.S. principle. The intent is to provide a basic understanding of dehydration, but without the scientific jargon. This paper is broken down into physics of dehydration, recognition of the four phases of dehydration, maximizing production and finally how to trouble shoot the process when your having problems. Dehydration is more an art form, than an exact science. As your personal experience grows, extend your experience, and don't be afraid to experiment. There will always be more than one way to dry a specific product. Your challenge is to find that special mix of temperature, air velocity, relative humidity, and dwell time that maximizes both production and product quality.

HISTORY:

In it's most simplest form, dehydration technology is thousands of years old. Dried meat on sticks and corn dried in the sun are two examples of early man's ingenuity. After 1900, the need for technology to accelerate dehydration and remove the dependence process became acute. Acceleration of dehydration and the need to remove the dependence on sunny dry weather where the factors that triggered invention of the Natural Draft dehydrator. This design incorporated a fire near the bottom on a hillside. Stacks of wooden trays filled racks. An exhaust vent in the upper porting of the roof allowed the smoke and hot gases escape with the water vapors.

As the fire heated the air, it was carried upward providing the critical air flow and low humidity necessary for dehydration. The Natural Draft

Dryer is generally accepted as the first commercial dryer and instituted the use of wood frame trays and artificial heat. Unfortunately, most burned down and today there are no known surviving examples. Ten years later, the Natural Draft Dryer gave way to a mix of crude dryers that incorporated small fans. Finally, between 1910 and 1920, Mr. L. N. Miller invented a box like dryer, with artificial heat made with oil, a large fan capable of high air velocity, humidity shutters and bleeder vents. This was the predominant design through the 1940's and spawned many variations. In the 1960's a group of scientists at the University of California, Davis, California, developed the now common overhead return Tunnel Dryer. Variations of this design are now in use throughout the USA and overseas. Commercial Dehydrator Systems, Inc. now carries on the tradition of L.N. Miller's dryers and the technology from UC Davis, which will keep dehydration alive into the next centuries to come.

FOUR PHASES OF HOT AIR DEHYDRATION

First Phase. (Raising the Core Temperature) In the first phase of raising the core temperature, the product is warmed as fast as possible without case hardening to within 10 to 20 degrees of the process air temperature. In the counterflow configuration the wet fruit is placed in the cool end and is subjected to very wet air that has lost 20 degrees or more by passing through the Tunnel. This wet air transfers heat very fast and as the car moves forward in the dryer, the process air temperature rises and the humidity drops. This accelerates the transition to the second phase. In the Parallel flow configuration the wet car is placed in the hot end and the product is immediately subjected to the high temperatures and low humidity of the high pressure end. Rather than pulling the product when it is dry (counterflow), parallel flow requires that, at in less than two hours, another car must be placed in the hot end to prevent the previous car from case hardening. Thus the wet product drives the dehydration rather than the dry product. As each car is placed in the high pressure end, a charge of wet, cool air, bathes all of the cars behind it for a few minutes. This dehydration and rehydration cycle continues throughout the process.

Second Phase (Rapid dehydration). In the second phase moisture content of the product is in near free fall. To maximize production, moisture inside the dryer needs to be controlled. As a general rule of thumb, moisture content of the process air, when drying most products, measured at the high pressure end, should be 17% to 19%. After the air passes through the dryer, measured at the cool end, the relative humidity should be 35% to 50%. Remember each product is different and should be treated as such.

Third Phase (Transition). Transition is the critical phase, from the point of view of damaging the product. The high rate of moisture release

experienced in the second phase slows down to a crawl. Most of the free water has been driven off. Capillary action at the cell level now provides the majority of the free water being driven off. The evaporative cooling that has kept the core temperature of the product well below the process air temperature, slows as well. Case hardening, cooking and caramelizing are all very possible as the product passes through the transition phase.

Fourth Phase (bake out). The final phase is characterized by a slow reduction in the product moisture content. This phase is normally the longest,and depending upon the target moisture content, may include over 1/2 of the dwell time. Caramelization is still a threat in the last phase, as well.

DEFINITIONS:

(Hopefully Mr. Webster will forgive the following abuses)

Batch Drying: Of the three ways to use the Tray Dryer, Batch Drying is simplest, and least commonly used. Batch drying refers to the loading the tray dryer with all of the product laden trays and cars at one time, and drying the lot, without moving the cars within the dyer. While some react well to this procedure, most don't The loss in the even and consistent dehydration motivates most operators to investigate other protocols. The problem with batch drying is in the uniformity of the environment the product is exposed to. Since the leading edge of the leading car sees a much different environment than that of the trailing edge of the trailing car, significant differences in moisture content will occur with in the product. It is like drying the same product in two different dryers, each dryer set at a different temperature.

Bound water: Water found in most products comes in two forms, free water and bound water. For our purposes , bound water is locked up or bound with salt, sugars, or proteins and as such, are not available for use by bacteria or mold spores for propagation. Bound water is not normally a concern in dehydration. See free water.

Caramelizing: Normally associated with fruit and vegetables with significant sugar content. Caramelizing is simply the burning of sugars. Caramelizing is normally associated with running the dryer too hot and with too much air velocity. Tearing open a sample and smelling a Camp fire scent is the classic test. For most purposes a caramelized product is ruined, with no way to salvage it for human consumption.

Case Hardening: Like caramelizing, case hardening is caused by too much temperature, too much air velocity and too little relative humidity. Symptoms include a virtual halt in dehydration and a tough leather-like

outer skin. Increasing the humidity is the key to salvaging the product. The product can normally be salvaged by massive re-hydration.

NOTE: I have seen fire hoses used to wet and re-soften the skin in an effort to kick-start dehydration again. Once softened, dehydration begins almost immediately.

Cooked: As with Caramelization above; your product has forever been changed into something else. (Will not re-hydrate back into the original form.) No amount of re-hydration will help. The oils and sugars inside the product have changed and will not keep. The rancidity clock is ticking and refrigerated storage is the only alternative.

Cool End: The cool end of the dryer refers to the end that encloses the fresh air inlet, combustion air inlet and the return air gap (in the air deck). Sometimes called the low pressure end, this part of the dryer brings fresh air, mixes in the return air and exhausts the saturated air. The fan bulkhead separates the Cool End from the Hot End.

Counterflow: Counterflow refers to the direction of the air flow within the dryer. The fresh (wet) product laden cars enter the dryer through the cool (low pressure) end doors and are stepped forward periodically as cars loaded with dry product are removed from the dry (Hot End) of the tunnel. When dry cars are removed, an entire row moves forward, and new row of wet cars enter the dryer. With each step forward the product sees a new drying environment; always dryer and hotter. Counter flow dehydration is normally associated with a lower process air temperature and higher quality dried products. Drying is accomplished from the inside out, and case hardening is rare.

Dehydration: The process of driving free water from products like fruits, vegetables and nuts, at an accelerated rate, without damage to the product. The purpose of dehydration is to stabilize the product at a low moisture content, so it can be stored without refrigeration, remain free of microbial action and can be re-hydrated to nearly the original form, appearance, taste and nutritive value.

Drying Personality Just as people are unique, so are the many products that can be dried in a tray or tunnel dryer. A carrot will respond to dehydration in a radically different manor than a prune. This unique personality causes the product to respond to dehydration in a unique manner, unlike any other product. The variables inside the dryer that you have some control over are: temperature, air velocity, relative humidity and dwell time. Constant monitoring and timely reaction to changing conditions in the product and/or in the environment will insure quality dehydration.

Hot End: The Hot End or high pressure end begins at the fan wall and extends across the air deck down through the air deck gap and extends back through the first few cars on the ground level. Distinguished by high static pressure and high process air temperatures, the hot end is where the dry product exits from the dryer when drying in the counter flow configuration.

Parallel Air Flow: Parallel air flow is a drying system that maximizes production. The wet cars enter the dryer from the hot end. The hot process air passes through the trays in the same direction as the cars are moving inside the Tunnel Dryer. Parallel air flow is used when production requirements out weigh quality concerns. The process air temperatures are high, sometimes nearly 200 degrees (F). The hot air from the fan reaches the fresh product first. To counter the potential for case hardening, another car full of fruit is placed upstream the first car at a specifically timed interval. The cooling action of moisture driven off the upstream car re-hydrates the original car slightly, thus averting case hardening. The timing of the introduction of the upstream car is critical, which means the last car (wet end) comes out of the dryer, whether it is ready or not. This is the cause of the quality issue. Parallel Flow is an adaptation of the original counter-flow methodology. See Counter-flow air flow.

Stewing: Just like it sounds, the product is not drying, normally from too much humidity inside the dryer. Add fresh air. The product is salvageable only when “Stewing” is discovered early. See cooking.

Tray Loading: The depth of the product on the tray is driven by drying personality and production considerations. To achieve even drying the tray loading must be consistent and uniform. Heavy on one side and light on the other will result in the heavy side not drying, and the light side over drying. Often seen where trays belly in the center.

---------- end here ----------

3.1.1 [How can I do jerky in wet zones?]

[The response from Vicky Shaw is on jerky. It is specific to the NW of the US. That includes the adjacent southern portions of British Columbia. While it is specific to jerky this information should aid with dehydration in general in areas that have high humidity and or rain. Thank you Vicky - ED]

Here is a cut and paste of info sheet SP 50-819 Revised October 16, 1997

New Venison Jerky Procedure

Home-prepared venison jerky was recently identified as the cause of a foodborne illness outbreak in Oregon. The small electric dehydrator that was used hadn't reached a high enough temperature to kill the harmful bacteria E. coil O157:H7 bacteria can grow in the intestines of deer and contaminate meat during handling. To kill these !bacteria, jerky must be heated to 160øF. while it is still moist. Because most home dehydrators aren't designed to reach this temperature, the jerky must be heated in another way to guarantee safety. This can be done by precooking. Precooking in marinade shortens the drying time and makes a more tender jerky. Although the color and texture will be different from conventional jerky, precooked jerky is still tasty.

Note: Research is needed to identify other safe jerky-making procedures. To date, there is no safe procedure for the dry cure method. To precook venison jerky

1. Freeze game meat before preparing so that it will be easier to dice.
2. Cut partially thawed meat into long slices that are no more than % inch thick. For tender jerky, cut at a right angle to long muscles ("across the grain"). Remove all the fat possible to prevent off-flavor.
3. Prepare 1-2 cups of marinade of your choice in a large sauce pan.
4. Bring the marinade to a full rolling boil over medium heal Add a few meat strips, making sure that they are covered by marinade. Re-heat to a full boil. Remove the pan from the range. Using tongs, immediately remove meat from the hot marinade to prevent over-cooking. Repeat steps 4 and 5 until all meat has been precooked. Add more marinade if needed.
6. Place precooked strips in single non-overlapping layers on drying racks.

We did try the method out with beef and it turned out really good. It surprised me. I thought that it would not have the flavor of an overnight soak but the cooking seemed to get the flavor into the meat real well.

3.1.2 [What results may I achieve with a SnackMaster?]

joylyn1955@aol.com <Lynette > relied:

I have the American Harvest Garden Master. Am doing apples as we speak! Here are my experiences. I have 8 trays going when I dehydrate. Am going

to buy 4 more this year plus 2 more roll up trays.

Jerkey takes about 12 hours. Apples about 8 - 12 hours depending upon the outside humidity. Roll-up about 12 hours depending upon how wet it is.

I find it does the same job in the same time no matter how many trays I use. (The most I've used is 8) Don't have more!

You don't have to rotate the trays as it has a good fan system that does great. All the trays dry at the same rate/time. Most of the variation in time for me is because we live in the Pacific northwest where it rains a lot. Humidity plays a part.

I've dropped the bottom unit from about 4 feet onto a lino. floor. It did not break or malfunction.

I chose to buy this one because I wanted something that would last and grow with me. I am very pleased with it. Paid about $230 for the whole setup with x-tra trays, fruit roll up liners and fine mesh liners.

BE SURE TO SPRAY THE TRAYS BEFORE PUTTING ANYTHING ON THEM. I always
forget and spend more time prying off the items than if I had sprayed.
They come right off then.

Can put the trays in dishwasher but have to take them out before dryer cycle.

All in all I am very pleased with my purchase. I had a Ro---- model before it was very cheap and didn't have a temp control. That is the most important part, get one with a temp control. Makes all the difference in the world. Alsl the Ro--- model's trays broke up after using 5 - 6 time.s The AH is sturdy and no sign of cracking

3.2. GENERAL QUESTIONS

3.2.1 [What do I *really* need to know about dehydrating food?]

Dehydrating food works on the principal that both microbes and enzymes in your food require free water to work. (To a lesser extent, this is how freezing works. The water is frozen instead of evaporated off.).

Generally, you get rid of the water in food by gentle, even heat (sun, oven, dehydrator) and air movement (wind, open oven door, fan) otherwise water just stays in the food or condenses on it. You especially

need to be cautious, though, about several types of mold that produce mycotoxins (e.g. aflatoxin) while growing on the surface of your dried food.

DRIED FOODS

Dried foods which take more than 1 to 2 hours to rehydration or reconstitution should be rehydrated either in the refrigerator or in simmering water to prevent the growth of microorganisms. Once vegetables are rehydrated, they will support the growth of Clostridium botulinum so they must be handled safely. Any dried foods with signs of spoilage or mold growth should be discarded. (section taken from Susan Brewer) [See also the section of aflatoxin under Spoilage.]

Check out Part 6 of this FAQ (different file), for additional web sites, and ISDN numbers, authors, etc of books recommended below.

2.2.2 [What foods dehydrate well?]

from Clint Scott (pre-1996)

Carrots dry very well. Most things do very well except green beans, zucchini and yellow squash. Oddly enough fresh asparagus tips do very well. The stalks are sort of 'barkey' but the tips re-hydrate nicely.

from Anne Louise Gockel (pre-1996)

I found that some foods are not worth drying (blueberries; yuck, although they might be useful for pancakes when camping) and others are just wonderful.

from Stephen Northcutt (pre-1996)

Besides apples and peaches, I have found that green or mature onions, spinach, and squash (zucchini) dry well and make great additions to winter soups and stews.

from Graham Dodd (Feb 8, 1996)

I use dehydrators for making fruit snacks and sweets also for preserving food. Without trying to 'Advertise' I also sell them and have some excellent recipe books with hundreds of recipes and tips in them. If any one would like to know more about dehydrators from a user view I would be happy to answer questions.

In other words, try it. It will either work for you, or it will not.
If it does not work perfectly for you, it will be great in some dishes

(stew!).

3.2.3 [Dehydrating Specific Items]

Look in 3.1 Dehydration 101 for the basics if you do not find a
specific mention on what you want to do.

3.2.4 [Pistachio Nut (and other seeds)]

Q: I intend to eat the nuts from my two eight year pistachio trees. By
now the nuts are growing. Does somebody knows how to get those crispy,
salty pistachios from the nut in the tree? Manuel Lopez Mateos]

from H. B. Ghoddusi , rec.food.historic

(pre-1996):

1 - Once you take the nuts from the tree, first get rid of the peel (the
thin one).

2 - Let them dry in sun (needs longer time and you need to have enough
sunny days) or in oven (it is faster but be careful to avoid
overheating).

3 - Make a bowl of brine (not very concentrated) up 3-4% should be alright.

4 - Put the pistachios in a pan and heat it over a cooker until browning
and bumping starts. Keep on low heating for a while in this stage.

5 - Add the brine (not soak the nuts, just make them wet) and keep on
heating while stirring until the nuts become dry again, while the salt
is crystallized over them.

P.S: I have never tried this procedure for pistachio, but I have done it
several times with different seeds and it works very well.

3.2.5 [(Sundried Tomato. (A very frequently asked question)]

(from an unknown source, posted in either rec.food.cooking or rec.food
preserving) (pre-1996)

First, a few notes. It takes about 7 pounds of fresh tomatoes to make
a single pint of dried tomatoes (I am not sure how much a pint of dried

tomatoes weighs. A pint of water weighs 1 pound.). This is part of the reason they are so expensive (costing in the neighbourhood of $20/pound around here). The best tomato to use in this process is the Roma (also known as a plum, pear, or Italian) tomato, because it contains less water and seeds. However, you can use any tomato. They will just take a little longer to dry.

Dried Tomatoes (yields about 1 pint)

Wash carefully and wipe dry:
7 or 8 pounds of firm, ripe (preferably Roma) tomatoes.
Cut out the stem and scar and the hard portion of core lying under it.
Cut the tomatoes in half, lengthwise. If the tomato is more than about 2 inches long, cut it in quarters. Scrape out all of the seeds that you can without removing the pulp. Arrange the tomatoes, with the cut surface up, on non-stick cookie sheets (glass or porcelain dishes are OK. They will have to withstand temperatures of a few hundred degrees F if you are going to oven-dry the tomatoes). Do *not* use aluminum foil, or bare aluminum cookie sheets. The acid in the tomatoes will react with the metal.

Mix together thoroughly:

1 tsp dried basil
1 tsp dried oregano
1 tsp dried thyme
2 tsp salt.
Sprinkle a small amount of this mixture on each tomato. (You may customize this mixture to suit your own taste.)
Dry the tomatoes in the oven, dehydrator, or in the sun. Directions follow for each of these methods. However, no matter what method you choose, be aware that not all of the tomatoes will dry at the same rate. They do not all have the same amount of moisture, nor do they experience the same temperature and air circulation while they are drying.

They are done when they are very dry, but still pliable. Texture is about that of a dried apricot. If dried too long, they become tough and leathery. If not dried long enough, they will mold and mildew, unless packed in oil. So watch them carefully while they dry. Try to remove them on an individual basis, before they become tough. Here are the drying methods. There is a time listed with each method.

This time is approximate, and can vary significantly depending on the moisture of the tomato. Do *not* rely on this time as more than a rough guide.

Oven-drying (approximately 12 hours):
Bake, cut side up, in 170 F oven for about 3 hours. Leave the oven door propped open about 3 inches to allow moisture to escape. After 3 hours, turn the tomatoes over and press flat with your hand or a spatula. Continue to dry, turning the tomatoes every few hours, and gently pressing flatter and flatter, until tomatoes are dry.

Dehydrator method (approximately 8 hours):

Place the tomatoes, cut side up, directly onto the dehydrator trays. Set dehydrator temperature to about 140 F. After 4 or 5 hours, turn the tomatoes over and press flat with your hand or a spatula. After a few hours, turn the tomatoes again and flatten gently. Continue drying until done.

Sun-drying (approximately 3 days):

Dry in hot weather, with relatively low humidity.
Place tomatoes, cut side down, in shallow wood-framed trays with nylon netting for the bottom of the trays. Cover trays with protective netting (or cheesecloth). Place in direct sun, raised from the ground on blocks or anything else that allows air to circulate under the trays. Turn the tomatoes over after about 1 1/2 days, to expose the cut side to the sun. Place the trays in a sheltered spot after sundown, or if the weather turns bad.
After the tomatoes are dry, store in air-tight containers, or pack in oil.

To pack in oil:

Dip each tomato into a small dish of white wine vinegar. Shake off the excess vinegar and pack them in olive oil. Make sure they are completely immersed in the oil. When the jar is full, cap it tightly and store at *cool* room temperature for at least a month before using. They may be stored in the refrigerator, but the oil will solidify at refrigerator temperatures (it quickly reliquifies at room temperature however). As tomatoes are removed from the jar, add more olive oil as necessary to keep the remaining tomatoes covered. The author notes that she has stored oil-packed tomatoes in her pantry for over a year with tremendous success. She also notes that she has tried a number of methods to pack the tomatoes in oil, but she says the vinegar treatment is the difference between a good dried tomato and a great one. It is also important from a food safety standpoint, as it acidifies the oil and discourages growth of bacteria and mold.

****** WARNING ********

Do *NOT* add fresh garlic cloves to oil-packed dried tomatoes, UNLESS you store them in the refrigerator. Garlic is a low-acid food which, when placed in oil, creates a low-acid anaerobic environment just perfect growth medium for botulinum bacteria if the mixture is not refrigerated. Botulism poisoning is characterized by a very high mortality rate. Be safe and add your garlic to the dried tomatoes as part of the recipe for them *after* they come out of the oil.

3.2.6 [Dried Cranberries]

from Marie Martinek (Dec 14, 1995)

I tried drying cranberries in the Excalibur, and even with poking every single one of them with a serious hole-maker (the sticker that comes with the meat thermometer) and soaking them in a sugar solution, they still came out sour and still not dry after twice as long a time as the instructions said. I, however, tried making cranberry sauce, whirred it through a blender/food processor, and made fruit leather with it. Worked quite well. Cover your dryer frames with waxed paper and pour the goop on (making sure it is higher on the edges than in the middle), dry until it looks right (I do not have the timing instructions here), then cut it into strips, peel the paper off the fruit (works better than trying to peel fruit off paper), curl them up, and dry some more.

from Phil Rozanski (Jan 2, 1996)

According to "Mary Bell's Complete Dehydrator Cookbook" you can dry blanched (checked) cranberries in the following manner:

1. In a bowl, pour boiling water over the cranberries or submerge them in a pot of boiling water with the heat turned off. Let them sit in the water until the skin pops. Do not let the berries boil or the flesh will turn mushy. Drain.

2. If desired, coat the berries with either a light corn syrup or granulated sugar.

3. Transfer the berries to a cooking sheet and place them in a freezer for 2 hours. Freezing the berries helps in breaking down the cell structure promoting faster drying.

4. Put the berries on a mesh sheet in the dehydrator and dry for 10 to

16 hours, depending on the make of the dehydrator, until chewy and with no pockets of moisture.

I really recommend the book that I mentioned above. It contains recipes for anything you could ever think of dehydrating. I purchased my copy at Yonkers.

3.2.6 [Fruit leathers.]

Steve Muskovin wrote:

>I am looking to cut through the fruit leather recipe trial and errors. Steve Muskovin .

>From Sandy Fifer :

I've made leather from strawberries, apricots, nectarines, peaches, and pears. I didn't like the blueberry and cherry. The skins were too annoying and I couldn't figure out a good way to get rid of them. I was able to get rid of the raspberry seeds but the leather was just too gooey for my taste. I puree the strawberries. The stone fruit I skin and then puree the flesh. I cook it briefly. Bring it to a boil for a few minutes to kill off any nasties (read this in PFB). I use 1 1/2 cups (1 1/4 cups if really thick) per American Harvester leather sheet. I add up to 1 Tbsp. sugar and depending on the fruit, an optional 1/2 tsp. vanilla extract or 1/2 tsp. finely minced ginger to each 1 1/2 cup of puree (before putting it on the sheet).

I lightly oil the sheets -- this is very important. When I've forgotten to oil the sheets the leather has been impossible to remove. As indicated in PFB, I start the dryer at 130 deg. for the first hour, 137 for the second, then 145 until the leather starts lose its tackiness (can be two to four hours depending on conditions, etc.) then lower to 135 deg until done. I rotate the trays (top to bottom and front to back) every half hour or so if I'm in the house. The strawberry I did last night took seven hours total. Pear has taken nine hours. PFB talks about needing the high temperature (145 deg) to kill mold, etc., but not wanting it the whole time because the fruit can get caramelized and scorch. And not starting at too high a temperature so that the fruit doesn't get case-hardened (cooked and sealed on the outside so that the inside can't dry out properly).

When the drying is done I remove the leather immediately. While it's warm it's still pliable and can be easily peeled off. Letting it sit for even 5 minutes has made it more difficult to remove. I tear off a large square of waxed paper and put the circular leather on that.

It's just about the same size. Then I use a scissors to cut the leather, backed by the waxed paper, into 8 wedges. I stack them and store them in a ziplock bag in a cool place for the winter.

3.2.7 [Jerky]

>From bunbury@earth.usa.net ()

It's really easy. I just made some the other night. I don't follow a recipe, but rather improvise.

Slice up some LEAN, raw beef in thin strips. Put it in a bowl and add some salt, pepper, cayenne, garlic powder, onion powder, vinegar, worscheshire sauce, sugar. (Be generous with the salt as this helps preserve it.) Use any combination of the above ingredients, and whatever else you find lying around the kitchen that seems like it ought to go good in the mix. Keep tasting it as you mix stuff together until it tastes really, really good. The very best jerky is spiced to the threshold of human pain. Use lots of red pepper if you can tolerate hot stuff.

Heat the oven to about 150 degrees F. Spread the meat out on a nonstick cookie sheet and put it in the oven with the oven door propped open (for air circulation). Make SURE that the heat is NOT high enough to cook the meat or it will be ruined. (actually, if it cooks, it will still taste good, it just won't come out being jerky). When the meat is pretty dry (but not so dry as to be crunchy) take it out of the oven and put it in a plastic bag. If it seems to be getting a little damp feeling after a few hours in the plastic bag, then you didn't dry it enough and it should go back on the cookie sheet in the oven for a while.

Safety tip: Do not use pork, bear, or any meat that could carry parasites such as trichina. All jerky is RAW, dried meat. I remember reading of some people that got trichinosis from eating bear jerky.

[One other important jerky tip.]

>From Richard Thead : in the bbq mailing list...

I have lots of experience smoking beef jerky. The bottom line is that if you aren't careful, it's easy to get it too smoky. Early in my learning curve, I made one batch that was completely inedible.

If you have a slow smoker or use wood mixed with other fuels, it's easy--just don't use too much wood. Exactly how much will depend on many things, so you'll just have to work it out by trial and error. I do it in the slow smoking section of my pit using wood only for fuel. I've

learned that smoking it at around 140 to 150F for three hours gives me the smoke flavor I like. At that point, the meat isn't completely dry, so I finish it in a dehydrator (use an oven if you don't have a dehydrator). One thing I'd recommend is to always add a teaspoon or so of Tenderquick per 5 lbs of meat just to play it safe.
I've made it without any curing salts and lived to tell about it, but nowadays I always use them. A half teaspoon of Prague powder #1 will do too. How smoky was that incredible stuff? It was in a ziploc bag stored in close proximity to some cashews in their own ziploc for a few hours, and the cashews got so smoky tasting I couldn't eat them!

3.2.7.1 [Beef Sticks]

From: paulhinr@nando.net (Paul Hinrichs)

Try this proven recipe:

Slim Jims (10 pound recipe)

2 level tsp. Prague Powder #1
4 tbsp. paprika
6 tbsp. ground mustard
1 tsp. ground black pepper
1 tsp. ground white pepper
1 tsp. ground celery
1 tbsp. mace
1 tsp. granulated garlic
3 1/2 ozs. kosher salt
1 1/2 ozs. powdered dextrose
6 ozs. Fermento
10 pounds lean ground beef

This is the Kutas recipe. The last two ingredients are for fermentation and may be omitted if you don't want the tang. After you stuff the beef sticks, he recommends smoking at 90-110 F for 8 hours and letting it go at this temperature for another 12 if you want the tang to fully develop. Then you raise the smokehouse temperature until the meat reaches 145 F internally.

If you wish to modify your current recipe for the dehydrator, or use this one (I highly recommend it, I've made it several times), just follow the temperature guidelines. IOW, keep the temperature under 110F for 8 to 20 hours, then crank it up to cook the sausage at the very end. What you've probably been doing is following the same procedure as for jerky, dry at 145 F until dry, and have been ending up with jerky in a casing. Beef sticks will not be as dry as jerky, hence the lower temperature. FWIW,

I use the Prague Powder #1 and make jerky at 120F and it is much more flavorful than the stuff dried at 145F like most recipes call for. Under 140F, the curing powder is absolutely necessary to prevent the growth of botulism.

3.2.8 [Dehydrator Tomato Paste]

>From Linda Merinoff :

HOMEMADE TOMATO PASTE

Tomatoes
Salt
Fresh basil
Olive oil

Push your tomatoes through a food mill. It's time consuming, but it gets rid of the seeds which I think are bitter. You can also puree the tomatoes in a processor or blender and push them through a sieve or chinnois to get rid of the seeds. Or you can leave the seeds if you don't mind them.

[If you don't have a food mill, cut your tomatoes in half, get rid of the tomato seeds with a finger, then rub the tomato halves through a course grater.--LEB]

Spread the very liquid tomato on the flexible solid ring that fits into the dehydrator. Sprinkle with a small amount of salt and put a few sprigs of fresh basil in.
Run the dehydrator, stopping every hour at first to stir the mixture with a rubber spatula a couple of times, making sure you stir every bit of it. When the puree starts getting thick, stir every half hour. When it gets almost to the right thickness (which is however thick you like it), stir every fifteen minutes. All this stirring keeps the puree from burning or sticking.
When it's slightly less thick than you like it (it thickens as it cools), stir again, remove the basil, and pack the paste into a jar just large enough to hold it. Put a very thin layer of olive oil on top. Every time you take some, put an extremely thin layer of oil on top again. Any extra paste can be frozen.

For those of you as absent minded as I am, I once scooped half a jar out to discard it, thinking it had gotten moldy. It hadn't. The oil on top had solidified, as it often does in the fridge, and just looked weird.

3.2.9 [parched corn and bean]

from David Sidwell (pre-1996)

Here is a wonderful recipe for parched corn. it is eaten by Hopi children and adults as a real treat. Speaking of parched corn, you can also parch beans. Small, white teparies work well, especially if they are from last year's harvest or older. The Hopi make parched beans the same way they make parched corn.

1. Heat clean, fine sand in a cast iron pot until it becomes dark brown and hot. (water sprinkled on it should pop and sizzle).

2. pour in a cup or two of dried corn. (old corn will be crunchy, this year's corn will be harder).

3. Stir corn briskly, to keep it from burning, until it stops popping.

4. Remove corn from sand with a sieve and pour into bowl.

5. Sprinkle corn with salt water (1 T. salt in 1 C. water), and stir with a corn cob that has been dipped in the salt water.

6. Add pinon or peach nuts for variety.

Note: The Hopi nation has very sandy soil. it does not cling like many sands but falls away from toasted foods. You may want to experiment a bit with the sand from your area.
We put parched corn in stews, soups, salads, and we eat it plain. yum yum. Parched beans are often used as a snack.

3.2.10 [Dried Chile peppers.]

From: ZebCook@pacbell.net (David Cook):

It's absurdly easy. Either take a needle and thread and string the chiles in a bunch near the stem of each, then hang in the sun. After a week or so they'll be nicely dried and you can break them off as you need them. This works particularly well for thin-walled chiles, like cayennes. Or, spread them on the rack in your oven, set it to just warm and prop the door open. Leave them in their overnight or longer until they're done. If the chiles are thicker, you might split them before drying.

Finally, get a dehydrator and dry them in it.

Personally, I favor the sun method. It's cheap, doesn't tie up the oven, and strings of chiles belong in the kitchen (at least in mine!)

[Nylon thread works very well, strong and doesn't fray. This procedure works just as well with morels, ceps and other edible wild mushrooms--just know your mushrooms. -LEB]

3.2.11 [Dried Tofu]

From: locksmth@dialnet.net

My tofu book says to dry it: It is preferred if you make your own tofu, make it as firm as you can. Freeze it for a day or 2, take it out and let it thaw out. Squeeze as much water as you can out of it. If you want crumbled or mashed, do that now, or slice it or cube it. Anyway now after it is in the form you need it, put it in the oven at 175 degrees for up to 6 hours. Do not let it get brown but make certain it is a golden tan color. Store after drying on the shelf in a sealed plastic bag. To reconstitute it, mix cup for cup with hot water, stock, or whey. Stir and let stand 15 minutes or so or until the previous spongy consistency returns. Drain off any liquid not absorbed. You can also reconstitute it in a marinade, full strength or diluted with water. You can also add dried tofu to soups, meat loaf or moist vegetable patty mixtures etc.

3.3 GENERAL EQUIPMENT QUESTIONS

3.3.1 [What do I *really* need to know about dehydrating food?]

from Cassandra Richardson (Jan 11, 1996)

>What about the type advertised on TV (Ronco?) are they worthwhile?

My opinion is that most people buy kitchen gadget and find they novelty wears off. Why not buy a cheap one and see if you really get much use out of it. I dry herbs and tomatoes and occasionally I dry smoked salmon after it comes out of the smoker (cuts down on the running in and out of the house); however, most of the people I know never use theirs.

from Leslie Basel (Feb 4, 1996)

If you are uncertain about how much use you will get out of a dehydrator, you might want to try using your oven as a dehydrator. I have done tomatoes for years in the oven, and I am certain that if you have the patience to fiddle around, you could make some dried things and see how much dried stuff you use. If you find that you are making and using dried things, remember that a dehydrator is much easier to use than the oven. You develop the interest first, then the specialized equipment.

That being said, many folks use dehydrators to make dried fruit for healthier snacks, dry herbs (dried tarragon in the supermarket is astronomical). If you do any camping, you could dry trail mix and meals to reconstitute for later on. Some canning recipes call for dried fruits for a richer flavor. Mostarda is a mustard/dried fruit compote, good for meats.

A garden is a capital idea, but an orchard much less so. You might want to ask your friends and neighbors if they are living with a fruit tree. We used to be shameless about asking around. If we got fruit, we dry it and can it, then give some to the tree owner as a gift. It just seems a bit too much work to raise a fruit tree up to maturity to see if you have an interest in food dehydration. What ever you do, good luck and have fun.

from Wendy Milner (pre-1996)

When looking for a dehydrator, consider volume. How much volume will you be using now, and how much in the near future? Additionally, if you like fruit roll ups, look for a screen with a very fine mesh. This would be in addition to the regular sized screen. The fine mesh is also good for drying herbs. I use a convection oven with dehydrate features. Very convenient since I do not have to pull out another appliance.

from Gary Yandle (pre-1996)

The reason you want a temperature control on a dehydrator is that different kinds of food dry at different temperature. Herbs dry best at about 90 to 100 degrees F. Vegetables at about 110 to 120 degrees F. Fruit is best dried at 120 to 130 and meat from 135 to 145 degrees F. The whole idea is to dry the food quickly so as to preserve as much of the flavor and vitamins as possible without cooking the food. Another must have when buying a dehydrator is look for one that has a fan. Good air circulation is a must for fast drying. Also look for one that has trays that are easy to clean. If the trays have places on them that you cannot get a scrub brush into then you will never be able to get it clean. (Do not let anyone tell you that dehydrating food is a clean operation, cinnamon apples and beef jerky make a big mess).

from Connie TenClay (Dec 7, 1995)

I would suggest getting a electric dehydrator as it can be used year around and is convenient. Also I feel that a fan as well as a heat

source is important. Without a fan the food dries much slower and not as evenly. While a thermostat is not mandatory it certainly makes for a better product. i.e. meats can use a higher temp than fruits to dehydrate. I have found that one of the best books about dehydration is the HP book "How to Dry Foods" by Deanna Delong. If you have any other question I would be happy to try to answer them. I have been dehydrating food for over 20 years with every thing from trays over a furnace duct to home made electric dehydrator to the commercial one that I have now.
Please take a look at the dehydrator sources/suppliers/more specific details in Specific Equipment Questions (in Part 4).

3.3.1.1 [What dehydrator features should I look for?]

Double wall construction of metal or high grade plastic. Wood is not recommended, because it is a fire hazard and is difficult to clean.
Enclosed heating elements.
Counter top design.
An enclosed thermostat from 85F to 160F.
Fan or blower.
Four to 10 open mesh trays made of sturdy lightweight plastic for easy washing.
UL seal of approval.
A one-year.guarantee.
Convenient service.
A dial for regulating temperature.
A timer. Often the completed drying time may occur during the night and a timer could turn the dehydrator off and prevent scorching.

3.3.2 [Specific Brands]

from Steven Kostur (Jan 1, 1996)

Some consumer book (or the other; name escapes me) suggested Waring's Deluxe Food Dehydrator Model DF4171 $90-100 (no reasons were given). An Organic Gardener 1995 (October?) suggested the Waring Deluxe Food Dehydrator, or the Excalibur 2500 (US$189.95), Press-AIReizer

(US$249.95), and (IMHO) to a lesser degree the Vita-Mix Harvest-Savor

(US$89.95) and American Harvest Snackmaster (US$89.95). Such factors as amount of control (fan speed, temperature), and how hard it is to peel the stuff off the racks and IF you had to rotate the trays (that latter ones you do) to get even drying.

[Note from Jennifer Cagle : Vita mix no longer
makes or markets dehydrators. (March, 1996).]

from Steven R. Tobin (pre-1996)

I just bought a Harvest Maid, also sold as American Harvest, and a friend has had one for a couple years and really likes it. The main thing is to look for one with a thermostat controlled heater. Do not be suckered into one like the Ronco, that does not have a heater. It took me 4 hours to dry a load of apples last night, while the other kind (w/o heater) will take days to do the same job.

from Stuart Johnson (Jan 1, 1996)

We use an American Harvest. Have had very good results with meats (jerky) and all types of fruits and vegetables.

from Lynn E Johnson-Conrad (Jan 2, 1996)

We have an American Harvester Snack Master (expandable to 12 trays). It has a blower and a variable temperature setting marked for the different types of foods. The Snack Master is about $65-70 with four trays and extra trays are $24 for two. Ours was bought at a big hardware store. For Christmas my husband bought me 6 new trays (that he found on half price sale - yippee) so we will really be in shape to dry when our garden goes nuts next summer. My only complaint is that there is no on-off switch (power control is by plug and unplug) and the noise of the fan, while not loud, can get to be annoying if you are trying to hear someone in an adjoining room. My understanding is that the Ronco model does not have a blower - so it takes a lot longer to dry.

Beef jerky takes about 18-20 hours- but we like to do it very dry and it starts out pretty wet from overnight marinating. We have done all sorts of stuff in our Snackmaster and love it. Apples and banana chips are our favourite and take about 12 hours. I recently dried 7 trays full of late growth celery tops from our garden. That took about 16 hours to get the thin stalks dry. Tomatoes take about 10-12 hours. The only thing I am not happy drying is herbs- I still prefer to do them in paper sacks on top of the fridge. They take about 24 hours in the dryer (very low temperatures) and about 48-72 on top of the fridge. We have dried other vegetables for use in soups and stews. I have not noticed any specific increase in our electric bill for the times we were drying lots of tomatoes.

from Phil Rozanski (Jan 2, 1996)

I also have an American Harvest Snackmaster with 8 trays and have great results with jerky (it takes 6 hours to dry) and anything else dried in it. The nice thing about the model I have, is that the temperature is adjustable and the foods are always dried uniformly. The other nice thing is the price is very reasonable.

from Naomi Counides (Jan 12, 1996)

I have an Excalibur and I do not can tomatoes (hot sweaty work in summer). I have usually about 25 plants. I slice them (unpeeled) and load them into my dehydrator which I keep outside (who needs extra heat in the house?) I make about 30 gallon bags of tomatoes. We use them in the winter. We also dry fruit, herbs and other vegetables. It gets used a lot more than my canner.

from Steve & Beth (Jan 1, 1996)

>What about the type advertised on TV (Ronco?) are they worthwhile?

All I know is on the advertisement for the Ronco Dehydrator they say it take 1 1/2 days to dry beef jerky. In my Excalibur it only takes 6 hours. If you plan on getting a dehydrator and are going to use it frequently do not buy cheap. Invest in something that you will be happy with. Point of reference 16 years ago my dehydrator (5 shelves) cost around $100.00.

from Naomi Counides (Nov 30, 1995)

Do you have a garden and fruit trees? The reason I ask is that the amount of "raw" material to be processed influences size need for dehydrator. I have a large garden etc and a nine tray electric Excalibur. Here in Idaho it does not rain much in late summer so I leave it outside. (Keeps the heat out of the house.) I use it steadily, 24 hour a day and 7 days a week from late July through September. When the air has a bit of chill, I take it inside and dry apples (smells nice). In the main summer months I dry, rather than can, tomatoes. The model I use can dry a half bushel of tomatoes in 24 hours, approximately. I also dry other vegetables, and fruits and make leather. A nice feature on mine is the that the plastic tray and plastic screen are separate pieces. This can make removal of individual pieces much easier.

from Rick Buchanan (Dec 24, 1995)

I have a garden master with round stackable trays. It is much faster than the models that look like microwaves. A friend of mine has the VitaMix food saver. She likes it a lot and I think it is a better machine than my garden master. The trays are a little smaller in diameter than on the garden master, but the unit costs a whole lot less than the garden master. Believe the VITAMIN will stack up to about 23 trays. Have experience with the Excalibur (microwave lookalike), and the round trayed garden master. If I had it to do over I would buy the VITAMIN with all trays, grids, and liners. [See

note from Jennifer Cagle above.]

3.3.3 [I have heard you can make a dehydrator yourself. Got any info?]

Check out the plans/ideas in Specific Equipment Questions in Part 4. You really are limited only by your own creativity. Take a read below.

from Stephen Northcutt (pre-1996)

Take an old dead fridge, cut holes in the top as vents. Cover holes with 2 layers of screen to keep bugs out. Put 100 watt light bulb in bottom in ceramic receptacle. You can add additional shelves easily by screwing small woodstock to sides and sliding in net covered frames.

[be VERY sure to child-proof any and all refrigerator adaptations - ED]

from Anne Louise Gockel (pre-1996)

Also, the newest edition of _Putting Food By_ includes information on building a smoker with a small fire pit, a ditch with stove pipe and a large 50-gal drum (from something like honey!). It is a pretty ingenious system.

4. PICKLING

4.1 GENERAL QUESTIONS

4.1.1 [What do I *really* need to know about pickling?]

For storage of unprocessed foods at room temperature the acidity must be 5%.

** Using 5% vinegar and adding water yields LESS than a 5% pickle - this is a VERY common error.

Salt brine must be 10% for vegetables. Sugar is often added to soften the effects. If process or storage temperature is above 21C higher levels of salt will be required.

For lower salt and vinegar pickling you will follow a *tested* recipe which will specify processing.

4.1.2 [What pickle styles are there?]

Pickling food encompasses several techniques, but usually involves equilibrating food in a salt solution, then one either adds an acid (vinegar), or allows the growth of free yeasts and bacteria to make lactic acid by fermentation. If you are trying to pickle food using fermentation, you need to insure that the salt concentration in your crock will support the microbes you need, and you need to control and monitor their growth. Since you are working with a salt and acid, you also want to make sure that you pickle in a non-reactive container (e.g. porcelain, glass). ----

PICKLES AND FERMENTED PRODUCT SAFETY

From Susan Brewer, files at the cesgopher.ag.uiuc.edu

The acidity (pH) of a food is of great significance in determining the type of processing required for safe preservation of a food. In the case of pickled products, the foods preserved are often low-acid foods (cucumbers, zucchini), but their acidity is adjusted to bring the pH into the high-acid range so that may be safely preserved using boiling water bath processing.

The most commonly used acid for pickling is vinegar, however some pickle products are produced by encouraging the growth of microorganisms which produce lactic acid from the naturally occurring carbohydrates in fruits and vegetables. The lactic acid selects for another group of microorganisms which produce acetic acid that gives pickle products their flavor and helps to lower the pH into the range where these vegetables can be safely water bath canned.

The acidity of pickling solutions needs to be maintained below pH 4.5 if water bath canning is to be used. For this reason, the amount and strength of the vinegar is critical.

I. Types of Pickles

- A. Brined or fermented: Depends on selection of natural micro-

organisms which will produce acid. Selection is accomplished by using salt to inhibit unwanted microbes. Fermentation is usually for 3 weeks or more. Color changes from bright green to olive or yellow green and white interior becomes translucent. Examples: sour pickles, sauerkraut.

- o B. Refrigerator dills: are fermented for one week.
- o C. Fresh-pack or quick-process pickles: Cured for several hours or combined immediately with hot vinegar, spices and seasonings. Examples: pickled beets, bread and butter pickles.
- o D. Fruit pickles: Whole or sliced fruit simmered in a spicy, sweet-sour syrup. Examples: spiced peaches, crabapples.
- o E. Relishes: Made from chopped fruits or vegetables which are cooked to desired consistency in a spicy vinegar solution. Examples: horseradish, corn relish.
- o F. Pasteurized Pickles: Prepared pickles are placed in a canner half filled with warm (120-140 F) water. Add hot water to 1" over jar lids. The water is then heated to 180-185 F and maintained there or 30 minutes. Temperatures over 185 F may cause softening of pickles.

USE THIS PROCEDURE ONLY WHEN THE USDA CANNING GUIDELINE RECIPES
ARE USED.

II. Ingredients

- o A. Vegetables or fruits for pickling
  - + 1. Fruits and vegetables should be ripe but firm, and in good condition with no evidence of microbial or insect damage.
  - + 2. Cucumbers should have a 1/16" slice removed and discarded from the blossom end.
  - + 3. Use unwaxed cucumbers for pickling so brine will penetrate.
  - + 4. Discard any cucumbers which "float"--they can make hollow pickles (use for relish).
  - + 5. Prepare fruits and vegetables within 24 h of harvest.
  - + 6. Cucumbers: need 14 lb for 7 quart canner load, 9 lb per 9 pint canner load. One bushel weighs 48 lb and yields 16-24 quarts (2 lb / quart). Use 1 1/2" for gherkins and 4" for dills.
- o B. Vinegar
  - + 1. Vinegar needs to be of sufficient strength to assure that low-acid vegetables will be appropriately acid. The vinegar should be 5 to 6% acetic acid (50 to 60 grain), and should not be diluted except according to an approved recipe.

    + 2. White vinegar is preferred with light colored fruits or vegetables.
    + 3. Do not use homemade vinegar--there is no way to know the strength (% acetic acid).
- C. Salt
    + 1. Canning or pickling salt should be used--it contains no iodine (which can cause darkening) or anti-caking ingredients (sodium silicate or tricalcium phosphate) (which cause cloudiness of the brine).
    + 2. Salt inhibits certain kinds of microorganisms and in fermented pickle products, it is required to prevent growth of spoilage and pathogenic microorganisms. Salt also draws water out of the cells making the pickled product more firm. Too much salt will cause shriveling.
    + 3. Do not use "sour salt"--it is citric acid and does not have the same inhibitory effect on microbes.
    + 4. Do not use reduced-sodium salt in fermented pickle recipes. Reduced sodium pickles can be made using quick pickle recipes given in the USDA Canning Guidelines. Fresh pack pickles, acidified with vinegar can be prepared with little salt but the flavor and texture will be affected.
    + 5. Salt concentration in brined, fermented products must not be reduced for safety. Do not try to make sauerkraut or fermented pickles by cutting down on the salt.
- D. Sugar
    + Either white or brown granulated sugar can be used.
- E. Spices
    + 1. Use fresh, whole spices in cheesecloth bag.
    + 2. Powdered spices cause darkening and clouding.
- F. Hard Water
    + 1. Hard water minerals may interfere with acid formation and curing in fermented pickles. In addition, hard water may have a pH of 8.0 or higher.
    + 2. Softening hard water: boil water for 15 minutes then allow to stand for 24 hours. Skim off any scum that appears. Pour out of container so sediment is not disturbed.
- G. "Crisping Agents"

These products are not recommended as they may result in a product with a pH which is unsafe.

