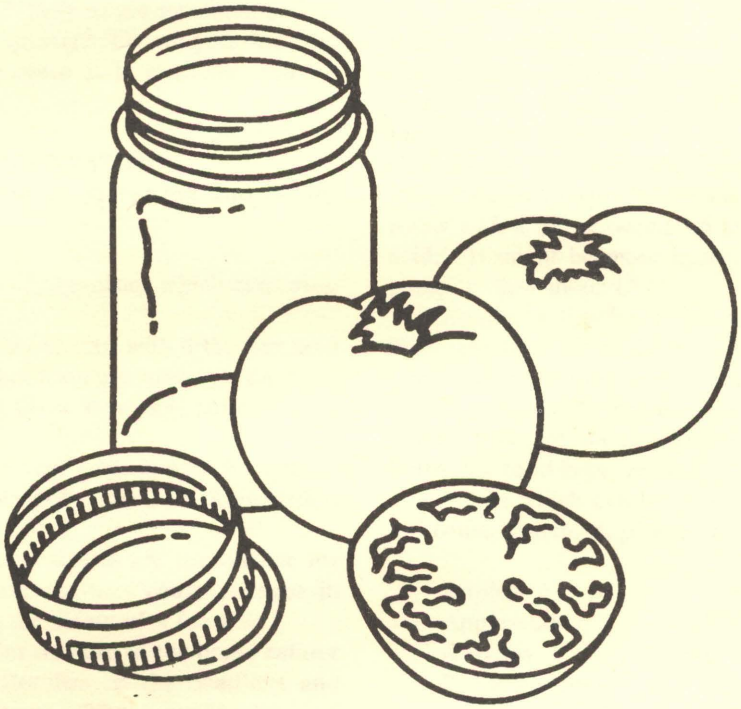
Preserving Foods



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Preserving Foods

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WHY PRESERVE FOOD?

Many reasons are given for preserving food at home. Some families see it as a way of saving money while others like to have control over the quality of food used. Some persons get a great deal of satisfaction from producing and preserving food. And then there are those who can't bear to see food go to waste.

Check your motivation for preserving food. Do you feel that your family eats a greater variety of foods as a result of having home preserved foods? Do you get satisfaction from looking into a full freezer or pantry? Or are you one who cans or freezes food just because it is available without considering ultimate usage?

PRINCIPLES OF FOOD PRESERVATION

There are two major goals in preserving and storing foods. They are

1) to maintain high quality
2) to prevent the growth of organisms which can cause illness.

Food must be of high quality to start with if the first goal is to be achieved. No method of food preservation improves the quality of food. In fact, there is usually some loss of quality.

The nature of food, the storage period, and the storage conditions must be considered when choosing a preservation method.

Enzymes, yeast, molds, and bacteria are responsible for changes in foods. Yeasts and enzymes cause changes in food quality but rarely affect the safety of a food.

One bacterium of particular concern to the home canner is **Clostridium botulinum.** Botulism is the deadliest and rarest kind of food borne illness. The organism lives on dead and decaying organic matter and is found almost everywhere in nature - in soil, dust, on fruits, vegetables, and other foods. In its dormant or resting phase as a spore, it can survive for years. The spores themselves are not harmful but they are capable of producing a deadly toxin (poison).

Most microorganisms require moisture, a food source, and air (oxygen). Activity is greatest at temperatures between 60° and 120° F. Activity may refer to changes in color, flavor, or texture; to an increase in numbers of microorganisms; or to the production of a toxin (poison) by the microorganisms. Lowering the temperature slows activity but it does not destroy the microorganisms.

Raising the temperature also slows or stops activity. Yeasts, molds, and enzymes are killed at temperatures between 160° and 212° F but botulinum spores have a greater tolerance for heat.

The acidity of food also influences processing. Acidity may be natural, as in most fruits, or added, as in pickled products. Foods are grouped as "acid" and "low-acid" for purposes of selecting the appropriate processing method. Acid protects against the growth of spoilage organisms, particularly **Clostridium botulinum.** Thus, the heat treatment need not be as severe for foods in the "acid" group as for foods in the "low-acid" group.

The degree of acidity or alkalinity is expressed as pH using a scale from 0 to 14. The center of the scale - 7 - is neutral, neither acid nor alkaline. As the pH moves away from 7, the foods become increasingly acid or alkaline. Pumpkin has a pH of 5.3; red cherries have a pH of 3.4, thus cherries are more acid than pumpkin.

Foods with a pH below 4.6 are classified as "acid," while foods with a pH between 4.6 and 7.0 are classified as "low-acid." It might be more appropriate to describe the latter group as "low-in-acid."

Foods in the "acid" group can be processed by the boiling water bath method. In this method, jars of food are immersed in boiling water. Heat is transferred from the water to the food. Food in jars never gets hotter than the boiling point of water - 212° F - regardless of how many hours the food is processed.

Foods which can be processed in a boiling water bath are fruits, tomatoes, pickles, and jams, including:

Apples	Fruit juices
Applesauce	Peaches
Apricots	Pears
Beets, pickled	Plums
Berries	Rhubarb
Cherries	Tomatoes
Cucumbers, pickled	Tomato juice

The following foods are "low-acid" and must be processed in a pressure canner where temperatures above 212° F can be achieved. At 5 pounds pressure, the temperature inside the canner is 228° F; at 10 pounds pressure, 240° F; at 15 pounds pressure, 250° F.

Asparagus	Okra
Beans, shelled	Peas
Beans, snap	Potatoes
Beets	Pumpkin
Carrots	Spinach and other greens
Corn	Squash
Hominy	Sweet potatoes
Mushrooms	

It's not enough to use a pressure canner. Recommended processing methods and times must be used also to insure that all food in the jar reaches the desired end-point temperature. This may not happen if processing time is cut short or if the food is processed at 9 pounds pressure rather than 10. It is a good idea to aim for 11 pounds pressure to compensate for fluctuations.

SALT AND SUGAR

The amounts of salt and sugar used in canning and freezing do not have a preservative effect. They are used primarily for flavor and may be omitted. Fruits can be canned in water or unsweetened fruit juices instead of sugar syrup. Juice made from the fruit being canned is best. Blends of unsweetened apple, pineapple, and white grape juice can also be used. Fruits canned without sugar will be