    + 1. Lime (calcium hydroxide) which is sold as "slakelime", "hydrated lime", "builders lime", or "household lime". When called for in a recipe, it is added to the brine before pickles are soaked. When used, lime is added for 12-24 hours of soaking. It must be removed from pickles by soaking (1

hour) and rinsing three times in fresh water in order to make the pickles safe. The component of calcium hydroxide which firms up the pickles is the calcium--it cross-links the pectins making them insoluble.

DO NOT USE: agricultural lime, burnt lime, quick lime--these are not food grade products and are unsafe.

+ 2. Alum (aluminum and potassium sulfates): Use no more than 1/4 tsp of alum per quart of pickling solution. Excess will cause bitterness. Alum may be safely used--it does not improve the firmness of quick-process pickles.
+ 3. Grape leaves: contain substances which inhibit enzymes that make pickles soft. Blossom removal takes care of this problem.
+ 4. Hot process: pickle firmness may be improved by processing the pickles for 30 minutes in water maintained at 180 F. Water must not fall below 180 F--prevents spoilage (pasteurization).

Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992 EHE-696 ----

4.1.3 [What is the process for making dill pickles?]

You have two options, depending on time, tastebuds, and ethnic heritage. First option is brine curing, where you scrub small size pickling cukes clean of hairs; dissolve pickling salt into hot or boiling water to make a brine; pack cukes, spices, and dill seed heads in a very clean crock; pour brine over the cukes; weight everything down with a clean plate; place crock in a cool, dark place; skim yeast scum as it forms for several weeks, adding salt brine as needed. [Check out the Tips 'N Tricks section for a tip to make this job easier.] When done, you either refrigerate or pack your dill pickles into canning jars, waterbath process. BTW, don't even think of taking a vacation during this procedure; uncontrolled pickle crocks are the most disgusting things in food preservation.

The second option is to make quick dill pickles by packing vegetable spears/ chunks tightly in pre-sterilized jars with dill seed heads, then heat a vinegar, water, salt, sugar, spice brine, then pour the solution into the packed jars. Seal, then waterbath process.

Check out some of the cookbooks cited in the back of this FAQ for recipes, and look at a couple of recipes at the back of this section. I have not tried any of these so YMMV.

4.1.4 [What makes pickles kosher?]

Check out the Real New York Pickle recipe for one poster's opinion. Also tells you what half and full sours are...

Kosher style pickle is commonly taken to mean a salt brine pickle. A real Kosher pickle is an ordinary brine pickle but it is made under rabinical supervison and inspection.

Leah H. Leonard in her book, Jewish Cookery, has recipes for pickles that one will find in any supermarket ... they are so mainstream and generic we know them as piccalli, pickled peppers, etc.
Strictly speaking Kosher in food is a very specific procedure(s) which assure food conforms to Jewish Religious Law.

4.2 GENERAL EQUIPMENT QUESTIONS

4.2.1 [What does it take to make pickles? Do you need special equipment?]

The most specialized piece of equipment that you'll need is a crock, which is just a large, non-reactive, smooth container. You need a big container, because you might as well do a lot of pickles rather than just a few; you need a non-reactive one (see below) because you will be working with salts and vinegar, and you don't want metals in your pickles. You also want a smooth container, because a lot of microbial spoilers will cling to rough edges, making it hard to clean thoroughly.

Other things you'll need: waterbath canner, canning jars and lids, timer, wooden spoons, heavy plates, cheesecloth. One of the most important things for successful pickles is a cool place. The crock shouldn't get above 70 F, otherwise the pickle bacteria/yeast grow too quickly and spoil the pickles.

4.2.2 [What's a non-reactive container?]

Non-reactive things: ceramic, glass, stoneware, food-grade plastic, wood, porcelain. Reactive: copper, zinc, cast iron, brass, aluminum, carbon steel, or galvanized anything.

4.2.3 [Where can I find pickle crocks?]

Citation? Crocks can be found at Williams Sonoma, a mail order store in California. They have two sizes and are quite dear, small size

about $20. I found some great pickling jars at Pier 1 Imports. Largest size about 1 gal goes for $12. I like the next size down, about 1.5 quart for $7. (1995-1996 prices). [Noticed that Alltrista (Ball Canning Co.) also sells crocks for about $15.--LEB].

From Bubba Leroy Bubba.Leroy@FLYING.NET:

(I get mine at the) asian market in my area-there are 4 such markets -they use them for kimchi and they do just fine, but then so do the gallon plastic jars that every restaurant gets mayo and relish in. I have a five gallon bucket that makes very nice dill pickles and most places will give you all you want. [Check out the food-grade plastic story (good for pickle crocks) in Tips 'N Tricks.--LEB]

4.3 TROUBLESHOOTING

4.3.1 [I followed this pickle recipe, but they don't look like they do in the store. What happened? Can I still eat them?]

PICKLE AND PICKLE PRODUCT PROBLEMS

Making home-made pickles is a time consuming and expensive operation. There are a variety of different steps along the road from cucumbers to sweet Gherkins, so there are a number of places where the process can break down. Pickle problems can usually be traced to the method by which the pickles, brine or syrup are prepared:

- o a. Weather and growing conditions (quality of your vegetables).
- o b. Kind of salt used (canning or pickling vs iodized table salt).
- o c. Vinegar (5% acetic acid, or 50 grain).
- o d. Temperature of storage conditions (fermentation).
- o e. Pickling method (fermented, quick-pack).
- o f. Time lapse between gathering and pickling the vegetables. [And you store them during this step.]

1. White scum appears during fermentation--the scum is a layer of yeast and/or mold: Safe

- o A. Vegetables are not submerged in brine.
- o B. Pickling container is not sealed.

2. Pickles or sauerkraut is soft or slippery: Unsafe

- o A. Brine is too weak (less than 10-12% salt)--allows growth of organ- isms which cause texture softening and sliminess.
- o B. Vinegar is too weak (less than 5% acetic acid)--allows growth

organisms which cause texture softening and sliminess.
- o C. Temperature during brining was too high (over 75 F).
- o D. Too little brine--all cucumbers must be immersed.
- o E. Salt is unevenly distributed on cabbage.
- o F. Air pockets due to improper "packing" of cabbage allow for growth undesirable microorganisms. [Need to tamp well]
- o G. Failure to remove scum daily on surface of brine.
- o H. Failure to remove the cucumber blossoms--enzymes from the blossom will cause softening.

3. Pickles are hollow: Safe

- o A. Improper curing: weak brine, pickles uncovered during curing, curing stopped short of full fermentation.
- o B. Too much time lapse between gathering and brining (ie. more than 24 hours).
- o C. Cucumbers have grown in an "abnormal" way.
- o D. Temperature too high during fermentation.

4. Shriveled pickles--caused by excessive loss of water from the cucum- bers: Safe

- o A. Curing brine is too strong (more than 12% salt, vinegar more than 6% acetic acid).
- o B. Too much time lapse between gathering and brining (i.e. more than 24 hours)-- cucumbers are dehydrated.
- o C. Pickling solution which is too "heavy", or contains too much sugar.

5. Pickles or sauerkraut is dark or discolored: Color development due to iron is safe to some extent but not with other metals.

- o A. Using hard water for pickling solution--minerals in the water react with pigments in the cucumbers. Iron in the water is the worst offender.
- o B. Use of brass, iron, copper or zinc utensils during pickle making - they contribute metal ions which react with cucumbers to form dark pigments.
- o C. Use of ground spices will darken pickles.
- o D. Whole spices were left in the pickles after packing.
- o E. Vegetables (cabbage) is unevenly salted.
- o F. Curing temperature is too high.
- o G. Vegetables are making contact with the air - pigments oxidize.
- o H. Use of cider vinegar with light colored vegetables.
- o I. Use of brown sugar with light colored vegetables.

6. Sauerkraut turns pink: Unsafe

- o A. Too much salt (over 2.25%) = yeast growth on surface.
- o B. Uneven distribution of salt = yeast growth on surface.
- o C. Kraut is improperly covered or weighted during fermentation = yeast growth on surface.

7. Moldy pickles or sauerkraut during fermentation: Unsafe

- o A. Fermentation temperature is too high.
- o B. Insufficient lactic acid production (too much salt).
- o C. Failure to keep cloth on top of kraut clean during fermentation (may need to be replaced after skimming).

8. Pickles are strong or bitter tasting: Safe

- o A. Used too much spice.
- o B. Spices cooked too long in the vinegar.
- o C. Vinegar is too strong (more than 6% acetic acid).
- o D. If pickles are too acid increase the sugar, do not decrease the acid.
- o E. Use of "old" or overmature cucumbers with tough, bitter skins.

9. White sediment occurs in the jars: Small amount of sediment normal. If pickles are soft and slippery---Unsafe.

- o A. Yeasts grow on the pickle surface then settle to the bottom--they are harmless, but can be prevented by water bath processing filled jars.
- o B. Use of table salt instead of pickling salt--it contains anti-caking ingredients which settle out.
- o C. Poor temperature control.

10. Pickling liquid in the jars is cloudy: Unsafe

- o A. Pickles are spoiled--discard.
- o B. Hard water minerals may cause clouding.
- o C. Use of table salt instead of pickling salt--it contains anti-caking ingredients which cause clouding.
- o D. Use of unstrained brine (from fermentation) for pickling liquid may cause clouding.

11. Pickles or sauerkraut "spoil": Unsafe

- o A. Use of unsterilized jars.
- o B. Use of ingredients which have lost their strength (i.e.

vinegar).
- o C. Inaccurate measuring of ingredients.

12. Pickles are "dull" or "faded" in color: Safe

- o A. Use of over-ripe or yellow cucumbers.
- o B. Use of fruits with pale color.
- o C. Overprocessing of beet pickles--pigments are damaged.
- o D. Pickles exposed to excessive light.

Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992
EHE-695 ----

4.3.2 [Pickles in the NW]

Suzanne Chandler sends this article:

From PNW 355 (Pacific Northwest Bulletin 355 which is based on the USDA's "Complete Guide to Home Canning"

"Preservation by Pickling
Microorganisms are always present on vegetables. Home canning prevents the growth of those that cause spoilage and illness. When the scidity of a canned food is high, harmful bacteria like 'Clostridium botulinum' <shudder> can't grow. That's why pickling (the addition of acid) prevents spoilage:

There are two types of pickles:
1.) Brined (fermented) pickles require several weeks of 'curing' at room temperature. During this period, colors and flavors change. Acid is produced as lactic acid bacteria grow.

2.) Quick (unfermented) pickles are made in 1 or 2 days by adding acid in the form of vinegar. It's critical to add enough vinegar to prevent bacterial growth.

[Suzanne's comments: remember the bacteria you are preventing is the feared 'Clostridium botulinum" which can be odorless, invisible, and still deadly.

Also the last sentance of option one reads funny (according to me). What it is saying is that as the lactic acid bacteria grow, they produce enough acid to wipe out there fellow bacterias.

Also, the the lactic acid bacterias in the Brined pickles are activated by the salt, so you must follow the salt instructions to the letter and only use canning or pickling salt. The salt included in recipes for Quick pickles is more negotiable.]

Sounds like you, Glen that is, have a fermented pickle recipe. Here is a Quick Pickle recipe from the same publication.]

4 lb pickling cucumbers (4 inch)
14 garlic cloves, split
1/4 C pickling salt
2 and 3/4 C Vinegar (5%)
3 cups water
14 heads fresh dill
28 peppercorns

Yield 6 to 7 pints

Procedure. Wash cucumbers and cut in half lengthwise. Heat garlic, salt, vinegar and water to boiling. Remove garlic and place 4 halves into each pint or quart jar. Pack cucmbers into jar, adding 2 heads dill and 4 peppercorsn.

Pour hot vinegar colution over the cucmbers to within 1/2 inch of the top. Adjust lids and use conventional boiling-water canner processing <snip>pints for 10 minutes and quarts for 15 minutes at sea level. (15 and 20 at 1001-6000 ft, 20 and 25 at above 6000 ft.)

[more Suzanne comments: the seasoning can be fooled with, but don't even think about adjusting the vinegar water ratio. I use the grape leaf trick for crispiness and wouldn't even try to make pickles without it: the tannins in the leaf reduce the impact of pickle softening enzymes.

> I come to me knees :-)

Well toss up a little pickle prayer while you are there! Good luck, let me know if you need more info.

Suzanne

4.4. Collection of pickle recipes. Some typical, some odd, most ethnic. YMMV, email the contributor for details.

4.4.1.RECIPE : Transylvanian Salt-Pickle Veggies

From: Wolfgang mailto:capuano@deakin.edu.au

I should have submitted this to the FAQ, but I never got around to it. I like these pickles because I don't really like vinegar. Balsamic is fine, but pure white commercial stuff is foul (on my tastebuds). This recipe is the way pickle is made in Transylvania. It was given to me by a non net person.

You will need :

Canning Salt
Water
Toasted Rye Bread
Canning Jars

Veggies :
Gherkin Cucumbers (whole)
Cabbage, sliced
Carrot (finely sliced)
Raw Green Beans
Cauliflower
Garlic cloves
Sun chokes
DILL, DILL, DILL and more DILLseed!!!!! (A must)

Spices :
Peppercorn (whole); Coriander (whole); Commercial Pickling Spice

Directions :

For every liter of water, add 40 grams of salt. Boil water and let cool (with lid on). Wash and dry jars. Prepare the vegetables. Place veggies in jar, tightly packed, and sprinkled with spices. Pour salt water over and place a small piece of toasted rye bread on top of veggies. Cap, and leave in a warm, dark place. You might notice bubbles forming and a thick white sediment. This is caused by the yeast fermentation that occurs in the jar. There are a few principles that give this sort of pickle a long shelf life:

1.) No oxygen. Yes, its starts of with oxygen in the headspace, etc, but the yeast fermentation uses that oxygen up. Remember, oxygen causes oxidation, which spoils the pickle.
2.) Salt. It stops many organisms growing, and keeps the vegetables fantastically crisp, and full of flavour.
3.) High Pressure. The yeast converts vegetable sugars into gas [CO2--LEB], this gas increases the atmospheric pressure, like a carbonated beverage. Not many organisms like high atmospheric pressures.

In 3 weeks, you can try your pickle. It will last much longer if you can put a few away. Taste your gherkin first, it will taste like a gherkin you have never had before. The carrot actually tastes like carrot, not a vinegar sandwich. Let me know what you think.

4.4.2. [Middle Eastern mixed pickles.]

From: Paul Holtpaulho@oub.ou.dk

Torshi Meshakel (Mixed Pickles)

1/2 lb. small, whole pickling cucumbers
2 large carrots, thickly sliced
1 small cauliflower, separated into flowerets
1 sweet green pepper, thickly sliced, seeded and cored
1/2 lb. small white turnips, peeled and quartered
1/2 raw beetroot, peeled and cut into medium-sized pieces [optional]
A few raw green beans, if available, cut in pieces
3 cloves garlic
1 small dried chili pepper pod
A few sprigs fresh dill and 2 teaspoons dill seed
1 1/2 pints water
1/2 pint white wine vinegar
4-5 level tablespoons [3 oz.] salt

Wash and prepare the vegetables and pack them tightly in glass jars together with the garlic cloves, a hot pepper pod divided between them and dill. Mix the water, vinegar and salt solution in a glass or china bowl, and pour over the vegetables. Prepare and add more liquid if this is not enough. Cover tightly and store in a warm place. The pickle should be ready in about 2 weeks. The vegetables will be soft and mellow, and tinted pink by the beet- root. However, the beetroot can be omitted if you prefer the vegetables in their natural colours.

Do not keep longer than 2 months unless stored under refrigeration.

D.4.3. [ogorki kiszone/kwaszone]

From: "Arthur A. Simon, Jr." aasimon@tribeca.ios.com

POLISH BRINE-CURED DILL PICKLES (ogorki kiszone/kwaszone)

(from POLISH HERITAGE COOKERY, by Robert & Maria Strybl)

"The classic Polish dill pickle, whose preparation goes back well over

1,000 years, is naturally cured, hence it is a far healthier alternative than any of the pickles pickled with vinegar. It is extremely versatile, since it produces several products in a single container: the crunchy, several-day undercured pickles some people like, tart and tangy fully-cured pickles, and very tart and soft overcured pickles, which are good for eating and a required ingredient in dill-pickle soup. The leftover dill-pickle juice is a vitamin and mineral-rich beverage as is, or in combination with other ingredients (see dill-pickle brine below) and can be used to give a delightful tang to soups, sauces, and meat dishes. Above all, ogorki kiszone are so delicious that they will quickly disappear from your counter-top crock. They are also easy to prepare."

Wash and drain 4 lbs. roughly 4-inch, green pickling cucumbers. Cukes larger than 6 inches are not used. If you have cucumbers of varying size, put the large ones at bottom of jar, since they take longer to cure. The best cucumbers to brine-cure are those picked the same day. If yours are not, soak them in ice cold water 2-3 hrs. Wash, dry, scald with boiling water, and dry again large glass jar or crock big enough to accommodate the pickles. At bottom of container, place 3 stalks mature pickling dill (heads or seed clusters as well as stems). Stand cucumbers in container upright. Add 3-5 cloves garlic, several small pieces of horseradish root, and several fruit leaves (cherry, black-currant or grape are best!).

Bring to boil 6 c. water and 3 T. pickling salt. When cooled slightly, pour warm solution over cucumbers. Cover with inverted plate and weight down so cucumbers are submerged. Cover with cheesecloth and that's all there is to it.

They should be fully cured in 7-10 days. You may leave them on counter until all are used up (and remove them with tongs, never with fingers!), or transfer to fridge.

Optional: Other flavorings may include: 1 horseradish leaf, 1-2 green oak leaves (this gives pickles a barrel-like taste), 1 bay leaf, a pinch of mustard seeds or unground coriander, a small piece of chili pepper, a slice of celeriac or parsley root. Do not use all these flavorings in a single batch of pickles, but experiment on successive batches to see which combination suits you best.

Personally, we feel the basic recipe is good just as it is.

Poster's comments: I have made these on a regular basis and the recipe is almost foolproof. The only alteration I routinely make is to add a slice of hard/Jewish rye bread w/caraway seed on the top of the

cucumbers. This serves to provide a starch base to hasten the fermentation (you did understand that these are fermented(!) pickles, I hope) and also to ensure a reliable yeast inoculum. Depending on wild yeasts can sometimes result in a spoiled batch, especially in warm climates. After 2-3 days, when the stuff really looks yucky-milky (from the yeast in suspension), I put in the fridge to slow down fermentation. Yeast will settle to bottom. Then I carefully drain, reserving liquid, oak/grape leaves, etc. but flushing away old yeast. You will discover the way that works best for you. I then replace liquid, place back into fridge and allow the ferment to continue slowly. Will keep for up to 3 weeks or more under those conditions. I do this for two reasons: (1) I am somewhat allergic to yeast, and (2) the rinsed product is esthetically more pleasing.

One final comment: Another exotic but delicious addition to the crock is a single piece of fresh ginger root the size of a dime.

4.4.4 [3-Day Lime Pickle]

From: George Shirley gshirley@iamerica.net

Use cukes or green tomatoes. 8.5 lbs before trimming, 7 lbs sliced.
3 cups household lime
2 gallons water

Dissolve lime in water, cover cukes/tomatoes with the solution in a non-reactive pot or crock. Soak for 24 hours, drain carefully and wash lime water off. Put back in container in plain water, soak for 4 hours, changing water every hour. [This step is important for safety.--LEB]

Syrup: 5 pints vinegar, 5 lbs sugar, 5 tablespoons pickling spice. Bring syrup to a boil. Pour over pickles-to-be, then let them sit overnight. Next morning strain off the syrup, then bring to a boil and simmer 1 hour. Add 4-6 drops of green food coloring for a nice looking pickle. Pack pickles in sterilized jars, pour the hot syrup over them, seal and hot water bath for 5 minutes. Makes about 8 quarts.

I tried some blue pickles once just for the heck of it and no one would eat them but me. Looked nice in a salad though.

4.4.5. [A real New York deli Pickle?]

From: Kurt Rieder

A good deli pickle (Kosher dill to some) is made without vinegar. The

pro- cess is a lactic acid producing fermentation. You need a crock or wide mouth container, a board or plate, and a weight...like maybe a rock.

Scrub the cukes and put them in the crock. For a 5 gal crock layer the following among the cukes: 3 1/3 oz sugar, 3/4 lb fresh dill, 3/4 oz allspice, 3/8 oz mustard seed, 3/8 oz black pepper corns, 1/8 oz bay leaf, 1 head garlic...broken into cloves. Put the board on top and the rock on top of the board. Fill the crock with 8% cool salt brine. An 8% brine will contain 3/4 lb salt per gallon brine. Store at 60 - 70 deg F. That's cooler than ambient this time of year in most places. Consider the basement or some other cool place. Every few days use a paper towel or cloth to clean any scum from the surface. Sample a pickle when you have the urge... after a few days. At first they will be half sours. A bit longer, 2-3 weeks, and they will become full sours. Both are often sold in the deli. After they are done, lower the temperature if you can but don't allow to freeze. Most pickles, even sweet gherkins, that you buy in the store are made this way. They keep the brine and recover lac- tic acid from it. The brined cukes are bottled and covered with cheaper vinegar... and sugar, if sweet ones are wanted. This is why a deli pickle has it over all others.

D.4.6. [Kimchee, 3 recipes including summer and winter versions.]

From: Nicole Okun ariadne@mindlink.bc.ca

Herewith, a kimchee recipe:

Half a head of Chinese cabbage
1 large daikon
3 Tbsps salt

Shred the cabbage and daikon. Place the shredded veggies in a large bowl and mix in the salt with your hands. Cover with cold water. Cover the bowl with a towel, and let it sit overnight. In another bowl, mix together 1" ginger root, minced 5 cloves garlic, minced dried hot pepper, crumbled, to taste Take the cabbage and daikon out of the brine with a slotted spoon or one of those wire Chinese things, and mix together with the spices. Put the kimchee in a large jar or bowl (I use a gallon glass jar that gets about half-filled by this) and pour enough of the brine over to cover by about 2 inches. Cover with a cloth (I just set the lid of the jar on it without screwing it closed at all) and let the kimchee mature for about a week. Start tasting it after four days. When you like the taste, transfer to smaller jars and refrigerate.

Subject: Re: Kim Chi

From: Naera Kim naera@panix.com, in rec.food.cooking

These recipes are from a Korean cookbook (translated in English) I bought in Seoul, Korea. There should be other Korean cookbooks around at bookstores or at Korean groceries. You can find these ingredients at a Korean market/gro- ceries. The Korean radishes are lot larger than the ones you find in regular supermarkets. If there isn't a Korean market near you then you can improvise by using many smaller radishes. If you can't find salted shrimps then try using finely chopped, fresh oysters and/or salted anchovies. I've never used anchovies before but other people do.

Radish Water-Kimchi (water-kimchi is not spicy but very tasty and soothing esp. during the summer)

3 medium Korean white radishes
1 bundle of scallion (about 4)
2 firm pears (golden pear is better)
2 red hot peppers, chopped.
6 whole hot green Korean peppers
1 C. coarse salt
3 cloves of sliced garlic
1/4 C. sliced ginger
2 Tbsp. salted shrimp chopped water

1) Select medium firm radishes. Remove roots. Wash and drain. 2) Chop scallions, 3/4 inch in length. 3) Slice ginger and garlic thinly. Then wrap garlic, ginger, and salted shrimp in a gauze or cheese cloth and tie. 4) Roll whole radishes in salt. 5) Peel pear and core the seeds. Slice them length-wise into 8 strips. 6) Place radishes, garlic, ginger, salted shrimp, pear, and peppers in a big crock or large heavy jar and sprinkle w/some salt. 7) Leave them out in room temperature for 3 days. 8) Pour enough salt water (not too salty) into the crock so it will cover all ingredients. Weigh them down with something heavy. Cover w/lid. 9) Let it ferment* to desired taste, slice radishes to any size before serving. * Make sure to leave some room in the crock so the kimchi juice can expand while fermenting. I use a heavy stone, washed and cleaned. This prevents the radishes from getting soggy. The heavier the weight will make radishes crunchier. To make water-kimchi ferment more quickly, let it stand in room temperature for 3 to 4 days (depending on how warm or cold the [room or out- door] temperature is, if its warm then the kimchi will ferment lot faster than when its cold). Refrigerate after. You can also leave them outside during the autumn season. If the water-kimchi is too

salty then add some more plain water to get the desired taste.

* The kimchi will last refrigerated for many months!

Whole Cabbage Kimchi (known for winter kimchi)

2 heads of Chinese cabbages
1 1/3 C. coarse salt
1/2 to 1/3 C. red pepper powder (depending on how spicy you want)
1/4 C. salted shrimp, chopped
2 knobs of ginger, chopped
1 head of garlic, chopped
1 bundle of chopped scallions (cut 3/4 inch lengths)
1/4 lb. fresh oysters (shelled, cleaned w/salt water and chopped)
1/4 bundle of watercress (cut 3/4 inch lengths)
4 Tbsp. salt

1) Trim roots from the cabbage, cut each cabbage lengthwise into two sections. 2) Make a brine with 8 cups of water and 3/4 C. of salt and soak the cabbage in the brine. Drain, sprinkle with some salt and let stand overnight. 3) When the cabbages are well-salted and a bit limp, rinse thoroughly in cold water and drain. 4) Mix the red pepper well with salted shrimp. Then add garlic, ginger, oysters, scallions, and watercress and mix well. Season with remaining salt. 5) Pack the seasoned mixture between each leaf of the wilted cabbage. 6) Place the stuffed cabbages in a large crock or large heavy jar. 7) Weigh it down with a clean heavy stone and cover. * To make the kimchi ferment more quickly, let it stand in room temperature for two days depending on how warm or cold the temperature is, if warm then the kimchi will ferment lot faster than when its cold. Refrigerate after. You can also leave them outside during the autumn season. * The kimchi will last refrigerated for up to 4 months or more! [Check out the Tip 'N Trick to keep kimchi from smelling.--LEB]

4.4.7. [Pickled ginger slices.]

Subject: Re: pickling ginger

From: "Col. I.F. Khuntilanont-Philpott" khing dong / ginger pickle

Description: In Thailand this is made from khing ong, or young ginger. The skin of this is very tender, and if it is available it need not be skinned before pickling. However if you use regular ginger, the woody skin should be removed first. This is a simple pickling recipe for ginger. The resultant pickle can be eaten with meats and poultry. It is also eaten on its own as a snack, and even on ice cream (!)

Ingredients To pickle 2 pound of ginger, prepare a pickling liquor with:

2 cups of water
2 cups of vinegar (preferably rice vinegar)
1 cups of sugar
1/4 cup of salt
half a teaspoon of baking soda (sodium bicarbonate)

Method Peel the ginger and then slice it thinly, cutting larger slices into smallish pieces. Rub with the baking soda and allow to stand whilst preparing the pickling liquor. Boil the water, and stir in and fully dissolve the sugar. Next dissolve in the salt, allow to cool, and add the vinegar, stirring thoroughly. Place the ginger in a one quart preserving jar, and fill with the liquor, seal and keep in a cool place for at least two weeks before using. Serving & Storage Keeps indefinitely.

4.4.8. [Zucchini recipes, because you can't grow just one!]

2 recipes.
Subject: Zucchini Relish
From: calhoun@gorge.net (Dave Calhoun)

About 6 months ago there was a great discussion about food made from zucchini and I promised to post my grandmothers zucchini relish recipe. Here it finally is. I love it and hope you do also.

Ingredients:

10 cups ground zucchini
4 cups ground onions
5 tablespoons pure granulated salt
2 1/4 cups white vinegar
4 1/2 cups sugar
1 tablespoon each: Nutmeg, dry mustard, turmeric & cornstarch
1/2 teaspoon pepper
2 teaspoons celery salt
1 each of sweet green & red peppers, chopped fine

Instructions: Put first 3 ingredients in large bowl and mix well. Let stand overnight. Drain and rinse in cold water; drain again & put in large kettle with remaining ingredients. Bring to boil & simmer, uncovered, stirring occas- ionally for 30 minutes or until desired consistency. Pour into 6 or 8 hot sterilized pint jars leaving 1/2

inch headspace & seal. Process 15 minutes in boiling water bath. There you have it straight from my grandma. I love this stuff and a burger just isn't right without it. Let me know if you try it and like it.

Pickled Bread-and-Butter Zucchini

From Shona Lamoureaux ,

Taken from an impeccable source: United States Department of Agriculture, Extension Service

16 cups fresh zucchini, sliced
4 cups onions, thinly sliced
1/2 cup canning or pickling salt
4 cups white vinegar (5%)
2 cups sugar
4 tbsp mustard seed
2 tbsp celery seed
2 tsp ground turmeric

Yield: About 8 to 9 pints Procedure: Cover zucchini and onion slices with 1 inch of water and salt. Let stand 2 hours and drain thoroughly. Combine vinegar, sugar, and spices. Bring to a boil and add zucchini and onions. Simmer 5 minutes and fill jars with mixture and pickling solution, leaving 1/2-inch headspace. Adjust lids and process according to the recommendations in Table 1 or use low-temperature pasteurization treatment. For more information see "Low- Temperature Pasteurization Treatment," (HE 8220).

Table 1. Recommended process time for Pickled Bread and Butter Zucchini in a boiling-water canner. Canner Pressure (PSI) at Altitudes of Style of 1,001 - 6,000 Pack Jar Size 0 - 1,000 ft ft Above 6,000 ft Hot Pints or 10 min 15 20 Quarts

This document was extracted from the "Complete Guide to Home Canning", Agriculture Information Bulletin No. 539, USDA. Reviewed 1994.

4.4.9. [And a recipe for another prolific fruit, green tomatoes]

From: Nicole Okun

Dill Tomolives

4 lbs tiny green tomatoes
1 clove garlic, peeled and quartered
2 sprays dill

20 oz water
10 oz white vinegar
1 oz salt

Wash tomatoes and pack into clean quart jars. In each jar place 2 quarters of garlic clove and one spray of dill. Boil vinegar, salt and water toget- her for 1 minute and pour over tomatoes. Leave 1/4" headroom and adjust lids. Process for 15 minutes in a boiling waterbath. Makes two quarts.

4.4.10. [Green Tomatoes Rovia]

>From Brenda Sharpe :

This is my most requested preserve recipe, for a sweet green "ketchup" that goes well with beef and cheese. The original recipe came from a congregation of nuns in Montreal, Quebec, Canada. Full recipe makes approximately 12 500 mL (pint) jars. The recipe can be halved.

30 green tomatoes (the size of small apples), sliced (with skins on but cut off stem and blossom ends and any nasty bits)
6 onions, peeled and sliced or chopped
1/2 cup pickling (coarse, non-iodized) salt

Slice tomatoes and onions (a food processor is great for this) and layer in a non-reactive, large pot with salt. Let stand overnight. In the morning, drain well. Add: 16 apples (hard and sour), peeled and sliced 4 cups granulated sugar 1/4 cup pickling spices, tied up in a cheesecloth bag (leave a long string on for taking out later!) White Vinegar (must be at least 5% acidic) Add vinegar until three-quarters (3/4) of ingredients are covered (DO NOT COVER COMPLETELY). Bring to a boil and then reduce to a simmer; simmer 1 to 1 1/2 hours until apples are transparent and everything is well cooked and fragrant. Remove spice bag. Pour into sterilized pint jars leaving 1/4 inch head space. Seal and process in a boiling water bath canner 10 minutes. This is great on burgers or eggs; one friend likes it on cheese sandwiches; another eats it like a dessert!

4.4.11. [Pickled garlic.]

>From James Wesley Dunnington :

I hope the following is what you are looking for. I found it in THE KERR KITCHEN PANTRY Volume 6, Number 4. It was concerning onions and garlic.

Pickled Garlic

3 cups peeled garlic cloves
1-1/2 cups white vinegar (labeled 5% acidity)
1/2 cup sugar
1/2 teaspoon pickling salt

Add garlic cloves to a pan of boiling water. When water returns to a boil, boil for one minute. Drain and pack into hot half-pint jars, leaving 1/2- inch headspace. Heat vinegar, sugar and pickling salt to boiling. Pour boiling pickling liquid over garlic, leaving 1/2-inch headspace. Carefully run a nonmetallic utensil down inside of jars to remove trapped air bubbles. Wipe jar tops and threads clean. Place hot jar lids on jars and apply screw bands firmly. Process in Boiling Water Bath Canner for 10 minutes. Yield: 3 half-pints

4.5.1 [Salsa Tips]

Marie Martinek offers:

In addition to all the recipes you'll be garnering, I want to suggest my technique of Time-Shifting. This requires that you have freezer space....

As the tomatoes get ripe, wash them and chop them and toss them into a gallon-sized ziploc bag. I put my bag into one of the tupperware juice-or-cereal pourers, the tall rectangular thingies, to make it stand up. When it's full, pull it out of the holder and put it in the deepfreeze. Do the same thing with hot and sweet peppers (but in a pint bag).

In January, or sometime when the heat & humidity isn't in the 90's, pull out 2 gallon bags of tomatoes, and 1 pint bag each of sweet and hot peppers. Peel them out of the bags (they're usually snagged enough by then that I don't try to save the bag; just cut it off) and put them in a big pot. As it thaws, scoop into a colander over another big pot. As it drains, scoop the pulp into YET ANOTHER big pot.

Eventually, you will have one potful of pulp, and one of juice. Put the pulp back in the fridge. Run the juice through your finest strainer, or a food mill, to pull out some of the excess tomato seeds. Put back into big pot. Start cooking the juice down. Once you get it to boiling, turn down to simmer and let it go for several hours, stirring every once in a while. Let your kitchen windows steam up.

Once the juice is reduced by at least a half, add it back to the pulp and continue on with your recipe.

I don't even take the skins off -- my husband doesn't mind a bit of roughage in his salsa.

5. CURING WITH SALT OR LYE

5.1 [What do I *really* need to know about curing foods, and what makes this different from pickling?]

Sometimes the difference between pickling and curing is semantic, but generally curing is salting, etc, without an acid treatment.
Examples of salt curing: salt pork, olives, anchovies, herring, lox;

Examples of Lye (NaOH) curing: olives, hominy, lutefisk.

5.1.1 [Why do I have to cure olives?]

>From On Food and Cooking by Harold Mcgee:

"Anyone who has bitten into a raw olive knows that olives must somehow be processed befoe they are edible. Olives are usualy pickled, and they contain a bitter glucoside called oleuropein (from the olive's botanical name, 'olea europa') which is usually removed first. This has been done since Roman times by soaking the fruit in a lye solution and then washing it thoroughly. The watery, oleuropein-rich residue left after raw olives are pressed for oil - what the Romans called 'amurca' - was used, so Cato and Virgil tell us, as a weed killer, insecticide, and a lubricant for leather and axles. Today's Greek olives are as strong tasting as they are because they have not been treated with lye to remove the oleuropein.

They are simply cured by packing dry in salt, or are pickled in a brine, where they undergo a lactic fermentation. Green Spanish olives are picked before they are ripe, treated with lye, and then brined. California ripe olives are first dipped in a ferrous gluconate solution to fix the pigment, then treated with lye, and immediately packed in brine. Because they are not allowed to ferment for a few weeks, these olives have neither the pickled flavour nor the resistance to spoilage of theother kinds, and so must be sterilized in the can. The cooking makes some contribution to their characteristically mild flavour."

6. SMOKING

6.1 [What do I *really* need to know about smoking food?]

Smoke gets in your eys and hurts, on and in food it tastes great.

Seriously...
Smoking food in order to preserve it is a bit different than smoking food on the barbeque. Generally, the meat or fish to be smoked is salt cured, which preserves the tissue throughout, then is smoked either for flavor, or to preserve the surface of the meat. Other items can be smoked to preserve them and concentrate their flavors, e.g smoked hot peppers. Smoking provides the flavor, but dehydration preserves the pepper. If you are smoking or curing meat, you need to be concerned the health of the animal (i.e. trichina).

6.1.1 [Where can I get the stuff (like saltpeter) used for curing?]

Mark Preston wrote:

"Tri-Ess
1020 Chestnut Street
Burbank, CA
818-848-7838

sells many chemicals for food. Usually in CP (chemically pure) which is about 5 or 6 grades higher than food grade. This is for the home sausage maker quantities of such stuffs.

For the commercial end see:

http://www.kochsupplies.com/

who sells to all large, larger or largest sausage and ham makers."

6.2 [MEAT CURING AND SMOKING Compliments of Richard Thead

[--N.B. This is *not* the most current edition of the meat curing/smoking FAQ. The most recent versions are on the Web, at URL http://www.azstarnet.com/~thead/msfaq.html. I put this file in simply to give the reader an idea of what this FAQ contains. --LEB]

Cures described herein are not representative of those prescribed in 9 CFR 318 et al. for commercial applications. They are for general information purposes only. No HACCP procedures have been included in this information.

6.2.1 [Why is meat cured?]

For a couple of reasons. One is safety. When meat is cold smoked its temperature often stays in the danger zone for several hours or days. Many environmental factors of this treatment are such that the growth of dangerous bacteria is greatly accelerated. The curing of the meat inhibits this growth.

The other reason is traditional preparation. There are many curing techniques that were developed in the days before refrigeration that are continued today for traditional reasons. A good example is corned beef.

> Old time butcher shops closed every weekend. Ice, the only refrigerant available, could not dependably hold fresh meat for two days. To keep unsold meat from going to waste, the butcher soaked the meat in a strong brine or covered it with coarse salt to trigger osmosis. The grains of salt were called "corn" in England, and the name "corned beef" stuck with the product. [1]

6.2.3 [What is osmosis?]

Osmosis is the movement of water across a membrane from weak solutions toward strong solutions. [1]

6.2.4 [What is meant by "the danger zone"?]

The "danger zone" is the temperature range between 40 and 140 degrees F. When uncured meat remains in this range for more than 2 hours the growth of dangerous bacteria increases to a dangerous level.

6.2.5 [What other factors affect the growth of bacteria?]

When meat is smoked, the environment is robbed of most if its oxygen.
If this is combined with temperatures between 40 and 140F, the growth of the bacteria that causes botulism is increased.

6.2.6 [What is botulism?]

Botulism is an intoxication of the bacteria clostridium botulinum. This bacteria is anaerobic meaning that it requires an environment relatively free of oxygen to multiply. It also requires a moist

environment and temperatures between 40 and 140F. The symptoms of botulism are sore throat, vomiting, blurred vision, cramps, diarrhea, difficulty breathing, and central nervous system damage (including paralysis). Symptoms usually occur within 12 to 36 hours. The fatality rate is up to 70%. [2]

6.2.7 [What are the commonly used curing compounds?]

Salt, sugar, sodium nitrite and sodium nitrate. Salt and sugar both cure meat by osmosis. In addition to drawing the water from the food, they dehydrate and kill the bacteria that make food spoil. In general, though, use of the word "cure" refers to processing the meat with either sodium nitrite or sodium nitrate.

Sodium nitrite and sodium nitrate are the basis for two commercially used products: Prague powders #1 and #2. Prague powder #1 is a mixture of 1 part sodium nitrite and 16 parts salt. The chemicals are combined and crystallized to assure even distribution. Even though diluted, only 4 ounces of Prague powder #1 is required to cure 100 lbs of meat. A more typical measurement for home use is 1 tsp per 5 lbs of meat. Prague powder #2 is a mixture of 1 part sodium nitrite, .64 parts sodium nitrate and 16 parts salt. It is primarily used in dry-curing.

One other commonly available curing product is Morton's Tender Quick. It is a mixture of salt, sodium nitrite, sodium nitrate and sugar. Ask your butcher or grocer to stock it for you.

6.2.8 [Where can these compounds be obtained?]

If you are chummy with a local butcher who does curing, maybe (s)he will sell you a small quantity. Otherwise, the Sausage Maker offers all items mentioned here and elsewhere in this FAQ mail order. See the books section for a phone number where you can obtain a catalog.

6.2.9 [What is spray pumping?]

It is the process of injecting the meat with cure using a special purpose needle. [Special purpose needle and syringe is called a stitch pump--can get this item from either the Morton's Salt Company or the Embarcadero Home Cannery, addresses are in part 6 of this FAQ.--LEB]

6.2.10 [What's trichinosis?]
It is an infestation of trichinae. The parasites invade the voluntary muscles causing severe pain and edema. It can be avoided by ensuring that cooked pork reaches an internal temperature of 150 degrees F.

6.2.11 [If my cured pork doesn't reach a safe temperature, what about trichinosis?]

Trichinae can also be killed by freezing the pork according to the following chart:

Temperature	Grp1-days	Grp2-days
5 deg F	20	30
-10 deg F	10	20
-20 deg F	6	12

Group 1 comprises product in separate pieces not exceeding 6" in thickness or arranged on separate racks with the layers not exceeding 6" in depth.

Group 2 comprises product in pieces, layers or within containers the thickness of which exceeds 6" but not 27". [3]

6.2.12 [What about dry-curing sausages and meats?]

I'll leave this topic open for someone with real experience. The dry climate in Tucson makes it difficult to maintain the ideal 70% relative humidity required for dry-curing so I've never even tried.

A dehydrator will work wonders :-)

6.2.13 [What is the difference between smoke cooking and curing?]

Pretty simple; Smoke cooking is done at higher temperatures in order to cook the meat. Smoke curing is really just smoking cured meat or sausage.

6.2.14 [What are the proper temperatures for smoke cooking meat?]

I prefer to keep the temperature around 220F. This means the temperature *at* the meat. I use a large log burning smoking pit with an offset firebox so it's easy to maintain this. In an upright water smoker you will have trouble keeping the temperature this low, since the heat builds up at the top where the meat is. You can achieve decent results with a water smoker, but the cooking time will be shorter and the depth of smoke penetration will be less. My briskets and pork shoulders smoke for 20-24 hours; pork ribs and loin roasts take less time.

6.2.15 [How important is temperature control during smoke curing?]

Very. If you are smoking sausages, excess heat will melt the fat out and leave the final product dry and crumbly. This I know from experience. Here, we're talking about temperatures around 140F, although it varies from recipe to recipe. This is very difficult to maintain in a wood burning smoker. Mine has a slow smoking section farthest away from the fire. With experience, I've learned to control

the temperature in this section without overdamping the air inlet. Some other meats, like bacon and ham, are a little more tolerant of higher heat, but it can affect the quality of the final product.

The best solution is a thermostat controlled gas or electric slow smoker like those sold by the Sausage Maker (see sources). These are not good general purpose smokers, in my opinion. I just don't think they do nearly as well as a log burning pit for smoke cooking.

Unfortunately for the many water smoker owners, they just won't do for slow smoking--don't even bother trying.

6.2.16 [Is closing down the air inlet dampers a good way to keep the temperature down?]

If you keep the temperature low by closing down the inlet dampers, the smoke gets thick and sooty and produces an unattractive and bitter coating on the surface of the meat. I prefer to keep the fire burning more freely and control the temperature by providing some draft between the fire and the meat.

6.2.17 [What are the various woods used for smoking?]

Alder
The traditional wood for smoking salmon in the Pacific Northwest, alder also works well with other fish. It has a light delicate flavor.

Apple and Cherry
Both woods produce a slightly sweet, fruity smoke that's mild enough for chicken or turkey, but capable of flavoring a ham.

Hickory
Hickory is the king of the woods in the Southern barbeque belt, as basic to the region's cooking as cornbread. The strong, hearty taste is perfect for pork shoulder and ribs, but it also enhances any red meat or poultry.

Maple

Mildly smoky and sweet, maple mates well with poultry, ham, and vegetables.

Mesquite
The mystique wood of the past decade, mesquite is also America's most misunderstood wood. It's great for grilling because it burns very hot, but below average for barbecuing for the same reason. Also, the smoke taste turns from tangy to bitter over an extended cooking time. Few serious pitmasters use mesquite, despite a lot of stories about its prevalence in the Southwest.

Oak
If hickory is the king of barbecue woods, oak is the queen. Assertive but always pleasant, it's the most versatile of hardwoods, blending well with a wide range of flavors. What it does to beef is probably against the law in some states.

Pecan
The choice of many professional chefs, pecan burns cool and offers a subtle richness of character. Some people call it a mellow version of hickory. [5]

6.2.18 [What is the bonafide official way to tell that beef jerky is done curing?]

>From Perry Noid:

Drying meat is NOT "curing" it!!! Drying meat is preserving it. "Curing meat" is treating it with a chemical to prevent food poisoning. I think you're pretty safe drying store bought beef in a dehydrator, because there's oxygen present which prevents botulism, and indians often dried meat by simply laying them out on rocks in the hot sun. But i wouldn't trust simply drying wild game or pork, unless you're an Indian who has developed a natural resistance to parasites.

BUT IF YOU ARE GOING TO SMOKE YOUR MEAT THEN ***YOU DAMN BETTER FIGURE
OUT WHAT CURING REALLY IS*** because smoking does a real good job of creating the 3 conditions necessary to trigger botulism: moisture, temerature (about 40 to 140 F i think) and lack of oxygen. This sometimes occurs when people try to cook their turkey crammed full of stuffing, especially when it has sat full of stuffing in the refrigerator all night.

Botulism doesn't always occur when those 3 conditios are met, and some people dodge the bullet for a while, and infact botulism is rare, but when it happens it is *very* deadly, mostly because you don't know you're sick until you are really sick. In a survival situation where going to the hospital is impossible, you can drink a slurry of charcoal to save your life which is simply the charred, blackened bits of wood from last night's campfire that is ground up and drank with water. Charcoal will absorb certain poisons.

certain chemicals can block botulism. I think old timers used things like potassium nitrate and salt or something, not sure. But the modern "cure" that practically all commercial producers who smoke meat use specialized cures, which i think are made up of a combination of sodimum nitrate and sodimum nitrite. There gobbs of different brand names (Prague Powder and Insta-cure) but they are all basically the same two types, one for meat to be refrigerated or even recooked, and the second for dried meat not to be refrigerated nor recooked. But the perscribed amount of cure is disolved into a brine solution in which the meat is soaked for a number of hours or days, depending on the type of meat and the size. In addition to this, some people with electric smokers will run their smoker without the dampwood chips so it acts like a big dehydrator and dry the meat out before applying the smoke, which keeps the 3 conditions botulism from being met and providing a further margain of saftey.

It is really inexpensive and requires very little. 5 lbs costs about $20 and is enough to "cure" about 1600 lbs of beef, fish, whatever. That's sure a lot cheaper than a trip to the emergency room.

Here's a soarce for both types: Insta-Cure #1 and Insta-Cure #2.

The Sausage Maker, Inc.
1-716-876-5521
Fax 1-716-875-0302

All commercially smoked meat and all jerky is required by law to be "cured" using these same cures. The "cure" also adds to the color and taste of the meat. It also adds shelflife to the meat you simply dry in a dehydrator. A good book on the subject is also money well spent.

Be safe.

6.2.19 [What temperature is right for smoking (fowl) turkey?]

From jay@heyl.org

I have a cookbook here that says 165-170F. There is a lot of paranoia about poultry being underdone. I haven't done any turkey yet (I have the same smoker you do), but I've done several chickens and have had no trouble pulling them off at 165F.

> The problem I am having is that although I follow the recipes exactly I
> have a very difficult time reaching this temperature. I installed an
> oven thermometer in place of the "cold - ideal - hot" thermometer that
> came with the smoker. I even placed a second thermometer inside to

The stock thermometer is worthless... I replaced mine.

Are you brining the bird before cooking? If not, I strongly recommend you do. I took a class in grilling and barbequeing and for chicken parts they suggested a brine of 1 cup kosher salt and 1 cup sugar dissolved in 1 quart of water. Soak the pieces for up to 90 minutes. Don't go longer than this or the chicken will take up too much salt. I think the basic idea here would work for turkey breast also, though I'd reduce the salt to maybe 1/2 cup and soak the turkey for 3 or 4 hours. (For a whole chicken they recommended 1 cup kosher salt in a gallon of water, brining the chicken for 6 to 8 hours. I'd guess the turkey breast would be somewhere in between the two methods.)

Also, you're going to have a tough time getting a turkey breast to 180F if the external temp (external to the turkey) is only 20 or 30 degrees warmer. To achieve an internal temp of 180F I'd push the smoker temp to at least 240F. But, as I mentioned above, 180F is higher than you really need to go. If the meat thermometer reads 165F and the juices run clear when you pull the thermometer out, that bird is done.

6.2.20 [Freezing cured ham, smoked or preserved meat is salty after a month. What can I do?]

From: Robb Dabbs

There's an old trick used in the South to reduce salt in country ham (which is salt cured), and it should work for your frozen ham. Thaw the ham, cut in slices if not already sliced, and soak overnight covered in milk. Next day, rinse and pat dry, and prepare as desired.

I don't know of any different storage method that would prevent the saltiness from occurring.

6.3 Specific Foods

6.3.1 [Can I make a Smithfield Ham at Home?]

These are unique since the hams come from only peanut-fed hogs. They are worked with cure for 30-45 days. Then they are smoked for at least 7 days and left in the smokehouse for another 6 months. "The Smithfield ham or a reasonable facsimile is rather difficult to produce unless you have a steady supply of peanuts and a huge smokehouse 3-4 stories high."

6.3.2 [How do I make my own bacon at home?]

It is my experience that bacon is the easiest product to produce at home and the results are as good as, or better than, the best commercially produced bacon.

I use Morton Tender Quick and brown sugar. Rub down a slab of fresh bacon (pork belly) with a liberal quantity of the Tender Quick. You can't really use too much but a cup or so should do. Then follow with a thorough rub of brown sugar (again, start with a cup or so). Then place the meat in heavy plastic and allow to cure for 7 days at 38F. I use a small refrigerator for this. I run a remote temperature probe inside and monitor the temperature, tweaking the thermostat when necessary. The temperature is important; too low (below 36F) and the curing action will cease, too high (above 40F) and the meat will begin to spoil. I also cut the pork belly in two and cure it with the meat surfaces face to face and the skin on the outside. It helps it fit in the fridge and improves the curing action. I then smoke it at 140-150F until the internal temperature of the pork reaches 128F (about 8 to 10 hours). I find it best to remove the skin about 3/4 of the way through the smoking process. This way the fat is protected but still acquires some color.

Chill overnight before using.

If you are using Prague Powder #1, mix 2 oz with 1 lb of salt and use like the Tender Quick.

Other sugars can be used instead of brown sugar. Try honey or even some maple syrup.

6.3.3 [How do I make my own corned beef?]

For best results, use trimmed briskets.

Start with a curing brine. This recipe comes from [3] and makes enough for 25 lbs of meat.

5 quarts ice water (about 38-40F)
8 oz. salt
3 oz. Prague Powder #1
3 oz. powdered dextrose

Spray pump the briskets to about 12-15% of their original weight. After pumping, the briskets are packed in a vat, and sprinkled with whole pickling spice. If more than one brisket is done at a time, pack them flesh to flesh with the fat sides out. Add enough brine to cover and allow to cure for 3-4 days at 38-40F. The meat is then ready to use (but still requires cooking).

6.3.4 [What is pastrami and how do I make my own?]

For best results, use trimmed briskets.

Start with a curing brine. This recipe comes from [3] and makes enough for 25 lbs of meat.

5 quarts ice water (about 38-40F)
8 oz. salt
5 oz. Prague Powder #1
5 oz. powdered dextrose
1 Tb garlic juice

Prepare and cure as for corned beef. After curing, remove from brine and rub liberally with cracked black pepper and coriander seeds. Smoke at 140F until the meat is dry and then increase smoker temperature to 200-220F and hold until internal temperature of meat reaches 170-180F.

Chill overnight before using. This meat is fully cooked.

6.3.5 [How do I make beef jerky?]

There are a jillion recipes for jerky--take a look in the recipe archives. [There is a template recipe in the Dehydration section; you can find an archive at ftp.rtd.com:/pub/rthead/jerky.rcp]
--LEB)

I prefer a teriyaki-based marinade (use 1/2 tsp of Prague Powder #1 or 1 tsp of Tender Quick for safety) with other spices,

lightly smoked. My recipe is not for publication, but it's nothing out of the ordinary. Experiment with your own combinations of spices and find something you like.

6.4 Other Sources (besides this FAQ) for info on meat Curing and Smoking

BOOKS:

Great Sausage Recipes and Meat Curing (1984). Rytek Kutas. Self published. Can be obtained from the author at The Sausage Maker Inc./ 26 Military Road/ Buffalo NY 14207. (716)-876-5521.

6.4.1 [references]

[1] Food Science--Osmosis, Rita Sorci Planey, "Fine Cooking", Aug/Sep 1994, pp 12,13

[2] The New Professional Chef (1991). The Culinary Institute of America.

[3] Great Sausage Recipes and Meat Curing (1984), Rytek Kutas.

[4] On Food and Cooking (1984), Harold McGee.

[5] Smoke and Spice (1994), Jamison and Jamison.

Please direct questions, comments, criticisms, and contributions to:
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6.4.2 [I bagged my deer. Now what do I do?]

Subject: Venison Processing FAQ, final version
From: pleasure@netcom.com (Tanith Tyrr)

Since I've been asked for inclusion in a FAQ, I figured I'd go over this account and do it right. Here's a pretty well complete tutorial on what to do with Bambi (or more accurately Faline) when you pot one. Reprint or archive it anywhere you want electronically, just credit the author. Enjoy!

"Euwwww," cry the husband/wife/children of the mighty hunter who has just dragged home the antlered kill. "This stuff is gamy and yucky. Do we hafta eat it?"

Disappointed, and maybe secretly agreeing with the spouse and kids, the mighty hunter chokes down his or her portion of venison and declaims in a hearty voice that it's perfectly good and really just like beef if you grind it into burgers and mix it with salt pork so you can't taste the deer.

This is a rather sad scenario that has undoubtedly been played out more times than most hunters (and cooks) care to think about. Why? It isn't because venison is a poor quality meat; far from it. The finest chefs serve medallions of venison braised with sauce Perigourdine and Merlot in their fancy restaurants, and they get a hefty price for it because they know how to cook it properly to maximize the enjoyable flavor. More importantly, they know how to obtain it from the right source, which is a young and healthy animal in prime eating condition.

The majority of game that tastes gamy, nasty, raunchy, sour or just plain awful does so for one of two reasons: either you messed up in the process of picking a target or you didn't treat the meat properly after you killed it - sadly common outcomes among today's generation of sport hunters who kill for antlers and not for meat.

Pick and treat your meat properly in the first place, and you will not have any gaminess to worry about, nor will you need to disguise the fine taste of properly prepared venison with strong flavored marinades. Venison which is butchered quickly and professionally with a high standard of hygiene and care is comparable to the finest cuts of lean beef - only better and more flavorful - and it has absolutely no gamy or unpleasant taste.

However, if you pick an animal to shoot that is not a good meat animal, for reasons of age, sex or rutting condition, you don't have anybody to blame save yourself if the results are not pleasant. If you shoot an old, tough, nasty buck in rutting condition because you want trophies, your dinner will taste crappy and you will have silly pointy things to hang on your wall and brag about. Enjoy your bragging rights and choke on your tough, testosterone-laden dinner, and don't say you weren't warned.

If you want to eat as opposed to rustically decorate your fireplace, eyeball out a young doe with a nice chunky brisket-shaped chest bespeaking plenty of fat. Look for graceful rounding in the hindquarters as well; you want fat hams, and the rump is where well-fed deer tend to put on padding.

Choose your target not for massive size or horned protuberances, but for a body conformation that indicates a plump, young, tasty meat animal.

Read agricultural texts or butchering handbooks for better information on how to judge this, and study the pictures of cows, pigs and sheep carefully until you are confident that you know by the eye at least some of the characteristics that distinguish a fine meat animal from a poor one. Then go out hunting; your taste buds will be better pleased with the results.

Some folks say that wild game fat is rancid; I suspect that these are the trophy-hunting folks who want to go shooting aged, tough males for the dinner table. Silly people. If you must take bucks, take the spikes; an old animal is a tough animal. You wouldn't eat a cow that old, would you? Well, maybe you would, but my palate will take a pass, thanks. I'll take the plump young meat animals every time, preferably 18 months to 2 years old.

Fresh yellow-white fat from a well-marbled deer which has been grazing in somebodies' cornfield is perfectly good food; the main danger here is eating too much of it and getting fatty deposits on your hindquarters your own self. ;P Check each carcass as you process it by frying a small portion of the fat and tasting it; individuals can vary. But don't chuck this lovely stuff until you have at least tried it. Venison confit crocked in its own fat and drained is stunningly spectacular with garlic mashed potatoes and sun-dried cranberry sauce, among other things, and the sizzling fat from a side of deer ribs popping and browning over the fire is an almost primal trigger to the hunter's appetite.

If you want this clean-tasting fat, don't hunt in areas where the deer are known for desperate grazing habits; strong tasting fodder can and does affect the taste of both fat and muscle meat. You'll figure it out if you shoot an otherwise good meat animal and it tastes like a pine pitch and mud marinade. Grouse is game that is famous for this problem in particular, but deer suffer from it too if they're browsing too much on scrub or tree bark. Get as quick a kill as you can, for mercy's sake and also for the meat's sake; an animal that dies in pain and fear is not as good eating as an animal that dies quick and clean.

So much for the hunting precautions. On to the butchering. Once you kill the animal, draw it as quickly as possible. Forget any silliness about cutting its throat; if you must finish it with a mercy stroke, use a brisket stick, thrusting your knife into the brisket at first a straight then an upward angle to sever the arteries around the heart. See a good butcher's handbook for pictures and information on the correct method of brisket sticking.

If you are not confident you can do an accurate brisket stick and the animal must be put down quickly, use a throat stab, not a throat slice. Insert (stab) the knife blade side facing outward as close to the animal's spine on the throat side as possible. Pull straight forward with a single swift move until everything from the front of the spine out to the throat is severed. This technique reliably severs a throat; slicing tends to be useless and unnecessarily cruel if you do not have the strength or the expertise to do it properly. Often, an inexperienced hunter will miss one or both jugulars or cut insufficiently deep to bleed the animal out quickly using the slice technique. The stabbing technique essentially can't miss and it *removes* the throat from the spine out, also severing the windpipe.

If you are approaching a downed deer that is still alive, approach from the back if possible. Those hooves are razor sharp and horns are no joke either. If you can get on its back and an arm around a doe's neck forcing the chin up, the throat stab-and-pull maneuver is easy and finishes the deer rapidly. If your downed quarry has antlers, use them as handles and pull the head up this way instead. Speed is of the essence; every second your downed quarry remains alive, terrified and struggling increases its suffering and decreases the quality of your fine steaks and chops. Expect there to be some struggling and continued attempts to breathe even after the throat is severed. If this bothers you, sever the spine just between the skull and the first vertebrae with the deft insertion of a knife. WARNING - Don't attempt this technique on a live deer until you have practiced it and can do it reliably and quickly, one-handed, on a dead deer.

There is a reason I don't advocate spine severing, eye stabs or braincase stabs as the first method of dispatch - it's dangerous, as the knife can slip on a struggling animal and hurt you badly.

It's better to wait for a clean shot in the beginning, but should you miss and cripple, it is your responsibility to finish the animal as quickly as possible. Some hunters use a second bullet or arrow at this stage, but there are certainly reasons to prefer finishing with a knife. Should you wish to save the blood, mix it immediately with vinegar in roughly 10-1 blood to vinegar proportions to use in a civet or sauce. You have about one to two minutes before it clots completely and is unusable for most culinary purposes.

Get those innards outwards as quickly as possible and wash and/or wipe the carcass down with a towel. If you have to field transport, leave the skin on, but get the skin off as soon as you make it to camp and get the temperature of that carcass down by any means you can, as fast as you can.

A carcass left at blood temperature will quickly sour and ruin good meat, and getting the skin off helps heat to dissipate. Ice can be helpful, but be aware that moisture is not a good thing in general for meat, so you want to keep it dry if possible as well as cold.

To start processing Bambi, fist the hide off the deer while it is still warm from the kill, and mind those thin stringy flat pieces of muscle under the forelegs that will stick to the hide and make your job a pain if you don't catch them early on and separate them by slashing lightly ahead of the muscle and into the silvery-white, slimy translucent membrane that separates muscle and hide. Pliers may help in getting the "slippers" off from the lower legs. Watch out for those nasty hairs that get stuck in the membrane and take forever to wash out. Pull that hide and get it off your butchering floor. Plastic tarps are your friend.

Don't pull the membrane from the muscle (the silverskin) if you plan to hang the meat. Personally, I don't age venison if it's a fat young doe, but that's a matter of taste. Once you've hung the meat, you can trim the silverskin, which should be a bit dry and hard in texture if you've hung it right (and it might even be blackened; this is common enough for an extended aging process). Some meat will go with it, but this is the price of aging.

I have two favorite ways to process a carcass. One of them is the traditional gambrel hang, with a cross-hatched stick splitting the legs and the deer hung from a tree. T'other, the one I pick when in my home facilities under ideal conditions, is a waist-height table with a raised metal surface which is holed to allow blood drainage.

Hang the deer up by its forelegs to let gravity do your work for you in removing those unpleasant bits. Unzip the front end of the deer carefully as you do not want the guts on your shoes in a hurry and by surprise, and have a barrel lined with a big Hefty garbage sack between the deer's legs. I make a *tiny* cut first, then slip my hand inside the carcass and keep two cupped fingers on the back of the knife as I cut. This keeps the guts from accidentally being slashed, which is as you probably can figure a really disgusting mess. Unzip slowly and let the guts fall down unbroken out of the slit you are making.

If you've done this technique right, you will have a mess of guts neatly in the barrel. Urge them into the right place with your hands. Wear latex gloves if you're fussy. Don't forget to get the stomach out too, and carefully sever any connections between the stomach and other organs. Let the stomach fall into the barrel; it's tough and won't burst unless you were clumsy with the knife earlier. The rest of the mass will likely remain attached; fish around the diaphragm (just

under the heart and lungs) with a short bladed knife that is not too sharp and find the connections to cut when you're ready to dump the stomach and guts. You may find it helpful to haul out the guts in your fists and try to have the connective tissue visible before you cut into it. Small scissors can also be invaluable at this stage.

Don't forget to tie off the bung and *carefully* find and remove the bladder, or your meat will be unsanitary and smell funny. I once clumsily dropped a deer bladder I had just carefully removed, and it burst on my tennis shoes. The results were really unpleasant. Dispose of the bladder carefully and don't let go of the tube on the other end until you have a wastes bucket to dump it.

Likewise, cut off the bung (the intestine leading up from the rectum) about eight inches from the bottom and tie it off carefully, after squeezing its contents to clear the area of your cut. Tie off both ends with a standard square knot. Without letting the cut ends touch flesh, dump the stomach and attached guts into the waste bucket and push the tied-off bung end through the rectum. Yes, I know this is gross. Do it anyway. Wear latex gloves and discard them when you are done touching these less than sanitary parts of the carcass. Take your knife and cut out the deer's entire rectum, with some flesh around it, including the tied-off bung. Carefully discard this unclean bit, without letting it touch the meat. Wash your hands. Wash any meat which has come in contact with this yuckiness very thoroughly, and cut out any discolored or suspect pieces. Discard the guts and waste away from your butchering area.

You can then fish around and grab a tough bundle of flesh up past the heart that is attaching the rest of the more solid innards to the carcass. Cut it as high up inside as you can reach, and pull. The whole mess will come down, so have another clean sack ready. This mess, except the green bubble attached to the liver, is good eating, don't waste it. Wash it well and save it on ice. You can eat the heart, the liver, the lungs, the spleen and the diaphragm, though I recommend throwing the latter scrap of tough flesh into the stock pot with the bones. Remove the nasty green gallbladder from the liver carefully and pitch it along with stomach and intestines.

You may wish to be extremely anal retentive about using all of your kill, and try to get something out of the deer's less pleasant parts. I used to be. Two experiences washing out deer stomach and intestines and using them in haggis and sausage was enough to convince me to never mind. They take hours to wash free of ick and they don't taste all that wonderful anyhow. The only use for deer gall that I know of is authentically medieval ink, which you make by mixing in pounded oak ashes. Not in my food processor, thanks.

One small warning: the kidneys of a deer can range from flavorful to pungent and disagreeable; you can either discard or soak in milk overnight to reduce ammoniacal odor and taste. The kidneys of a rutting buck aren't even worth discussing; no marinade can save them, except possibly turpentine. There is only one recipe worth thinking about for buck kidneys in my opinion, and it is this: bake the kidneys underneath a hot brick in the oven for 8 hours. When finished, discard the kidneys and eat the brick, which will probably taste better.

Take a hose to the inside of the carcass once it is gutted out, or if you are field butchering away from a water source, wipe down with a damp cloth thoroughly. Dry the meat with a clean towel before proceeding. If the day is hot, throw some ice in the carcass instead and skip the dry towel the moisture content of the meat might suffer, but the temperature is more important.

At this point, you have a whole mess of tasty and hopefully clean-smelling meat ready for your processing. You can hang at this stage if you like (I don't, especially with a doe whose hindquarters are covered in nice yellow fat - mmmm!), but you can also proceed to dismember into neat freezer and fridge packages. A fresh-killed deer keeps a surprisingly long time in the refrigerator, but your results may vary depending on the condition and holding temperature of your refrigerator.

I separate the meat into: shanks for long braising (venison osso bucco is delish!), two shoulders, two hams which I usually bone out, a whole saddle roast (that's the butt end minus the bare bone you have left after the legs are gone), a crown tenderloin roast with the backbone split in half and about 6" of the ribs still on, two slabs of ribs for immediate BBQ slathered in homemade sauce, the neck for stewing and the flank for scrap. You can further reduce the saddle or the crown tenderloin roast into chops; it depends on how many folks you want to invite over to eat.

Now, all of this is *damn* fine eating and the only parts I would turn into burger or sausage would be the flank, the neck and the shoulders of a lean deer. (A fat deer makes a nice shoulder roast!). The innards are nothing to waste, either. Stuffed deer heart with breadcrumbs and onions and bacon is marvellous, and if you're a medieval cook like I am, haggis is always in the works when I get hold of a nice chunk of internals that includes spleen and liver and lungs. Boiled deer tongue is not unlike beef tongue if you are fond of such things, and you can also use the jowl and palate meat in slivers in any French recipes calling for ox palate. Warning: skinning a deer head really and truly sucks, so less than die-hard medieval recreation enthusiasts may choose to skip this step. I've done it a number of times, but since I managed to get carpal tunnel syndrome, I'm not sure I'll ever do

it again. It is some tedious and painful work, though you do get a nice "deer face" that you can flesh out and tan to make an interesting hat or shaman's pouch. Deer brains are good poached, but make sure you cook them well and don't mind the bottfly larvae that you will occasionally find in the nasal cavities of the skull as they're not uncommon to find. If you're squeamish, don't delve in there at all.

Even the bones of a deer can provide some amazingly good eating. Cut the bones into fairly small chunks (1-2") or have the butcher do it for you, roast them until lightly browned and boil down with the scrap meat for 4-6 hours for venison demiglace, which stores for months in the freezer and adds amazing flavor to all kinds of dishes.

If you must make sausage, make it well. Venison can actually make a very good sausage product that showcases rather than disguises its unique flavor. Much depends on whether you do the sausage "black" or "white" style, ie, do you bleed and rinse the meat thoroughly first for a more delicate product, or do you make a civet with the reserved blood mixed with vinegar? The former will produce a mild, delicate product which takes well to a bit of sage, basil and shallot in the mix. The latter takes to onions and garlic or perhaps fennel or caraway. The middle ground is to use fresh venison that is neither washed and beaten free of blood or civetted, and much depends on the individual carcass - age, sex, diet, condition, etc.

A lot of hunters ignorant of fine venison cuisine turn the works into deerburgers or hash or sausage, trying to disguise its taste rather than showcase it with fine cooking. I suppose if you shoot a rutting buck deer and then don't gut it out before it sours, burgers or sausage or dogfood is a reasonable destination for such a wasted kill. But geez Louise, if you have a mountain of fine gourmet steaks and roasts and chops in front of you and you make mush out of them or allow them to spoil, you have just effectively pissed money away into the snow. Also it's bad karmic brownie points, y'know? Eat what you kill. Don't waste good food, or the life of an animal, senselessly. The Goddess is watching you. ;P

It is all very well I suppose to want to kill the biggest boy deer with the biggest antlers if you wish to prove your fitness to rule the herd and to mate with the does. I guess it's a phallic kind of guy thing. ;P
Since I'm not a guy, I'll just take good venison where I can get it and never mind the big rack of antlers, a sure indication to me of a less than prime meat animal.

Rare roasted venison, fragrant with bay leaves and garlic on a bed of wild rice with pecans, is serious cuisine. Deer neck braised Moroccan style with lemons and honey and olives is delicious over cumin-scented

couscous. Venison shanks osso bucco, steam-braised for hours in your oven, will fill the house with its tantalizing perfume until the neighbors sniff their noses into your yard and cry, "What's for dinner?"

In a rougher setting, wrap chunks of lean hind leg or whole tenderloins in bacon and shishkebab them over the fire with a little cracked black pepper, or throw a slab of deer ribs on the fire and baste at the last minute with the best sauce your granny ever gave you a recipe for.

If you must make sausage, make it well. Don't disguise the taste of the meat; enhance it with the freshest herbs and the finest ingredients. The conventional wisdom is that deer fat is rancid; sometimes this is so and more often in my experience it isn't. Fry a small piece and judge for yourself for each carcass. If there isn't enough of it, add some fresh pork fat of the best quality, and possibly some veal meat, which does not overpower the venison as pork can do.

Venison should be done either rare or falling-off-the-bone well stewed for the tougher cuts such as neck or shank. To enhance the meat, marinades are permitted, but remember that if you've done your job well in selecting a good animal and butchering it cleanly, you don't need to overpower any gaminess with the marinade. Cabernet Sauvignon and Merlots are traditional companions of venison, and should you have some money to splurge, a fine red Bordeaux from one of the great vineyards would also not be amiss. These can be sipped along with the venison as well as making a fine marinade with the addition of some fresh herbs, garlic and best quality olive oil.

Dry coatings for a venison roast are as good as marinade and in many cases better; try powdered porcini mushrooms and pink peppercorns in seasoned flour, or crushed dried chanterelles and hazelnuts as a crust before roasting. Drizzle on some extra virgin olive oil for additional basting on your lean meat. Herbs du Provence, with lavender and rosemary, can add a note of delicate sweetness when balanced by the mellow sweet tang of balsamic vinegar. Keep your aceto balsamico in a small spray bottle; you will find it amazingly easy to do a thirty second spray-on "marinade" to all sorts of meats and vegetables that way, and it can give a lovely caramelized look and taste to dishes like mashed potatoes or baked savory pies if you spray it on at the last minute.

To accompany venison, I recommend simple dishes with hearty, earthy flavors - a duxelle of dark wild mushrooms perhaps, or wild rice with roasted chestnuts and brandied dried cherries. The simplicity of fluffy mashed potatoes drizzled with a bit of olive oil and served with a head of softly sweet, caramelized roasted garlic always complements a good piece of venison. Vegetables on the grill can be sprayed briefly with balsamic vinegar and dipped in fine olive oil and herbs, and then seared briefly

before joining the tender pieces of meat and the creamy pillows of mashed potatoes on your plate.

Any sauce you want to use on your high quality meat can of course be enhanced with truffles, and if you find yourself the fortunate possessor of some of this Perigourdine black gold, chop it very fine and simmer gently in a simple sauce made from the roasting venison juices thickened with a little cream and flour. Simmer (but do not boil) until your whole kitchen is perfumed with the indescribably savory aroma of venison and truffles. Then eat like the kings and queens of old, feasting on the finest viands in your kingdom. Your deer deserves it, don't you think? Not to mention the hunter.

Larousse Gastronomique gives recipes in plenty for venison done in this royal style, often enhanced with foie gras or other delicacies or enclosed in fine pastries. They knew how to properly treat a deer in that culinary era, to be sure; and none went wasted or unappreciated by the serious gourmet. The phenomemon of "deerburgers" is a modern abomination of antler-mad sport hunters who care nothing for cuisine and consider venison a mere by-product of the hunt instead of its object.

I have no moral qualms with hunting, but when it comes to wasting and mis-treating fine meat, I will certainly have some words to say to the ignorant boor who does not respect his kill enough to use it properly. (The mildest are: Give it to me, you bozo, and I'll enjoy it properly if you're not going to!)

However you cook your deer, you should certainly enjoy the rightful reward of the hunt - the taste of venison in all its glory, not disguised but showcased and enhanced by careful handling of the meat and respectful cooking.

6.4.3 [Virginia Ham]

From dgill from the bbq mailing list at
bbq@AZStarNet. com:
CURING PORK VIRGINIA STYLE
The process of curing pork is essentially one of creating conditions favor-able to good microbes and unfavorable to bad ones long enough for the meat to absorb enough salt so that it won't rot before it is can be used. Before refrigeration the primary objective was preservation but now curing is used as a means to flavor meats. In addition to salt, sugars are used to enhance the action of salt, improve flavor and keep the meat more moist and soft during aging. Nitrates and nitrites are often included as anti-bacterial agents, particularly effective against the botulism organism, but they tend to make aged meat hard and dry.

Other seasonings such as black pepper, paprika, and red pepper are used as flavorings and may have some preservative effects but I suspect that their use is more psychological than functional.

Methods of naturally curing pork vary greatly in different areas because of climate and other variables. Since curing conditions are unpredictable, the methods I will describe are more art than science and procedures are admittedly vague. The general principles are pretty simple, though, and there is plenty of room for variations.

In the Tidewater area of Virginia, hogs are killed from mid-November to late January. We try to pick a time when cold weather has settled in but we do not expect it to get too cold. Once meat has frozen, it does not take the cure properly and extended periods of warm weather (50 F ambient) before the cure has penetrated will spoil the meat. Fresh meat freezes at 28 F but as the cure is absorbed, the freezing temp is lowered. The ideal conditions for the first phase, taking the cure, is about 38 F with relatively high humidity. The curing process stops at meat temperatures below 34 F. and curing time must be increased to compensate. Time varies depending on the cut and weight from 2 weeks min. for bacon to over two months for large hams.

After the initial cure, the meat can stand a gradual warm-up through the aging process. Good cures start with good meat. We raise our own hogs and fatten them on a corn based ration supplemented by whatever is available - stale bakery products, household garbage, etc. Garbage should not dominate the ration as the fat will be soft. Top hogs weigh 220 pounds and yield about a 16 pound ham. We like to cure hams between 20 and 30 pounds. Large hams with adequate fat layers age better and don't dry out as much during extended storage. Country cured hams will keep indefinitely but achieve their full flavor after about one year when "white flecks" appear in the muscle. We feed our hogs to 300 pounds or better but don't let them get too fat. Some cuts may be slightly tougher with heavy hogs.

Hams, shoulders and bellies may be bought from packing houses and can be ordered by butchers if you are not in position to grow your own. You may have to buy box lots but make absolutely sure that the meat is fresh and quickly chilled. Pork should be put in cure as soon as possible after

chilling and trimming but, properly handled, it can be a couple of days old. I once bought ten, 25 pound hams that had been two days in transit to the butcher and then were left in his cooler over the weekend. I lost the whole batch! Those hams had also been trimmed excessively leaving little skin and fat covering. As a result, I have gone back to raising my own so I know what I have to work with. I am supposed to talk about curing bacon and I will get around to it. As hams (and shoulders) are more valuable, demanding and

risky, the entire process is keyed to the larger cuts.

Curing and smoking facilities vary greatly. Traditional farm hamhouses/ smokehouses are windowless wood frame buildings about ten feet square with a dirt floor. Wooden plank benches provide work areas for mixing the cure and salting down meat. Joists are within reach and studded with 20 penny nails for hanging meat. The dirt floor allows a higher humidity in winter and allows a smoldering fire to be built inside - both for smoking and to keep meat from freezing during extreme cold. Some hamhouses have external smoke generators - simply a firebox with a stovepipe stuck through the wall. This arrangement makes it easier to cold smoke for several days (or weeks) in the spring without exceeding 100 F. and is essential if the smokehouse is made of wood and insulated. Either the eaves are loosely fitted or there are operable vents to allow for air exchange, especially during smoking, so that there is adequate fresh air and the smoke does not become stale and acrid. Openings are covered by fine screen mesh and the interior is kept dark to discourage skippers (larvae of a small black fly which also likes pork).

My smokehouse follows the tradition except that the walls are poured concrete and the roof is metal. The thick walls store a lot of heat and smooth out daily temperature fluctuations. I have no smoke generator or operable vents but there is plenty of air exchange at the eaves. In places where conditions are not favorable, curing and smoking chambers with temperature and humidity controls and a smoke generator can be easily fabricated or small cuts may be cured in the refrigerator.

My dry cure is mixed by the "pour 'til it looks right" method. My daddy showed me how. There was a request from a pork eater in Israel to provide metric measurements. Unfortunately, I don't know how to convert the SAH (Standard American Handful)! I buy plain (not iodized) dairy salt in 50 lb. bags from a farm supply co-op and other ingredients from one of the warehouse retailers.

I had better stop writing and start posting. Sorry about the verbosity, Rick, but it should be clear. Will finish this one soon and then talk about bagged sausage - my favorite!

6.4.4 [Sausage]

>From Bryan L. Gros :
If you're really nervous, just grind some pork (maybe 2 lbs). If you don't get the leanest pork roast, you won't need to add fat. Or maybe just a little. If you don't have enough fat, the sausage will be a bit dry. You can often get fat for free from the meat guy at your local supermarket. Oh, grind on the coarse plate.

Now to your ground pork add spices. For a spicy Italian, add about 1 Tbsp salt, 2 tsp black pepper, 2 tsp (or whatever) of cayenne. I find that to get really spicy sausage, use crushed red pepper rather than cayenne. Add paprika for a more red color. Add chopped fresh parsley, about 8 cloves of garlic, maybe some fresh basil.

Now mix real good and form a couple small patties. Cook the patties and try it. Is it good? Add whatever you need.

You now have bulk sausage. If you want to stuff it in casings, that isn't too hard with a Kitchen Aid. Grease the casings holder a little, slide the casings on, and feed the sausage through the feeder. Having two people helps, and it is a bit messy, but fairly quick. I'll try to post a couple recipes if that is okay on this digest. I'd like to see others' recipes as well as tips on smoking sausages.

6.4.5 [dry-curing sausage chemistry]

>From Paul Hinrichs :
Someone asked here a while back what Fermento was and, collectively, we got them sort of an answer, that it was a starter culture for fermented sausages. These are of the general family of dry-cured sausages and the process making these has been greatly accelerated and made more dependable by Fermento (or Lactocel, a similar product).

Specifically, there are two stages in dry-curing. The first is called pan curing. It takes about 3 days at 37 degrees and is used specifically to allow time for some of the NaNO3 (saltpeter) to convert to NaNO2 (sodium nitrite), which is the inhibiting agent for _C. botulinum_. The disadvantage of this 3 day wait is that worked meats become harder to stuff into casings since it "sets" some, becoming more viscous. Lactocel accelerates this essential conversion process by using a _micrococcus aurantiacus_ culture which converts NO3 to NO2 more rapidly. Products using Prague Powder #3 do not require pan curing at all, since this already has nitrites (as well as nitrates for the longer run) in it.

Second process is called greening. It takes place after stuffing and is the time that fermentation takes place, in which sugar is converted to lactic acid for the characteristic "tangy" flavor. This would normally take 10 days at 73 degrees F. However, with the _lactobacillus planarum_ starter present in both Lactocel and Fermento, greening takes place in about 16 hours at 85 degrees F. The drying process used with these sausages (the period in which the nitrates come into play for long term safety, converting to the _clostridium_-inhibiting nitrites slowly) still takes 10-90 days, depending on the type of product being made, but the use of starter cultures reduces the 13 days needed for pan curing and greening to a mere 16 hours.

6.4.6 [Salami]

>From Paul Hinrichs :
Here's the salami recipe I concocted/adapted:

2 1/2 pounds pork butt, trimmed lean, ground through 3/8" plate
2 1/2 pounds beef shoulder (both of these were on sale for $1.49 a pound), ground through 1/8" plate
1 pound bacon, diced into 1/8" cubes (easier with homemade bacon because it's more firm than most store-bought)
3 tablespoons corn syrup solids
1 tablespoon freshly-cracked pepper
1/2 tablespoon whole pepper
1 tablespoon cardamom
1 teaspoon ginger
1 teaspoon nutmeg
4 cloves smoked garlic
1 cup soy protein concentrate
1 slightly-bulging teaspoon Prague Powder #2
1 1/2 cup Gamay Beaujolas

I mixed the meats together around noon and let them chill until early evening. Then, I mixed together all the other ingredients in the blender, adding wine until it became the consistency of pancake batter. This all went into a well in the middle of the meat, then got kneaded in. Meanwhile, I had been soaking some 3 1/2" fibrous casings in vinegar, which keeps them from sticking to the meat. I stuffed them in about 10" lengths and got 3 and a half salamis. These went into the smoker at 100 degrees and at 8 o'clock in the evening. There they stayed while I napped until midnight. Then I cranked up the smoker to 130 degrees F for one hour.

Time to smoke 'em! Temperature raised to 150 F and a pan of sawdust in the smoker. By 3am, the first pan was gone, so I added another and went back to bed. When I got up at 6am, I cranked up the temperature to 165 and got a cup of coffee. It's now 8:30 and I'm ready to finish them off by steam-cooking them. I'll put a pan of boiling water in there until they get to 152 degrees internally, shower them down to 120 so they don't shrivel, then let 'em "bloom" until noon when they'll hit the fridge to set up solid.

I am hoping the various textures of meat add a nice touch, but you never really know until you slice it.

6.4.7. [Where do I find kosher sausage casings?]

From our Thomas Jefferson of rec.food.preserving, Paul Hinrichs
:

Both the Sausage Maker (1-716-876-5521) and Stuffer's Supply Company (1-800- 615-4474) sell beef and lamb casings. I am not aware of the slaughtering requirements for a casing to be deemed "kosher", but if all that is needed is for the product to be free of blood, then these will pass.

You might also check the Con Yeager Spice Company, who I've been told have very reasonable prices. I don't have their number, but I believe their web-site is http://www.nauticom.net/w-pa/yeager.htm. It shows mainly spices for sausage making, but you can get a list of stuff available mail order by calling 1-800-222-2460 or faxing 1-412-452-6171.

6.4.8 [Pickled beef.]

>From Sallie Montuori :
A while ago, somebody requested recipes for pickling beef. This weekend I finally saw my mother long enough to winkle out of her our family recipe. Please note that amounts are approximate at best, and I'm sure someone is going to point out that the traditional method is an invitation to food poi-soning in one or more ways for a variety of reasons.

Spiced Beef (Christmas tradition, made in early December)

1 small box each ground cloves and ground allspice (about 1 oz.?)
1 1/2 cups salt
3/4 cup sugar
2 tablespoons saltpeter (optional; all it really does is keep the meat pink)
4 to 10 pounds of boneless beef. My mother uses chuck because she likes the taste; her grandmother used prime rib, boned, rolled, and tied. The tougher cuts work fine, since it gets sliced paper-thin in the end.

In a non-reactive container (hereafter referred to as "the crock", although a large bowl with a plate to cover works fine) large enough for all ingredients, mix the spices, salt and sugar. Rub the saltpeter into the beef, then drop it into the crock and rub the spice mixture into it. (You may want to use rubber gloves to save on scrubbing your hands.) Cover and set out from under foot; the garage works fine in the winter when this is traditionally done. Use the fridge if you'd rather.

Every day for 7 to 14 days (depending on the size of the piece(s) of meat you're curing), turn the meat and rub more of the spice mixture into it. After a day or so, the mixture will be wet from the meat juices. Try not to overcure the meat; it will get dry.

After the meat is cured, you need to cook it. Do this on a day you weren't planning on doing anything else!

In a large, non-reactive pot, put a rack on the bottom to keep the meat from

sitting and burning. Wipe as much of the spice mixture off the meat as you can, then put it on the rack, and add cold water to cover. Bring slowly to a boil; reduce heat and simmer until the meat floats. This will take a couple of hours for a small piece, longer for a larger one. Turn the heat off and let the meat cool in the pot (again, allow a few hours). Wrap (not in aluminum foil) and store in the refrigerator.

6.4.8 [Sources for wood chips for smoking.]

From: Kit@maine.com/ eskwired@shore.net
I obtained a bag of lump natural harwood charcoal. It comes from Brookline Ice & Coal. (617)232-0941. I called my local hardware store and they are going to start carrying it. Maybe yours will too.

Kit--
... I called them up--they said that they manufacture the charcoal themselves, using only oak and hickory. $7.75 for 20 lbs. They carry apple, mesquite and hickory chunks at $12 for 50 lbs. They also carry 1 in chips of maple, cherry, apple and mesquite for $1 per lb. [1996 prices--LEB]

6.5 VEGETABLE/FISH CURING AND SMOKING

6.5.1 [Salt curing items.]

6.5.2 [How do I cure olives?]

Nothing I like better than a home cured olive, and they are very easy to make. All that's required is patience, yer olives, a rolling pin or a paring knife, canning salt and a non-reactive container.

You can cure olives at nearly any stage, but the really tiny green ones aren't worth it. Green olives are green colored; red ripe olives have a reddish 'blush' to them (if you have olives, you know what I mean); black (or dead) ripe olives are deep black throughout. Just make sure that the black ripe olives are still firm, and don't cure 'drops', olives that have fallen to the ground. You've got several choices, depending on your curiousity and your fanaticism.

Water curing.
Generally you water cure the big green ones, right before they turn red. You pick the olives, crack each of them with a rolling pin, then immerse them completely in cold water, changing the water *each* day for at least 25 days. Stir them up when you think about it. Immerse and change the water, etc, taste one after 25 days. If they are too bitter, keep up this

regime until they are edible.

Brine curing.
Brine cured red-ripe or black-ripe olives are Greek-style; brine cured green olives are Sicilian style. The red-ripe olives generally turn a grey green to pink, while the black-ripe ones keep their color, becoming a Kalamata-deep purple. Again, you pick the olives, or you shake the tree over a tarp, and collect the olives. Deeply slit each one using a sharp paring knife, then plunk them into a brine (brine is 1/4 cup pickling salt in 1 qt water). Weight down the olives, make sure they are fully immersed. Cover your vat of olives, stir once in awhile, wait one week. Rinse, and change the olive brine once/week for at least 3 weeks. Taste, if still too bitter, keep changing brine 1/week. Mine usually take about 6 weeks. Scum will form on the top of the vat; its harmless *if* olives are immersed, but get rid of it when you see it.

Lye curing. (No fanaticism necessary)
You always lye cure green olives. If you bubble air through the lye solution, those green olives turn black; the California black olive is born. You pick the olives, clean them. Save a few of your biggest olives for the top of your vat. Immerse all those olives in a lye solution (2 tablespoons flake lye in 1 qt water) for 12 hours. Dispose of lye solution, reimmerse olives again in new lye solution for 12 more hours. Take and cut into some of your largest olives to see if the lye penetrated the olive (olive will be soft to the pit, easy to cut to the pit, and the flesh will be yellowish green when ready). Soak olives in water for 3 days, changing the water at least 3-4 times/day. Taste an olive on the fourth day. Should taste sweet and fatty, with no bitterness, a little like a tiny avocado. Immerse for 1 week in a light brine, about 6 Tbs salt in gallon of water.

Lye is nasty, remember to wear rubber gloves, use lemon juice or vinegar to neutralize lye burns, and your olive vat shouldn't be plastic.

Can also make marinades for your cured olives, good flavors/herbs to use in various combinations are: garlic, bay leaf, oregano, thyme, dried chiles, fennel seed, peppercorns, coriander seed, orange peel, lemon peel, lemon slices, cumin seed.

6.5.3 [Salt cured (pickled/preserved) lemons and limes. Used in Middle Eastern/ Moroccan cookery.]

From: Paul Holt
Hamad M'Rakad (Preserved Lemons and Limes)
This preserve gives a mellow lemony flavour to many North African dishes and is easily made. Choose ripe unblemished lemons or limes. Wash them and make

two deep vertical cuts in a cross, almost, but not quite through them, so that they still hold together at the stem. Sprinkle plenty of salt inside on the cut flesh, about 125 g (4 OZ) for 1 kg (2 lb) fruit.

Then close them, and put them in a sterilized jar so that they are jammed tightly together. Squeeze enough fresh lemon juice over them to keep them covered. The salt will draw out the juices and the peel will soften within a week. They will be ready to use in 3 or 4 weeks. Rinse off the salt before using and discard the flesh; it is the peel alone that is used for flavouring. It is cheaper and easier, but not as good, to cover the salted lemons or limes with strong brine, or a mixture of sunflower oil and water.
Claudia Roden: MIDDLE EASTERN FOOD, Harmondsworth 1970 (Penguin Books)

Lamoun Makbouss (Pickled Lemons)
A delicacy which is also magnificent made with fresh limes.

Scrub lemons well and slice them. Sprinkle the slices generously with salt and leave for at least 24 hours on a large plate set at an angle, or in a colander. They will become soft and limp, and lose their bitterness. Arrange the slices in layers in a glass jar, sprinkling a little paprika between each layer. Cover with corn or nut oil. Sometimes olive oil is used, but its taste is rather strong and may slightly overpower the lemons.

Close the jar tightly. After about 3 weeks the lemons should be ready to eat- soft, mellow and a beautiful orange colour.

[Email note: My mother accidentally discovered a way of speeding the process when left with dozens of lemon wedges which had been used to garnish a large party dish. She put them in the freezing compartment of her refrigerator to keep them until she was ready to pickle them. When she sprinkled the frozen lemons with salt, she found that they shed a large quantity of water and softened in just over an hour. They were ready for eating after only a few days in oil and paprika.]
--
Lime Pickle (Hot)
12 whole limes
2 Tbsp salt
Juice of 3 lemons
2 bay leaves
4 oz green ginger (see page 160)
2 tsp cayenne pepper
2 oz green chiles

Peel and slice the ginger. Remove the seeds from the chiles. Wash and dry the limes and cut them into slices and remove the pips. Put a layer of lime slices in the bottom of a jar, sprinkle with salt and crushed bay leaf, add

some of the chopped chilies and strips of ginger. Repeat these layers until the ingredients are used up and then pour in the lemon juice.
Having tied a piece of cloth over the jar, shake it thoroughly but carefully and put it on a windowsill in the sunshine. Each day for 4 days add some more salt and shake the jar again. Remove the cloth and put on a glass or plastic top (never a metal one). Then leave the pickle to mature for a fortnight.[2 weeks]

This makes a strong sharp pickle, not for over-sensitive palates. To make it even stronger, put in more cayenne pepper, and leave the seeds in the chiles. To make it less strong, halve the amount of chiles and omit the cayenne pepper. This is really a basic recipe which can be added to or subtracted from as you wish. It can be made with half limes and half lemons, or lime juice may be substituted for the lemon juice. in a pinch it can be made entirely with lemons and just the juice from half a dozen limes, or tinned natural lime juice, if you can get it.

Spiced Lime Pickle

This very hot pickle is usually served in Indian restaurants with curry and can be bought ready made up in jars, but is well worth making up for yourself.

10 limes
2 tsp fenugreek
5 lemons
1 Tbsp cumin seeds
2 Tbsp dried chiles
1 1/2 pints olive oil
1 dessert spoon ground black pepper
3 Tbsp salt
6 cloves crushed garlic
1 Tbsp brown sugar
2 Tbsp mustard seed

Wash and dry the limes and lemons and cut them into pieces removing all the pips [seeds]. Shake the mustard seed and fenugreek in a dry frying pan over a good flame to roast them for a minute or two, and then grind them down finely. Grind the cumin seed or crush it, but not too fine. Put together the salt, garlic, ginger, mustard and fenugreek, and sprinkle them all over the fruit, stirring well. Then pack the fruit into a jar, adding in the rest of the ingredients in layers so that they are well spread through the pickle.

Heat the oil until it is smoking, and keep it hot for 5 minutes, but do not burn it. Let the oil cool so that it will not break the jar, and pour it over the pickle. Leave it loosely covered for a week, then screw down the lid and keep it for another week before using it.

To make a milder pickle cut down on the chiles, or leave them out altogether and substitute a pinch of chili powder or cayenne pepper.

6.6.1 [Lye and Mud curing items.]

6.6.2 [A friend of mine is looking for the recipe for "preserved eggs" or "1,000 year old eggs". Jim Kofler]

from Katherine Pepers , rec.food.cooking
I just got a new Chinese cookbook - "The Chinese Gourmet" by William Mark. It has a detailed description of "Hundred-Year-Old Eggs", though not an actual recipe. I'll pass on what it says, in case it may be of use/interest.

"Rather than being dug up from an ancient tomb, as the name might suggest, '100-year-old eggs', or as some call them '1000-year-eggs,' are actually preserved for only 100 days at most. Fresh duck eggs are mixed with various preservative compounds that permeate the shell and alter the consistency of the egg.

There are two main methods for preserving eggs in China: P'i tan are coated with an alkaline mud and then covered in ash, rice husks, or tea leaves, before storing in large crocks for 100 days. The yolk becomes creamy and very pungently flavored, the white turns an amber-gray color and coagulates into a firm, gelatin-like consistency.

They are shelled and the egg sliced to serve as an hors d'oeuvre with slivers of preserved ginger and a vinegar dip.

Hom tan are preserved in brine and saltpeter, or a mixture of finely ground charcoal and brine. The yolk hardens to a firm, grainy texture and acquires a pleasing salty taste. These must be cooked before they are ready to eat, as a snack with a splash of sesame oil and vinegar and a sliver of ginger, or to add, sliced, to congee. The yolks are an ingredient in the fillings of many sweet pastries.

Hundred-year-old eggs are valued not only for their taste, but also for their medicinal value. The preservation process raises their alkalinity, making them a good antidote for ulcers and other conditions caused by hyper-acidity.

They are also considered a cure for hangovers."
--

6.6.3 [After some discussion on posole (aka, hominy) on the Chile-Heads list,

someone in France asked how you make hominy, since it isn't really available there.]

from Justin M. Sanders , the Chile-Heads list..
Traditionally not lime, but *lye*. Here is a recipe paraphrased from a delightful recipe book called "Seems Like I Done It This A-way", by Cleo S. Bryan. (Mrs. Bryan was an Extension Home Economist in Oklahoma, and many of her recipes are traditional Native American recipes).

Hominy
2 qts. dry shelled corn (white or yellow)
8 qts. water
2 oz. lye

Boil the above 3 ingredients 30 minutes. Remove from heat and let stand 20 minutes. Rinse in cold water until all the skins and the "eyes" on the corn are loose. Return to heat, cover with water, bring to boil for 5 minutes. Pour off the water, and repeat 2 more times (for a total of 3 five-minute boilings with fresh water). Cover again with water and cook 30 minutes and can. Process in a pressure canner at 10 lbs. pressure for 70 minutes for quarts, or for 60 mins. for pints.

Apparently, if you don't wish to can the hominy, you can eat it after the 30 minute cooking period.

In more traditional recipes, the lye was obtained by straining water through hardwood ashes-- or by boiling the ashes along with the corn.
--

6.6.4 [Sugar curing or candying items]

6.6.5 [Does anyone know how to make candied orange rind, grapefruit rind or pineapple, etc?]

From: Barbara Mayo-Wells :
Here's how my grandmother (1880-1965) and mother (1908-1982) made candied fruit rind:

1. Remove as much of the white stuff as you can from inside the rind.
2. Cut the rind into strips about 1/4 inch wide and as long as you like. Remember that the size you cut now is the size you'll wind up with.
3. Submerge the rind in a pan of cold water. Bring to a boil. Drain.
4. Repeat step 3.
5. Repeat step 4. (That is, boil the rind in three successive waters. The purpose is to eliminate bitterness.)
6. While the rind is boiling, prepare a simple sugar syrup: 1 part sugar to

1 part water. How much you make depends on how much rind you want to candy.
7. After draining the thrice-boiled rind, put it into the sugar syrup. Boil gently until almost all of the syrup is absorbed. Keep a close eye on this process. Stop too soon, and the rind will be gooey. Wait too long, and you'll have scorched sugar.
8. While the rind is boiling in the sugar syrup, put some granulated sugar (a cup or so) in a bowl and arrange some cake racks over cookie sheets.
9. A few pieces at a time, drop the sticky rind into the sugar, roll them around to coat them thoroughly, and transfer the pieces to the cake racks to dry. Let them get quite dry to the touch before putting them into an airtight container.

6.6.6 [Candying fruits]

>From Ellen Wickberg :
Martha wanted the candied fruit instructions, so here they are.

Choose firm ripe fruit. Peel, then core peaches or pears and cut into quarters, pit cherries, cut small thin wedges of pineapple, can leave small crab-apples whole, apricots and plums should be pricked several times to the centre with a fork.

Cover the fruit with boiling water and simmer until just tender (test this with a skewer). This should take about 10-15 mins for firm fruits, 3-4 for tender ones. Test this frequently - over cooking makes fruit squashy, while undercooking makes them dark and tough. Drain fruit into a large bowl, but save the cooking water.

For each 1 lb of fruit make a syrup combining 5 fluid oz of the water in which fruit was cooked and 6 ozs (by wt) of sugar. Stir until the sugar dissolves and then bring to boil.

Pour the boiling syrup over the cooked, drained fruit. If you have insufficient syrup to cover the fruit, make up some more (same proportions as above) with water. Note how many times you have to do this. Weight down the fruit with a plate, and leave the fruit in the syrup for 24 hours.

On the 2nd day: drain the syrup into a saucepan, add 2 oz sugar for each original 5 fluid ozs of water, bring to the boil and pour again over the plate. On the 3rd day, 4th day, and the 5th day repeat what you did on the 2nd day.

On the 6th day, add 3 oz of sugar for every original 5 fluid oz of water, heat and stir to dissolve in the saucepan. Add the drained fruit and boil for 3-4 minutes and then put all back in bowl. Leave for 48 hours. On the

8th day, follow the day 6 instructions and then leave the fruit for 4 days. If you notice that the syrup is still thin as it is cooling on the 8th day, repeat the instructions for day six again before leaving it to soak for the 4 days.

At this point you can leave it in the heavy syrup for up to 3 weeks OR remove from the syrup after the 4 days, drain on wire rack (put a sheet below to catch the drips). The instructions then say to dry in a cool oven, but I don't, usually just air dry. Pack or put in sugar to coat and then pack. Keep in cool place. Have fun. Ellen

6.6.7 [Candying flowers]

>From Lynn Otto :
Last summer I spent many hours sugaring violets, geraniums, daisies, borage flowers, and other types of blossoms. The conclusion that I came to after a lot of botched attempts is that the simpler the flower, the easier to sugar (or candy). Here's my method:

1--Pick blossoms early in the day, and put them into cool water.
2--Have ready a wide bowl of extra fine, or berry, sugar. Sometimes I grind the sugar just a bit more.
3--Beat equal parts eggwhite and water--mixture should not be too gelatinous. I have heard that it is possible to obtain powdered eggwhite and if you can get it in you area I would suggest trying it. It was nowhere to be found in Edmonton last summer.
4--On a steady surface ready everything for sugaring: eggwhite, sugar, a plate or wax paper on which to dry blossoms, tweezers, a bowl of water for washing hands, and the flowers.
5--Take tweezers, and grasp stalk of flower close to stem. With paintbrush dipped in eggwhite, paint all surfaces of flower leaving no dry spots. Areas not painted will darken and decay in time.
6--Quickly, while eggwhite is still wet, sprinkle blossoms with sugar. You may wish to use your fingers or a small coffee spoon. The idea is again to cover all areas of blossom. Tap spoon on tweezers to shake off excess sugar.
7--Place sugared flower down on plate or sheet of wax paper to dry. You may want to put a fine layer of the sugar down first to avoid sticking.
8--The flowers should be left undisturbed for several days in a cool area. When removing from plate/paper you may wish to use a razor blade to gently pry blossoms from plate.
9--Always candy more flowers than you need as there is bound to be some wastage.

I still have candied flowers left over from last summers work. I simply keep them in a covered container.

6.6.8 [Smoking vegetable/fish items.]

6.6.9 [How do I smoke chiles?]

Some recipes and techniques are available at the chile heads www site. Check the Other Sources List for the URL.

From Garry Howard, , taken from the chile-heads list..

Americans who love the smoky taste and fiery bite of chipotles have recently been hit with high prices and a scarcity of product. With prices for these smoked jalapenos reaching $15 a pound wholesale, home growers yearn to smoke their own. But the Mexicans have been fairly secretive about their techniques, and none of the books on chiles describe home smoking. After a trip to Delicos Mexico, I think I have solved this mystery -- but the process takes some dedication. First, let's look at how the Mexicans do it.

They use a large pit with a rack to smoke-dry the jalepenos. The pit containing the source of heat is underground, with a tunnel leading to the rack. The pods are placed on top of the rack where drafts of air pull the smoke up and over the pods. The jalapenos can be whole pods or pods without seeds. The latter are more expensive and are called "capones", or castrated ones.

It is possible to make chipotle in the back yard with a meat smoker or Weber type barbecue with a lid. The grill should be washed to remove any meat particles because any odor in the barbecue will give the chile an undesirable flavor. Ideally, the smoker or barbecue should be new and dedicated only to smoking chiles.

The quality of homemade chipotle will depend on the maturity and quality of the pods, the moisture in the pods, the temperature of the smoke drying the pods, and the amount of time the peppers are exposed to the smoke and heat. The aroma of wood smoke will flavor the jalapenos, so carefully choose what is burned. Branches from fruit trees, or other hardwoods such as hickory, oak, and pecan, work superbly. Pecan is used extensively in parts of Mexico and in southern New Mexico to flavor chipotle. Do not be afraid to experiment with different woods.

The difference between the fresh weight of the fruits and the finished product is about ten to one, so it takes ten pounds of fresh jalapenos to produce approximately one pound of chipotles. A pound of chipotles goes a long way, as a single pod is usually enough to flavor a dish.

First, wash all the pods and discard any that have insect damage, bruises, or are soft. Remove the stems from the pods before placing the

peppers in a single layer on the grill rack. Start two small fires on each side of the grill with charcoal briquettes. Keep the fires small and never directly expose the pods to the fire so they won't dry unevenly or burn. The intention is to dry the pods slowly while flavoring them with smoke. Soak the wood
in water before placing it on the coals so the wood will burn slower and create more smoke. The barbecue vents should be opened only partially to allow a small amount of air to enter the barbecue, thus preventing the fires from burning too fast and creating too much heat.

Check the pods and the fires hourly and move the pods around, always keeping them away from the fires. It may take up to forty-eight hours to dry the pods completely. The pods will be hard, light in weight, and brown in color when dried. If necessary, let the fires burn through the night.
After the pods have dried, remove them from the grill and let them cool. To preserve their flavor, place them in a zip-lock bag. It is best to store them in a cool and dry location. If humidity is kept out of the bags, the chipotles will last for twelve to twenty-four months.
Buen apetito!

NOTES : From the article: The Chipotle, Mystery -- Solved at Last!
by: Dr. Paul W. Bosland, Agronomy and Horticulture Department
New Mexico State University

Chile Pepper Magazine - October, 1992

MasterCook formatted by Garry Howard, Cambridge, MA
garhow@hpubmaa.esr.hp.com

[And remember, you can smoke anything. Fruits, garlic, cheeses..]

>From Paul Hinrichs :
... for anyone who thought I was losing my mind when I smoked garlic, let me prove I was not the first. Here is the procedure given in the book for smoking blueberries:

"Pacific coast Indians used to smoke-dry blueberries for winter use. They may be successfully processed in an ordinary smoke oven.

Spread the blueberries on a fine wire screen and cold-smoke at 75 to 85 F, [you guys in the heat are out of luck--LEB] until they are partly dehydrated. The skins become wrinkled, and they look somewhat like dried currants. Keep in a covered - though not airtight - jar or dish under refrigeration."
"The smoked berries make a very tasty dessert served with ice cream or sherbet." ...the same section also tells about smoked nuts, eggs, and garlic bread.

6.7 [What do I need to know about smoking a fish?]

from Doug Smart, ...
This isn't a recipe, but it is good information and does offer something on the strength of the brine:

Pacific Northwest Cooperative Extension publication PNW 238 advises the following (somewhat paraphrased) for safety in smoking fish:

- Fish must be heated to 160 F internal temp and held there for at least 30 minutes during the smoking process.
- Fish must be brined long enough to absorb adequate salt for preservation. A brine solution containing 1 part salt to 7 parts water by volume for 1 hour will usually suffice.
- Oily fish such as salmon, steelhead, shad, and smelt take longer to absorb brine, but tend to absorb smoke faster.
- Fish should be air dried before smoking for better smoke absorption and to minimize the chance of spoiling during smoking.
- It is best to smoke at a low temp for 3-5 hours before elevating to the 160 F cooking temp. This helps eliminate "curd" formation as juices boil out. To avoid spoilage during smoking, the magic 160 F temp should be reached within 6-8 hours.
- Commercial smoked products must meet an FDA requirement of at least 3 1/2% water phase salt after smoking. Since most home smokers cannot make that measurement, refrigeration is essential for safe storage of home-smoked fish.
- Use only hardwoods for smoking. Maple, oak, alder, hickory, birch and fruit woods are recommended. DO NOT USE WOODS FROM CONIFERS.

6.7.1 [Smoked salmon]

From Brian Bigler ...
I recently responded to a thread concerning oily versus non-oily fish by listing my recipe for smoked salmon. I figured it may be of use to others on this newsgroup, so I'm posting this to the group. I hope to hear from some of you who have improvements on this, but be advised, this recipe has received rave reviews from my colleagues in the salmon business:

First of all, the smoker you use will greatly effect the final product. I'm not familiar with all the various brands, but the hobbyist smokers that I've seen tend to be small, for the sake of shipping, and not really practical for the performance I need. I like to use cool smoking for cheeses, as well as warmer smoking for salmon or trout. I'll describe my ideal smoker at the end of this. [I put a copy of this under equipment sources--LEB]

SMOKED FISH

I use the following for at least two-six pound fish

Brine:

1 gal	water (at least a gallon, I use a couple)
1/2 lb (at least)	pickling salt
1/4 lb (at least)	brown sugar
3-4 tbs	pickling spice
2-3 tbs	paprika

Put the water on to boil, adding the entire 1/2 lb of salt, stir until salt is dissolved. Add sugar and stir. Add the pickling spice and paprika. You may not be able to get the sugar to dissolve, but if you can, add more salt.

Irrespective of the amount of water, you want to achieve a super-saturated saline solution with the salt and sugar. The mixture will be super-saturated when you have salt granules on the bottom of the pot at a boil. Speaking to details, the sugar is absorbed by the meat much slower than the salt. I've used half salt/half sugar mixtures with great success, but the amount I recommend here will allow you to reach the point of super-saturation and keep the salt content down.

Boil the mixture (covered) for five or so minutes, and either set it aside to cool, or put it in a sink of cold water (change the sink water several times as it gets hot).

I cut my fish in fillets and then in pieces about two to three inches wide. Brine the pieces for 3.5 to 5.0 minutes, depending upon thickness. Timing is important, don't brine longer than 5 minutes, no matter the thickness of the meat. This brine time imparts salt/sugar/pickling spice flavors to the outer tissues, that then diffuse through the meat as it dries. I've tried the products of people who leave the meat in brine for so long all you taste is salt. Don't make that mistake, too little salt is MUCH better than too much.

Take the pieces from the brine and place on a paper towel-covered board. Allow to dry at least until a pelicle (hard outer surface) has formed. This could take up to two days if the weather is wet, a lot less if you put it in the sunshine. I like to dry mine for a long time to attain a chewy texture, but you at least want the excess moisture to evaporate off.

Smoke the pieces, skin side up, alternating the ones on the lower racks with those on the upper racks between chip loads.

If your smoker is warm, the paprika will cause the meat to darken without your having to smoke the heck out of it. Too many hobbyists impart a creosote flavor to their meat in the attempt to make it LOOK like it's smoked.

Paprika is a great way to make it look really well-smoked without having to leave it in too long. If your smoker is cool, the cooking will turn it dark.

Remove the pieces to a cookie sheet and place in an oven that has been heated to 350 degrees. Put the cookie sheets in the oven, close the door, and turn off the oven. Leave the smoked meat in the oven for about 15-20 minutes, or until you can see that it's cooked.

I vacuum pack mine, one to three pieces at a time, right out of the oven while it's still hot. At the least, use Freezer Bags to store your fish.
I've had success with Freezer bags by closing the ziplock to one end and sucking out the air to mimic the vacuum sealer. Vacuum packing assures that the salt/sugar/pickling spice flavors will be diffused through the meat.

I hate to have to freeze mine, but I do anyway out of necessity. My vacuum packages will stay fresh if I refrigerate, but freezing makes certain.

6.7.2 [Lox, Nova Lox, and Gravlax]

1. from Ray Goddard :
Gravlaks(Norway)- buried or grave fish, for a modern version:

Take a 6-7 lb salmon, 1 tablespoon brandy, 3/4 oz sugar, 1 1/2 oz salt, pepper, fresh dill.

Clean and wipe out fish (do not wash), fillet, sprinkle with brandy. Mix sugar, salt and pepper and sprinkle over fish. Put one fillet skin down on plate, chop dill and spread it over, place other fillet on top skin side up. Cover with foil and place board on top and a weight (1lb) on top of that. Put in cool place 3 - 4 degrees C. Turn fillets twice a day and pour liquid back onto fillets. Remove weights after two days. Ready in three to four days. Serve cut in thin slices with more pepper and chopped dill, accompany with rye bread and butter.

By way of Leah Smith:
Lox comes from the German word "lachs," which means salmon, and came here with German-Jewish immigrants. Note that true lox is not smoked, merely brined, although the smoked salmon called Nova is often incorrectly referred to as lox. The name Nova comes from Nova Scotia, which is where that type of cold-smoked salmon first came from. Old-fashioned Jewish lox is saltier and oilier than Nova.

Here's a recipe:
1 - qty of VERY fresh, VERY fatty (with whole skin) salmon
1 - large earthenware crock (or wooden keg) Kosher Salts (or rock salt)

Qty of clear flavorless oil comparable to the qty of salmon

- Skin the salmon keeping the skin as whole as possible.
- Cut the salmon meat into thin slices.
- Within the crock, (or keg), lay down a layer of salt to cover evenly.
- Place one side of the salmon skin scale side up flat onto the salt layer.
- Drizzle the oil lightly over the skin until shiny.
- Lay one salmon slice atop the oiled skin.
- Drizzle the oil lightly over the salmon slice until shiny.
- Layer the salts thinly atop the salmon slice to cover.
- Repeat the layers as above alternating salt, salmon, oil for all remaining slices.
- Before adding the final layer of salts, lay the other side of the skin scale side up atop the oiled salmon.
- Drizzle with oil until shiny.
- Layer salts atop the final layer of skin to cover.
- Cover entire crock (or keg) with multiple layers (3-4) of plastic wrap.
- Weigh down the top of the sealed crock (or keg) with heavy stones.
- Store in a cool place 2 weeks prior to usage.
- Eat when ready!~

NOTE: This will keep almost indefinitely, but refrigeration is recommended.

Alitak Pickled Salmon
>From Brian Bigler :

Alitak is not an incorporated town, although many people can claim it as a birthplace. It's the location of a salmon cannery on the southern shores of Kodiak Island (Gulf of Alaska) that was first established around the turn of the century. The following recipe was actually developed years ago by one of the many fishermen hired by the cannery to harvest and deliver fish.

This recipe has become the standard for Wards Cove Packing Company, where I have retained it and pass it to you.

ALITAK PICKLED SALMON RECIPE

Fillet salmon (sockeye works best) and remove skin, cut into bite sized pieces. For one batch of the pickling mixture listed below, you'll need three quarts of fish pieces (one fish) and three sliced onions. This will make 10-12 pints of pickled salmon.

Soak salmon pieces in a stainless steel, plastic, wood, or crockery pot for 8-12 hours in a mixture of half salt and half water. Refrigerate and turn the mixture with your hands or a soft spatula every few hours. When brining

is complete, gently rinse for one hour, changing the cold water three times. Air dry about 1 hour to let pieces firm up and a slight glazing will form.

Pickling Mixture:
- 8 cups white vinegar
- 3 cups white sugar
- 1 cup brown sugar
- 7 Tbsp pickling spices

Mix all the above ingredients in a large stainless pot and boil for 15-30 minutes, stirring frequently. Let cool to room temperature, placing the pot in cold water or refrigerating if necessary. Mixture must be cool when poured over fish.

Slice three medium-large white onions thin and layer fish pieces and onion slices in pint jars. After each layer or two, add pickling mixture. Stir the pot of pickling mixture before dipping out a portion to insure spices are evenly distributed when mixture is spooned into jars. Fill jars and seal using fresh lids. Refrigerate and turn jars upside down for a day or two during the first week.

Tastes best about two weeks after pickling, and at Alitak it's gone in one day!

6.7.3. Many Salmon and Trout Recipes - http://www.dejanews.com
search for "Salmon and Trout" in rec.food.preserving archive.

7. POTTING

7.1 [What is potting anyway?]

Potting generally involves preserving food (meat, cheese) by smothering it in a layer of oil or fat, much like paraffin wax is used to seal up a jar of jam or jelly. This method of preserving food is not for amateurs, or for folks who have to watch their fat intake.

7.2 [How do I render lard? Which pieces of pork fat are used?]

from Imogen .
Hi Jon, nothing simpler than making lard! The fresh fat from under the skin

should be passed through a meat grinder. Your butcher will do this when you have your meat cut. Take small portions and heat them in a large, shallow pot. Safety is very important here!

1. Keep a tightfitting lid handy in case the fat catches fire.
2. Use a stainless steel pot, if you have one. They are easiest to clean later.
3. Use a wooden scraper to constantly loosen the fat from the bottom of the pot. Plastic one's are no good as they will melt.
4. Keep a metal ladle and WARM, HEATPROOF jars handy to fill as the lard dissolves.
5. Continuously remove liquid lard as it becomes available.
6. Try to push the raw fat under, so it can dissolve versus the rest spitting all over the place, while it starts to roast.
7. When all your fat is crisp and your lard out, remove pot from the hot element immediately.
8. Never try to refill your pot. ALWAYS do one batch at a time!
9. If you want to use the fried fat later, freeze it in small portions. It is very greasy. Little portions go well though in spaghetti sauce for exam-plea.
10. You should either pressure-can your lard or simply freeze it.

[In answer to pressure canning it, also from Imogen...]
When I pressure-can lard, I use the hot-pack method. The temperature of the lard should have at least 170 degrees Fahrenheit, when you seal the jars with new lids coming directly from a pot of boiling water. Always try to fill the jars as full as possible. You only fill as many jars at a time, as your pres-sure cooker will hold. I use the remainder of this batch of lard for freezing. That way, I don't have to reheat it.

As for time and pressure that I use, 120 mins. at 10 lbs (70 kpa). The above mentioned information are based on what I have read in several books on the subject of pressure-canning procedures for meat. They all seem to agree on these figures. Nobody expressively mentions lard in their recipes though. Most have recipes for pork cuts of various sorts with the addition of either broth or lard. I want to mention, that I, for my part, never sell canned lard, only the freezer variety.

Besides for cooking purposes it tastes well as breadspread on Pumpernickel with cheese or just plain with a dash of salt.

11. Good luck and be careful. This advice comes to you from a porkfarmer!
12. NEVER leave the hot grease on the stove out of your sight!

Hope I didn't sound like a preacher, but over the decades that I have been doing this, I have seen too much go wrong. Besides some nasty little burns

from spitting grease I have so far always been lucky.

From: mboddy@peg.apc.org
Subject: Re: Help with lard making???

No doubt you've been flooded with advice, but I might just as well have a go. Your request has brought back many pleasant memories. Rendering lard was the first cooking operation I can remember doing as a child. Watching the lard on the fuel stove, the bubble off of the water, and the rise of the cracklings.

The best lard is made from the leaf and kidney fat which is stripped from inside the carcass. Trimmings left from cutting are also suitable. You won't get a huge amount from baconers. In large, older pigs, backfatters, you can also use the excessive fat on the back.

The fat from the mesentery or caul (round the stomach), and the fat round the gut (ruffle fat) should be kept separate. The lard rendered from this is darker in colour than other lard and can often have an unpleasant odour. Makes good soap.

In any case, do not render the caul. Use pieces of caul to wrap up sausage meat and suchlike for slow frying or baking--an experience in itself, and rare these days.

In preparing the best fat for rendering, remove all skin and traces of

muscle meat. Muscle will cause an unpleasant flavour in the lard, if burned during rendering.

To remove the skin from the back fat, etc., cut the fat into 25 mm (inch-wide) strips. Lay the strips on a table, skin side down. At one end of each strip, make a cut in the fat to the skin and pull the skin between the knife held flat and the table. Then cut the fat into 25 mm (one inch) cubes, or put it through a coarse mincer before putting it in the vessel for rendering. We find the mincing method well worth while. Cutting top quality back-fat from a good pig into cubes is a bastard.

You can render in a kettle or other vessel over a slow fire, or in a shal-low dish in the oven. We much prefer the slow fire method--it is more personal and interesting to do. And you can control it.

We often use an electric frypan, so that we can regulate the heat easily. One frypan doesn't hold much, so we do it in batches, or borrow a pan or two. If using a stove, set the pan at the back as the heat gradually rises, then move the pan to the hot-spot. But watch it! Overheated lard tastes peculiar and often darkens in colour.

Always add a little water to prevent burning before the fat melts. The water will boil off, and when it has boiled off, the lard is ready.

Bring fat and water up to heat gradually. Stir frequently and skim off any cracklings (little cooked fragments of this and that) as they rise to the top. Press out the lard that remains in the cracklings. Cracklings are delicious, with a dash of salt, and can also be used in baking.

If you have a frying thermometer, you will find the optimum temperature to render the lard is about 120 Celsius (about 255 Fahrenheit), but watch carefully and don't push it. The cracklings will come to the surface, the water will bubble off, any cracklings left in the lard will sink again. The lard is ready. Strain the melted lard through clean cheesecloth into jars or other containers for storage. Cool quickly in order to obtain the best texture. We like to stir or whip the setting lard gently. Lard can become grainy as it sets. Stirring or whipping gently stops this. I also follow my grandmother and put a fresh sage leaf in each container.

Lard can be stored in the freezer for at least six months and probably longer without becoming rancid. If you wrap the lard, or seal the lard in its container so that no air gets to it, it will keep for a long, long time in the fridge as well.

Do you want uses of lard? It is the baker's friend. Makes excellent ointments (we used to make calendula). Fries potatoes. Cooked meat and solid meat sausages can be stored in lard. Melt lard in pot, put in meat, pour in more lard until meat is sealed off from air. Melt it again gently to get meat out and make sure the rest is still sealed off with lard. Much like the confits of duck and goose, done this way in the goose or duck fat.

[More on this technique below--LEB]
Older recipe books, before people became panicky and paranoid about fat, are full of recipes using lard. The difference between your own rendered lard (done slowly!) and supermarket lard is marked. Home-made lard, stirred as it cools, is of a soft, creamy texture and always used to fill me with
wonder.

Other bits from the pig's inside are worth having--spleen, testicles, kidneys, etc. In our time, we have cleaned the guts to make runners for the sausages, but it's a hell of a job. Any questions?

7.3 [Mini FAQ on Meat Potting]

From: Al Durtschi :
Mini FAQ on Meat Potting

Before refrigeration changed everything here in Southern Alberta, meat potting was a more prevalent way of preserving meat than either salt curing or drying. In my mind, 'meat potting' was an accident waiting for a place to happen, but under the appropriate circumstances it could have a place again.

7.4 [This is how we used to do it...]
As told by Gorden Schaufert (born 1942)

Meat potting is preserving meat in its own grease in a large crock pot. This is how we did it. Early in the morning Dad killed a pig and started cutting it up. He gave the pieces to Mom who had the wood stove in the kitchen hot and ready to cook. She started frying the pork and prepared the crock pot. This pot was about 18 inches in diameter and 24 inches deep. Mother washed it, and got it just as clean as she could get it. As the pork fried, it gave off lots of grease. She took some of this very hot grease and poured it into the bottom of the crock, sealing and sterilizing the bottom. Then she put the meat she had just finished cooking down onto this grease. As she continued to cook throughout the day she added the well fried meat and covered it with the hot fat that came from the cooking process. By the evening the pig was all fried up and in the pot, covered over with a nice layer of lard that had hardened. As the days passed by, we dug down into the lard to where the meat was, pulled out what we needed, and put it in the frying pan. We cooked it good a second time to kill any bacteria that could have possibly gotten into it. Doing this not only re-sterilized the meat for eating, but melted off all the excess fat. The meat was taken out of the pan and the fat was poured back into the pot to seal up the hole we had just made getting the meat out.

Frequently Asked Questions:

7.5 [How long can pork be preserved in this way?]

In the Summer time we could expect it to last about six weeks. Of course in the Winter it would last much longer. When it went bad there was no question about it, as it really started to stink. (In my research for this subject, I talked with many old timers who never had any meat go bad through many years of potting.)

7.6 [How much did you have to cook it to be sure it was cooked enough?]

We cooked it until all the red was gone, then cooked it some more. If there was even one piece put in the barrel partially cooked it could have easily

destroyed the meat in the whole barrel. (Leslie Basel ,
the custodian of the FAQs for rec.food.preserving, suggests the meat be cooked to 240 degrees F and the fat that is poured in after it be even hotter.)

7.7 [What other meats can be preserved in this way?]

Really, you can preserve any type of meat. But if a low fat type of meat is potted, there must be an adequate supply of extra fat to cover the meat as it is cooked and placed in the pot. (Several old timers talked about potting beef. But mostly it was used for pork as it furnished it's own fat.)

7.8 [Could meat be salt cured and then potted?]

Yes, and this was done by some families. It is hard to say how long this extended the shelf life of the meat in the pot.

7.9 [What can I do to enhance my chances of potting safely?]

Insure your crock pot is clean and sanitized before you start. Be sure the grease you pour into the crock is always nice and hot as well as the meat. Keep everything as clean as possible. Don't use the came cooking utensil to take the meat out of the pan as you used to turn or handle the raw meat. Leave the utensil you use to move the meat from the pan into the pot in the frying pan where it can stay hot and therefore sterilized. Do not touch the cooked meat with anything except the cooking utensil you transfer the meat from the pan to the pot with. When putting meat into the crock, don't touch the sides of the crock pot and don't touch the meat. Cover the crock with a lid when not putting meat or fat into it. Remember, your success depends entirely on insuring that not one cell of bacteria is permitted to remain alive in the pot. And on using the meat, schedule things out so you plan on using the last of the meat within 6 weeks. (This was not a problem for the early folks as they often had 10 or more children.)

7.10 [Should I give this a try to gain experience in this type of meat preserving?]

Potting is no longer done for good reason. It's just not an approved way of preserving meat, considering our present technology. This information is given here for three reasons:

a. Save the skill from being lost in a rapidly changing world. (There are fewer old timers every day.)
b. Help people realize it is an option (in very hard times).
c. Preserve our heritage. [Potted pork (rilletes) is a common

technique in France, Belgium, and Germany; in the UK, potted beef and shrimps potted in butter are delicacies. And if you substitute shredded meat of duck or goose, potted in its own fat, you have a confit.--LEB]

Should you want to give it a try, go ahead. If you follow these instructions you will probably have good luck. Remember when you re-heat your meat, cook it good a second time to kill any bacteria that might have gotten into it. If it starts to smell bad, don't mess around with it, but throw it away. Finally, always pull your potted meat out with a very clean utensil, not your fingers.

7.11 [A last comment about "scraping the bottom of the barrel"]

The term 'scraping the bottom of the barrel' came from potting meat. By the time the old timers got to the bottom of the pot, the quality of the meat was often very questionable. And hence the term means even today 'using something rather undesirable because it is all there is.' (Ref: Leslie E. Basel)

8. Making Vinegar

8.1 [How do I make vinegar from wine?]

As the French vintners used to say, God loves to make vinegar...
---------- Forwarded message ----------
Date: Mon, 17 Apr 1995 13:35:18 -0400
From: EWhiteVHP@aol.com
To: london@sunSITE.unc.edu
Subject: FAQ Making Vinegar

These directions show how to make vinegar at home using readily available ingredients and supplies.

In the late 1800s chemists learned to make acetic acid. Manufacturers added water to reduce its strength to 5%, colored it and sold it as vinegar. Imitation vinegar is still manufactured and by law the label must state that it is diluted acetic acid. Diluted acetic acid is inexpensive and lacks the vitamins, minerals and esters found in fermented vinegar; its flavor and aroma are also inferior.

It takes good alcohol (wine or beer) to make fermented vinegar. The hit-or-miss method of making vinegar by allowing sugar and water to ferment

is not wise. The fermentation of sugar to alcohol by wild yeast is followed by a conversion of the alcohol to acetic acid by wild bacteria. Chances of failure or undesirable tastes and aromas are high. Control the process by using great care in cleanliness and introducing chosen yeast and bacteria to obtain quality vinegar every time.

General Directions
Winemaking suppliers list acetobacter as "mother" or vinegar culture. These cultures convert alcohol to acetic acid (vinegar). Most suppliers sell red and white wine vinegar cultures. Some sell cider, malt and mead cultures as well. Any culture may be combined with any type alcohol to produce vinegar.

Vinegar should contain at least 5% acid as required for preserving or pickling. Specialty vinegar contains acid as high as 7%. Beer containing 5.5% alcohol will yield about 5% acid. Wine containing 11 to 12% alcohol must be diluted to 5.5 to 7% alcohol before using it to make vinegar.

Acid test kits, sold by winemaking suppliers, are used to determine the acidity of vinegar. Acid tests are easy to perform and instructions come with the kit.

Sanitize
Sanitize utensils and containers that will touch the vinegar by soaking them for 20 minutes in a solution of 2 tablespoons chlorine laundry bleach to 1 gallon water. Rinse everything well with hot tap water. Hot tap water is relatively sterile after being held at high temperatures for several hours in the hot water heating tank.

Vinegar Method I
3 measures beer, ale or vinegar stock (5.5 to 7% alcohol)
1 measure vinegar culture with active bacteria

Directions
Vinegar leaches molecules from iron and aluminum. Use sanitized glass, enamel, stainless steel or stoneware containers less than two-thirds full. Cover the container with a cloth or stopper it with cotton to keep insects out, while allowing air to freely reach the stock. Store the mixture in a dark place.

Temperatures:
Temperatures between 80 and 85 degrees are ideal. Low or fluctuating temperatures slow the process. At 75 to 85 degrees F, it will take 6 to 8 weeks for conversion. At 85 to 90 degrees F, it can take 4 to 6 weeks for conversion. Temperatures over 95 degrees F slow conversion; above 140 degrees F, the bacteria die.

An acetic film called "mother" will form. This smooth, leathery, grayish film becomes quite thick and heavy. It should not be disturbed. It often becomes heavy enough to fall and is succeeded by another formation. If the mother falls, remove and discard it. An acid test will indicate when all of the alcohol is converted to vinegar. Part of the vinegar may be withdrawn and pasteurized. The remaining unpasteurized vinegar may be used as a culture to start another batch. Living bacteria are in the liquid. A piece of the mother is not necessary to start a new batch.

Add beer or diluted wine to the culture every 4 to 8 weeks, depending on the temperature maintained and when most of the alcohol is converted to vinegar. Adding more alcohol to the culture keeps it alive, prevents spoilage and increases the quality of vinegar. If unpasteurized vinegar is exposed to oxygen without alcohol present, bacteria can convert the vinegar to carbon dioxide and water.

Vinegar Method II
2 measures dry wine (11 to 12% alcohol)
1 measure water (boiled 15 minutes and allowed to cool)
1 measure vinegar culture with active bacteria
Follow the directions in Method I. Purchased wine can be used, but some commercial wines contain sulfites or preservatives that could kill the vinegar bacteria.

Vinegar Method III
(For winemakers only)
Wine containing less than 10% alcohol is subject to spoilage. This formula to make 7% alcohol is an ideal vinegar stock. Follow good winemaking procedures. When the fermentation is complete (specific gravity 1.000 or below) this low-alcohol wine can be converted to vinegar as directed in Method I.

1 1/2 pounds weight honey (or any sugar source to obtain a specific gravity of 1.050)
2 teaspoons yeast nutrient or energizer
4 teaspoons acid blend (7.5 ppt tartaric acid with an acid test kit)
1/4 teaspoon tannin
wine yeast
add water to equal 1 gallon

Homemade wine
Dry wine containing 11 to 12% alcohol can be diluted after fermentation (specific gravity 1.000 or below). It's important that the wine contain no excess sugar. Excess sugar increases the chance of spoilage and formation of a slime-like substance in the vinegar. The wine does not have to be clear as this is accomplished when the vinegar ages. At the last racking, do not add campden tablets or potassium sorbate. Dilute the mead as directed in Method

II and follow the directions in Method I.

Preserving vinegar
To preserve vinegar, add 3 campden tablets per gallon of vinegar -or-
Heat the vinegar to 155 degrees F and hold the temperature for 30 minutes.
After pasteurizing vinegar add one tablespoon 80-proof vodka to each gallon and age it. If desired to enhance the bouquet, up to one cup oak or beech chips may also be added.

Pasteurized or sulphited vinegar can no longer produce more vinegar. Pasteurizing kills vinegar bacteria and prevents the formation of "mother" which could lead to spoilage. Pasteurized vinegar keeps indefinitely when tightly capped and stored in a dark place at room temperature. Temperatures above 160 degrees F cause a loss of acidity, flavor and aroma.

Aging vinegar
Vinegar has a strong, sharp bite when first made. It becomes mellow when aged. The esters formed during aging, like those in wine, develop after a period of six months or more when stored at a cool, steady temperature (50 to 60 degrees F is ideal). This undisturbed rest also allows suspended solids to fall, making the vinegar clear and bright. Siphon the clear, aged vinegar off the deposit of solids into sanitized bottles. Introduce as little oxygen as possible. Winemaking suppliers sell attractive vinegar bottles. Use corks or plastic caps to avoid vinegar contact with metal. If corks are used, the necks of the vinegar bottles should be dipped several times into melted wax to form an air-tight seal. The quality of vinegar improves for up to two years and then gradually declines. Fermented vinegar can be sold without the special permits or licenses required for alcoholic beverages. It costs the same as a good bottle of wine.

8.1.2 [So, does anyone know how sour grapes are converted to verjuice?]

>From Joyce Miller :
This isn't the Roman or medieval method, but it is the Southwestern French method. I haven't tried this recipe out. When I was still thinking about it I found bottled verjuice by Roland. This recipe is from Paula Wolfert's _The Cooking of South-West France_. Let us know how this works out.

"...The grapes - the bourdelois, the gressois, and the farineau - are no longer grown. Some types can make the process a little tricky. If the grapes are picked too ripe, their liquor will be too watery; if too green, the verjus will not taste good. We want grapes in the middle of their ripening, whose juice can be allowed to ferment slightly.

To make verjus, choose the sourest green grapes available. Holding on to the thick stem, dip them in bunches into boiling water for three seconds to kill the yeasts. Remove at once and drain on a towel. Roll the bunches, one by one, in the towel while removing the grapes from the stems. Discard any blemished grapes. When dry, place grapes in the workbowl of a food processor and process 10 seconds; then strain, pressing down on them to extract all the juice. Let stand for 10 minutes, then ladle juice into a sieve lined with a damp cheesecloth and strain again. Use at once, or freeze in plastic ice cube trays. Store the cubes in a plastic bag in the freezer. Use frozen or immediately upon defrosting for maximum flavor. Keeps 3 months. Some people add alcohol to their verjus along with vinegar & sugar so it will keep, but this distorts the flavor. Another way to obtain the sour taste of verjus is to add a pinch of tartaric acid, which one can find at a wine-making shop. Don't go over 2 pinches, it is really strong."

8.1.3 [How do I make flavored vinegars?]

I tend to want to make very powerfully flavored vinegars because you can always dilute, so I add a packed cup of herb/chile/fruit to 2-3 cup of vinegar. For delicate flavors such as delicate herbs and fruit, white wine vinegars, rice wine vinegar, or champagne vinegar are unobtrusive. Rice wine vinegar is probably the cheapest of those choices. For strong flavored herbs, chiles, and most berries (e.g. blackberries--strawberries are too delicate), any vinegar will do. Combine, let sit for at least two weeks, depending how strong you want the flavor, then filter out the solids. A little heat, using either the stove or the sun is helpful to extract more flavor.

[Check out the herb flavored vinegar recipes in Henriette Kresses' herb FAQ at http://sunsite.unc.edu/herbmed/culiherb.html]

8.1.4 [How do I make flavored oils?]

Okay. Flavoring oils are a bit trickier than vinegars, because like potting, the oil creates an anaerobic situation. Its quite possible to culture _C. botulinum_ in this way.

[Check out the herb flavored oil recipes in Henriette Kresses' herb FAQ at http://sunsite.unc.edu/herbmed/culiherb.html]

Oh yes, one last thing. I prefer to label my bottles, instead of putting a token sprig of whatever in. The token sprig is a spot for spoilers to grow, at least in my hands :).

8.1.5 [Garlic (chiles, herbs, dried tomatoes, etc.) in oil. How safe is it? How can I make them safely?]

You can flavor oils with garlic, etc. within reason. Frankly, garlic is best preserved as dried heads in a garlic braid, not in a garlic and oil paste. It has been tragically shown that garlic and oil pastes, and by extension garlic cloves in oil, provide a good anaerobic medium, perfect for _Clostridum botulinum_ to develop. You want to pickle garlic and other root vegetable flavorings in some sort of acid, either vinegar or citric acid. Check out the botulism questions in Section 5 for more information.

Here's another solution for garlic in oil flavoring..

From: kallisti@merle.acns.nwu.edu (Patrick Grealish)
Subject: Re: Garlic and spices in oil

I have been making garlic olive oil for a few years now. After I heard of the possible contamination troubles I didn't like the idea of using vinegar, so I, instead, roast my garlic which makes IMO an even better tasting oil. I roast a whole head of garlic double wrapped in aluminum foil for about 2 hours @ 250 F. Then squeeze out the garlic cloves into the oil. ~300 ml per one head of garlic. This may be too strong (or weak) depending on your like of garlic. Also I've tried adding dried herbs (rosemary, thyme and oregano) to the garlicked oil. It is very good. I hope this is helpful.

Cordials
From: Daisy the gardener
To: lebasel

>From book: MAKING LIQUEURS AT HOME Complied by Carmen Patrick,

About Liqueurs:
The history in making liqueurs goes back almost 2,000 years. It was not until the Middle Ages through, that liqueurs came into great use, developed by the alchemists, monks and sorcerers of that period. Monks, whose monastery gardens provided the raw materials, were the chief experimenters. The first liqueurs were used as medicines and aphrodisiacs. The medicinal qualities of some liqueurs are well established, especially those made from coriander, caraway seeds and various roots and herbs.

How Liqueurs Are Made:
About the only thing easier then making liqueurs is drinking them. They

require no special equipment, skill or culinary talent - just a bit of patience. Liqueurs are generally divided into two categories; those made with plants and those made with fruit. Although there are various methods for making liqueurs, this book (in your case these typed pages I'm sending you) only gives recipes for two methods; "by scratch" using the steeping method, and with "extracts" - the addition of the flavor extract.

To steep, all you do is put the various ingredients in an alcohol base for a specific period of time. Sweeteners are added for palatability. After this period, the liqueurs are filtered until clear, bottled, and then set aside to mature before serving. Instructions for making these scratch liqueurs are included with each individual recipe.

The Extract Recipes simply involve adding the flavoring extract to the spirit. The extracts that I have found to work extremely well, and are used here, are made by the T. Noirot firm of Nancy, France. By using extracts, which can be found in wine-making supply shops, the liqueurs can be served the same day they are made. Of course, like all liqueurs, these also improve with age.

Extract liqueurs are easily made. All you do is make a simple syrup of 2 parts water to 1 part sugar. Add the Glucose Solids [????], also available in wine making shops, to this mixture and boil slowly until dissolved. When this cools, add the flavoring and spirit. To mix the ingredients more

thoroughly, blend them in a blender for a short time. Then bottle the liqueur, let settle and enjoy!

In making your own liqueurs, you can determine the strength wanted by using a 40, 80 or 100 proof spirit. The sweetness, flavor and color can be adjusted to your taste.

Equipment Needed: Most if not all of the equipment for making these liqueurs can be found in your own kitchen. These items include:

- a small saucepan
- a blender
- cheesecloth or cloth
- tight sealing glass jars
- measuring utensils - cups, spoons etc.
- paper filters (I use coffee filters that work just as well as the special filters you can buy at the winemaking shops.)
- a colander or strainer
- a funnel

GENERAL HINTS:

- It is best to use fresh fruits and vegetables, washing them well.
- Make sure the jars and bottles are clean and sterilized.
- Dissolve the sugar in boiling water unless otherwise stated.
- Make sure the jar is always tightly closed, or the bottle firmly corked.
- Label the jar with the name and date.
- Store all liqueurs in a cool place away from bright light.
- For those liqueurs, which are stored for several months, it is wise to seal the lids with wax.

8.1.5.1 [Fruit cordials]

This is a recipe that I got from a non-net person in Seattle. I've had some of his blackberry cordial, and it was spectacular. He claimed that it was the easiest recipe that you could ever imagine, and I'd have to agree. He has doubled it, halved, tripled it, and suspects that it would work with any kind of fruit, so try it! LEB.

Fruit cordial recipe:
1/3 part cleaned and drained fruit, 1/3 part granulated sugar, 1/3 part vodka.
Crush the fruit, mix all ingredients together. Store for 2 weeks covered, in the dark. Strain. Pour into sterilized bottles. Cork. Drink.

Even the fruit dregs are great over ice cream.

8.1.5.2 [fruit cordial recipes]

From: tamale@primenet.com (Teresa Bruckner)
Newsgroups: rec.food.cooking
Subject: Re: HOMEMADE LIQUEURS

INSTRUCTIONS FOR MAKING FRUIT LIQUEUR

(Tested on raspberries, blackberries and a mix of both).

Start with fresh fruit. Place cleaned fruit into a jar. Add very strong alcohol just so it barely covers all of the fruit. I used double distilled vodka (alcohol content probably about 55-65%). Beware though- Apparently operating a still is VERY illegal ;-)

Let the covered jar sit for about a week and a half (it's covered so the alcohol doesn't evaporate). Note that no fermentation takes place here- all that happens is that the fruit soaks up the alcohol, and releases some of its juices. Depending on the type of fruit the level of fluid may decrease. Once you've decided that the fruit has soaked in much of the alcohol

gently pour off the fluid so as not to blemish the fruit (try one now for a taste experience :-). Call this (very strong) fluid rack #1.

During the following steps you probably should avoid blemishing the fruit if at all possible.

Replace the fruit in the jar, but layer it with sugar. How much sugar is a bit difficult to say here. I usually tried to do my best to cover almost all of the fruit with _some_ sugar. Cover the jar again. What happens now is that the sugar makes the fruit give off its alcohol and shrivel slightly. In a couple of days the level of juice in the jar should reach almost the top of the fruit. This means it is time to pour it off again. Call this rack #2.

Now we repeat the layering with sugar step (getting rack#3, rack#4, etc) until only a very small amount of juice is released. I have been told that with cherries this can be kept up until only a tiny little bit of cherry skin is surrounding the pit. Each rack is sweeter and sweeter.
With rasp[black]berries I got to rack #4 and then got bored waiting for really small amounts of juice. So I took the berries, threw them into a cloth and twisted the hell out them to release the vestiges of alcohol and juice. This was rack#5. The left over pulp can be used with ice-cream.

Note that rack#5 is entirely optional, four racks were plenty enough (but why waste alcohol :-). Now comes the fun part. Invite several friends (I used 5) and mix the different racks in various proportions and get some feedback on how they taste (too sweet, too alcoholic, too dry, etc). Don't use too many friends or else you won't have any left after the tasting. Now you should know what proportions to mix the final product in. Disposing of juice _not_ used in the final mix is left as an exercise to the reader (I had some sweet stuff left over and use it on ice cream).

Thoughts on the final mix:
In my case the final mix was very close to the ratio of rack#1: rack#2: rack#3 etc. This was convenient because I got the maximum of liqueur with minimal leftovers.

Afterword: After a visit to a friends house in Poland and a sampling of his Cherry Liqueur (THE BEST liqueur I have EVER tasted)- I have decided to make liqueur also. Here are the directions he gave me (for cherry liqueur):

Fill a Jar with cherries. Add alcohol to cover all the cherries. Let sit for a week or so, by this time the cherries should have swelled and there should be less liquid in the jar. Pour off the liquid.

a)Layer the cherries with sugar and let sit another week.

b)Pour off resulting fluid.
c)Repeat steps a) and b) until the cherries are so small that they're just basically the pit covered with a very thin skin.
Now mix all the batches that you poured off to suit your taste. The first is most bitter, the last is the sweetest.

8.1.6 [Brandied fruit, i.e. tutti-frutti.]

From: Teresa Bruckner :
I've not tried the following yet: { Exported from MasterCook Mac }

Bottomless Brandied Fruit Crock
mixed fruit: peaches/ plums/ apricots/ berries/ cherries/ grapes.
brandy OR dark rum [vodka, Marsala, Madeira, and good sherry work too--LEB]

* Use brandy or rum for this recipe, with ripe, unblemished fruit in season. Use a crock or jar with tight fitting lid.
1. Remove stems from fruit but leave fruit whole. Peel large fruits such as peaches, apricots and plums.
2. Place fruit carefully into the container of your choice. Fill the container completely but without packing the fruit to avoid bruising.
3. Add enough brandy or rum to completely cover fruit. Close container tightly and store at room temperature. Let stand at least 3 weeks before using; 4 weeks is even better.
4. As you use the fruit replenish with more fruit and cover with more brandy or rum.

* Use a variety of fruits and berries. Some suggestions are: peaches, plums, apricots, grapes, blackberries, raspberries, cherries and nectarines.
[Another variant: sprinkle granulated sugar between the layers of fruit before you pour the liquor. Brown sugar might work particularly well with rum, if you are using that.--LEB].

8.1.7 [Vanilla Extract]

Wes and Kelly Wyatt write:
>I have just received 6 nice vanilla beans from a friend. I would like to
>make vanilla extract with them. What is my best approach?

>From Sylvia :
Here's the recipe I have for Vanilla Extract:
Place 6 long beans, split open and cut into pieces into 1 quart of good quality vodka. Cap tightly and place in a cool dark place. Leave for 1 month to 6 weeks, shaking the bottle occasionally.

Before using, sieve through a strainer lined with cheesecloth (or use a coffee filter), rinse the bottle to remove residue, and pour back into the bottle. Add one whole vanilla bean and cap tightly until used.

9 ROOT CELLARING AND STORAGE OF STAPLES

9.1 [What do I *really* need to know about root cellaring?]

Root cellaring is one of the simplest acts of food preservation. Many vegetables, especially root crops, can be preserved in a root cellar, a dry dark place, with temps held just above freezing. In some climates, one can even leave garden produce in place during the winter. What you really need to know are the precise conditions needed for optimal storage, and know what cannot be stored next to what. Also, your pile of produce needs to be carefully monitored. Overripe fruits and vegetables produce ethylene which can quickly age all of your produce. (The scientific reason why one rotten apple does what the old adage says it does.)

9.1.1 [How long to do stored items last?]

From: Dunross@dkeep.com (A. T. Hagan)
Newsgroups: misc.survivalism

(Situation 1) Grains, beans, pasta (off the shelf) stored in airtight plastic containers in a dark, dry environment at a temp of between 55 and 70 degrees.

In that temperature range and if they are kept DRY, in well sealed, airtight containers with no bugs included then your beans and whole grains (excluding brown rice discussed elsewhere) then they ought to be good for three to five years. I'd assume three and rotate them out. Use dessicant to keep the atmosphere they're in dry. I don't recommend keeping white flour pasta for more than a year at the most under the above storage conditions.

(Situation 2) Canned food (commercial-off the shelf) in airtight, waxed cardboard boxes in the same environment as the above.

Recently discussed here, you might want to try to pick up the last week or two's traffic from this newsgroup. Cans are good about six months from time of purchase. Inspect the cans to be certain they're sound and inspect again

before opening to be certain nothing is bulging. Cool and dry are the important conditions here. I'm told that high acid foods are canned with a different kind of liner in the can so they'll keep better, but I have no hard information on that.

(Situation 3) MRE's in the same environment as the above.

I don't have a lot of personal experience with MRE's other than the fact that I don't much care for the taste so I'll leave others to comment.

9.1.2 [Storage of grains and flours, possibly also of rice.]

9.1.3 The dry ice method....
From: Mick Kunstelj

One thing I was after was how long such grains as wheat/rice etc., last for. Rice is an interesting alternative, as it is cheap, can be used for a lot of dishes (not least making bread), and would appear to be quite hardy. A method that I use for storing is really suited to wheat and flour, but can be applied to a number of other grains (rice) and foodstuffs.

I buy large drums (44 gallon drums or importers pickle container drums) but any type of airtight drum will do. Naturally, make sure that the drum is clean and dry. (I use a bleach solution, not the least to remove the smell of pickles... :-))

At the bottom of the container place a good layer of (rock?) salt, this will over time remove any moisture from the container. Then, dry ice wrapped in newspaper is placed into the container, followed by some more layers of newspaper, then the rice. (I keep the rice in the bags I bought them in)

The drums are closed but not completely sealed (see important note). As the dry ice (it's frozen carbon dioxide) melts, the gas expands to many times its original size, forcing out the bulk of the original air. After some time, the dry ice will completely melt, and the container can be sealed. Important note: If the dry ice has not completely melted, the sealed container will contain a lot of pressure, and may bulge, causing a possibly dangerous condition. What a friend did in this situation was to punch a small hole in the top of his metal 44 gallon drum, and the pressure abated. He then arcwelded the small hole he'd created.

The carbon-dioxide atmosphere ensures that any little weavel/bug eggs that may be in the grain will die once they hatch, instead of eating/multiplying

and giving you a nasty shock. Remnant moisture within the container is absorbed into the salt.

I have been advised that wheat (in the husks) last much longer than flour, but I have no idea how long rice lasts for (treated in this way or not...). Thus - if you have any idea, I'd love to know!

9.1.4 The nitrogen gas method...
From: Richard De Castro , misc.survivalism

For Nitrogen packing, you need a tank of nitrogen with a regulator, a hose, and a small diameter pipe (about 1/4 inch or so). The pipe's attached to the hose, and you fill the bucket up with grain. Position the pipe in the grain (as far down as you can), and then get the bucket lid into position. Give the bucket a shot of nitrogen (3-5 seconds is plenty) and gently remove the pipe, while continuing to release the nitrogen. Then, put the lid on. You're all done.

Both of these techniques [N2 and CO2] should be done in a very well ventilated area. I highly recommend doing it outdoors, since indoors the oxygen in the room can be displaced by the carbon dioxide or the nitrogen gas, and asphyxiate everyone.

From: David G. Allbee , misc.survivalism..
Nitrogen is available for home use. Well at least it is here in Virginia. Never got any but I called the local industrial gas distributor and was given prices and bottle sizes in cubic feet. BTW, I didn't ask if a bottle rental contract was required but my brother in law, works for a industrial supplier in North Carolina said no.

And from: David L. Paxton" , misc.survivalism.
I had experience with this once. Helped a friend put away about 50, 5 gallon buckets of wheat, oats, and corn. We were using welding grade nitrogen. I have heard that it is not recomended anymore, too much contamination possibility. Now they say use medical grade nitro. He never seemed to have any problems but then he never lived completely off the stored grain for any long period of time.

From: Tinpan :
[for a source of supplies]...you also need to contact Nitro-Pak:
Nitro-Pak/ 151 North Main Street/ Herber, UT 84032/ 800-866-4876
These guys wrote the book on Nitrogen packed foods, and they also have an excellent supply of stuff you will find handy when storing foods. Their prices are quite reasonable too.

A concern about both techniques, expressed by Charles Scripter

, in misc.survivalism...

[...]. Someone else pointed out that this will allow Botulism toxin to form (since the bacteria is anaerobic). Wouldn't vacuum packed food have the same tendency?... And now I wonder a bit about some of the other inert gas packaging as well. Does anyone know exactly what conditions are required for Botulism to form? (e.g. will it grow in N2? How about CO2? Or will these atmospheres inhibit growth?)

Leslie Basel said:
Depends. After providing a nice anaerobic condition, the one thing that _C. botulinum_ needs is free water. If you are storing flours, dried beans, rice, sugar, dry staples, you shouldn't have any problem because there is no free water to support bacterial growth. If you are vacuum packing MREs, meats, fresh vegetables, etc., then you probably should worry a bit about this. I don't have any info on atmospheres per se, just that N2 is probably not toxic to _C. botulinum._. This means that you shouldn't vacuum pack items willy-nilly, but you'll have to cure meats, rub nitrates into the surface of the meat, vacuum pack pickled items, or simply vacuum pack dehydrated fruits and vegetables.

9.1.5 [Storing garlic. Probably the most asked question in r.f.p.]

>From Carol Nelson :
After the garlic is harvested, it can be stored in mesh bags or slatted crates or hung in braided ropes or bunches. Any cool, well-ventilated place will do for storage through the winter months. In very cold areas, the bulbs should be protected from freezing. The ideal storage temperature for garlic is 32-38F at less than 70% humidity.

All garlic placed in the freezer should be tightly wrapped. Garlic can be frozen in three ways:
(1). Chop or grind the garlic you want to freeze. To use just grate or break off the amount you need.
(2). Freeze the garlic unpeeled and remove cloves as you need them.
(3). Peel the cloves and puree them with oil in a blender using 2 parts oil to 1 part garlic. The puree will stay soft enough in the freezer to scrape out amounts to use in sauteeing.

Peeled cloves may be submerged in wine and stored in the refrigerator.

The garlic can be used as long as there is no sign of mold or yeast growth on the surface of the wine. Both the garlic and wine may be used.

Garlic can be dried and made into garlic powder and garlic salt. Select only fresh firm cloves with no bruises. Separate and peel the cloves.

Small cloves can be cut in half and large cloves should be cut in 1/4 inch slices. Dry at 140F for 2 to 3 hours or until garlic is crisp. Grind

using a coffee grinder, or add salt and grind, depending if garlic powder or garlic salt is desired.

Raw or cooked garlic and/or fresh herbs in oil may be STORED IN THE REFRIGERATOR FOR NO LONGER THAN 3 WEEKS.

All this information comes from Oregon State University Extension bulletin SP 50-701 (Herbs and vegetables in oil) and SP 50-645 (Preserving Garlic). [There are also several preserving garlic recipes in Henriette Kresses' herb FAQ.--LEB].

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>From Ross Reid:

My wife and I are true garlic lovers and we grow several hundred feet of row of various cultivars, both soft neck and hard neck varieties. Plus, we have for years made garlic oil in the manner noted above. However, during my surfing of various garlic sites on the web I came across the following information and copied it for future reference. Unfortunately, I neglected to make a note of the source.

<Quote>
BOTULISM WARNING

Regardless of its flavor potency, garlic is a low-acid vegetable. The pH of a clove of garlic typically ranges from 5.3 to 6.3. As with all low-acid vegetables, garlic will support the growth and subsequent toxin production of the bacterium Clostridium botulinum when given the right conditions. These conditions include improper home canning and improper preparation and storage of fresh herb and garlic-in-oil mixtures. Moisture, room temperature, lack of oxygen, and low-acid conditions all favor the growth of Clostridium botulinum. When growing, this bacterium produces an extremely potent toxin that causes the illness botulism. If untreated, death can result within a few days of consuming the toxic food.

STORING GARLIC IN OIL
Extreme care must be taken when preparing flavored oils with garlic or when storing garlic in oil. Peeled garlic cloves may be submerged in

oil and stored in the freezer for several months. Do not store garlic in oil at room temperature. Garlic-in-oil mixtures stored at room temperature provide perfect conditions for producing botulism toxin (low acidity, no free oxygen in the oil, and warm temperatures). The same hazard exists for roasted garlic stored in oil. At least three outbreaks of botulism associated with garlic-in-oil mixtures have been reported in North America.

By law, commercially prepared garlic in oil has been prepared using strict guidelines and must contain citric or phosphoric acid to increase the acidity. Unfortunately, there is no easy or reliable method to acidify garlic in the home. Acidifying garlic in vinegar is a lengthy and highly variable process; a whole clove of garlic covered with vinegar can take from 3 days to more than 1 week to sufficiently acidify.
<Unquote>

Needless to say, we no longer make our garlic oil by peeling a bunch of cloves and dropping them in a three liter bottle of olive oil.

10 Preserving Dairy Products

10.1 [Looking for rennet for a cheese recipe?]

from Teresa Brucker , rec.food.cooking..
Funny, I just bought a book on cheesemaking today as I still want to make that mozzarella. But the book talks about definitely not using the rennet available in the grocery stores. There are a few choices as well: animal vs vegetable and liquid form vs tablets. Take your pick. The liquid is more perishable. They give the following sources:

Caprine Supply/ 33001 West 83rd/ PO Box Y/ Desoto, KS 66018.
Misc. starter cultures, kits, molds, presses and equip. Specializes in dairy goat supplies.

Cumberland General Store/ Route 3, Box 81/ Crossville, TN 38855.
Starter cultures, presses, boxes, cutters & tools.

Lehman's Hardware

Starter cultures, kits, dairy thermometers, presses, cheesecloth, butter churns, butter molds & colors. Catalog $2.00.

Lehman's, home of the Non-Electric Catalog
"Serving the Amish and others without electricity with products for simple, self-sufficient living"

Retail store is at One Lehman Circle, Kidron. (Mon-Sat, 8:00 am to 5:30 pm plus Thur til 8:00 pm.)
PO Box 41, Kidron, OH, 44636

Orders only: 330-857-1111
Customer service: 330-857-5757
Info: info@lehmans.com

New England Cheesemaking Supply Co./ 85 Main Street/ Ashfield, MA 01330.
Starter cultures (including direct set), rennet, wax, molds, presses, kits and miscellaneous supplies. Also workshops. [Check out their web page; the address is in part 6--LEB.][http://www.cheesemaking.com/]

A newsletter was mentioned too:

Cheesemaker's Journal/ 85 Main Street/ Ashfield, MA 01330.
Bi-monthly with articles about making cheese and a large recipe section.

10.2 [BUTTER]

From: Jim Richardson , rec.food.cooking
Subject: Easy Homemade Butter

Buy the freshest and best whipping cream you can find. Otherwise, your results will only be a step or two above the butter you buy at the store. I find that milk and cream at natural food stores often comes from smaller local dairies and tastes far better than what *any* of the grocery chains sell. As with sharp and extra sharp cheddar cheeses, the typical quality has gone *way* down over the past 20 years, as people who live in "dairy country" know well. Even the skim milk from some of these smaller dairies has a richness somewhere between "grocery chain" whole milk and 2% -- and it tastes far better.

Chill your blender in your freezer for 20 minutes. Remove and add 2 cups cold (but not frozen) whipping cream + 1/4 tsp salt + a few drops yellow food coloring. Blend on high for about 20 seconds, or until the cream stiffly sticks to the blender blades. Add 1/2 cup of ice water, no ice.

Blend on high about 3 minutes, stopping to scrape the sides as needed, until all the butter fully separates from the water/liquid. Remove from blender, put into the middle of a handkerchief. Chill further, if necessary, then twist and wring it tightly, removing the water. This will make about a stick and a half's worth of butter. Make it the same day as you'll serve it. Shape into curls or balls. Your guests won't forget it.

[N.B.: In case you don't have a blender, or you want to do it the authentic Wisconsin-elementary school method: take a very clean Miracle Whip jar, fill 1/4 with cream or non-homogenized milk, screw the lid on tightly, shake the jar briskly until you get butter. Make sure you don't fill the jar, as you need the airspace to shake the liquid, and don't try it with homogenized milk because the milkfat globules are too small and too evenly distributed throughout the milk to form butter.--LEB]

10.3 [devonshire clotted cream]

From: James Harvey
How to make homemade Devonshire Cream

Devonshire cream is just another name for clotted cream (or perhaps just for clotted cream made in Devonshire?) Clotted cream is the richest form of cream at 55% butterfat by weight. A traditional way to eat it is loaded on scones already spread with fresh butter, and topped with blackcurrant jam. Here are two basic methods of making it:

***** Clotted cream, traditional method *****
Put the cream in an earthenware or enameled bowl, or a stainless steel milk pan. Heat gently over very low heat or in a basin of water for up to six hours until the cream has a rich wrinkled crusty look. You must never let it boil. Set the pan to cool overnight (in the refrigerator is OK but obviously not traditional :) In the morning, lift off the clout that has formed and store in jars or lidded pots in the refrigerator.

***** Clotted cream, quick method *****
This method requires a bain marie or double boiler, and a thermometer. Heat the cream until it reaches a temperature of 170 to 180 degrees Fahrenheit (76 to 82 degrees Centigrade). Stir it once to distribute the heat. Keep the cream at this temperature (not more than 190 degrees Fahrenheit or 87 degrees Centigrade) for an hour until it looks wrinkled and crusty. Cool quickly by standing in a bowl of cold water, then set the pan in the refrigerator overnight. In the morning lift off the clot that has formed and store in jars or lidded pots in the refrigerator. I have used the second recipe, starting with U.S. light cream (equivalent to British single cream, about

18% butterfat by weight) with good results. Of course, results using commercial cream will not be able to match the best products of particular farms.

10.4 [stirred curd-cheddar recipe]

From: Kim Pratt
Stirred-Curd Cheddar Recipe

A few people requested this recipe for making Stirred-Curd Cheddar Cheese. By the way, it tastes great! This recipe assumes that you know the basics for making cheese. It uses 2 gallons of milk (can be doubled etc).

1) Heat milk to 90 degrees, stir in 1/2 cup cultured buttermilk, cover, let sit for 45 minutes at 90 degrees.
2) Add 1/4 tablet rennet, let sit for 45 minutes at 90 degrees.
3) Cut curds and let sit for 15 minutes.
4) Stir curds gently and warm to 100 degrees over the next 30 minutes.
5) Hold for 30 minutes at 100 degrees.
6) Drain curds, put curds back in pot without whey.
7) Add salt (2T) and work it into the curds.
8) Allow curds to sit at 100 degrees for 1 hour.
9) Press curd for 24 hours.
10) Air dry cheese for 2-3 days.
11) Age as long as you can stand it at 40 to 55 degrees.

If you eat this cheese at 3 weeks, it tastes like a Jack cheese. After about 2 months it starts tasting like Cheddar (mild). It takes about 6 months for it to be sharp.

11 [specific equipment questions]

11.1 [CANNERS--PRESSURE AND WATERBATH, CANNING EQUIPMENT]

11.1.1 [I see different sized canners for sale. Why should I get a big one?]

from Dirk W. Howard

My wife and I have two All-American canners. One can do a double stack of pints and a single stack of quarts, and the other can do a triple stack of pints and a double stack of quarts. I like the large capacity. It means

that in a 75 minute processing time I can do anywhere from 9 to 18 pints in the "smaller" canner and up to 27 pints in the "large" canner. Total would be 45 pints if running both canners. As opposed to 375 minutes (3 hours 15 minutes) to process 45 pints in a single 9 pint canner. OK, this isn't fair since I did gauge two canners on one. Let's say that your goal was to process 36 pints of green beans. In a single stack canner that is four different batches. Just the processing time alone is 5 hours. This doesn't count the vent time and the cool down. A canner that can have a double stack of pints cuts the processing time down to 2-1/2 hours. This can be worth the extra price of the canner and the trouble (minimal) to work with.

11.1.2 [What do I need to know about a waterbath canner?]

Make sure you get one tall enough for your needs. _Putting Food By_ had a very good piece about actually measuring the height of the waterbath canner before you buy it. If you are going to be canning qts, you need to make sure that you bring a quart jar with a two-piece lid on. Get the waterbath canner out of the box (or look for one already out), put the jar in the rack, and make sure you have at least 3" of clearance between the top of the jar and the top of the canner. You want to be able to maintain a roiling boil (full tilt, manly-man, no-holds-barred boil, not a girly simmer) of water comfortably over the jars, with enough clearance to make sure that the boiling water isn't going to boil over onto your stove and into your burner.

Also need to know your stove. If you have a gas stove, can use the waterbath canners with ridges; if you have an electric stove, you should use flat bottom canners. Also with electric stove, measure the size of your burner. You'll get best results with a canner that overhangs the burner by less than 4".

Lesson for the newcomer to canning: a ruler is the most important tool you'll have. Use it liberally.

11.1.2.1 [Can I use a pressure canner as a waterbath canner?]

Toni <toni@servcom.com> wrote:

>>I advise AGAINST using your Pressure Canner as a container to water bath
>>in.

>> After 30 years of experience with canning, using both methods, I did
>>just this and spent 3 days in the hospital. I did not tighten the lid on
>>the canner and did not close the petcock. I maintained the full rolling
>>boil

Eric responded:

It is not a problem if one does not use the lid but your advice is basically sound. BWB is usually done in an open pot so your experience is somewhat rare - I hope.

I am truly sorry to here of your misfortune. Yes, you have touched on a FACT. Installing the lid on ANY pressure device even without locking / closing off for pressure WILL induce a pressure proportional to the heat induced vs the escape rate of steam. The pressure will be quite variable but can reach up to around 3 lbs.

PFB says "It has to be deep enough" That is a reference to a pot that is deep enough for 2" coverage of jars and an additional amount for the roll of a boil.

That 2" depth of water above the jar is to assure the temperature at the top jar of the jar is the maximum and not slightly lower as one gets closer to the open suface. Proper BWB relies on convection and that process feeds off thermal mass to immerse and soak the jars with heat.

Needless to say, not many pressure canners are deep enough to do quarts and leave a good margin for safety - covers ALWAYS off.

>>which blew off at my first touch. A very painful experience. Water bath
>>canners are not expensive and worth every dime they cost.

Thank you for mentioning your experience as it is quite possible for a newbie to make that very mistake.

11.1.2.2 [Can I use a device sold as a steam canner in food processing?]

No. These devices which consist of a lidded pot used to be sold as a "atmospheric canner". Putting Food By is strictly opposed to such devices - they do not do the job. USDA and AgCanada are strong in thier denunciation of said devices.

That being said, a great explanation in explaining why the device is useless comes from Robert Matern who wrote:

"The physics is clear, and undeniable. The only way to make convection work faster for cooking of any form is to speed it up (forced airflow), a sort of reverse-windchill. This is why something like the Jetstream Oven and similar devices work so much faster than traditional ovens, toaster ovens, and regular convection ovens - high speed airflow, not higher temperature. This would speed up heat transfer with steam, also, but none of the non-pressurized steam canners I've seen use forced

airflow. The time differential between regular convection and a Jet-Stream type oven is 3:1 to 4:1 or more. For a steam canner, you'd probably have to quadruple the processing time over boiling water canning in order to be safe; but without standardized testing, you still wouldn't be SURE. Why risk it?"

Sandy from halcyon.com writes another great article"

I wonder what catalog you're reading. I've seen this in the Territorial Seed catalog, from Oregon. I think they have great seeds for the Pacific NW, but this claim they make is idiotic. I've tried to get them to remove that text, but they've refused. I have not been able to make them understand that on this planet, under normal atomospheric conditions, steam is not hotter than boiling water.

Here's what I've written in the past on this question:

When you boil water, it gets hotter and hotter until it reaches 212 degrees Fahrenheit. At this point, no matter how long you continue to boil, it stays the same temperature. The water evaporates and becomes steam. This steam is also the same temperature, 212 degrees F. The only way to make the steam hotter (and/or to boil the water at a higher temperature) is to put the system under pressure. This is what a pressure canner does. (As an aside, steam heat in an apartment building is steam that is generated under pressure and is therefore hotter than steam generated by a pot of unpressurized boiling water.)

You can put your hand in a 200-degree F oven and it will feel warm but tolerable. If you put your hand in 200-degree F water (close to boiling) you will get a severe burn. This is due to the different methods of heat transfer: air is a poor conductor; water is a good conductor. Think of being outside when it's 70 degrees F (quite pleasant) versus being in a pool of water at 70 degrees (feels very cold).

This transfer difference is what makes steam canners poorly suited to canning: you need good heat transfer so that not only the outside of the jars, but the contents at the centers of the jars get thoroughly heated to 212 degrees F. (This is also why smaller, narrower jars are preferred over larger, wider ones -- the heat does not reliably reach and cook the food at the centers.) This will definitely happen in a boiling-water bath when jars are processed for the prescribed times. This will not reliably happen in a steam canner. IF you're canning a high-acid food, such as fruit jam, AND it's been made with a HIGH ratio

of sugar, AND you've cooked everything properly AND sterilized the jars, a steam canner might POSSIBLY be safe to use. However, there are too many variables to be absolutely sure and I, for one, use the methods that result in the lowest risk. I'm not sure why everyone thinks steam canning is that much easier, either. There's a high risk of getting burned from the steam when removing the unusually large cover, and you're still boiling water (although a smaller amount) which will still heat up your kitchen. A steam canner is just a large pot with a high lid but inverted -- the lid goes on the bottom and gets filled with water, and the former-pot-but-now-a-lid sits on top to trap the steam. Why not just get a good, large pot that will be useful at other times of the year, too?"

11.1.3 [What do I need to know about gauges and weights ?]

Dial gauges must be tested *every* year before canning season [Hey! Maybe near the time of daylight saving; you're changing your clock and checking your smoke alarm anyway.--LEB], and sometime throughout the canning season, depending on the amount of use. This gauge should also be tested/retested if the lid was dropped, because a sharp jolt can cause a dial gauge to lose its calibration.

Even if you buy a brand-spanking-new dial gauge pressure canner, you *must still* test the gauge. I've found that nearly 50% of new dial gauges have gross errors on the minus scale (i.e. inside doesn't get as hot as the dial gauge would lead you to believe).

[Dial gauge are required at elevation in excess of 10,000 ft.as the weight of a deadweight canner is insufficient to generate the pressure needed to achieve 240F.

Weights are considered foolproof. A few folks have reported seepage from jars when using dead-weight type canner. Jars lids must be clean and tightened properly before processing. REDUCE the heat to the minimun required to keep the weight rocking gently. Any more heat than this and the jars will be over-pressurized in relation to the pressure inside the pot - seepage will result. Opening a canner or inducing a sudden temperature drop will cause a pressure drop - seepage will result.

Do not over-pressure ANY canner, NEVER douse a canner with cold water, and allow the canner to cool to 0 pressure before opening the canner. There should be no seepage - period. Seepage is a sign of an imperfect seal caused by improper procedure or faulty equipment. --ED]

11.1.4 [I got this pressure canner (not cooker!) for a gift. How do I take care of it?]

From: phillips@colum.edu (Gary Phillips x397)
The two largest US manufacturers of pressure canners for home use are Mirro and Presto. I imagine their products are available in Canada and if you can find a hardware or cooking supply store that handles either brand they will be able to special order these items for you even if they don't have them in stock.

My present canner is a Mirro. It does 7 quart jars at once, operates at a choice of 5, 10, or 15 psi, and cost me about $50 in US currency six years ago. It was the least expensive model offered by a local hardware store from stock, and prices went up from there to as high as $100. It has been well worth the investment.

Do NOT buy a pressure *cooker* for canning. Although most of them purport to be suitable for doing a few jars (3 or 4) at a time, in fact they can't hold the temperature and pressure evenly enough for really safe operation.
[lack of thermal mass -- ED]

From: phillips@colum.edu (Gary Phillips x397)
>Yes I bet...I would love to find one at a garage sale. BTW if I ever do,
>do you know what to look for to make sure it is still operating safely?

Sure. Check the rim of both pan and lid to make sure there are no nicks or damage to the interlocking tabs. Make sure the safety pressure release (usually a rivet-like rubber plug) is still present and soft and moving freely in its slightly oversized hole. Check the gasket that goes between pan and lid for cracks or hardening. Make sure the pressure vent is clean and open, and that the seat for the pressure release weight is smooth and fits well. If there is a pressure gauge, it MUST be recalibrated. Contact the manufacturer for information about that. It would probably be a good idea to order a new gasket and a safety release at the same time. (And an instruction manual if you didn't get one with the canner.)

When you are satisfied that everything is present and working, run a test with just water in the pan. Raise pressure to 5 psi and hold it for 15 or 20 minutes, watching carefully for leaks or drips that might indicate problems. If there is a safety interlock to prevent opening while pressure is present examine it to determine whether it has activated. Allow pressure to drop and make sure the interlock doesn't release (not by trying toopen the pan under pressure, but by visual examination) until pressure is gone and you can remove the release weight without any steam escaping.

[For deadweight canners the checks and tests are similar with the sole exception of calibration which is never needed. Be sure you get the three weights which create the 5,10 and 15 lb pressures when used additively. --ED]

Care Of Pressure Canning Equipment

To preserve low-acid foods which are safe, good tasting and nutritious, you need to correctly use equipment which is well-maintained and in good operating condition.

Safety Vents or Petcocks:

- Be sure the vent is clear and unobstructed. Use Q-tip or cotton string to clean.
- Be sure vent tubes are screwed tightly into lid.
- If it is a model with vent under the handle, be sure the lever is moving freely.
- If it is a model with a petcock, be sure it opens and closes freely, either by screwing or flipping the lever up and down.
- If there is a film from hard water on the petcock, and it can be unscrewed from the lid, soak the parts in vinegar, then wash and dry.
- A ball and socket type petcock can be cleaned with silver polish.

Safety Overpressure Plugs:

- If it is a metal alloy or composition metal plug that screws into the lid, do not try to remove it.
- If it is a rubber plug, use the thumbnail test to see if the rubber is still pliable enough. If pressure with thumbnail leaves a permanent dent in the rubber it is too brittle for safe use and should be replaced.
- If either type of plug has been blown out by overpressure in the canner, it must be replaced by a new plug. Do not try to reuse the plug that blew out.

Gaskets:

- Soak gasket in hot water for an hour to soften before the first use of the season.
- Insert gasket into its groove in lid. If it is either too shrunken to fit to the edge, or too stretched to lie smoothly in the lid, it must be replaced.

- Use thumbnail test - if pressure with thumbnail leaves a permanent dent in rubber, it is too brittle and should be replaced. Rubber safety plug should be replaced at the same time, since it will probably be too brittle also.

Presto suggests coating the rubber gasket with vegetable oil before use. I concur and further suggest a rubber gasket be given a little smear of oil { use a brush to avoid injury to the finger} when putting it on the pot. Dry rubber can tear very easily due to friction against the metal. -ED]

On or about 4/1/2000, Bob, (Zxcvbob) sent me email sugesting:

"Mineral oil or vaseline might be a better choice than vegetable oil for lubricating a pressure cooker or canner seal. Especially after exposure to heat, vegetable oils will start to "dry" and turn into a varnish. First they get sticky, then eventually they harden like shellac. This could cause the gasket to stick to the lid and the rim and tear when it is separated, or crack later in storage." Thank you Bob.

I concur with this assesment. Testing shows vegetable oil does indeed bond the rubber seal to the canner lid.

Henceforth the official position of this FAQ is that rubber gaskets on pressure canners shall be lubricated with petroleum jelly (aka vaseline).

Pressure Gauge:

- Have dial and pop-up gauges tested every year before canning season at your local Cooperative Extension Office. If it is inaccurate it must be replaced.
- Check entrance port and carefully remove any debris that may have accumulated.
- Be sure gauge is screwed firmly into lid. If it attaches with a nut on the underside of the lid, be sure the nut is tight.

Weighted Pressure Regulators:

- Have no moving parts so there is no need to have them tested for accuracy.
- Be sure they are clean, with no debris or food residue encrusted especially in the sockets where the weight fits over its vent.
- Be sure the entrance port and vent pipe are open and unobstructed.
- Be sure there are no nicks or damage to the weight or to the tip of the vent pipe where the weight fits.

[especially the vent pipe which supports the weight. Damage here will affect the proper action of the weight. Improper results may result. Note: a test run which shows the 5lb weight rocks evenly when manually revolved around the vent pipe shows a vent that is in good condition -ED]

Canner Lids:

- Be sure handles are securely attached.
- Be sure gasket fits smoothly into its groove in the lid.
- Set lid on canner and turn to lock it into place. It should turn on smoothly and easily.
- If it does not turn on easily, check to be sure gasket is properly seated in its groove. Adjust if necessary.
- If the gasket is properly seated, check the lid. If the lid is warped or bent, it might be replaceable. Contact the manufacturer. If it is an old model or no longer manufactured, there may be no way to continue using it as a pressure canner. It may be used as a regular pot for cooking. If this is the case, remove the gasket, and if possible open or remove the gauge and overpressure plugs or petcocks, to avoid the possibility of pressure buildup.
- If there is no visible problem but the lid continues to be tight, a small amount of petroleum jelly or cooking oil may be applied to the gasket to lubricate it.

Canner:

- Be sure there is a rack in the canner.
- Check the bottom for flatness. Older model canners may warp if overheated. If the bottom is not flat or the canner will not sit flat on the heating element or burner of the stove, it should not be used for canning. Warped canners may be used for cooking. Once warped, the damage *can not* be reversed.
- Put 1 inch of water in the canner, close the lid, heat the water and pressurize the canner. Check to see if steam is escaping at any point other than the petcock or safety vent.
- If steam is escaping around the gasket and it seems to be properly in place, a *small* amount of petroleum jelly or cooking oil may be rubbed around the gasket.

- With weighted gauge canners, if the weight only hisses continuously and does not rock or jiggle intermittently as the manufacturers' directions specify, check to see if the stove is level. This type of weight must hang in a centered position on a vertical vent. If the stove is not level the weight will not hang properly and steam will escape in a continuous stream from the side, so the pressure

will not build up properly.

[This will also happen if the pot is not properly exhausted before placing the weights. The resulting condition is food that is not propely processed. A similar end result happens when using dail gauges if the pot is not exhausted. -- PFB via ED]

- If steam is escaping around the base of any of the vents (dial gauge, weight vent, safety vent, petcock) where they screw into the lid, and if you can screw them out of the lid, the threads can be wrapped with plumber's tape to seal them. Plumber's tape is a stretchy, non-sticky silicon tape used to seal threads. It is available in small rolls from a hardware store. Be sure to wrap the tape in the right direction, so that when you screw the vent back into the lid, the direction of the turning does not unwrap the tape.

Canner Use

- Follow manufacturers' directions for use of your particular model.
- Use canner on the appropriately sized burner. A canner should not hang over the edge of the burner by more than 2 inches on either side.
- Be sure to center the canner on the burner. Some ranges do not allow enough space to center a large canner on rear burners.

[N.B. Those newfangled smooth-top induction burners are a *poor* idea for either a waterbath or pressure canner, both appliances are too heavy, and the burner can't take it.--Diane Hamilton?]

- Be sure lid is securely locked on (turned on, or screwed down).
- If your canner has six or eight large screws and wing nuts to close it, screw them down in opposite pairs. If there are six, screw numbers 1 and 4 down part way, then 2 and 5, then 3 and 6, then return to the first pair to finish tightening continuing around the lid.

VERY IMPORTANT for Pressure Canning: Exhaust the pot.

- For all models, be sure to vent the canner for 10 minutes on high heat with a full stream of steam escaping. This is necessary to remove air from the canner. Air remaining inside will lower the maximum temperature achievable, and may cause underprocessing of the food. After the 10 min. venting, close the petcock, or place the safety weight or weighted pressure regulator on the vent.

Allow the pressure to build to 10 psig, or to 5 or 15 psig if you are processing at those pressures. (psig means Pounds per Square Inch by Gauge, the measure of pressure.) Be sure that you use the proper time for the pressure level that you are using. Check the new USDA Home Canning Guide for safe recommendations.

- When canner reaches the specified pressure, begin counting the processing time.
- Reduce heat gradually to maintain the pressure without over-pressurizing. With a weighted pressure regulator, leaving the heat on too high will not increase the pressure, but will cause excess steam loss from the canner, since steam will be escaping continuously. Surpassing the specified pressure in a dial gauge canner will result in soft, mushy or darkened food, and excessive vitamin loss.
- If the pressure drops below its proper level during processing, increase the heat to bring the pressure back up, then begin the timing over again from zero, for the full specified time.
- Never run cold water over a canner to cool it. In addition, excessively rapid cooling may cause jars in the canner to crack or explode as the pressure in the canner drops more rapidly than the pressure in the jars.

[More commonly this produces a serious seepage problem as the jars with high intermnal pressure are no longer restrained by an equal or greater pressure in the pot. Seepage means a seal that is compromised - depending on what is canned it can be a quite serious problem. Seepage means food is present in the lid gum-to jar lips junction. Seal failure will occur eventually and you know what that means --ED]

- When the pressure has dropped to zero, wait another 1 minute before opening the canner. On some models the pressure drop will be visible when the overpressure plug drops back into the lid, the rubber plug is no longer bulged, or the dial gauge will read zero. Smaller canners will take at least 30 minutes to cool, larger ones may take over an hour.
- Open the petcock or remove the safety weight carefully and wait until any rush of steam has stopped. Then open the lid and tilt the back edge up first, so that it directs the steam away from your face. [and arms. Ouch!]
- Remove the jars immediately. Do not leave jars sitting in a hot canner overnight, spoilage may result.

Canner Storage:

- Turn the lid upside down and rest it on the canner. The weight of the lid should not be resting on the gasket during storage as it could deform it.
- For long-term storage at the end of the season, wash and dry the canner well. Be sure all the parts (safety weight, rack, etc.) are in the canner. A few crumpled newspapers in the canner will absorb moisture and odors.
- If you unscrew the gauge or vents, coat the threads lightly with petroleum jelly to prevent rust and make them easier to replace.
- Coat the gasket very lightly with petroleum jelly or oil.

Burpee, Health, National Victory and Dixie canners are no longer manufactured, and no parts or service are available for these canners. Parts and service are available for Presto, Mirro and All American, and for some models of National Presto, Kwik Kook, Steamliner and Maid of Honor. If you need further assistance or have other problems, contact your local Cooperative Extension Office.

If you are thinking of buying a canner at a garage sale, check to be sure you can open and close the petcocks. Look for stains or drips down the sides or on the lid near the vents, they may indicate that the lid does not seal or leaks steam all the time. Check that the lid twists on and off easily. Check the condition of the gasket. Check that the base is flat. A rounded base indicates that the canner is warped. Check that there is a rack.

Buying any of the models listed above as having parts and service available is a much better bet than one of the older ones. [I.e. Presto, Mirro, and All-American.]

Prepared by Mary A. Keith, Foods and Nutrition, August, 1991
Revised by M. Susan Brewer, Foods and Nutrition, June, 1992
EHE-704

11.1.5 [Weight "jiggle" questions]

The instructions say the appropriate pressure is being maintained when the weight jiggles about 4 times a minute. When I have the weight set to 15 pounds, I cannot get this to happen. It is either jiggling almost all the time or only 1-2 times a minute.

Two answers from two rec.food.preservers.

>From John Taylor :

Jiggling once or twice a minute is fine. It indicates that you have full pressure in the canner, which means it's at the desired temperature. If this is happening at a constant heat setting, it also indicates that the temperature is not falling and then rising again (which you wouldn't want). Sounds like you've got an appropriate setting for the flame.

>From Richard Nielsen :

I've had similar problems with a Mirro 12 qt. I finally decided to let jiggle most of the time. I add an extra cup or two of water and I've never had it even come close to boiling dry in a 90 min process time.

11.1.6 [cleaning my pressure canner..]

Compiled by Tracy L. Carter :
Here is a summary of the response I got for cleaning out my nasty looking pressure canner when I forgot to add vinegar.

1. Put in water and cream of tartar. Bring up to pressure for a certain number of minutes and let come back to room pressure naturally before removing lid. If you want the exact instructions, let me know, and I will go into my other account for them.

2. Scrub with a brillo pad. Thought about that, but didn't know if I should scratch the inside of it or not.

3. Cook a batch of tomatoes/tomato juice in the pressure cooker.

11.1.7 [Where can I find canning equipment parts?]

SOURCES OF CANNING EQUIPMENT

PRESSURE CANNERS

	Liquid capacity quarts	Jar capacity quarts	Gauge type pints	Parts avail-able	Repair service
Mirro	12, 22 (4,6,8 cookers)	4 7	10 20	weight	yes	no

Presto	13,17,22	4	8	dial	yes	yes
		7	16	weight		
Wisconsin Alumin.	7,10,15	4	4	dial	yes	yes
"All-American"	21,25,30				yes	no

Dixie Canner (sells the All-American line)

Canners previously made, with no available parts or service:
National Victory Health
Burpee Dixie

Note: replacements and testing also available Presto for spring-type "pop-up" pressure regulator.

Presto also services and carries parts for:
Steamliner
Maid of Honor, Model 620
Kook Kwik, Models "Best Made" and "Merit"

BOILING WATER CANNERS

	Volume capacity	Jar capacity quarts	pints
Mirro	21	7	9
General Housewares	12, 21	7	8
Glashaus - Weck (electric self-contained heating unit)		8	11

JARS AND LIDS jar sizes

Ball
jelly, 0.5, 1, 1.5 pint, quart, 0.5 gallon regular mouth
1, 1.5 pint, quart, 0.5 gallon wide mouth

Golden Harvest
0.5 pint, pint, quart regular mouth
0.5 pint, pint, quart in wide mouth

Kerr

jelly, 0.5, 1, 1.5 pint, quart regular mouth
1, 1.5 pint, quart wide mouth

Addresses for sources:

Mirro Aluminum Corp./P.O. Box 409/Manitowoc, WI, 54220-0409/(414) 684-4421. ** also sells Foley, Earthgrown brands

National Presto Industries Inc./3925 N. Hastings Way/Eau Claire, WI 54703/ (715) 839-2209. [correction thanks to Lois Grassl
].

Wisconsin Aluminum Foundry Co./P.O. Box 246/Manitowoc, WI 54221-0246/ (414) 682-8627

Dixie Canner Equipment Co./Box 1348/Athens, GA 30603/ (404) 549-1914

General Housewares/P.O. Box 4066/Terre Haute, IN 47804/ (812) 232-1000

Ball Corp./345 S. High St./Muncie, IN 47302/ (317) 284-8441

Kerr Glass Manufacturing Corp./2444 West 16th St./Chicago, IL 60608/

(312) 226-1700 or (800) 331-2609. [BTW, as of March 1996, Kerr was bought out by Ball.--phone research by the folks at r.f.p.]

Anchor Glass Container Corp./ One Anchor Plaza/4343 Anchor Plaza Parkway/ Tampa, FL 33634/ (813) 884-0000. Golden Harvest jars.

Glashaus Inc./Crystal Lake, IL / (815) 356-8440. Distributes Weck Products.

Other Sources:

Lemra Products/ 4331 North Dixie Highway/ Suite 4/ Boca Raton, FL 33431/ (407) 368-8781. Makes the Squeezo juicer/press.

NASCO/ 901 Janesville Ave./ P.O.Box 901/ Fort Atkinson, WI 53538-0901/

(414) 563-2446 or (800) 558-9595. Home Ec. supplies.

Robert Bosch Corp./Household Products Div./2800 S. 25th Ave./Broadview, IL 60153/ (708) 865-5256. Electric juicer/press.

Prepared by Mary A. Keith, Foods and Nutrition, August, 1991

Revised by Susan Brewer, Foods and Nutrition Specialist
EHE-703

11.1.8 [What about zinc rings, rubber sealed jars, and other antique (Out-dated or superceded are other terms) canning equipment?]

Lots of things are legal for sale but are not conducive to good health. Do not confuse commercial availability and/or commercial use with suitability for home-canning.

Selecting Canning Jars and Lids

If you are going to invest the time, the produce, your own energy and your electrical energy in home canning, then it should be important to you to select the best containers for your food. Here are some pointers to guide you, or maybe to give you some answers about why the jars you have used in the past broke in the canner or did not seal.

The best jars to use are standard canning jars. There are several brands on the market. They are all suitable. However, as in any mass-produced product, you may find a few mistakes. Be sure to check the rims, or sealing surfaces. Run your fingertip lightly around the circle to check for any chips or bumps. These will prevent the canning lid from sealing properly. Also look to see that the rim is circular. Occasionally a jar will stick momentarily in the mold and an oval jar is the result. These curiosities can not be used for canning.

While the jars themselves will last for decades, until they are broken, their safe life for canning is much shorter. With the repeated heating and cooling of canning, the glass gradually becomes more brittle. Eventually, it becomes very sensitive to even light shocks. Older jars are often the ones that break in the canner for no obvious reason. Glass manufacturers generally say that a canning jar will have a reliable life of 12 to 13 years. After that their tendency to break increases, and they should be replaced. This includes most of the blue glass jars.

[N.B: In addition to being beautiful, some of those colored glass canning jars are valuable collectors' items. Why bother canning with them?--LEB] [Food in blue jars? No thank you. Colour is a key indicator of food condition. No canner will deprive herself of that advantage. -ED]

Many of the older jars were made for use with rubber rings and zinc lids. In this style of lid, the seal was not on the rim of the jar mouth but on the

shoulder, below the threads. Therefore, the smoothness of the rim was not important. Many of these jars have rough rims, and rims of uneven thickness. These jars will not seal reliably with today's lids. They can be used to store grains and pasta, but are not a good choice for canning.
[N.B: Zinc lids are an especially bad idea for processing pickles, since zinc is highly reactive in high salt and acid.--LEB]

Mayonnaise jars or "one-trip" commercial jars are considered by some canners

[they make excellent feed stock in recycling for manufacture of REAL canning jars - ED]

to be an inexpensive alternative to buying canning jars. (use only for DRY or highly acidic foods - pH proven to be lower than 4.0)

they should *never* be used in a pressure canner. The glass sides are slightly thinner than in a standard canning jar. When there is a pressure difference between the inside of the jar and its environment they may explode. This occurs when the canner cools while the contents of the jar are often still boiling. In addition, the rims of mayonnaise jars are often thinner than those of canning jars. This means that there is less space for the jar lid to properly seal onto. It is very important that the lid be carefully adjusted onto the jar and be exactly centered. Otherwise, it may not seal.

As noted, the glass geometry is different than the standard canning jar. Canning lids and rings will not fit well and most certainly will not attain the seal they are desinged for. The seals of mayo-type jars are single use ONLY. It is a false economy to use mayo-type jars for any form of preserving.

Prepared by Mary Keith, June, 1991
Revised by M. Susan Brewer, June, 1992
Revised by Eric Decker, January 2001

11.1.9. [1/2 gallon canning jars. How to find, and what to do with them?]

>From Emily Dashiell (antem@peak.org)
I found my first collection of half-gallons at a garage sale. Priced at $3/doz, it was a steal!!! I bought several doz; then thought about it some more, and drove back the 8 miles and bought more. I did see new boxes of them, in a large chain store (like Home Depot or some-such), and the price was $15/doz and that was 5+ years ago! Made my bargains look even better :)

You could make them into terrariums; you could build a model in one; you can make vinegar in bulk: raspberry, orange, assorted herb types, etc. Lotsa

uses, just use your imagination.

--

Generally we say: Do NOT use half-gallon jars for canning. However if you use 100% water-like liquids you may use them. Canning water? Juice? Freeze it.

or: High acid foods may be stored in such jars - be SURE the aicd is full 5% - use ONLY pickling vinegar which is clearly labeled at 5% acid. If 3 cups 5% vinegar is used with 3 cups water - that is NOT a 5% acid solution.

Home made vinegar and / or cider vinegar are not suitable. If the acid level is suspect - bump it up with glacial citric acid. If using non-standard vinegar you MUST test the acidity - preferably by acid titration.

The issue with using half-gallon (1/2) jars for processing is that of heat convection. We know full well how the viscosity of a food affects processing in half-pints, pints and quarts. We know that fish is nearly always processed in half-pints. Pureed pumpkin / squash is no longer recommended for home canning as the viscosity is such that heat penetration to the core is rarely reached in even pint sizes.

Commercial processes that use half-gallon jars are exacting ones which use high temperature steam in equipment which records the temperature and time. High temperature flash pasteurization is common also.

Regardless of the origin of food in half-gallon jars, the issue of oxidation rears its ugly head. Once opened, the food degrades rapidly even when safely processd at source. Commercial processors then add anti-oxidants, gums, sulfites, modified corn starch, benzoate and other 'goodies' to stave off degrade.

Here is an example: Commercail 4% red wine vinegar in 1 gallon glass jar from a reputable manufacturer. It is stored in a food cellar along with other canned goods. Usage is over 6 months unless in canning season. It is quite common for the remaining two inches of depth to oxidize (goes brown) to the point it is useless and must be discarded.

The wise kitchen master will procure the size that blends price effiency and quality. Throwing out 1/4 of a large container makes little economic sense. Container size, as all smart preserves know, is suited to serving size.

The risks associated with jars larger than 1 quart or 1 liter are not trivial. Due to the mass of the large jars, food may be botulitic at the core with little

visual evidence of it. Those who think the bulging lid is the tip off of content activity can be sadly mistaken. Seldom will the lid of a large jar show any sign. The reason for this is compressibility of gases. The internal size of the jar is such that gases produced by a live culture at the level of toxicity can be easily accomodated without pressure being induced.

11.2 DEHYDRATORS

from ufl.edu:

Dehydrator Features to Look For

Double wall construction of metal or high grade plastic. Wood is not recommended, because it is a fire hazard and is difficult to clean.

Enclosed heating elements.

Counter top design.

An enclosed thermostat from 85°F to 160°F.

Fan or blower.

Four to 10 open mesh trays made of sturdy lightweight plastic for easy washing.

UL seal of approval.

A one-year.guarantee.

Convenient service.

A dial for regulating temperature.

A timer. Often the completed drying time may occur during the night and a timer could turn the dehydrator off and prevent scorching.

11.2.1 [Where can I find suppliers of premade dehydrators?]

Dehydrator Companies:

American Harvest/ 4064 Peavey Road/ PO Box 159/ Chaska, Minnesota 55318

1-800-288-4545 and (612) 448-4400
Thanks to Joshua H Moffi

Dehydration Technology/ PO Box 864/ Coupeville WA 98239

*****

Excalibur/ 6083 Power Inn Rd/ Sacramento CA 95824

Available from:
http://www.living-foods.com/marketplace/dehydrators.html

Clearly a superior line of dehydrators. The 9 tray, ED-2900, model is selling for $US199.00 in October 1998.

The Excalibur units are highly recommended in RFP by a lot of preservers.

*****

Harvest Maid/ Alternative Pioneering Systems/ 7900 Computer Ave South/ Minneapolis, MN 55435. (800) 624-2945
>From ALG: I'm pretty sure this address is no longer any good

Sun Pantry Enterprises/ 16182 Gothard St, Unit N/ Huntington Beach, CA

92647. (714) 848-1686

A timer is handy for dehydrating. Use one of the type for lamps and such which are readily available from your local hardware.

11.2.2 [Where can I find plans for homemade dehydrators?]

These plans were painstakingly complied by Anne Louise Gockel . Prices are included, but are dated. The last several items
are posts from people in rec.food.preserving and misc.consumers.frugal-living.

--Tabletop Dehydrator:
A Make it yourself dryer that is set on a table. Described in full in Circular #855 "How to Build a Portable Electric Food Dehydrator" by Dale E. Kirk, Agricultural Engineer, Oregon State University, Corvallis, Oregon.

Directions for building this dryer are also contained in USDA H&G Bulletin 217, "Drying Foods at Home", 1977. [From ALG: This dryer offers about

8.5 feet of tray surface and handles about 18 lbs, of fruit or vegetables. Basically it is a plywood box that holds 5 screen trays above the heat source, which is nine 75 watt light bulbs. The heat is dispersed by a shield and forced upward through the trays of food by an 8" household fan.]

--Solar Dehydrator Plans:
"Solar Energized Food Dehydrator" $15.00. Order from: Solar Survival/ Cherry Hill Rd/ Harrisville, NH 03450

"How to Build a Solar Food Dryer" $3.00. Order from: Benson Institute B-49/ Brigham Young University/ Provo UT 84602

"Drying Food", from Blair and Ketchum's Country Journal. Sept 1981

"Build PM's Solar Food Dryer", from Popular Mechanics, Jan 1979

"A Build-It Incubator/Dryer", from Organic Gardening, July 1979

"Solar Dehydrator", from Popular Science, Oct 1976
(From ALG: I have this article; it's just a quick one-page description and a single illustration)

--Electric Dehydrator Plans:
"How to Build a Portable Electric Food Dehydrator" (EC #855, $0.75) Agricultural Communications Publications Orders/ Administration Building #422/ Oregon State University/ Corvallis, Oregon 97331-2119. Reprinted in Horticulture, August 1980. (From ALG: I think this is the set of plans I have; they are fairly complete and look like a good set of plans. They could be made by someone with reasonable handyman skills. It think it requires the cook to manually inspect the temperature and adjust the openings to adjust the temp.)

"Step By Step to a Food Dehydrator", by David Ashe. Better Homes and Gardens. July 1977

"Super Dehydrator Does Much More", by J Stephens. Organic Gardening and Farming, Aug 1977

"Build Your Own Fruit and Vegetable Dryer", by R. S. Hedin. Popular Mechanics, May 1976. (From ALG: I have this article; this is a serious dehydrator. Uses two 600-watt heaters to maintain a temperature of about 120 F and will dry a load in about 12 hours; twelve screens provide a drying area of 14.5 square feet. The drying cabinet is made of 3/8" particle board. There's a blower and an "air safety switch" and this is one *serious* project.)

--Dryer Plans from University Extension Services:
1. Agricultural Engineering Extension/ 325 Riley-Robb Hall (ALG:/* hmmm, does Riley Robb still exist?)/ Cornell University/ Ithaca NY 14853. 607-256-2280 /* DEFINITELY a bad phone number!!!!

Plan No 6252: $2.00: This "Cassette Fruit Drier" is a portable cabinet 18"x 24"x21" and with a heater and fan to dry four aluminum screen trays of fruit. Isometric drawing is shown with door and hasp removed. Notes specify 750 to 1500 watt heater with adjustable thermostat and independent operation of fan. 1 sheet.

Plan No 6244. $2.00: Plan shows a "Solar Fruit Drier" which is tilted box 4'x4'x1' on legs with slots for natural ventilation. Four trays, 2" deep inside the black box, a vinyl or polyethylene box cover and joint details are shown. 2 sheets.

Plan No 6202. $3.00: This "Fruit Drier" has two electrical core resistance heaters, an 80 cfm fan and five slide-out trays in a 2' cubicle plywood box. Shown are a general view, sections, back view with removable panel to plenum chamber and wiring diagrams. A bill of materials and suggested fruit drying procedure is included. 4 sheets.

2. I have this last one and it's "developed by the fruit substation, Clarksville, and the Agricultural Engineering Dept, University of Arkansas, Plan no 731001." This model has a thermostat that will turn the heaters on and off. It looks pretty sophisticated. However I don't think it has a temperature control, just an "on/off" control. It's 4 blueprint sheets of drawings and notes.

3. Two proud innovators in rec.food.preserving...
Sorry, I have no plans, but my husband and I built a good dehydrator years ago. We solved the problem of relatively inexpensive trays by having them fabricated at a glass shop around the corner. They used (not sure what it is called by pros) screen frame stock and screen fabric. These were built in the size that we needed, and were stable enough to support the drying foods. As I recall, they were quite inexpensive, could have been even more so if we had bought the stock and done the work ourselves. Let me know if you use this suggestion and how it works for you. Betty Kohler (using my son's account)

From: Paul Opitz
After building a plywood dehydrator cabinet (2 x 2 x 4 feet!), I, too, had a problem finding suitable trays that didn't cost the big bucks. Found a good solution: fluorescent light box diffusers. You can find these at lighting supply stores or at large building supplies (I found 'em at Home Depot). These have a 1/2-inch grid, are plastic (but are ok for relatively high temperature), come 2 x 4 foot 'slats', and are easy to cut to size. Also,

I've noticed absolutely no taste (like you can get from some metal screens) and you can just toss 'em in the dishwasher to clean.

For smaller foods (peas, corn, ...) I place crochet 'cloth' (plastic sheets about 10 x 14 inches with tiny holes) I got at Cloth World over the main trays. For liquids I use a teflon-coated cookie sheet. I had one problem when I overloaded the tray and it broke (was spanning 2 feet with only end supports and put 4 lbs of beef for jerky on the tray). I added a center support to the dehydrator, and have had no problems since.

As to dehydrator design, I just made a cube out of plywood. The pieces are screwed into 2x2s (take the plywood away and it would look like a 2 x 2 x 4-foot cube wireframe made out of 2x2s). Added a hot plate I got for $10 at Incredible Universe and a surplus 6-inch computer fan I had already. Temperature control is achieved using a modified electronic aquarium thermostat (range of 90 - 160 F).

Several holes drilled at top and bottom sides for some air exchange, and presto! The entire thing cost about $80 (mostly for the plywood) and can simultaneously dehydrate a LOT of food.

I've made black bean soup, jerky, spaghetti sauce, vegetable soup, huevos rancheros casserole, fruit juice leather, fruit pemmican... All turned out much better than the freeze-dried stuff at the stores.

And finally, an amazing idea from a couple on misc.consumers.frugal-living.

From: John and/or Mari Morgan
We had great fun with what we called "the rolling fruit dryer" - my 1981 Chevette hatchback. In the summer, the temp would get over 120F inside if it was sitting in the sun. So I put the back seat down, spread fruit on trays, and set it in the hatch section. I covered it with cheesecloth to keep flies off and left one window about 1/2" open to let some air circulate. Fruit dried in one day, parked in the sun. Made the car smell nice too! Try it next summer (or if you live in a sunny climate) if you have a hatchback car.

11.3 SMOKERS

11.3.1 [Where can I find plans for a homemade smoker?]

THE IDEAL SMOKER: from Brian Bigler .
I got introduced to smokers the same way most people do, but as a Fisheries

Scientist with the Alaska Department of Fish and Game, I enjoy a nearly inexhaustible supply of salmon and other fish to experiment. The small smokers are okay, but the one I built is a lot more versatile. Soon after I got introduced to smokers, I built my own from plywood. My present smoker is about two feet on each side, and about five feet tall. I have three racks scrounged from where I could find them, and a single-burner hot plate I got from Sears as a heat source. I fill a 1-pound coffee can with smoker chips intended for charcoal barbeques. The height of my smoker allows for smoking cheeses on the top rack where it's coolest, and warmer smoking closer to the heat on the lower racks. The hot-plate has to be set carefully, to a point where there's just enough heat to smolder the chips within 5-8 minutes. I plug in the hotplate just long enough to see smoke wisping from the seams, then unplug the cord and allow the chips to smolder on their own. It takes two loads of chips for each load of fish.
BE CERTAIN TO PUT YOUR SMOKER AWAY FROM YOUR HOME!

Other smoker blueprint sources. These were all compiled by Anna Louise Gockel.

"Smoking Fish at Home" #2669, $0.25
"Smoked Shark and Shark Jerky" #21121 $0.25
Sea Grant MAP Extension/ University of California/ Davis, CA 95616

"Fishery Facts 5, Sportsman's Guide to Handling, Smoking and Preserving Coho Salmon"
US Dept of the Interior/ US Fish and Wildlife Service/ Bureau of Commercial Fisheries/ Washington, DC 20240

"Home Smoking of Fish" #B-78865-S $1.00
"Smoke Your Own Poultry" #A 2732 $1.00
Agricultural Bulletin Room #245/ 30 North Murray/ Madison, WI 53715 (zip code?)

Smokehouse plans: North Dakota State University/ Extension Agricultural Engineering Dept./ North Dakota State University Station/ Fargo ND 58105
[found this address on the web--LEB]

(from ALG: I've looked through a copy of the following. It includes making a smoker out of an old discarded fridge:

TITLE: The easy art of smoking food / Chris Dubbs and Dave Heberle; ill. by Jay Marcinowski; photos. by Gary Thomas Sutto. Pub. New York : Winchester Press, 1977. SUBJECTS: Smoke meat. Smoked fish.
DESCRIPTION:
v, 180 p. : ill. ; 23 cm. NOTES: Includes index.

11.3.2 - [How do I use my Little Chief?]

From Gerry Fowler

Enjoy that little Chief, I had one and now use refridgerators for more volume... Just got done with 10 pounds of Peppeoni sticks for schools snacks for the kids. Here is the url for Jerry's site that may provide some more info:

http://home.att.net/~g.m.fowler/frame/index.htm

As of September 26, 1999 Jerry was saying:

For those interested in meat smoking, sausage making and recipes requests that show up here frequently, like pickled eggs, pickled fish and herring, corned beef, pastrami,
canadian bacon and gravlax. I have 490 recipes and will be adding more as time goes by.

Jerry, keep up the good work - ED.

12. Tips 'N Tricks

This section was created as a compendium of tips and tricks. In many cases, I have not seen any of these tricks in the books and pamphlets that I have. They can help you get around specific problems, or are easy ways to do what you have to do. YMMV.

12.1 [The Fruit Fly Trap From: Diana Hamilton]

Given that a lot of people here might be working with fresh fruit, here's an excellent way to keep the kitchen fruit fly population down. I learned this from my brother, who works in a research lab where escaped fruit flies are always a problem.

Materials: 1 glass jar; 1 piece of paper and a piece of tape, or a plastic baggie and a rubber band; a little *cider* vinegar (not white vinegar), or wine or beer; a couple of drops liquid soap or detergent.

Procedure: Tape the paper together to make a funnel shape that will rest inside the mouth of the jar, but have a fairly broad opening. Or, tear a hole in the corner of a baggie, put it in the jar as a funnel, and secure it around the rim using a rubber band. Put cider vinegar (or wine or beer) in the bottom of the jar (1/4 inch or 0.5 cm or so). Add a couple of drops

of detergent to the vinegar. Place the paper funnel on the jar. Set on the kitchen counter near the fruit.

How it works: Flies are attracted to the cider vinegar, which they interpret as decaying fruit. They go into the jar (the funnel makes entry easier than exit) and either fall onto or land on the surface of the liquid. The detergent decreases the normal surface tension, so they sink and drown. Easy and cheap!

We tested this at our parents' house when the apple crop came in. A single trap caught >100 flies in 2 days.

Acknowledgment: Thanks to lank-mrc@tigger.jvnc.net who suggested the baggie method last time I posted this, and to others who suggested beer/wine.

[Little bits of overripe fruit and cheap sherry are also irresistible to fruit flies.--LEB].

12.1.1 [Wax paper weight From: Kate Gregory]

Crumple up a square of wax paper, add the wax paper ball to the top of jars of pickled peppers, canned cherries, etc. to keep the food down in the brine. Seal with two piece lids, can process with wax paper ball in waterbath.

12.2.1 [chop citrus peels for marmalade]

From: Matt Albright
Faster way to chop citrus peels for marmalade

I usually use a vegetable peeler to strip off the zest and then run it through the food processor. Just a few pulses are necessary. I do not use the white part in my marmalade because it makes it too bitter and it takes longer to set (my observation).

12.2.2 [using ascorbic acid]

From Michael Stallcup
Using Ascorbic Acid

Citation from "Drying Fruit" pamphlet by Pat Kendall, Colorado State University Cooperative Extension foods and nutrition specialist and professor, food science and human nutrition; Lesta Allen, retired consumer and family education agent, Tri River Area Cooperative Extension. 8/94. ©Colorado State

University Cooperative Extension. 1994.

"Ascorbic acid (vitamin C) is an antioxidant that keeps fruit from darkening. Pure crystals usually are available at drug stores. Prepare a solution of 1 to 2-1/2 teaspoons of pure ascorbic acid crystals to 1 cup cold water. Vitamin C tablets can be crushed and used (six 500 milligram tablets equal 1 tsp ascorbic acid). One cup treats about 5 quarts of cut fruit. Dip peeled and cut fruit directly in ascorbic acid solution. Soak for a few minutes, remove with a slotted spoon, drain well and dehydrate. Commercial antioxidant mixtures are not as effective as ascorbic acid but are more readily available in grocery stores. Follow directions on the container for "fresh cut fruit."

[ascorbic acid is a cheap and in stock item at beer and wine-making suppliers - ED]

12.3.2 [a jelly bag for emergencies]

_____

From: Alan Blacklock
A jelly bag in a pinch...

Both legs of a fresh pair of pantyhose. This will produce cloudy jelly, though. But if you are desperate for a clean jelly bag..

12.3.3 [How to reach the jelling stage/The Fork Test]

From: Jean P. Nance
How to reach the jelling stage/The Fork Test

There are a couple of other tests for "jelling". One is "when it sheets from a spoon", but I have found this confusing and sometimes deceptive. My favourite is "when it closes the tines of a fork". I have found that it really should be a silver plate fork, not stainless steel. Dip the fork in, bring it out and observe. If the mixture stays in a sheet between some of the tines, the jam is pretty near done. I usually cook it a few more minutes just to be sure. At times my jam is a little stiffer than some people would like, but better that than runny. Experiment to see how much "closing" means jam is at the stage you like.

12.2.4 [Keeping powdered pectin from lumping up]

From: Al Kudsi
Keeping powdered pectin from lumping up

I usually take a little cool water, mix my pectin in it, then add to the fruit. Think of it as corn starch...it reacts very similarly. [Remember that some pectins must be mixed in with the sugar for that very reason.--LEB].

12.3.5 [canner rack - rack for under jars]
From: Barb Schaller
Canning Rack

Fresh from County Ag Extension Pressure Canning Class last night (6/19/96):
Make a rack by joining jar rings (regular size) together with twisties.
Ta-Da!!

12.4.1 [Tips and Tricks for Drying Foods in Oven]

From: David Schwoegler
Tips and Tricks for Drying Foods in Oven

Test the temperature with an instant-read thermometer lying on the middle oven rack with the thermostat at the lowest setting and watch the reading. You shouldn't damage the plastic cover on the thermometer at temperatures below 200F.

Some oven thermostats can maintain 140F using the heating element or burner; many can't. But don't despair; there's another way. Years ago small metal "play" ovens were manufactured as toys. The heat source was an electric light bulb, which baked small cakes and too often burned the young owners. You can apply the same principal in your gas or electric oven by substituting an larger electric bulb for the 25W appliance bulb that's already in there. Fortunately for this purpose, bulbs are rated by their heat output in Watts, not by their light output in lumens.

Take out the 25W. Turn on the oven light and begin with a 40W, using the thermometer to monitor the heat gain. Move to larger sizes until you reach the right sized bulb that gives the temperature you want when it is on continuously. BE SURE TO REPLACE THE ORIGINAL BULB BEFORE USING THE OVEN
FOR BAKING.

Leaving the door ajar increases the air flow, but also alters the heat loss characteristics. This is a slow process, but it can work if you are willing to experiment.

[the exhaust airflow should blow out a common birthday candle at a distance of 3-4inches from the exhaust outlet. Increase or decrease heat independently of air flow. -ED]

12.4.2 [Mini-dehydrator]

From: A. T. Hagen
Mini-dehydrator

Back when I had a very productive garden going and had more herbs than one man who works for a living should have to deal with I dried them all in the house.

I have the same problem you do since I live in Florida. The humidity in the summer generally stays over 70%, frequently goes over 90% and I doubt there are three basements in all of Gainesville.

I took a good sized cardboard box, made rack holders inside of it and put it in the corner of the living room. I took one of my shop clamp lights and put a hundred watt bulb in it and fixed it to the bottom of the box. I put a metal colander over it to block most of the light and made sure that it wouldn't overheat. I put the racks of herbs in, turned on the light, put the lid on so it would stay dark inside and made sure that I had plenty of vent holes. The house air conditioning kept the humidity down and in two to three days I had dried herbs with color and flavor that you can't buy. Made terrific Christmas gifts. I kept a careful eye and thermometer on the whole works for the first day to make sure that the herbs weren't overheating and that nothing was going to catch fire. I kept going like this for several weeks until a truly torrential downpour put my garden under two feet of water and put me out of business.

12.4.3 [Getting fruit leather off of the dehydrator tray]

From: paulevi@psd.k12.co.us (Paul F. Levine)
Getting fruit leather off of the dehydrator tray

I was having a little trouble getting my fruit leathers off the American Harvester solid sheet trays even when they were really dry. The booklet that came with the dehydrator said to try to peel it off while it was still warm. Not so I find. This is what seems to work well:

Once the leather is really dry (around 24 hours +or-) take the sheet right from the dehydrator an put it into the refrigerator for only about 5 minutes (too much more and the leather begins to rehydrate). Then the leather comes off of the sheet.

12.4.4 [Sauerkraut fermenters]

>From Ross Reid:

Sauerkraut not done in an "authentic", or, "old fashioned way" does not mean that it will be inferior. Ancient krautmeisters made kraut in stoneware crocks or barrels because that's what they had.
For these past many years, I have made my large batches of kraut in a large (20 gallon?) container purchased at a wine making supply shop. In such a shop it is normally referred to as a 'primary fermenter' but, to anyone else it looks like a white garbage pail ;-). I have my kraut fermenter clearly marked so that it does not inadvertently get used as a wine primary.
However, I have also made kraut in wide mouthed, 4 liter glass jars. Firmly press the cabbage/salt mixture into the jar, up to the shoulder, cover with a few thicknesses of cheesecloth, hold it in place with a few popsicle sticks wedged into the shoulder, keep in the proper temperature range and it has produced excellent results. By employing accurate measurements (by weight), for both cabbage and salt, it should not really matter in what container the kraut is fermented, as long as it is non-reactive. As a matter of fact, it is quite interesting to watch the fermentation progress in a glass jar. First the liquid rising, next, the bubbles of fermentation, finally, a few weeks later, all that liquid seems to have magically disappeared and you have your own homemade, excellent tasting sauerkraut, made in a non-chemically preservative laced brine. Everyone should try it at least once, especially if you grow your own cabbages.
While I agree that making kraut in a 1 liter (or quart) canning jar will hardly produce a worthwhile quantity, when completed, it is still sauerkraut.
Finally, the adventurous may want to try replacing the cabbage with shredded rutabaga, in the same proportions, to produce a tangy delight known as sauereruben.

--

From Eric Decker

Brined food done in a container where the scum has not been removed will have a reduced level of acid which will render it unsafe jar except in refrigeration. Depending on how much residual salt remains or if vinegar [Arggh!] is or was added, the saurkraut may be fine despite the issue of scum.

12.4.5 [the easy way to wash cukes]

From: Schaller_Barb@htc.honeywell.com (Barb Schaller)
Easy way to scrub cukes (don't show this to your kids!)

I started scrubbing my pickles in the washer. Cold water, no soap, and a couple terry towels for friction. Regular cycle for a couple minutes.

[I wonder if Bogey would have felt different about leaches had they been put through the boiler of the "Queen" - ED]

12.4.6 [Skimming brine]

From: Eric Decker

Muslim is excellent for brining processes. Cheesecloth works almost as well. Use an oversize piece and tuck it down between the product and the walls of the vessel. Skimming is dead easy now as you lift up the sides and tuck into the center
forming a neat sac which contains the scum. Do make sure to purge the scum each day
as the acid level will not be correct otherwise.

Rinse the cloth and reuse right away if you wish.

12.4.7 [keeping pickled peppers crish]

From: Scott Murman
Keeping pickled peppers crisp

If you're getting mushy peppers its likely that you're leaving them in the water bath too long. Peppers will get soggy quickly, try and stay in the 10-15 minute range. You can try adding alum, but I've never been able to find it, so I can't comment on how well it works.

[peppers will go mushy in time no matter what you do. The only remedy is eat, eat, eat and eat before momma-time says, "clear the table". Other solutions are 'make less or give more away' - ED]

12.5.1 [Food-Grade Plastics]

>From Denis DeFigueiredo :
Food-Grade Plastics

I called Berlin and spoke to them, plus an outfit called Kirk Container (they manufactured some 5 gallon paint buckets I saw in the local hardware store). Both places said that buckets made from High Density Polyethylene are approved for food. It has to do with the possibility of interaction between any chemicals in the food and the plastic. As it turns out, Kirk manufactures only *one* kind of bucket, and then markets it for paint, hardware, food, etc. The price is right on the "paint buckets" - much cheaper than the local restaurant supply house.

High density Polyethylene buckets will have HDPE stamped on them, or a recycle symbol with a "2" in the middle. DISCLAIMER: I'm only passing on information I received from the manufacturers. I am in no way professing these things to be absolute fact!

12.5.2 [how can I make kimchee without compliants ..]

from an unknown poster, the chile-heads mailing list...
Keeping outside fermenting items a secret from the neighbors

I learned to love and make kim chee while attending college in Hawaii. I encountered the same odor problem and was forced to come up with a solution or get into a shooting war with the neighbors. Obviously, tightly closing the fermentation container is a recipe for disaster. I actually just cover my crocks with an unbleached muslin stretched over the top. (Five gallon churns are the best "crocks" I have found.) However, I deal with the odor problem by putting six inches of charcoal in the bottom of a plastic trash can and setting the crocks on it. The charcoal I use is provided by a friend at the Jack Daniels distillery, but any "raw" or activated charcoal will work. Bagged charcoal briquettes, even when crushed, are not really a good option, though. I use a large trash can and can actually get three crocks in at once without crowding. I then put several layers of burlap on top of the covered crocks. (I used laundered peanut bags, but feed sacks would work as well.) Finally, I put the lid on the trash can. The lids for these cans fit fairly tight, but will allow for the equalization of pressure. You can still smell the kim chee working, but you must get very close to the trash can and sniff hard.

12.6.1 [Sources of wood chips]

From Kathy Meade
Salvaging Wood Chips for smoking foods

I never buy wood chips. We have an apple tree in our backyard and use the prunings from that. In addition we use the prunings from a neighbor's grapevine. My mother has a crab apple that needs suckers cut out. If you look around there should be plenty of free smoking hard wood. It is just another way of recycling and my neighbors love that I am willing to haul their "trash" away. My sons cut the wood into pieces, we dry it in the sun, and then pack it in plastic buckets that we keep by the smoker until they are needed. Just don't use soft woods such as pine. Fruit woods are the best, but hickory and oak are good too.

12.6.2 [beef stick tips]

From Patricia Riddler?
Tips on making beef sticks

I use the Jerky gun from American Harvest. It is similar to a cookie press. It comes with three tips, a flat tip for making jerky strips similar to the jerky press, and two round tips, one small and one large. I always use the small one because it dries faster. It always makes perfect jerky. You do have to be careful not to over dry it, as it can get tough. I squeeze out one gun's worth in a spiral pattern, one load per tray. After it's dry, I cut it with scissors to the length I prefer. I love this gun and it is so fast!

13. Spoilage, Especially Botulism

13.1 [Okay, I've got some bad jars. What's growing in them? How can I dispose of them?]

HOME CANNED FOOD SPOILAGE--WHAT WENT WRONG??

0.1 Jars and lids that are not sterile. Food placed in unsterilized jars or even air contact with non-sterile lids provide a bacteria source that can ramp up in numbers VERY rapidly. Processing times are deemed for uncontaminated food and vessels.

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1. Fresh food was decayed, unwashed, unpeeled or untrimmed. This results

in a high microbial load. A larger than normal number of microorganisms can take a longer processing time for complete sterilization than is usually recommended.

2. Food packed too tightly in jars. Temperature in the geometric center of the jar was not high enough long enough to result in complete sterilization of the food. Pack food loosely, prepare according to USDA Guidelines (1/2 inch slices, halves, etc.) then use the recommended time, pressure, temperature.

3. Jars became un-sterile soon after being filled. If lids are not placed on jars and processing is not started immediately after jars are filled, microorganisms may start to grow and reach very high levels prior to processing.

4. Inaccurate heat-processing time was used; this may occur if old recommendations are used (food is underprocessed) or if the timing was interrupted (power failure, pressure fluctuation, etc.)

5. Food was not processed at the correct temperature:

A. Pressure Canner (240F, 115C).

1. Failed to test dial gauge yearly.
2. Failed to exhaust canner 10 min with full steam flow.
3. Failed to make an adjustment for elevation (11 PSIG versus 10 PSIG in Illinois due to average 1000 above sea level altitude)
4. Failed to keep pressure accurate (high enough).

B. Boiling Water Bath Canner

1. Water was not covering jar tops by 2" or more.
2. Water was not maintained at a rolling boil.
3. Processing time was too short.
4. Failed to make an adjustment for altitude (addition of 2 minutes for every 1000 ft above sea level).

6. Use of Open Kettle Canning, Microwave Canning, or Oven Canning Methods. These methods do not get the canned food hot enough long enough to destroy microorganisms so the food may spoil, may contain dangerous microorganisms and their toxins, or both.

7. Improper cooling of jars after processing:

A. Failure to remove jars from canner at the end of processing time or when gauge reads "0". As jars cool, they may suck water (containing microbes or spores) back into the food.

B. Failure to properly cool jars. Very slow or very rapid cooling may

interfere with formation of a seal.

8. Use of paraffin to seal jelly jars. Paraffin is no longer recommended for sealing jams, jellies or preserves. Mold, which is the most common spoiler of sweet spreads, can send "roots" down along the edge of the paraffin and produce toxic substances into the spread.

9. Improper storage of home-canned foods:

A. Home canned foods which are exposed to temperatures in excess of 95F may spoil. Sterilization recommendations used for home canning do not necessarily kill some of the "thermophiles" or heat-loving microorganisms. These organisms tolerate high temperatures and will grow at high temperatures. If they are still present, they may grow and spoil the food, or alter the food so that other microorganisms can grow.

B. Home canned foods which are stored in the sunlight may get very hot inside--the light goes in, changes to heat as it is absorbed by the food, allows the air in the headspace to expand breaking open the seal allowing microorganisms to come in.

C. Keeping very acid foods (pickled or fermented products, some juices) for a long period of time may give the food acid time to eat away at and deteriorate the lid resulting in pinholes which allow microorganisms to get into the jar. Discard any home canned food with damaged or flaking metal on the lid.

D. Lids on home canned foods stored in a damp place may rust through allowing microbes to get into the food.

Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992

EHE-669

UNSEALED JARS AND SPOILED FOOD--WHAT TO DO

Occasionally even the most careful home canner has jars which become unsealed during storage resulting in food spoilage. Exposure to high temperatures or water during storage may cause the seals to break open or the lids to rust through allowing microorganisms access to the food inside. Any time a jar of home-canned food looks suspicious, treat it as though it were spoiled. Low-acid home-canned foods such as vegetables, meat, poultry and seafood are a special problem because of their association with botulism, so spoiled in these food categories should be detoxified before they are disposed of.

1. Do not taste food from an unsealed jar or any food which appears to be spoiled. Presence of black discoloration, gas, swelling of the lid, unnatural odors, spurting liquid and mold growth (blue, white, black or green) indicate spoilage.

2. Spoiled, low-acid foods (including tomatoes) may have no evidence of spoilage, so if they are suspect:

   A. Swollen but still sealed jars can be put in the garbage (in a heavy bag) or buried.
   B. Unsealed jars should be detoxified.

3. Detoxification:

   A. Place containers and lids on their sides in a large pot (8 qt or more).
   B. Wash hands well.
   C. Cover containers with water to at least 2" over them.
   D. Put lid on pot and bring to a boil.
   E. Boil 30 minutes.
   F. Cool and discard (in trash bag or bury).
   G. Scrub all counters, containers, equipment (including the can opener), clothing and hands that may have had contact with the food. Throw away sponges, wash cloths, etc. used in the clean-up.

ALTERNATE DETOXIFICATION METHODS:

Cover jar and food with chlorine bleach. Let stand 24 hours. Dispose of as above.

Cover jar and food with a strong lye solution and let stand 24 hours. Dispose of as above.

NOTE: Do not mix chlorine bleach and lye (sodium hydroxide) together. [Pick a detox method and stick with it.--LEB].

Prepared by Susan Brewer/Foods and Nutrition Specialist/Revised, 1992

EHE-680

13.1.2 [Botulism. What is it?]

The word from the FDA, courtesy of Henry Hilbreath, aka souris..

Food and Drug Administration Foodborne Pathogenic
Microorganisms and Natural Toxins 1992

1. Name of the organism: Clostridium botulinum
Clostridium botulinum is an anaerobic, Gram-positive, spore-forming rod that produces a potent neurotoxin. The spores are heat-resistant and can survive in foods that are incorrectly or minimally processed. Seven types (A, B, C, D, E, F and G) of botulism are recognized, based on the antigenic specificity of the toxin produced by each strain. Types A, B, E and F cause human botulism. Types C and D cause most cases of botulism in animals. Animals most commonly affected are wild fowl and poultry, cattle, horses and some species of fish. Although type G has been isolated from soil in Argentina, no outbreaks involving it have been recognized.

Foodborne botulism (as distinct from wound botulism and infant botulism) is a severe type of food poisoning caused by the ingestion of foods containing the potent neurotoxin formed during growth of the organism. The toxin is heat labile and can be destroyed if heated at 80C for 10 minutes or longer. The incidence of the disease is low, but the disease is of considerable concern because of its high mortality rate if not treated immediately and properly. Most of the 10 to 30 outbreaks that are reported annually in the United States are associated with inadequately processed, home-canned foods, but occasionally commercially produced foods have been involved in outbreaks. Sausages, meat products, canned vegetables and seafood products have been the most frequent vehicles for human botulism.

The organism and its spores are widely distributed in nature. They occur in both cultivated and forest soils, bottom sediments of streams, lakes, and coastal waters, and in the intestinal tracts of fish and mammals, and in the gills and viscera of crabs and other shellfish.

2. Name of the Disease:
Four types of botulism are recognized: foodborne, infant, wound, and a form of botulism whose classification is as yet undetermined. Certain foods have been reported as sources of spores in cases of infant botulism and the undetermined category; wound botulism is not related to foods.

Foodborne botulism is the name of the disease (actually a food-borne intoxication) caused by the consumption of foods containing the neurotoxin produced by C. botulinum.

Infant botulism, first recognized in 1976, affects infants under 12 months of age. This type of botulism is thought to be caused by the ingestion

of C. botulinum spores which colonize and produce toxin in the intestinal tract of infants (toxico infectious botulism). Honey is the only implicated food source for C. botulinum spores. The number of confirmed infant botulism cases has increased significantly as a result of greater awareness by health officials since its recognition in 1976. It is now internationally recognized, with cases being reported in more countries.

Wound botulism is the rarest form of botulism. The illness results when C. botulinum by itself or with other microorganisms infects a wound and produces toxins which reach other parts of the body via the blood stream. Foods are not involved in this type of botulism.

Undetermined category of botulism involves adult cases in which a specific food or wound source cannot be identified. It has been suggested that some cases of botulism assigned to this category might result from intestinal colonization in adults, with in vivo production of toxin. Reports in the medical literature suggest the existence of a form of botulism similar to infant botulism, but occurring in adults. In these cases, the patients had surgical alterations of the gastrointestinal tract and/or antibiotic therapy. It is proposed that these procedures may have altered the normal gut flora and allowed C. botulinum to colonize the intestinal tract.

3. Nature of the Disease:
Infective dose - a very small amount (a few nanograms) of toxin can cause illness. Onset of symptoms in foodborne botulism is usually 18 to 36 hours after ingestion of the food containing the toxin, although cases have varied from 4 hours to 8 days. Early signs of intoxication consist of marked lassitude, weakness and vertigo, usually followed by double vision and progressive difficulty in speaking and swallowing. Difficulty in breathing, weakness of other muscles, abdominal distention, and constipation may also be common symptoms.

Clinical symptoms of infant botulism consist of constipation that occurs after a period of normal development. This is followed by poor feeding, lethargy, weakness, pooled oral secretions, and wail or altered cry. Loss of head control is striking. Recommended treatment is primarily supportive care. Antimicrobial therapy is not recommended. Infant botulism is diagnosed by demonstrating botulinal toxins and the organism in the infants' stools.

4. Diagnosis of Human Illness:
Although botulism can be diagnosed by clinical symptoms alone, differentiation from other diseases may be difficult. The most direct and effective way to confirm the clinical diagnosis of botulism in the laboratory is to demonstrate the presence of toxin in the serum or feces of the patient or in the food which the patient consumed. Currently, the most sensitive

and widely used method for detecting toxin is the mouse neutralization test. This test takes 48 hours. Culturing of specimens takes 5-7 days.

5. Associated Foods:
The types of foods involved in botulism vary according to food preservation and eating habits in different regions. Any food that is conducive to outgrowth and toxin production, that when processed allows spore survival, and is not subsequently heated before consumption can be associated with botulism. Almost any type of food that is not very acidic (pH above 4.6) can support growth and toxin production by C. botulinum. Botulinal toxin has been demonstrated in a considerable variety of foods, such as canned corn, peppers, green beans, soups, beets, asparagus, mushrooms, ripe olives, spinach, tuna fish, chicken and chicken livers and liver pate, and luncheon meats, ham, sausage, stuffed eggplant, lobster, and smoked and salted fish.

6. Frequency:
The incidence of the disease is low, but the mortality rate is high if not treated immediately and properly. There are generally between 10 to 30 outbreaks a year in the United States. Some cases of botulism may go undiagnosed because symptoms are transient or mild, or misdiagnosed as Guillain-Barre syndrome.

7. The Usual Course of Disease and Complications:
Botulinum toxin causes flaccid paralysis by blocking motor nerve terminals at the myoneural junction. The flaccid paralysis progresses symmetrically downward, usually starting with the eyes and face, to the throat, chest and extremities. When the diaphragm and chest muscles become fully involved, respiration is inhibited and death from asphyxia results. Recommended treatment for foodborne botulism includes early administration of botulinal antitoxin (available from CDC) and intensive supportive care (including
mechanical breathing assistance).

8. Target Populations:
All people are believed to be susceptible to the foodborne intoxication.

9. Food Analysis
Since botulism is foodborne and results from ingestion of the toxin of C. botulinum, determination of the source of an outbreak is based on detection and identification of toxin in the food involved. The most widely accepted method is the injection of extracts of the food into passively immunized mice (mouse neutralization test). The test takes 48 hours. This analysis is followed by culturing all suspect food in an enrichment medium for the detection and isolation of the causative organism. This test takes 7 days.

10. Recent Outbreaks:

In the last 10 years, two separate outbreaks of botulism have occurred involving commercially canned salmon. Restaurant foods such as sauteed onions, chopped bottled garlic, potato salad made from baked potatoes and baked potatoes themselves have been responsible for a number of outbreaks. [Root crops, pattern?--LEB] Also, smoked fish, both hot and cold-smoke (e.g., Kapchunka) have caused outbreaks of type E botulism.
In October and November, 1987, 8 cases of type E botulism occurred, 2 in New York City and 6 in Israel. All 8 patients had consumed Kapchunka, an uneviscerated, dry-salted, air-dried, whole whitefish. The product was made in New York City and some of it was transported by individuals to Israel. All 8 patients with botulism developed symptoms within 36 hours of consuming the Kapchunka. One female died, 2 required breathing assistance, 3 were treated therapeutically with antitoxin, and 3 recovered spontaneously. The Kapchunka involved in this outbreak contained high levels of type E botulinal toxin despite salt levels that exceeded those sufficient to inhibit C. botulinum type E outgrowth. One possible explanation was that the fish contained low salt levels when air-dried at room temperature, became toxic, and then were re-brined. Regulations were published to prohibit the processing, distribution and sale of Kapchunka and Kapchunka-type products in the United States.

Most recently, a bottled chopped garlic-in-oil mix was responsible for three cases of botulism in Kingston, N.Y. Two men and a woman were hospitalized with botulism after consuming a chopped garlic-in-oil mix that had been used in a spread for garlic bread. The bottled chopped garlic relied solely on refrigeration to ensure safety and did not contain any additional antibotulinal additives or barriers. The FDA has ordered companies to stop making the product and to withdraw from the market any garlic-in-oil mix which does not include microbial inhibitors or acidifying agents and does not require refrigeration for safety. Since botulism is a life-threatening disease, FDA always initiates a Class I recall.

The botulism outbreak associated with salted fish mentioned above is reported in greater detail in Mortality and Morbidity Weekly Report (MMWR) 36(49): 1987 Dec 18. A botulism type B outbreak in Italy associated with eggplant in oil is reported in MMWR 44(2):1995 Jan 20.

An incident of foodborne botulism in Oklahoma is reported in MMWR 44(11): 1995 Mar 24. [Traced to a 3 day-old pot of beef stew left sitting at room temperature on the stove burner. Yikes!--LEB]

In the late 1900's a MD in northern Canada was found guilty in the death of a young woman. Autopsy showed she died of botulism. The doctor misdiagnosed the

problem and the patient died a couple of days later. Botulism is sneaky, deadly and not seem much anymore. Be VERY careful in your canning as the doctor treating you or your family just might make an error based on a lack of experience with said toxin. - ED.

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Botulism poisoning is due to ingesting toxin(s) produced by the anaerobic bacterium _Clostridium botulinum_. There are seven isoforms of botulism toxins (Types A-G). Botulism toxins are colorless, odorless, and tasteless, but highly potent neurotoxins. To explain the physiology of the toxin a little farther, you might remember that nerve impulses are electrical signals (charge gradient that runs along the length of an axon), while the connection between muscles and nerves are mediated by chemical signals. The end of an axon releases synaptic vesicles filled with chemical neurotransmitters. These synaptic vesicles travel a short distance to the synaptic plate on muscle cells, then bind and release neurotransmitters. Current research indicates that botulism toxins bind and cleave several proteins on the outside of synaptic vesicles. Those vesicles cannot then bind to the next synaptic plate and unload the neurotransmitter. Thus, the connection between nerve and muscle impulses is cut biochemically, at the place where the chemical signal is delivered. Muscle control is lost, especially fine facial muscles.

Symptoms of botulism toxin poisoning usually occur within 12-36 hrs after ingestion. They include muscle weakness, slurred speech, blurred vision (all fine muscle movements); followed by an inability to hold up the head. Death occurs by respiratory failure.

If you recognize these symptoms after trying a canned food, call 911 immediately. Whoever is able should reclose the jar, wrap well, put in a ziploc bag, close, bring to the hospital. Wash your hands carefully after this procedure! [Other food poisoning symptoms are listed below in question IV.5--LEB]

Treatment for botulism is straightforward. Often the antisera to the toxin is given, and the victim is placed on a respirator. Survival depends on the amount of toxin ingested, and how quickly the victim got treatment. Recovery is quite slow, taking months. The United States case/fatality rate has dropped in recent years, but the *number of cases* in the US increases slightly in proportion to the popularity of home canning. Interesting cultural comparison: botulism cases in Europe tend to come from cured meats, from Japan from salted fish, from the US from canned vegetables.

13.1.3 [I'm confused about when the toxin is produced. Tell me more about the bacterium.]

There are three varieties of _C. botulinum_; 2 of these varieties (A, C) live and grow in soil under anaerobic (without oxygen) conditions, while 1 variety (E) can be found in fresh and saltwater, also under anaerobic conditions.

Under aerobic (oxygen) conditions, all varieties of _C. botulinum_ encyst, producing a spore. Under normal *aerobic* conditions, both oxygen and your immune system take care of the few dormant spores that you meet in everyday life. NOTE: This is the dormant spore, *not* the bacterium. The bacterium is what you could find in a badly processed can. However, while the encysted, dormant form does *not* produce the toxin (only the bacterium does), the _C. botulinum_ spore is much more resistant to extreme conditions than the bacterium, making it harder to kill.

Deadly problems can occur in situations where you attempt to preserve food by creating an *anerobic* state; namely, when you create a vacuum seal using heat and a 2-piece lid, sometimes when you preserve food in oil, or when you smoke meat. In each of those situations, the _C. botulinum_ spores can develop ("hatch" is a good way of thinking of it) into the bacterium, which then produce the toxin in your canned goods, oil, or on your smoked meat. For this reason, _C. botulinum_ spores in canned/smoked food must be killed or must be kept dormant. You, as a food preserver, using good common sense and a bag of tricks can accomplish this.

13.3.4 [How can I be absolutely, positively sure that those spores are killed?]

You know, I think someone could make a mint by inventing the "home botulism test kit" that would work in the same way that a home pregnancy test kit does. But we don't, so...

Remember, that despite the bacterium's fearsome reputation, _C. botulinum_ is still a microbe, and can be killed using a little basic microbiology. Preserving recipes utilize at least one of these 5 microbiological facts, good recipes often use several.

1. _C. botulinum_ bacterium dies at 212 F/ 100 C.
2. _C. botulinum_ spores die at 240 F/ 116 C.
3. Botulism toxin denatures at 185 F/ 85 C.

(All temperatures must be maintained for least 15 minutes, and the heat must be consistent throughout the food, fluid, and jar.)

4. _C. botulinum_ spores cannot hatch in strong acid solutions of pH 4.6 or below. (Some sources claim pH 4.7.)

5. _C. botulinum_ cannot grow, develop, or multiply in food with a water content of less than 35%. (Food dehydrators have another set of toxic pests to worry about, see IV.6 about aflatoxin.)

Common sense is a first step in the prevention of botulism.

For instance: 1.) _C. botulinum_ bacteria and spores usually live in soil. Thus clean foods of soil, dust, grit, etc, using fresh, cold water. Change wash water often. Don't can "drops", fruit that has dropped to the ground. Pay special attention to cleaning root crops (including garlic!), shucking skins or peeling that produce if need be.

2.) One variety of _C. botulinum_ (E) lives in flat water. So, you want to make your brines, etc, with fresh cold water. Start with fresh, cold water if you are boiling to sterilize, or perform other operations.

3.) Botulism spores remain dormant under high acid conditions. Fruit is quite high in acid but also contains a lot of sugar, so the fruit still tastes sweet. Vinegar is added to vegetables to pickle them. You can can foods like this in a boiling waterbath. However, the concentration of acid (ionic strength) is also very important, so you want to use vinegars of a known strength (5% or 5 grain); add the recommended amount of vinegar, citric acid, or ascorbic acid described in your recipe; can just-ripe fruits. For safety's sake, you shouldn't cut down the amount of vinegar in a recipe, take a cue from fruit and add a little bit of sugar to cut down the extreme acid taste. Vegetable pickles should be immersed in the vinegar or brine. *BTW, finding out that honey is a source of botulism spores (infant botulism), means that I'm not thrilled about the idea of substituting honey for sugar, as the Rodale Institute appears to be.*

4.) Botulism spores, bacterium, and the toxin are killed by high heat. However, all the contents of the jar has to get to the target temperature, no matter the volume, and the temperature should be sustained for about 15 minutes. Follow recipes exactly, including jar sizes and treatment of the jars. Process at least for the times indicated, but remember that you have to increase processing time or pressures depending on your altitude. (Water boils at lower temperatures the higher your altitude.) Note that larger size jars usually require longer processing time, because the heat has to penetrate through the jar.

Acid and heat are each used in canning things that are borderline acid, such as tomatoes, tomato vegetable mixes (like salsa and spaghetti sauce),

vegetable relishes, and other vegetable mixes. The idea here is that you can't increase one thing to avoid other procedures. (You can't increase acid to avoid pressure canning).

5.) Botulism cannot grow or develop without water.
In making jams or jellies, enough sugar and pectin is added to form a gel, depressing the amount of free water available for bacteria to grow. This is one of the reasons why special care has to be taken if the jam or jelly is extremely runny.

Foods preserved in oil (raw garlic, chilis, dried tomatoes) create a special case. Oil contains no water, as it is centrifuged out during processing. If an item is dependably dry, under 35% water content, adding it to the oil should not cause problems, as long as your items are well immersed (1 inch of oil covering). Dry herbs, seeds and spices, dried chiles, even sundried tomatoes should not cause problems. (N.B: Research from the Australian Extension Service--sundried tomatoes are more acid than hydrated ones: pH 4.0 for dried, 4.6 for hydrated--LEB). However, the dehydrated food must be properly dried, conditioned, and not case hardened (case hardened things are hard and crunchy on the outside, soft and gooey on the inside). The jury is out on wet herbs.

If you try to preserve a lot of "wet" items in oil (garlic cloves, chopped onions, ginger root, fresh chiles), you might have a heap of trouble. Oil doesn't contain much dissolved oxygen, so it is a good anaerobic medium. Raw garlic, onions, ginger are all rootcrops, and each contain over 35% water. Chilies often are added to oil in a non-dried state. Generally, you want to "pickle", or at least allow your wet, raw item to take up some 5% vinegar for about 15-20 minutes before putting into the oil. Chunky items (i.e. garlic cloves) should be smashed, crushed, or chopped to get the vinegar into the item.

Simple, but through, sauteing of your chosen flavoring in your oil can also get rid of spores, since they evaporate free water, and the oil can be heated to above 240 F. Yet another idea is to refrigerate your flavored oils, as bacterial growth is very slow below 40 F/4 C.

In addition, the garlic-in-oil botulism problem began when garlic pastes in olive oil were introduced in grocery stores. Many of the botulism poisonings occurred when these pastes were used in cold pasta, salads, and salad dressings. If you are going to be using your flavored oil for sauteing, stir fry, or deep fat frying you will easily heat your oil to above any of the target temperatures described above.

Since the toxin is denatured at 185 F/85 C, if you are concerned about a canned good the usual procedure is as described in the above section (to

hard boil the contents for 15 minutes). NOTE: This will denature the botulism toxin. Other toxins, such as those caused by _Staphococcus_, will not denature until temps of 240 F/116 C are reached and sustained for 30 minutes. As a matter of fact, a hard boil in that case will break open the bacteria, and more toxin would be released into the food.

13.1.5 [I don't feel so good. What do I have/had/will have?]

This is a generalized list of food poisoning symptoms pulled from the Bad Bug Book on the FDA site: http://vm.cfsan.fda.gov/~mov/app2.html.

[If you are actually in the throes of food poisoning, do not use this as a substitute for a doctor's diagnosis and care. I merely list this as a subject useful to food preserver--LEB.]

Onset time to symptoms	Predominant symptoms	Associated organism or toxin
Upper gastrointestinal tract symptoms (nausea, vomiting) occur first or predominate:		
Less than 1 h	Nausea, vomiting, unusual taste burning of mouth.	Metallic salts
1-2 h	Nausea, vomiting, cyanosis, headache, dizziness, dyspnea, trembling, weakness, loss of consciousness.	Nitrites
1-6 h, mean 2-4 h	Nausea, vomiting, retching, diarrhea, abdominal pain, prostration.	Staphylococcus aureus and its enterotoxins
8-16 h (2-4 h emesis possible)	Vomiting, abdominal cramps, diarrhea, nausea.	Bacillus cereus
6-24 h	Nausea, vomiting, diarrhea, thirst, dilation of pupils,	Amanita species mushrooms

collapse, coma.

Sore throat and respiratory symptoms occur:

12-72 h	Sore throat, fever, nausea, vomiting, rhinorrhea, sometimes a rash.	Streptococcus pyogenes
2-5 days	Inflamed throat and nose, spreading grayish exudate, fever, chills, sore throat, malaise, difficulty in swallowing, edema of cervical lymph node.	Corynebacterium diphtheriae

Lower gastrointestinal tract symptoms (abdominal cramps, diarrhea) occur first or predominate:

2-36 h, mean 6-12 h	Abdominal cramps, diarrhea, putrefactive diarrhea associated with C. perfringens, sometimes nausea and vomiting.	Clostridium perfringens, Bacillus cereus, Streptococcus faecalis, S. faecium
12-74 h, mean 18-36 h	Abdominal cramps, diarrhea, vomiting, fever, chills, malaise, nausea, headache, possible. Sometimes bloody or mucoid diarrhea, cutaneous lesions associated with V. vulnificus. Yersinia enterocoliticia mimics flu and acute appendicitis.	Salmonella species (including S. arizonae), Shigella, enteropathogenic Escherichia coli, other Enterobacteriacae, Vibrio parahaemolyticus, Yersinia enterocoliticia, Pseudomonas aeruginosa (?),Aeromonas hydrophila, Plesiomonas shigelloides, Campylobacter jejuni, Vibriocholerae (Ol and non-Ol) V.vulnificus, V. fluvialis
3-5 days	Diarrhea, fever, vomiting abdominal pain, respiratory symptoms.	Enteric viruses
1-6 weeks	Mucoid diarrhea (fatty stools) abdominal pain, weight loss.	Giardia lamblia
1 to several weeks, variable --	Abdominal pain, diarrhea, constipation, headache, drowsiness, ulcers,	Entamoeba histolytica

	often asymptomatic.	
3-6 months	Nervousness, insomnia, hunger pains, anorexia, weight loss, abdominal pain, sometimes gastroenteritis.	Taenia saginata, T. solium
	....---....	
Neurological symptoms (visual disturbances, vertigo, tingling, paralysis) occur:		
Less than l h	*** SEE GASTROINTESTINAL AND/OR NEUROLOGIC SYMPTOMS (Shellfish Toxins) (this Appendix)	Shellfish toxin
	Gastroenteritis, nervousness, blurred vision, chest pain, cyanosis, twitching, convulsions.	Organic phosphate
	Excessive salivation, perspiration, gastroenteritis, irregular pulse, pupils constricted, asthmatic breathing.	Muscaria-type mushrooms
	Tingling and numbness, dizziness, pallor, gastrohemmorrhage, and desquamation of skin, fixed eyes, loss of reflexes, twitching, paralysis.	Tetradon (tetrodotoxin) toxins
1-6 h	Tingling and numbness, gastroenteritis, dizziness, dry mouth, muscular aches, dilated pupils, blurred vision, paralysis.	Ciguatera toxin
	Nausea, vomiting, tingling, dizziness, weakness, anorexia, weight loss, confusion.	Chlorinated hydrocarbons
2 h to 6 days, usually 12-36 h	Vertigo, double or blurred vision, loss of reflex to light, difficulty in swallowing. speaking, and breathing, dry mouth, weakness, respiratory paralysis.	Clostridium botulinum and its neurotoxins

More than 72 h	Numbness, weakness of legs, spastic paralysis, impairment of vision, blindness, coma.	Organic mercury
	Gastroenteritis, leg pain, ungainly high-stepping gait, foot and wrist drop.	Triorthocresyl phosphate

Allergic symptoms (facial flushing, itching) occur:

Less than 1 h	Headache, dizziness, nausea, vomiting, peppery taste, burning of throat, facial swelling and flushing, stomach pain, itching of skin.	Histamine (scombroid)
	Numbness around mouth, tingling sensation, flushing, dizziness, headache, nausea.	Monosodium glutamate
	Flushing, sensation of warmth, itching, abdominal pain, puffing of face and knees.	Nicotinic acid

Generalized infection symptoms (fever, chills, malaise, prostration, aches, swollen lymph nodes) occur:

4-28 days, mean 9 days	Gastroenteritis, fever, edema about eyes, perspiration, muscular pain, chills, prostration, labored breathing.	Trichinella spiralis
7-28 days, mean 14 days	Malaise, headache, fever, cough, nausea, vomiting, constipation, abdominal pain, chills, rose spots, bloody stools.	Salmonella typhi
10-13 days	Fever, headache, myalgia, rash.	Toxoplasma gondii
0-50 days, mean 25-30 days	Fever, malaise, lassitude, anorexia, nausea, abdominal pain, jaundice.	Etiological agent not yet isolated -- probably viral
Varying periods (depends on	Fever, chills, head- or joint ache, prostration, malaise,	Bacillus anthracis, Brucella melitensis, B.

specific illness)	swollen lymph nodes, and other specific symptoms of disease in question.	abortus, B. suis, Coxiella burnetii, Francisella tularensis, Listeria monocytogenes, Mycobacterium tuberculosis, Mycobacterium species, Pasteurella multocida, Streptobacillus moniliformis, Campylobacter jejuni, Leptospira species.

Gastrointestinal and/or Neurologic Symptoms - (Shellfish Toxins):

0.5 to 2 h	Tingling, burning, numbness, drowsiness, incoherent speech, respiratory paralysis.	Paralytic Shellfish Poisoning (PSP) (saxitoxins)
2 - 5 min to 3 - 4 h	Reversal of hot and cold sensation, tingling; numbness of lips, tongue & throat; muscle aches, dizziness, diarrhea, vomiting.	Neurotoxic Shellfish Poisoning (NSP) (brevetoxins)
30 min to 2 - 3 h	Nausea, vomiting, diarrhea, abdominal pain, chills, fever	Diarrheic Shellfish Poisoning (DSP) (dinophysis toxin, okadaic acid, pectenotoxin, yessotoxin)
24 h (gastrointestinal) to 48 h (neurologic)	Vomiting, diarrhea, abdominal pain, confusion, memory loss, disorientation, seizure, coma	Amnesic Shellfish Poisoning (ASP) (domoic acid)

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13.1.6 [Aflatoxin. What is it?]

Food dehydrators have another set of toxic pests to worry about. While bacteria need free water to reproduce, molds can grow and spread, and develop their toxins under much drier conditions. The most famous mold is

that of ergot, which when ingested causes hallucinations. The molds of most concern here are those of _Aspergillus_, which produces aflatoxin. The Bad Bug MO of aflatoxin is listed below.

Aflatoxins
U S Food & Drug Administration Center for Food Safety & Applied Nutrition Foodborne Pathogenic Microorganisms and Natural Toxins 1992 (Bad Bug Book)

1. Name of Toxin: Aflatoxins
2. Name of Acute Disease: Aflatoxicosis

Aflatoxicosis is poisoning that results from ingestion of aflatoxins in contaminated food or feed. The aflatoxins are a group of structurally related toxic compounds produced by certain strains of the fungi _Aspergillus flavus_ and _A. parasiticus_. Under favorable conditions of temperature and humidity, these fungi grow on certain foods and feeds, resulting in the production of aflatoxins. The most pronounced contamination has been encountered in tree nuts, peanuts, and other oilseeds, including corn and cottonseed.

2. Aflatoxins:
The major aflatoxins of concern are designated B1, B2, G1, and G2. These toxins are usually found together in various foods and feeds in various proportions; however, aflatoxin B1 is usually predominant and is the most toxic. When a commodity is analyzed by thin-layer chromatography, the aflatoxins separate into the individual components in the order given above; however, the first two fluoresce blue when viewed under ultraviolet light and the second two fluoresce green. [Could a black light be useful to monitor dried items?--LEB]. Aflatoxin M a major metabolic product of aflatoxin B1 in animals and is usually excreted in the milk and urine of dairy cattle and other mammalian species that have consumed aflatoxin-contaminated food or feed.

3. Nature of Disease:
Aflatoxins produce acute necrosis, cirrhosis, and carcinoma of the liver in a number of animal species; no animal species is resistant to the acute toxic effects of aflatoxins; hence it is logical to assume that humans may be similarly affected. A wide variation in LD50 values has been obtained in animal species tested with single doses of aflatoxins. For most species, the LD50 value ranges from 0.5 to 10 mg/kg body weight. Animal species respond differently in their susceptibility to the chronic and acute toxicity of aflatoxins. The toxicity can be influenced by environmental factors, exposure level, and duration of exposure, general health, and nutritional status of diet.

Aflatoxin B1 is a very potent carcinogen in many species, including nonhuman primates, birds, fish, and rodents. In each species, the liver is the primary target organ of acute injury. Metabolism plays a major role in determining the toxicity of aflatoxin B1; studies show that this aflatoxin requires metabolic activation to exert its carcinogenic effect, and these effects can be modified by induction or inhibition of the mixed function oxidase system.

4. Normal Course of Disease:
In well-developed countries, aflatoxin contamination rarely occurs in foods at levels that cause acute aflatoxicosis in humans. In view of this, studies on human toxicity from ingestion of aflatoxins have focused on their carcinogenic potential. Therelative susceptibility of humans to aflatoxins is not known, even though epidemiological studies in Africa and Southeast Asia, where there is a high incidence of hepatoma, have revealed an association between cancer incidence and the aflatoxin content of the diet. These studies have not proved a cause-effect relationship, but the evidence suggests an association.

One of the most important accounts of aflatoxicosis in humans occurred in more than 150 villages in adjacent districts of two neighboring states in northwest India in the fall of 1974. According to one report of this outbreak, 397 persons were affected and 108 persons died. In this outbreak, contaminated corn was the major dietary constituent, and aflatoxin levels of 0.25 to15 mg/kg were found. The daily aflatoxin B1 intake was estimated to have been at least 55 ug/kg body weight for an undetermined number of days. The patients experienced high fever, rapid progressive jaundice, edema of the limbs, pain, vomiting, and swollen livers. One investigator reported a peculiar and very notable feature of the outbreak: the appearance of signs of disease in one village population was preceded by a similar disease in domestic dogs, which was usually fatal. Histopathological examination of humans showed extensive bile duct proliferation and periportal fibrosis of the liver together with gastrointestinal hemorrhages. A 10-year follow-up of the Indian outbreak found the survivors fully recovered with no ill effects from the experience.

A second outbreak of aflatoxicosis was reported from Kenya in 1982. There were 20 hospital admissions with a 60% mortality; daily aflatoxin intake was estimated to be at least 38 ug/kg bodyweight for an undetermined number of days.

In a deliberate suicide attempt, a laboratory worker ingested 12 ug/kg body weight of aflatoxin B1 per day over a 2-day period and 6 months later, 11 ug/kg body weight per day over a 14-day period. Except for transient rash, nausea and headache, there were no ill effects; hence, these levels may serve as possible control levels for aflatoxin B1 in humans. In a 14-year follow-up, a physical examination and blood chemistry, including tests for

liver function, were normal.

5. Diagnosis of Human Illnesses:
Aflatoxicosis in humans has rarely been reported; however, such cases are not always recognized. Aflatoxicosis may be suspected when a disease outbreak exhibits the following characteristics:

- the cause is not readily identifiable
- the condition is not transmissible
- syndromes may be associated with certain batches of food
- treatment with antibiotics or other drugs has little effect
- the outbreak may be seasonal, i.e., weather conditions may affect mold growth.

The adverse effects of aflatoxins in animals (and presumably in humans) have been categorized into two general forms.

A. (Primary) Acute aflatoxicosis is produced when moderate to high levels of aflatoxins are consumed. Specific, acute episodes of disease ensue may include hemorrhage, acute liver damage, edema, alteration in digestion, absorption and/or metabolism of nutrients, and possibly death.

B. (Primary) Chronic aflatoxicosis results from ingestion of low to moderate levels of aflatoxins. The effects are usually subclinical and difficult to recognize. Some of the common symptoms are impaired food conversion and slower rates of growth with or without the production of an overt aflatoxin syndrome.

6. Associated Foods:
In the United States, aflatoxins have been identified in corn and corn products, peanuts and peanut products, cottonseed, milk, and tree nuts such as Brazil nuts, pecans, pistachio nuts, and walnuts. Other grains and nuts are susceptible but less prone to contamination.

7. Relative Frequency of Disease:
The relative frequency of aflatoxicosis in humans in the United States is not known. No outbreaks have been reported in humans. Sporadic cases have been reported in animals.

8. Target Populations:
Although humans and animals are susceptible to the effects of acute aflatoxicosis, the chances of human exposure to acute levels of aflatoxin is remote in well-developed countries. In un-developed countries, human susceptibility can vary with age, health, and level and duration of exposure.

9. Analysis of Foods:
Many chemical procedures have been developed to identify and measure afla-

toxins in various commodities. The basic steps include extraction, lipid removal, cleanup, separation and quantification. Depending on the nature of the commodity, methods can sometimes be simplified by omitting unnecessary steps. Chemical methods have been developed for peanuts, corn, cottonseed, various tree nuts, and animal feeds. Chemical methods for aflatoxin in milk and dairy products are far more sensitive than for the above commodities because the aflatoxin M animal metabolite is usually found at much lower levels (ppb and ppt). All collaboratively studied methods for aflatoxin analysis are described in Chapter 26 of the AOAC Official Methods of Analysis.

10. History of Recent Outbreaks:
Very little information is available on outbreaks of aflatoxicosis in humans because medical services are less developed in the areas of the world where high levels of contamination of aflatoxins occur in foods, and, therefore, many cases go unnoticed.

14. Recipe troubleshooting, and a list of Other Resources.

14.1.1 [I just got a recipe from rec.food.preserving that I'd like to try. Is it safe to make?]

0. Check the origin. If the poster is not using a real name - be suspicious of the content. Check the RFP FAQ. If the poster is not mentioned in the FAQ as being a contributor the poster is new or does not have a proven track record in RFP. The "Jewels" of RFP are posters who are well known to us, have a consistent track record over several years - these folks will not lead you astray. They can always be counted on for advice which will not endanger anyone. Stay clear of posters whose content is challenged by RFPers.

1. Posters should be responsible for recipes posted, and if you are trying out a preserving recipe for the first time, extreme caution should be taken. Your best source of information on a posted recipe is the poster's E-mail address. Be extra vigilant and wary of posters who will not post their real name.

2. Recipes, if they came from a publication (book, pamphlet, magazine), that publication should be stated, preferably at the beginning. It would be very wise to note and post the copyright date, too. If the recipe is an old family recipe,it should also be posted, too. Of course, plenty of bad recipes get into cookbooks, and preserving recipe books are no exception!

3. If you altered the recipe, you should post that. The best thing to post

would be the original recipe, and your changes made to it.

4. Processing times for recipes are assumed to be for sea level. You should know your elevation, and you must remember to increase the processing time the higher the altitude that you can at. If you are posting an old family recipe, you really should post your altitude, too.

5. And remember, you can always make a refrigerator batch, by not sealing and processing, just refrigerating the results.

6. You can BWB if the pH of the finished recipe is lower than 4.6. You will need calibrated equipment with NIST reagents or use a commercial lab to prove the pH. It can be very risky to use any other method in establishing pH.

7. You could add preservative agents but getting the amounts right is not easy. This FAQ does not supply any information on the use of chemical agents to aid in preserving per se. Sausages aside ... we try to keep our foods free of the stuff that commercial foods are full of. That is one great reason why we preservers do our own!

14.1.2 [Most of the recipe measurements posted here are not metric. Can you help me?]

Some basic conversions. Check the rec.food.cooking FAQ for more of them.

Temperature.
F to C = temp-32 X (5/9) C to F =temp X (9/5)+32

-20 F = -29 C 0 F = -18 C 32 F = 0 C 70 F = 21 C
165 F = 74 C 180 F = 82 C 212 F = 100 C 220 F = 105 C
240 F = 116 C

Volume Measure.
1 qt = 1 liter (L)
1 cup (C) = 250 mL ; 1/2 pt = 250 mL
1 pt = 500 mL
1 Tablespoon (Tbsp) = 15 mL
1 teaspoon (tsp) = 5 mL
1 fluid oz = 30 mL

Weight Measure.
1 lb = 454 grams or .454 kg
1 oz = 28.4 grams

Length (elevation). *Length (headspace measurement)

1000 ft = 305 meters 1 inch = 2.5 centimeter

14.1.3 [Help! What's a peck? Uncommon English measurements.]

From: Barb Schaller :
3 tsp = 1 Tbsp
2 Tbsp liquid = 1 fluid ounce (fl oz) = 1/8 cup
16 fl oz = 2 cups = 1 pint (look on a carton of whipping cream)

(From Nathan Justus : I burned many things that I
cooked from my British cookbooks until I realized that Imperial pints are
20 ounces, and not 16)

32 fl oz = 4 cups = 1 quart (look on a carton of milk)
64 fl oz = 8 cups = 1/2 gallon (look on a bigger carton of milk)
128 fl oz = 16 cups = one gallon (look on a bleach bottle)

And a couple of measurements especially useful for
rec.food.preservers:
Dry measures (1 1/6 dry = 1 wet), this taken from _Joy of Cooking_
1 peck = 2 gallons = 8 quarts
1 bushel = 4 pecks = 32 quarts
These are really only useful for large quantities of whole fruits and
vegetables.

14.1.4 [Finding your elevation so you can alter your canning recipes.]

Yep, you've got to alter your processing times if you are above sea-level.
The question is, what is your elevation? If you live in the US, and have
Web access, check out the URL
http://www.mit.edu:8001/geo
Type in your town, and you should see a geographic summary, including your
elevation in feet.

Just one caveat, from Susan Wood :
I just read your post of the URL for finding out geographic data. When you
include this in the FAQ I think it is important that people understand they
must adjust for their specific location. I just checked my town, Woodbury,
Vermont. The data was OK except I live on a hillside which puts me about
1000 feet above the elevation listed in the data. Anyone in a hilly terrain
owes it to themselves and their families to check a topographic map for their

area and confirm the elevation.

14.1.5 [I got some recipes from my grandparents. Are they safe? How can I make them safe?]

Evaluating Home Canning Recipes For Safety

What do you do when someone gives you "Aunt Tillie's Special" old favorite jam recipe? Or Uncle Willie's barbecue sauce? Or Cousin Millie's dill pickle recipe? In today's heightened awareness of food safety, how do you tell which are safe and which are not? There are no hard and fast rules, or secret formulas, to help you decide. But there are some priorities you can use to help you balance the pros and cons. They depend on the factors that molds, yeasts and bacteria need to grow, and on the relative hazards that molds, yeast and bacteria present in foods.

Factors Influencing Safety

In food preservation, the growth factors that are important are:

Sugar - enough sugar will stop the growth of most organisms
Salt - enough salt will stop the growth of most organisms
Acid - enough acid will stop the growth of most organisms
Water - dehydration. Lack of water inbibits all organisms. Below 35% moisture, even C. botulinum, is directly inhibited in growth.

** Too little sugar, salt or acid will permit spoilage.

Air - most organisms must have air to grow, BUT the most dangerous bacteria in home food preservation, Clostridium botulinum, will only grow without air.

Temperature - most dangerous microorganisms grow best at room temperature or a little above. But in preserving food, we are interested in killing the organisms and their spores, not just in slowing their growth.

The death rate of microorganisms depends on:

Microorganisms: They die at different rates. The number of cells or spores present initially in the food the more there are, the longer it will take to kill them all. The medium (food) that they are in most die faster in acidic food than low acid food, and in wet food than dry food.

The temperature in canning: the important temperature is the temperature at the coldest spot in the jar.

The length of time at that temperature when we heat the food: not all the organisms will die at the same time, they die gradually, and the full process time is necessary to be sure that all, even the most heat-resistant ones, have died.

These last two factors, temperature and time, depend on how much solid vs. liquid is in the jar, and on how tightly the food is packed. Heat from the steam or water in the canner penetrates into different foods at different rates. Liquids circulate in the jar and carry the heat into the center of the jar. Solids must heat slowly from the outside in. A process time for randomly packed green beans, which have spaces for water to circulate, will not be adequate for "tin soldier" green beans, when the tightly packed, vertically aligned beans leave no room for water to circulate.

The most important microorganism in home canning is Clostridium botulinum. The toxins it produces damage the nervous system, producing paralysis and possible death. The damage to nerve cells is permanent. Minute amounts of contaminated food can carry enough toxin to cause death. This bacteria produces spores which are very resistant to heat. It is also very sensitive to acid, and will not grow in acid foods. Other pathogenic bacteria are usually killed by much less heat and in a shorter period of time than Cl. botulinum. Most require air, so will not grow in a sealed jar. They are of less concern in home canning.

Molds and yeast are of concern because if they grow they can reduce the amount of acid present in the food. If that occurs Cl. botulinum may be able to grow. Some molds, particularly those that grow on fruits and fruit products are known to produce toxins that cause damage to the nervous system and kidneys, or cancer in research animals. The likelihood is that they will cause some damage in humans if consumed often enough. (Toxin-producing molds grow well on grains and peanuts, but these products are not home-canned.) Molds and yeasts will also spoil the taste, texture, color and overall appearance of the food, making it unfit for consumption.

Jams, Jellies, Sweet Spreads

In a jam or jelly recipe made with regular pectin, not the low or no-sugar variety: If the jam or jelly sets properly (stiffens into jam or jelly) it has enough sugar to inhibit the growth of bacteria and all but a few sugar tolerant molds and yeasts. This will also be true for marmalades and preserves, and for jellies made the long-boil method without added pectin. The fruit blend used is not crucial.

However, mold growing on a fruit spread is a problem. It should not be scooped off, rather the entire product should be discarded. To avoid mold problems, all jellies, jams and sweet preserves should be packed in pre-sterilized jars and processed 5 minutes or more in a boiling water bath canner.

The exceptions are some of the sugar-free types which explicitly state on the package of jelling agent that they should not be processed. These contain preservatives to prevent mold growth, and the heat of processing would cause soft jelly. In addition, heat will cause the sweetener to break down and lose its sweet taste.

Pickles and Relishes

The pickle recipe is more complicated. The proportion of acid (vinegar) to the amount vegetable is crucial. Enough vinegar must be added to change the low-acid cucumber into a high-acid pickle to be safe. There is no formula or set proportion to decide if the recipe provides for adequate vinegar. The best thing to do is to find a recipe with similar procedures in the USDA Guide to Home Canning and compare the amounts. This is especially true of pickle relishes or vegetable relishes where several vegetables are ground together.

Similarities to look for include:

1. Similar recipes will use the same presoak - soak in ice water, or in salt water, or no soak.

2. They will call for the same size cucumbers - 4", or 6", or 8", or

   specify small or large.

3. The maturity of the cucumber influences how much acid it will take to pickle it. Smaller, less mature cucumbers have the capacity to neutralize more acid per unit of weight than do larger, more mature ones.

4. Similar recipes will also specify similar procedures with the brine: Are the slices or spears packed in the jar raw and the brine poured over, are they merely heated in the brine, or are they simmered before packing? Is the simmering or boiling time the same? Each of these will influence how rapidly the acid penetrates the cucumber and how much the cucumber juice will dilute the acid.

5. Similar recipes will call for similar proportions of onion or other vegetables.

6. Quantities of salt are critical in fermented pickled products; proportion of

salt to vegetable to vinegar should be very similar to USDA recipe to be sure that it will be safe. Proportions of spices are not crucial and may be adjusted

to suit tastes without danger.

If too little salt is used the cucumbers will spoil, get slimy, float, smell foul, and the fermenting mixture may support the growth of hazardous microorganisms. If too much salt is used, there will be no fermentation, just shriveled cucumbers sitting in salt water. Either case is obvious: the recipe is not good.

In quick-pack pickles the amount of salt is not critical. Salt may be omitted, or a reduced sodium salt-type product used. The flavor and texture may be noticeably different, and probably less acceptable but, the product will be safe.

All pickle products should be processed in a boiling water bath to reduce the likelihood of mold or yeast spoilage. Old recipes for whole or sliced pickles that have been used for generations without processing and without spoilage should at least be given a 10 minute process.

Pickle relish products must also adhere to the USDA proportions and process times. Quantities of vegetable and vinegar, heating prior to packing, and process time must be similar to a USDA recipe. An old, tested and trusted recipe may be used if the 10 minute process time is used. Other recipes may be changed, or the product refrigerated.

For comparison of quantities, note the following equivalencies:

1 lb 5" cucumbers = about 5 cucumbers
1 lb mushrooms = about 6 cups chopped = 1 1/2 cups sauteed
1 lb onions = about 3 cups chopped = about 4 medium
1 lb green peppers = about 3 C chopped = 8-9 peppers
1 lb sweet red peppers = about 3 cups chopped = 6-7 peppers
1 lb celery = about 4 cups chopped)
1 lb tomatoes = about 3 medium = about 1 1/2 cups chopped
22-23 lb tomatoes = about 7 quart or 28 cups cooked juice

Other Ingredients:

The use of alum is unnecessary. The slight increase in crispness that it provides is lost after about 2 months of storage. Few pickles are consumed within 2 months of processing. However, since alum is usually used in very small amounts, its use does not constitute a safety problem.

The use of grape leaves might contribute slightly to flavor. They have no

significant effect on safety.

Lime does cause a significant increase in the crispness of pickles. If it is used, all excess lime must be rinsed away before the vinegar is added since it will neutralize the vinegar. After the soak in lime water, the cucumber slices should be soaked in fresh water then drained, re-soaked and drained two more times (3 rinses in fresh water).

Honey may be used safely, but quantities will need to be adjusted for taste, and

color may be darker. One cup of sugar is equivalent to 3/4 C + 1 T honey (or 1 C less 3 T).

Tomato Products

Tomatoes and tomato products are very hard to categorize. Tomatoes are borderline acidic. Lemon juice or other acid (vinegar, citric or ascorbic acid) must be added to all tomato products to insure adequate acidity. Added acid is necessary whether the product will be pressure canned or boiling water bath processed. Bacteria and spores die faster in an acidic environment, and the recommended process times for pressure canning assume that the tomatoes are acidic. The times would not be reliably adequate to insure safety if the tomatoes were low-acid.

Green tomatoes are more acidic, and may be used safely in any recipe calling for red tomatoes. Overripe and frosted tomatoes are less acidic and can not be safely home canned. They can be frozen.

Addition of salt, while optional, does give a miniscule margin of safety. For dietary information, one teaspoon of salt added to 1 quart of juice or sauce adds about 526 mg sodium per cup.

Addition of low-acid vegetables to tomatoes decreases the acidity. The amount by which the acidity is lowered depends on which vegetables, how much, how finely they are chopped, if they are boiled in the tomatoes or not, if seeds and skins remain in or are removed, and if the chunks of vegetable and tomato remain, if they are ground together or sieved out. The initial acidity of the vegetables and tomatoes depends on maturity, growing conditions, post-harvest holding conditions, and soil/location of growth.

It is impossible to test every recipe. It has so far been impossible to develop a set of proportions or an equation that would take into account all the variables and give a reliable assessment of the acidity or the necessary process times. The only safe recommendations can be made by comparing the recipe in question with the USDA guide recipes. If more vegetable or less acid (vinegar or lemon juice) is added than the USDA recipe, the recipe in

question can be changed or the product should be processed according to the process times for the vegetables. Alternatively the product may be frozen or refrigerated.

These proportions of vegetables have processing times in the USDA Home Canning Guide:

Tomato-vegetable juice	22 lb tomato : 3 C chopped vegetable
Spaghetti sauce	30 lb tomato : 8 C vegetable : no acid
Ketchup #1	24 lb tomato : 3 C onion : 3 C vinegar
Ketchup #2	24 lb tomato : 1 C peppers : 2.6 C vinegar
Ketchup #3	24 lb tomato : 9 C vegetables : 9 C vinegar

Use the equivalencies above to convert the amount of vegetables to cups before a recipe is evaluated for safety.

The tomato-vegetable juice recipe specifies "chopped vegetables". Up to but no more than 3 cups of mixed vegetables may be safely added to tomatoes to make 7 qts of juice. Which vegetables are used is not important, the margin of safety is large enough to tolerate the variations in this recipe. BUT, after boiling, this recipe is pressed or sieved, so the chunks are removed, and a smooth juice is canned. These proportions can not be used for a chunky sauce.

The spaghetti sauce is pressure processed, so the proportions can be different. The tomato acid and the long boiling prior to canning are sufficient. These proportions and procedures can be used with different spices to make a taco or barbecue sauce type product.

Ketchups 1 and 2 are pressed or sieved so skins and seeds are removed. The proportions are similar, #2 with less added vegetable has a little less added vinegar. Ketchup #3 is a blender ketchup, skins are not removed prior to canning. The amount of added vegetable and of added acid is much greater relative to the amount of tomato.

If these proportions are maintained, the amounts of sugar and spices may be varied to suit one's taste without endangering the safety of the product, and processing times given in the USDA Guide can be used. If other proportions are used, if the product is canned chunky instead of sieved smooth, or blended raw (uncooked) or any other variation, the processing times are not valid: the recipe must be changed, or the product must be frozen or held refrigerated.

Fruits and Vegetables

These products may be safely canned only according to USDA guidelines. Piece size, packing density and process times must be followed. Grated carrots can not be safely processed according to times for carrot chunks. Pumpkin puree can not be safely canned. The density varies too much, according to variety and preparation method, to give safe recommendations. Only pumpkin chunks may be canned. Addition of aspirin, salt, or "canning powders" will not increase the safety or allow for reduced process times. Deviations from the specified procedures might not be safe. The only safe recommendations that can be given for other procedures is to freeze or refrigerate the product.

[There you have it. Don't bother asking for a pumpkin-butter recipe. LEB]

Fruits and vegetables may be pickled. In this case the guidelines for pickled products should be used.

Jar Sizes

For all products, if the USDA Home Canning guide only offers processing times for pint jars, then the product should not be canned in quarts. Usually this occurs for dense or tightly packed products such as cream style corn, or for heat-sensitive products such as jelly, mushrooms or pickle relishes. In all cases, the extra processing time that would be required to insure an adequate temperature for an adequate time in the coldest part of the jar would be so long that the quality of the product would be lost. Relishes would be soft and mushy, corn would be tough, jelly would be syrupy.

Packing food for canning in irregularly-shaped jars such as ketchup bottles or honey bears is not acceptable. The irregular shape and size might not allow for normal circulation and heat penetration, and cold spots might exist that would allow for the survival of bacteria.

If the product has all ready been packed and processed within the last 24 hrs, it may be repacked and reprocessed in smaller jars, or refrigerated. If it has been longer than 24 hrs since the processing, the product should be discarded to ensure safety.

Food may be packed and processed in smaller jars, half pint instead of pint if desired, but the processing time to be used should be that specified for pints. There is no formula to determine how much less processing would still be adequate. Mayonnaise or other straight sided, regularly shaped, commercial packer jars may be used for boiling water bath canning only. They should not be used for pressure canning, due to the danger of breakage,

particularly when the canner is opened. Flying glass is dangerous.

SUMMARY
1. SWEET FRUIT SPREADS

If it was made with regular pectin, high sugar recipe:

Did it jell? If it jelled, it has enough sugar, so is safe. Was it processed? If not processed, it should be refrigerated for added safety. Is there visible mold? If so, discard the entire contents of the container.

If it was made with a low sugar or no sugar pectin product:

Were the directions on the box, particularly the processing or refrigeration, followed exactly? If the directions were not followed, but there is no visible spoilage, the product may be refrigerated, or possible frozen. If there is mold, if there are bubbles rising, or other signs of spoilage, the product must be discarded.

2. PICKLED VEGETABLE OR FRUIT:

Find a recipe that has similar ingredients and procedures (i.e. pre-soak, size of pieces, maturity and size of vegetables, treatment in brine).

If there is no similar recipe, you can make no judgement on the recipe. If it is an old recipe that has been used successfully for generations without spoilage, a 10 minute processing should be added. If there is a similar recipe, compare the amount of acid to vegetable between the two. If the recipe in question has less acid, either the acid can be increased or vegetable decreased to fit the USDA recipe. If acid is increased, sugar may be increased to adjust the flavor.

If the product is all ready made and the recipe is unsafe:

If it was made less than 24 hrs previously, it may be refrigerated.
If it was made more than 24 hrs previously, it should be disposed of in a safe manner.

If the recipe is safe but the product was not processed:

If it was made less than 24 hrs previously, it may be processed, with new lids. If it is cold, either empty the jars, heat product, repack, and put into hot water, or put cold, filled jars in cold water, heat together; process for full time. It may be refrigerated, or frozen if feasible. If it was made more than

24 hr previously, and has not been refrigerated, it should be disposed of in a safe manner.

3. TOMATO-VEGETABLE BLEND:

Find a similar recipe in the USDA Guide. Check ingredients, proportions, and procedures.

If there is no similar recipe, no processing times can be estimated. To err on the side of safety, do not use the recipe, or freeze the product.

If there is a similar recipe, check proportions of tomato to vegetable, and be sure there is added lemon juice or vinegar. Minor adjustments to quantities of ingredients may be made to fit the USDA recipe.

USDA recipes for juice can not be used to judge chunky sauce recipes, or vice versa.

Spices and seasonings are not crucial to the safety of a recipe and can be adjusted.

4. FRUIT OR VEGETABLE:

Products improperly processed less than 24 hours previously may be reprocessed, with new lids, or refrigerated or frozen.

Products improperly processed more than 24 hrs previously should be discarded as potentially unsafe.

5. Wrong JAR OR JAR SIZE:

If a larger jar or an irregularly shaped jar was used, and the food was processed less than 24 hours previously, it may be reprocessed, with new lids, in smaller jars.

If more than 24 hours have passed, the food should be discarded.

Prepared by Mary A. Keith, Foods and Nutrition, September, 1991
Revised by M. Susan Brewer, Foods and Nutrition, June, 1992
EHE-705

How To Evaluate Recipes - Procedures

Here are five sample recipes taken from two home canning cookbooks on the market. Use the questions and procedures from Fact Sheet EHE-705, Evaluating Home Canning Recipes For Safety, to evaluate them [the section above--LEB]. You will also need the USDA Complete Guide to Home Canning. [This is also available online, check "Other Resources--Electronic" at the end of this FAQ--LEB.]

[Please remember that these are sample recipes, each with or without an important flaw. Do not use them until you read the ANALYSIS for each one.]

1. Pepper relish

2 C chopped sweet red peppers
2 C chopped sweet green peppers
4 C shredded cabbage
2 C chopped onions
3 small hot red peppers, chopped
4 C cider vinegar
4 C sugar
4 T mustard seeds
1 T celery seeds
4 T salt

Mix all the ingredients and let stand in a cool place overnight. In the morning pack in sterilized jars and seal.

2. Picnic Relish

12 sweet green peppers, seeded
12 onions, peeled
12 green tomatoes
1/2 C salt
4 C cider vinegar
6 C sugar
2 t dry mustard
1 t allspice
1/4 T red pepper

Put all the vegetables through the medium blade of a food chopper, sprinkle with the salt, and let stand 4 hr. drain, rinse in clear water, and drain again. In a kettle combine the vinegar and sugar. Bring the liquid to a boil, add vegetables and spices. Boil for 10 min. and seal in hot jars.

3. Chili Sauce I

24 large ripe tomatoes
1 small bunch celery, chopped
6 onions, chopped
3 cloves garlic, minced
3 sweet red peppers, seeded and chopped
2 T whole allspice, tied in a bag
2 C cider vinegar
2 T salt
1 t pepper
1 t dry mustard
1 1/2 C light brown sugar

Scald, peel, core, and quarter the tomatoes. Squeeze out the seeds and

excess juice and chop the pulp finely. Put the pulp in a large kettle, bring to a boil, and boil rapidly until the tomatoes are soft. Ladle off the clear liquid that comes to the top of the tomatoes while they are cooking. Add the remaining ingredients and cook for 30 min. Discard the spice bag and continue to cook for about 1 hour longer, or until thick, stirring occasionally. Seal in hot sterilized jars.

4. Chili Sauce II

4 qt ripe tomatoes, peeled and chopped
1 C chopped onions
1 1/2 C chopped red peppers
1 1/2 C chopped green peppers
1 1/2 t whole allspice
1 1/2 t whole cloves
2 sticks cinnamon
2 C vinegar
1 C sugar
3 T salt

In a large preserving kettle, combine the tomatoes, onions, and peppers. Add the spices, tied in a bag, bring the mixture to a boil and cook until it is reduced to half its volume, stirring frequently. Add the vinegar, sugar, and salt and boil rapidly for 5 min., stirring constantly. Discard the spice bag. Pour into hot jars and seal.

5. Shirley's Sweet-Sour Sauce

10 C chopped, ripe tomatoes
2/3 C chopped green peppers
2 C chopped onions
2 C sugar
2 C 5% acid cider vinegar
2 T canning/pickling salt

Dip tomatoes into boiling water 1/2 min. to loosen skins. Cool in cold water. Remove skins and cores. Blend or put through food chopper. Place in 8-qt. kettle. Remove stems, membranes and seeds from peppers and peel onions before chopping. Add to tomatoes; stir in sugar, vinegar and salt. Simmer, uncovered, stirring frequently, for 2 hours or until thick and sauce begins to round up on spoon. Ladle into 3 hot pint jars, filling to within 1/8" of jar top. Wipe jar rims: adjust lids. Process in boiling water bath 15 minutes. Start to count processing time when water in canner returns to boiling. Remove jars and complete seals unless closures are self-sealing type. Makes 3 pints.

ANALYSIS OF THE RECIPES

1. Pepper Relish

A. First, as it stands, there is neither cooking nor processing. The

recipe can not be used as is. Can it be made useable? Here's how to try.

B. What are the vegetable:acid proportions? Add the cups of vegetable. There are 10 C vegetables. The 3 small hot peppers are negligible so they do not need to be counted. There are 4 C vinegar. Notice that the recipe did not specify 5% acidity.

C. What is the most similar USDA recipe? While the Piccalilli recipe (p.18) might look similar because they both have shredded cabbage, it really is not, because it has green tomatoes, an acid product, and the questionable recipe has no acid foods. So, the USDA recipe to use is the Pickled Pepper Onion Relish (p.18).

D. What are the USDA proportions? Twelve cups of vegetables to 6 C vinegar.

recipe 10 C veg : 4 C acid = 2.4 C veg : 1 C acid
USDA 12 C veg : 6 C acid = 2.0 C veg : 1 C acid

Therefore, this trial recipe does not have enough acid to be safe.

E. What recommendations can be made?

If the vinegar were increased to five cups, the ratio would then be 2 C veg : 1 C acid (10:5). So, to use this recipe:

a. increase the vinegar to 5 C
b. use 5% acidity vinegar
c. boil the mixture for 30 min. to use USDA procedures
d. presterilize jars
e. process the filled jars for 5 min. in boiling water

OR: f. make the recipe as directed, do not seal it, refrigerate.

Note that the recipe all ready has much more sugar (4C) than the USDA recipe, so the increased vinegar should still be acceptable. However, the sugar could be increased still further to counteract the vinegar increase if desired.

If the recipe is made in its original form, the jars should be covered but the lids should not be sealed. There should be no vacuum in the jars. Since nothing has been done to kill or inactivate any Cl. botulinum spores or cells, air should be left in the jar. The air will prevent its growth.

2. Picnic relish

A. What is the most similar USDA recipe? In this case, the Piccalilli (p.18) is the reference recipe to use. Both the ingredients and the procedures are similar. It does have green tomatoes, it does call for soaking the vegetables in salt water and draining them, and it does call for simmering them before packing. So, while the times are not quite the same, the next step is to look at proportions.

B. What are the vegetable:acid proportions? With this recipe it is not as simple as adding the quantities, because this one only specifies numbers of peppers, etc., and not cups. Use the equivalencies table in fact sheet (705) to estimate how many cups of produce it uses.

12 peppers; 9 peppers = about 3 C, so 12 = about 4 C
12 onions; 4 onions = about 3 C, so 12 = about 9 C
12 tomatoes; 3 tomatoes = about 1.5 C, so 12 = about 6 C

TOTAL VEGETABLES = 19 C

4 C vinegar
TOTAL ACID= 4 C

In the USDA recipe there are a total of almost 19 C of vegetables, but the vinegar amount is 4.5 C.

Recipe: 19 C vegetables : 4 C acid
USDA: 18.75 C vegetables : 4.5 C acid

C. So, to correct the proportions, the acid must be increased at least to 4.5 C, or better yet, to 4.75 C of vinegar. This recipe also has much more sugar than the USDA recipe, so the increased vinegar might not be noticeable. If it is the sugar may be increased as desired.

D. What recommendations can be made?

a. use 5% acidity vinegar
b. increase the vinegar from 4 C to 4.75 cups
c. mix the salt in, do not just sprinkle it on top
d. increase the time of soaking from 4 hrs to 12 hrs
e. increase the simmering time from 10 min to 30 min
f. use presterilized jars
g. process the filled jars for 5 min in boiling water

OR: h. use the recipe as is, do not seal, refrigerate the product

3. Chili Sauce I

A. The procedures in this recipe are so different that there are no USDA recipes to use for reference. It can not be considered safe.

B. Explanation and analysis:

When the juice is removed from tomatoes by mechanical means (squeezing, ladling off the clear liquid) the acid balance is changed. With the juice removed, it will take less time for the sauce to become thick when it is cooked. But, that means that there is less cooking time to kill bacteria and mold spores. Also, because it is thicker the heat will penetrate and kill the spores more slowly. So, the product going into the jar has a greater likelihood of still having live spores present. And, if it were processed, because it is thick, it would need more than the usual process time to kill them.

C. The only recommendation that can be made with a recipe of this type is to refrigerate the product without sealing, or freeze it. It can not be canned safely.

4. Chili Sauce II

A. First look at the procedures in this recipe. The tomatoes and vegetables are boiled together until it is thick. But, the mixture is not sieved or put through a food mill. All the skins and seeds are left in. Therefore, this has to be considered in looking for a similar USDA recipe. There are several possibilities; the Spaghetti Sauce without Meat (p. 13), or any of the Ketchup recipes (p. 16-17).

B. So, go to proportions and see which matches best.

	Chili Sauce ?	Spaghetti Sauce	Ketchups Regular	Western	Blender
tomatoes	16 C	30lb=45C	24lb=36C	36C	36C
onions	1 C	1 C	3C	--	(2 lb = 6C)
red pepper	1.5 C	--	--	5chili	(1 lb = 3C)
grn pepper	1.5 C	1 C	--	--	(1 lb = 3C)
mushrooms	1 lb=6 C	--	--	--	
TOTAL VEG:	4 C	8 C	3 C	0 C	12 C
TOTAL TOMATO	16 C	45 C	36 C	36 C	36 C
TOTAL ACID	2 C	--	3 C	2.6 C	9 C

C. Spaghetti sauce: the proportions do look the closest. Half of each quantity is 4 C vegetables to 22.5 C tomatoes. However, looking at the directions, it specifically states: "Caution-do not increase the proportion of vegetables." So, for an exact match, the amount of tomatoes in the chili sauce recipe would have to be increased to 22.5 C. You might say "Yes, but the chili sauce has vinegar added." That is true, but there is no way of knowing if the added vinegar is enough to compensate for the fewer tomatoes. (Both are acid.) If you adapt to the spaghetti sauce recipe, the vinegar becomes optional.

Next, notice that the tomatoes in the spaghetti sauce are sieved to remove the seeds and thick pulp. This would have to be done for the chili sauce too. The skins have been removed in both recipes. Also, notice that the spaghetti sauce recipe only has directions for pressure processing. Many consumers do not have or do not want to use a pressure canner for their tomato products. The other vegetables remain, so the sauce is chunky.

D. So, if the spaghetti sauce recipe were used the recommendations would be:

a. increase the tomatoes to 22.5 C
b. sieve to remove the seeds of the tomatoes.
c. process in a pressure canner, 10 psig for 20/25 min.
d. the vinegar is optional, use it for flavor

All the chili sauce spices would remain the same, so the flavor should be quite similar to the original.

E. Now, look at the proportions of the ketchup recipes compared to the chili sauce in question.

chili	1 C veg.	:	4 C tomato	:	0.5 C acid
Regular	1 C veg.	:	12 C tomato	:	1 C acid
Western	- C veg.	:	14 C tomato	:	1 C acid
Blender	1 C veg.	:	3 C tomato	:	0.75 C acid

Of the ketchups, we can eliminate the Western, because it has no added vegetables at all. It is essentially spicy tomato sauce. The regular ketchup has a much higher proportion of tomato to vegetable, and more acid as well. This is what happens when the solids are removed (sieved out).

F. What can be done with the blender ketchup recipe? The amount of vinegar would have to be increased from 2 C to 3 C. There are more tomatoes than needed, but that only increases the safety margin. So, they do not have to be changed. The spices and cooking procedure could be left the same, with the exception of blending the tomatoes and vegetables together. This would

insure that all the pieces are small enough to coincide with the USDA recipe. It becomes a smooth rather than chunky product but all the original solids are still present. And finally, the product would have to be processed.

G. The recommended changes in the recipe would be:

a. specify 5% acidity vinegar
b. increase the vinegar from 2 C to 3 C
c. blend the tomatoes and vegetables together before cooking
d. process the product for 15 min in boiling water

OR e. use as is, do not seal, refrigerate or freeze the product

V. Shirley's Sweet-Sour Sauce

A. Begin with the procedures. The tomato skins are removed, the rest of the tomato is blended, the onions and peppers are chopped, added to the tomatoes, and the mixture is simmered until thick. It is not sieved. Of the USDA tomato recipes used in the previous section, the Blender ketchup is again the most similar in procedures.

B. Look at the proportions.

sweet-sour 2.6 C veg : 10 C tom : 2 C acid
or to reduce it to lowest common denominator (divide all by 2.6):

sweet-sour 1 C veg : 4 C tom : 0.75 C acid
Blender 1 C veg : 3 C tom : 0.75 C acid

So, this is an almost perfect match. The sweet-sour sauce has more tomatoes than necessary for minimum safety, the acid and vegetable are balanced correctly. The long boiling times match, the final processing times match.

C. What recommendations are necessary?

The only thing that could be said would be "Be sure the vegetables are chopped finely, to approximate the blending used in the Blender ketchup." Most people wouldn't mind using a blender to chop the vegetables, so it is a minor change.

Remember, if there is no similar USDA recipe, the only recommendation can be to freeze or refrigerate the product.

Prepared by Mary A. Keith, Foods and Nutrition, September, 1991
Revised by M. Susan Brewer, Foods and Nutrition, June, 1992

EHE-705 Supplement

15. Other Sources (besides this FAQ)

15.1 [US national Food Safety Database]
The current revision date is 1994. http://www.foodsafety.org

15.1.1 [This FAQ does not tell me what I need to know!]

Please put the question to the group, rec.food.preserving. Rec.food.cooking, rec.food.historic, misc.consumers.frugal-living, misc.rural and misc.survivalism all have dealt with some food preservation traffic. Sci.bio.food-science has been helpful for more pointed scientific questions about food preservation. Procedures and or devices not currently reccomended for home-based preserving are best discussed in sci.bio.food-science.

15.1.2 [General Reference Books]

N.B. I've attached a little code to describe the main contents of the books I have or know about. {c = canning/ f = freezing/ dr = dehydration/ s = smoking/ p = pickling/ cr = curing/ pt = potting/ d = distilling/ rc = root cellaring}

Putting Food By (1991). Janet Greene, Ruth Hertzberg, Beatrice Vaughan. ISBN 0-452-26899-0. If you only can afford one book on this subject, this is the one to get. {c,f,dr,s,cr,p,rc}

Stocking Up (1990). Carol Hupping. ISBN 0-671-69395. This is the book compiled by the Rodale Institute. Check for copyright dates, especially if you are curing meats. Early editions have meat curing protocols and recipes, the latest edition does not. {c,f,dr,p,rc,d}

The Ball Blue Book: The Guide to Home Canning and Freezing (various). Ball Corporation. So important, it is its own question in the FAQ. You may order your copy using the coupon on the top of your next case of Ball jars. {c,f,p}

Kerr Kitchen Book, Home Canning and Freezing Guide (various). Kerr Glass Manufacturing Corporation. Can order your copy using the coupon on the top of your next case of Kerr Jars. {c,f,p}

Bernardin Guide to Home Preserving (various). Bernardin of Canada. Consumer Services/ Bernardin of Canada Ltd/ 120 The East Mall/ Toronto Ontario M8Z 5V5. ISBN 0-9694719-0-4. Also can order your copy via the coupon contained on side of the box of lids, also on top of the next case of Mason jars. Also printed in French. [Look for both its phone number and Web site below.--LEB]

Complete Guide to Home Canning, Preserving, and Freezing (various). USDA. Dover Publication ISBN 0-486-27888-3. Tip from Susan Hattie Steinsapir Another tip for the cheap--The USDA Complete Guide to Home Canning is online. Look for the address under Internet Sources.

Sunset Home Canning Guide (1993). ISBN 0-376-02433. Now you know I'm posting west of the Mississippi; this book can be hard to find in the eastern United States. {c,f,p}

The Beeton Homebooks (various), edited by Irene Hirst. Publisher Ward Lock and Co. Limited, London, Melbourne and Cape Town. From Ellen Wickberg

15.1.3 [Specific Techniques and Interests]

Arranged in alphabetical order. If your favorite book isn't here, talk about it in r.f.p, and I'll put it on the list...

The Art of Accompaniment (1988). Jeffree Sapp-Brooks. ISBN 0-86547-346-3. {c,p,d}. Some of the most unusual jam/chutney/sauce recipes I've seen. Love the dried fig jam recipe, still thinking of trying out the carrot/ date marmalade. Lots of quick pickle recipes, a kimchee recipe, even a recipe for pickling grape leaves for dolmathes..

Better Than Store Bought: Authoritative Recipes for the Foods that Most People Never Knew They Could Make at Home (1979). Helen Witty, Elizabeth Schneider Colchie. ISBN 0-06-014693-1. Recipes in this book include those for crystallized violets, tomato ketchup, German-style mustard, pickled okra, chutneys, mustards, jellies and jams, gravlax, three recipes for corned beef, and smoked meats and fish. While you're waiting for the fish to smoke, you can whip up some pudding mix, or make marshmallows or fig newtons. Recipes do not appear to be excessively difficult--some, like those for mustards and flavored liqueurs, are simple--and descriptions of ingredients and finished products are clear and understandable. Thanks to kvj@mcs.net (Kevin Johnson)

Canning (1983, also various). Bill and Sue Demming. HP Books. ISBN 0-

89586-185-2. {c}.

Canning and Preserving Without Sugar (1993). Norma M. MacRae. ISBN 1-56440-163-4. (1982). ISBN 0-914718-71-1, Published by Pacific Search Press in 1982. from Ellen Wickberg {c}

Clearly Delicious (1994). Elizabeth Lambert-Ortiz, Judy Ridgway. ISBN 1-56458-513-1.

The Country Kitchen (1979). Jocasta Innes. Frances Lincoln Publishers LTD, London. ISBN 0-906459-01-X This book also contains recipes for scones and blackcurrant jam, besides many others, many of which touch on preservation topics, including curing hams and bacon, salting and smoking fish, making pickles, chutneys, preserves, butter, cheeses, etc. Review from James Harvey .

Don Holm's Book of Food Drying, Pickling, and Smoke Curing (1992). Don and Myrtle Holm. ISBN 0-870004-250-5. {dr,p,s,cr}

Dry It - You'll Like It (1974). Gen MacManiman. Published by MacManiman, Inc., P.O. Box 546, Fall City, WA 98024. from . {dr}

European Peasant Cookery: The Rich Tradition (1986). Elizabeth Luard. Corgi Publishing. ISBN 0-552-12870-8.

The Fancy Pantry (1986). Helen Witty. ISBN 0-89480-094-9. {c,p,d,pt}. The first food preserving book I ever bought. I still use a lot of the recipes in it. The pear honey recipe is sinful, so is the green tomato mincemeat. Cornichon, sundried tomato, pepper flavored vodka, pepper jam, herb jellies. Excuse me while I go get my waterbath canner..

Farm Journal's Homemade Pickles and Relishes (1976). Betsy McCracken. Library of Congress Catalog Card Number 76-14048. {p}

Feast of the Olive (1993). Maggie Beth-Klein. ISBN 0-8118-0523-9.

Several olive curing techniques listed here, also everything you've wanted to know about different olive oils. {cr}

Fruits of the Desert (1986). Sandal English. ISBN 0-9607-758-0-3. Preserving fairly exotic fruits, such as kumquats, loquats, fresh figs, cactus fruits, olives. {c,p,cr,d,dr}

The Glass Pantry: Preserving Seasonal Flavors (1994). Georgeanne Brenner. ISBN 0-8118-0393-7. {c,p,dr,d,pt}

Great Sausage Recipes and Meat Curing (1984). Rytek Kutas. Self published. Can be obtained from the author at The Sausage Maker Inc./ 26 Military Road/ Buffalo NY 14207. (716)-876-5521. {s,cr}. If you want to learn how to cure and smoke meats, and make sausage, this is the place. You can also order equipment and supplies pertaining to meat preservation here.

The Herbal Pantry (1992). Chris Mead, Emelie Tolley. ISBN 0-517-58331-3. {c,p,d}

Herbal Vinegar (1994). Maggie Oster. ISBN 0-88266-843-9. {d}

Home Book of Smoke Cooking Meat, Fish & Game. Jack Sleight and Raymond Hull. ISBN 0-8117-2195-7. Stackpole Books, Cameron and Kelker Sts., Harrisburg, PA 17105. I'm very happy to say that I found a book about smoking foods that I can recommend. Covers all the essentials from building a low-temperature home smoker to large-scale production. It provides some recipes, but mainly is concerned with techniques and methods. From Paul Hinrichs. {cr,s}

How to Dry Foods (various). Deanna DeLong. HP books. This book is highly recommended by Anna Louise Gockel, and several other folks in r.f.p. ISBN 0-89586-024-4

[ISBN provided by Vicky Shaw. Vicky notes: " The only thing outdated in it is the jerky information. Here in the northwest the procedures have changed for drying".]

Keeping Food Fresh (1989). Janet Bailey. ISBN 0-06-272503. This book will also give you tips on how to select produce from either the supermarket or garden. {f,rc}

Keeping the Harvest (1990). Nancy Chioffi and Gretchen Mead. ISBN 0-88266-650-9.

Little Chief Smoker Recipes (?). Is available at: Luhr Jensen and Sons, Inc./Post Office Box 296/Hood River, OR 97031. from Hank Nolle .

Making and Using Dried Foods (1994). Phyllis Hobson. ISBN 0-88266-615 -0. {dr}

Mary Bell's Complete Dehydrator Cookbook (1994). Mary Bell. ISBN 0-688-13372-X. {dr} from Paul Opitz

Mary Norwak's The Book of Preserves (Jams, Chutneys, Pickles, jellies). Mary Norwak. ISBN 0-89586-507-6, HPBooks. A tip o' the hat from Barb

Schaller

Native Harvest (1979). Barrie Kavasch. Vintage Books. Native American preserving recipes, including pemmican. {dr}

Out of the Sugar Rut (1978). HAH Publications/ Box 2589/ Colorado Springs, CO 80906. Low sugar canning recipes, from Jean Sumption {c}

Preserving Today (1992). Jeanne Lesem. ISBN 0-364-58653-0. {c,dr,p}

The Rocky Mountain Berry Book (1991). Bob Krumm. ISBN 1-56044-040-6, Falcon Press Publishing Co., Inc. A book to fill a need--how to identify edible wild berries, then recipes for their use. Preserving recipes are pretty much jam/jelly/ketchup, with 2 pemmican recipes thrown in. I would note that the processing times do not mention altering them based on your elevation, so be sure you remember, especially if you are able to harvest them locally.--LEB.

Root Cellaring (1994). Mike and Nancy Bubel. ISBN 0-88266-703-3. {rc}

Smoking Salmon and Trout (). Jack Whelan. ISBN 0-919807-00-3. Aerie

Publishing, Deep Bay, Vancouver Island R.R.1, Bowser, B.C. V0R 1G0. This is probably the best resource for smoking fish that I've ever seen. It is where I learned the art of cold smoking using a forced draft smoker. Plans on how to build various smokers are in the book. Also has the best description on the whys and therefors of marinades and brining that I've ever read. review from Kai {s}

Summer in a Jar: Making Pickles, Jams, and More (1985). Andrea Chessman. ISBN 0-913589-14-4. This book has basic canning instructions but also some inventive recipes. It has a section on single jar recipes (although why anyone would go to the trouble to can one jar of something is beyond me). The single jar recipes are, however, successfully increased to make a reasonable batch. The jam recipes are easy and unusual,they don't require that you use pectin or make your own apple pectin. My favorite is peach maple jam. It is low sugar and very tasty. It also has lots of recipes for vegetable pickles. (from Rachel Beckford) {c}

--N.B. Many standard cookbooks, such as Joy of Cooking, will give you information on preserving food and recipes. Check for the most recent edition and the copyright dates. Ethnic cookbooks often have food preserving or condiment recipes that can be preserved (refrigerate or freeze if in doubt about canning them).--

15.1.4 [Books and Guides to Equipment]

"Red Book No. 6 The Collector's Guide to Old Fruit Jars" by Alice M. Creswick. This is one of two by Creswick on fruit jars. A purchase address is Alice Creswick, 0-8525 Kenowa Sw., Grand Rapids, Michigan 49504. Thanks from: Emily Dashiell

"1000 Fruit Jars Priced and Illustrated" by Bill Schroeder. 1996 is the fifth edition. An ordering address is: Collector Books/ P.O. Box3009/ Paducah KY 42002-3009. 1996 price is $5.95 + $2.00 handling. The dedication lists William A. Dudley as a dealer in rare jars. His address is: 393 Franklin Ave./Xenia OH 45385. From Leslie Basel

The Embarcadero Home Cannery (Division of Quaternion Industries)/ 2026 Livingston Street/ Oakland CA 94606. Proprietor: Louis "Butch" Nagel. This catalog is also a mini-pamphet of home canning, especially tin canning. Got a need for an unusual piece of canning equipment? Need a stitch pump, a portable pressure canning unit, cans, can sealers, chucks, tin lids, lifters? Here they are. Also are "outfitters of community and commercial canneries".

Home Canning Supply & Specialties (Hugh and Myra Arrendale) have a selection of books, bulletins, and pamphlets (not to mention canning jars and supplies). They are in San Diego CA area, 1-800-354-4070 (orders); 619-788-0520; fax 619-789-4745. They have the USDA Complete Guide to Home Canning, Preserving and Freezing (240 pages, $7.95, 2/1/95) and many more. Give Myra a call for her current catalog/pricelist. Info from Barb Schaller .

15.1.5 [Food Preserving books of Historic Interest]

The Domostroi: Rules for Russian Households in the Time of Ivan the Terrible (original 1550's, current English translation 1994). Edited and translated by Carolyn Johnston Pouncy. ISBN 0-8014-2410-0. If you think preserving food is a lot of work nowadays, imagine being a Russian house steward in 1550...

Michel de Nostradame (Nostradamus) apparently published a collection of jelly recipes. From: Tim in rec.food.historic: The recipes I have of Nostrodamus are contained in the book 'The Elixirs of Nostradamus' edited by Knut Boeser. Published by Bloomsbury U.K. 1995. I have tried searching on the net for similar items, but all that 'Nostrodamus' turns up are predictions. [There's a real foodie for you!--LEB]. The book is divided

into two sections. The first is a collection of beauty potions and elixirs, the second is a collection of jellies and preserves. These include: How to preserve lemon peel/ How to preserve pumpkins/ Preserving bitter oranges in sugar of honey/ How to preserve bitter cherries/ How to preserve limes/ How to make a superb quince jelly.

The Foxfire series (especially Foxfire 1) has some information on food preserving techniques as they are (and were) practiced in the southeastern US.

From zoeholbr@rs6a.wln.com (M Zoe Holbrooks) in rec.food.historic:
I've just gotten word that Louis & Clark Booksellers (P.O. Box 5093, Madison, WI 53705) has a complete set of the Mallinckrodt Collection of Food Classics for sale.
The set of 6 volumes includes: Nicholas Appert (The Art of Preserving All Kinds of Animal and Vegetable Substances for Several Years; 1812); Frederick Accum (A Treatise on Adulterations of Food, and Culinary Poisons; 1820); Denys Papin (A New Digester or Engine for Softening Bones; 1681); H. Jackson (An Essay on Bread; 1758); Platina (De honesta voluptate; 1475); and Kenelme Digbie (The Closet of the Eminently Learned Sir Kenelme Digbie Kt. Opened; 1669). Most of these works are difficult to find. If interested, please contact them directly (tel# 608-231-6850). They are not yet online (maybe later this year [1995.--LEB]). My personal experience with them has been pleasant and rewarding. They put out a catalog at least once a year and it never fails to include something I "can't live without"!

If you are looking for older canning recipes, ones that contain unusual combinations of fruits, or perhaps are trying to track down your grandmother's secret conserve recipe, check out the selection of used or collectible cookbooks from the Book Garden Gallery. The BGG is online, at email address bgg@magpage.com; and a Web page at http://www.eden.com/~bgg/index.html. I've ordered books in cyberspace from them, they are polite, speedy, and accurate about the condition of their used books.

15.1.6 [Pamphlets]

Consumer Information Center, Department EE, Pueblo CO 81009. Ask for the Consumer Mailing List Catalog. Can order those nifty USDA pamphlets from this catalog.

The Foodsense series of pamphlets in the UK. Keeping Food Cool and Safe. The booklet number is PB 1649 and it can be obtained from... Foodsense, London, SE 99. 7 TT. Tele 01645 556000. There are a number of other booklets in this food series covering such things as additives, labels, pesticides, radioactivity in food, etc. Citation From Ron Lowe .

The Jam & Jelly Times is a newsletter-type publication from SureJell. No specific subscription info, but return address says: Jam & Jelly Times from SureJell, P. O. Box 945, Kankakee, IL 60901. (A tip from our woman in Gedney, Barb Schaller)

The Kerr Kitchen Pantry, 6 pages, each issue focusing on a topic. The Kerr Kitchen Pantry is published by the Consumer Products Division of Kerr Group, Inc., 1840 Century Park East, Los Angeles, CA 90067. (from Barb Schaller)

Heinz Successful Pickling Guide, P.O. Box 57, Pittsburgh PA 15230. [That PO Box is easy to remember, eh?--LEB]

The Pleasures of Pickling (1986). 46 pg. Older editions appeared as the Pampered Pickle, each are from Sifto Salt Division of Domtar Inc. Write to: Sifto Canada Inc./ 5430 Timberlea Blvd./ Mississauga, Ontario/ Canada L4W 2T7/ 1-800-387-8580 (from Brenda Sharpe, aj471@freenet.carleton.ca)

Home Meat Curing Guide. Morton Salt. can get at the Cumberland General Store/ Rt 3/ Box 81/ Crossville TN 38555. 32 pg. 15 meat recipes and various techniques for curing hams with Morton salt products: dry cure, dry/sweet pickle cure combination, aged/non-aged cures.

So Easy to Preserve. Agriculture Business Office, 203 Conner Hall, Cooperative Extension Service, University of Georgia, Athens GA, 30602. This series is online at the University of Florida site, see below under Internet listings.

Kraft General Foods has booklets and info available: 1-800-437-3284 (1-800-43PECTIN :-) Their Gifts From the Harvest has a couple of conserve recipes. So, too, does Fruits of the Harvest. And, surprise, Fruits of the Harvest Beyond the Basics. Not surprisingly, all of their recipes involve added pectin in one form or another. From Barb Schaller .

Storey Communications, Inc., Department 9300, Schoolhouse Road, Pownal, Vermont 05262 (1-800-827-8673 or 802-823-5811) publishes a series of 32-page booklets on a variety of topics from "Grow the Best Strawberries" to "TACK: Care & Cleaning" to "Making Potpourri." Bulletin A-129 is Making & Using Mustard. From Barb Schaller .
Also has smokehouse plans, from deadbird@aol.com.

Check for pamphlets when you purchase new equipment. I recently found a multi-lingual pamphlet (English, French, German, Spanish) on canning with a new waterbath canner.

Seed Catalogs have ordering information for canning supplies, and food

preserving information. Catalogs to check for this include Johnny's Select Seeds, Gurney's Seed Nursery, Burpee, Henry Fields. Tip 'o the hat to Joan Lane.

Check your county extension service office for pamphlets, which can usually be bought for a dollar or so. Especially important for high altitude canning, getting recipes specific for locale, even information on U-Pick sites and local farmers' markets.

The Church of Latter Day Saints can sell you a copy of "Essentials of Home Production and Storage" which is _really basic_, but a good start. Another idea is to get catalogs from Emergency Essentials (Ogden, UT), Out-N-Back (Salt Lake City, UT) and Nitro-Pak Preparedness Ctr (CA). All have 800 #'s, free catalogs (last I checked) and sell lots of books. Citation from Logan VanLeigh .

15.1.7 [Magazines]

(These are all hit or miss. To the best of my knowledge, no magazine specific to food preserving exists.)

The Herb Companion	Sunset
Mother Earth News	Saveur
Organic Gardening	Martha Stewart's Living
Better Homes and Gardens	Farmer's Almanac (various)

15.1.8 [Phone - voice]

Bernardin Ltd.	1-416-239-7723
Kerr Hot Line	1-800-654-6249
Ball Hot Line	1-800-240-3340
Kraft General Foods Corp.	1-800-431-1001/1-800-437-3284
Sifto Canada, Inc.	1-800-387-8580
Church of Jesus Christ of Latter-Day Saints	1-800-537-5950
Andrews Senic Acres (berry farm all varieties)	1-519-878-5807
Lehman's Hardware	1-330-857-5757
National Presto	1-800-877-0441
American Harvest Customer Service	1-800-288-4545
All-American Canner / Wisconsin Aluminum Foundry	1-920 682 8627

Also check locally:

The Church of Jesus Christ of Latter Day Saints usually has a local Relief Society (womens' auxiliary) representative to call. [From Logan VanLeigh.]

Your county extension service - check your local university directory, especially if its a Land Grant College; look under Government Services, under Dept. of Agriculture.

[Compliments of Blanche Nonken here is a list of central office numbers for each State's County Cooperative Extension Office program. There may be variations. If you notice a number as being invalid - get the correct number and area code an send it to the RFP FAQ Maintainer by email.]

Alabama: 334-821-5108
Alaska: 907-474-7246
Arizona: 520-626-5161
Arkansas: 501-671-2000
California: 510-987-0505
Colorado: 970-491-6281
Conneticutt: 860-484-4125
Delaware: 302-831-2504
District of Columbia: 202-274-6900
Florida: 352-955-2402
Georgia: 706-542-3824
Hawaii: 808-956-7138
Idaho: 208-885-6639
Illinois: 217-333-2660
Indiana: 765-458-5055
Iowa: 515-294-4576
Kansas: 913-532-5820
Kentucky: 606-257-1846
Louisiana: 504-388-6083
Maine: 207-581-3188
Maryland: 301-405-2906
Massachusetts: 413-545-4800
Michigan: 517-355-2308
Minnesota: 612-624-1222
Mississippi: 601-325-3036
Missouri: 573-882-8237
Montana: 406-994-6647
Nebraska: 402-472-2966
Nevada: 702-784-1614
New Hampshire: 603-862-1520
New Jersey: 908-932-9306
New Mexico: 505-646-3015
New York: 607-255-2237
North Carolina: 919-515-2811

North Dakota: 701-231-8944
Ohio: 614-292-4067
Oklahoma: 405-744-5398
Oregon: 541-737-2711
Pennsylvania: 814-863-3438
Rhode Island: 401-884-2671
South Carolina: 864-656-3382
South Dakota: 605-688-4792
Tennessee: 423-522-3148
Texas: 409-845-7808
Utah: 435-797-2200
Vermont: 802-656-2990
Virginia: 804-524-5961
Washington: 509-335-2811
West Virginia: 304-293-5691
Wisconsin: 608-263-5110
Wyoming: 307-766-5124

15.9 [Suppliers of Specific Items]

16. [Internet]

http://www.oznet.ksu.edu/ext_f&n/HRAP/cespub.htm
A page with links to the Extension Pages of 39 States [-ED]

http://vm.cfsan.fda.gov/~mow/app3a.html - PH of food stuffs

http://www.ext.usu.edu/publica/foodpubs.htm
Utah State presents an electronic version of the USDA Home Canning Guides in PDF format. Excellent page for preservers.

http://www.orst.edu/food-resource/index.html
Food Resource at Oregon State University
excellent content - ED]

http://www.ces.ncsu.edu/depts/foodsci/agentinfo/hot/natdis.html
Natural Disasters and Food Safety
North Carolina State University Food Safety Information Retrieval System - thank you George Shirley for the tip]

This site is a good one to assist preservers in planning. The six disasters listed may not be common in all locales but flood, fire,

and power outages almost certainly are. No paranoia here - just plain common sense of being prepared.

http://www.extension.umn.edu/Nutrition/
University of Minnesota Extension Service.
Aging Beef, dairy, preserving.

http://www.foodpres.com/ - from A. Gallagher Oct/98
- Food Safety and Preservation by Dr. Shirley Vangarde and Dr. Margy Woodburn.

ftp: ftp.ucdavis.edu pub/extension/4h-youth fp001.zip-fp008.zip
Files are eight lessons in food preservation, written for 4H students.
These are compressed, written in Word Perfect 5.1 or Post Script format.

http://www.ext.usu.edu/publica/foodpubs.htm
http://www.hoptechno.com/book30.htm

One site at Utah State University, another at Johns Hopkins. You will find the entire contents of the USDA canning guide (258 pages, beware for your hard disk!) along with several other food safety data sheets. These are in .pdf format, so you need another program to read the files. [From Dirk Howard]

Dehydration:

http://dryer.com
1-800-369-4283
Voice: 1-541-688-5281
Fax: 1-541-688-5989

This firm provides dehyration equipment for the _serious_ dehydration preservers.
Live in a good neighbourhood? Pool the cost and use of a larger unit. - ED]

Thanks for to A. Gallagher for the Nov/98 tip on this site.

http://www.dfst.csiro.au/handling.htm [reprinted 1993 - ED]
http://www.dfst.csiro.au/consumer.htm [articles have various 1994 dates - ED]

Files from the Commonwealth Science Industrial Research Organization Department of Food Sciences (Australia). Excellent files on handling frozen, refrigerated, and thawed food, including little known facts about the average

refrigerator. [From John Laidler]

http://www.colostate.edu/Depts/CoopExt/PUBS/FOODNUT/pubfood.html
Colorado Extension Food and Nutrition.
They also have a LOT of other good food preservation publications (all in Adobe .pdf format). [From Michael Stallcup]

http://www.agen.ufl.edu/~foodsaf/

A collection of food preservation and food safety files collected at the University of Florida. There is a lot of information here, but you will be driven mad by the non-descriptive file titles (at least I was!). Some hints: can*, canning; freeze*, freezing; cont*, contamination; dry*, dehydration. [From Daniel Burke]

Several of the two letter codes are from specific states; e.g. ga, il, nc, de, wi, wy.

http://www.home-canning.com/

This is the Bernardin Web site. A pretty site, good for beginners. The recipe search is good for common ingredients like strawberries and peaches, hit and miss for rarer ingredients like figs. Files are also written in French, ingredients are noted in English and metric. From Leslie Basel.

http://www.lehmans.com
email: info@lehmans.com
FAX: 330-857-5785
TEL: Customer Service: 330-857-5757
TEL: Orders only: 330-857-1111

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Lehman's, home of the Non-Electric Catalog
"Serving the Amish and others without electricity with products for simple, self-sufficient living"

See the retail store at One Lehman Circle, Kidron.
(Mon-Sat, 8:00 am to 5:30 pm plus Thur til 8:00 pm.)
PO Box 41, Kidron, OH, 44636

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This is the home of Lehman's Hardware. If you ever get within 200miles of

Kidron, Ohio you MUST get to Lehmnan's. The entire store evokes memories of a simpler
and more gentle time. They carry high quality goods which have been tested in the
crucible of real life. - ED.

See 10.1 for additional info on Lehman's.

http://www.azstarnet.com/~thead/bbq/
http://www.azstarnet.com/~thead/msfaq.html

These are the addresses and URLs for the current version Rick Thead's Meat Curing and Smoking FAQ. An early version of that FAQ is contained in this FAQ, while the current version has more recipes and advice.

http://www.stuffers.com/ - Stuffers Supply Company - an excellent catalog of all the supplies for making sausages.

ftp://ftp.stuffers.com/ Serious sausage heads will want to use a FTP client and download it all. Check often, updates are constantly happening. Recipes are available from the Web page also.

"The recipe archive of www.stuffers.com. An archive of sausage making recipes from all over the world". [Thank you Stuffers Supply Company -ED]

http://www.panix.com/~paleodiet/

The Paleolithic Diet Page - What the Hunter/Gathers Ate

http://www.beyondveg.com/
From their Mission Statement:
"We hope the range of views presented here will encourage--perhaps even force--you to think for yourself and go beyond the need for reliance on any single
authority in evaluating the worth and workability of a diet."

[Food preservers by virtue of what they do are creating a special diet which may be condidered to be quite retro. These pages give preservers a wider perspective. It is my
hope your efforts are enhanced by what you find here. Kudos go to donwiss@nospam panix.com
(Don Wiss) for the link to this site - ED]

http://www.eaglequest.com/~bbq/
Home of the BBQ FAQ and More. Home made smokers and smokehouses.

http://members.xoom.com/celtic_farm/
Celtic Homestead. "One of our major interests is self reliance and doing things the "old fashioned" way." [Good and getting better - ED]

http://www.geocities.com/Heartland/Meadows/6996/homecft.html
Chatzie's Homepage. Another person we know who is putting back more than they take.

http://soar.berkeley.edu/recipes/

Huge searchable index of recipes - they have a canning and preserving section [-ED]

http://www.gingerich.com/
Berry farm with some really cool recipes [- ED]

http://easyweb.easynet.co.uk/~gcaselton/chile/canning.html
A site in the UK whick has a neat page on chiles - quotes USDA. Whoever thought the British to be just bubble and squeak heads had best take a look at this
excellent site. Chile-heads in Merry Olde England - Yayyyyyy!

http://ificinfo.health.org/index8.htm
FNIC information regarding sugar. Includes Food Insight reports,
Q&A on aspartame and a variety of other resources.

http://www.sugars.com/
Indiana Sugars, INC. is a site which has considerable information on sugar/sweetener information. Has an excellent update of sugar as a crop and links to a variety of sugar associations.

http://www.imperialholly.com/
Imperial Holly Corporation has processing and history methods wth sugar beet.

http://www2.portal.ca/~urbanpre/
Urban Preserving is a supplier of labels suitable for home cannning creations.

http://www.cheesemaking.com

This a terrific site to visit if you are thinking of trying to make cheeses

and yogurts. While it is run by New England Cheesemaking Supply Company, the webmaster has the good taste to give a surfer a mini-FAQ about cheese and yogurt making before trying to sell you something. Also has good links to other cheese/dairy sites. [From Daniel Nachbar]

http://www.lis.ab.ca/walton/old/

This is the Old Timer's Page, where you can get information about old timer's rural skills, such as preserving food. Think of it as an online Foxfire book. If you are the *least bit* interested in building or using a root cellar, you must check out this site. [From Al Durtschi]

http://www.seanet.com/Users/tberry/recipe.html#Recipe_List
Apples, apples, apples. A recipe for Beverly's Fried Apples is here. Has a recpie for maing your own pectin.

http://www.wwmagic.com/haphov/

A food storage Web page of the Back-to-the-land stuff. [From Deana D. Karas]

http://ecep1.usl.edu/cajun/index.htm
A Cajun Family's Recipe Collection. Jams, pickles, etc - you will have to poke around a bit.

http://www.kitchenkrafts.com
KitchenKrafts webpage. Suppliers of ClearJel(tm) among other things. 1998 - $2.85/lb (16 pies) or $2.65/lb if you buy it bulk. Those prices might be slightly out of date, but I do recall paying less than $3.
Thank you Kate Wrightson for the price information.

http://www.kingarthurflour.com
ClearJel(tm) is available at King Arthur Flour.
1-800-827-6836 It is $3.25 (+s&h) for 8oz. 6 pies. - 1998 price
Thank you Susan Ness

Henriette Kresses' four part culinary herb FAQ
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ftp: ftp.sunsite.unc.edu
/pub/academic/medicine/alternative-healthcare/herbal-medicine/faqs/culiherb.txt

http://sunsite.unc.edu/herbmeds/culiherb.html

Henriette Kresses' four part culinary herb FAQ (and its almost as big as this one!). She also crossposts it on rec.food.preserving monthly, around the 20th of each month. The culinary herb faq has ideas and recipes for preserving herbs--check out the recipes for garlic and lavender jelly, herbal syrups, scented and flavored sugars, candied and sugared rose petals. Also contains info on drying herbs, making herb vinegars, oils, mustards, etc.

Email to: LISTSERV@HOME.EASE.LSOFT.COM. Leave the subject line blank, but write a one-line message in the format 'subscribe HERBS '
If you wish to discuss culinary herbs, or gardening of herbs here's the list for that. From Henriette Kress .

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http://vm.cfsan.fda.gov/~mow/intro.html

The FDA's Home Page and Bad Bug Book. If we haven't scared you about spoilers, maybe they can. From Ron Meisenheimer . http://www.cdc.gov
The MMWR (Mortality and Morbidity Weekly Report) is available from the CDC's web page. From Richard De Castro .

Email to chile-heads-request@chile.ucdmc.ucdavis.edu Write a one line message containing the command SUBSCRIBE to this listserve address. This is the chile heads mailing list, which has info on preserving chile peppers.

http://chile.ucdmc.ucdavis.edu:8000/www/preserve.html

Point to this www site for information on preserving chile peppers. This includes recipe classics like drying (make your own ristra!), pickling, smoking, and pepper jam; but there are novel recipes like honey preserved chiles, chiles in sherry, and salted chiles. Also contains a number of salsa recipes, including fruit salsas.

Kansas State Extension Preserving web site - the links and recipes

http://www.oznet.ksu.edu/foodsafety/hotlist.htm

http://www.accessone.com/~sbcn/index.htm

The homepage of the Solar Cooking Archive, with an article describing solar canning and solar dehydration. From Tom Sponheim.

[Solar Canning is not recommended by any canning authority or reputable (Ball, Bernardin, etc) firm in the home canning business. The "boil-in-a-jar-method" method is NOT canning that assures food safety of time in storage. The "boil-in-a-jar-method" does not assure proper processing throught the jar at all. From that series of web pages: "terminal sterilization ... Once the correct temperature has been reached, the contents of the jar will boil and flow under the tightly screwed-on lid. Remove the jars one-by-one as each one boils over."

Absolute hogwash ... terminal indeed. Heat penetration is higly likely to be Spotty and concentrated in the exposed areas. We certainly DO NOT want food between the lid and jar lips for that is a contaminated seal. It will go bad, it will fail, it will attract pests and vermin. The process as outlined is little better if not worse than open kettle canning where the jar lips are kept clean.

If you use your solar cooker to do BWB for recommended times - ah! now that is a Different story where heat penetration is assured.]

http://www.ebicom.net/kitchen/page/veggies/chipot.htm (chipotles)
http://www.watermelon.org (watermelon)
http://www.arrowweb.com/aris/rsa/biltong.html
http://www.worldexport.com/bcblue (blueberries)
http://members.tripod.com/~DanGill/Beef.htm#Jerky (jerky)

Pick a noun, there's probably a home page for it. If you get stuck for a recipe, try a search for the item in question, like this item + recipe. You just might find it.

http://me-www.jrc.it/htbin/cook
Dan Sawyer's Smokehouse Jerky

http://www.cookshack.com/recipe.html
BBQ and Smoke food - lots of really cool smoky recipes.
Thanks to Jerry<rednck> for the mention and evaluation of this site.

http://bbq.tamu.edu/USDA/handbook/handbook_pg1.html
Valuable tips for those who do their own meats.

Little Chief Smoker is made by Luhr-Jensen
http://www.luhr-jensen.com
1-800-535-1711

Thanks to Ivan Weiss for the information.

Shelf life / storage guidlines

http://www.msnbc.com/OnAir/nbc/Dateline/Food/shelf.asp

http://www.glitchproof.com/glitchproof/filearchive.html
Select the "Food Shelf Life Info" link.
Thanks to Carol Zimmer for the diligent work on the document.
Pat Meadows gets a nod for notiying of Carol's work.

http://www.glitchproof.com/glitchproof/linksaboutfood.html
http://www.oznet.ksu.edu/dp_fnut/HRAP/STORAGE/cupstor.htm

http://www.alpakfoodequipment.com
Suppliers of used and new food processing equipment. This site is mentioned purely for education or voyerism. Could be a good source for community preserving kitchens but the equipment is commercial. Be prepared to pay 20-50x residential retail AND do you have 550 volts? A lot of commercial gear is 550 volt, practically none is less than 220v. If money is no object for your preserving kitchen - this is the site for you.

http://www.neosoft.com/recipes/

[Note: the neosoft site is compiled by Stephanie da Silva.]

http://sunsite.auc.dk/recipes/english/index.html
Morten's Recipe Collection. Has 186 Jam, 272 pickle recipes. [-ED]

http://www.arabicnews.com/ansub/Daily/Recipes/RecipesDB.html
Arabic recipes. None are specifically cited as preserves per se, but many give valuable insights on how to use exotic ingredients in what we preserve.

17 BitBucket of valauble information unclassified - yet.

All-American Canners are made by:

Wisconsin Aluminum Foundry Co.
P.O. Box 246, 838 S. 16th St.
Manitowoc, WI 54220

414-682-8627
Fax: 414-682-4090
All-American pressure canner; Burpee Seed
Catalogues w/canners.

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http://www.nutritionsciencenews.com/
Nutrition Science News online

Some sources for FCC(Food Chemical Codex) and USP(United States Pharmacopoeia) chemicals: [Thank you Derace Fridel]

http://www.hawkinschemical.com/
http://www.spectrumchemical.com/
http://www.execpc.com/milsolv/
http://www.witeg.com/
http://www.jostchemical.com/

One last quote:
"And here, without secrecy anywhere or of any kind, are some recipes which seem to have outlived the nineteenth century, our Golden Age of Pickling. Like most family jewels, they are called Sarah's This and Maggie's That, and in one way or another all of these people were witches, so I have carefully tested their brews, and often, to prove them honest... There are shades of exotic and ethnic backgrounds in them, but basically they are still living proofs of the passionate romance between Midwestern housewives and the Mason jar, which filled shelves with gleaming beautiful vessels of cooked fruits and vegetables, all dirt cheap in season and as rare as toad gems in the long winters fed on potatoes, cabbages, and parsnips..."
--MFK Fisher, With Bold Knife and Fork (1968)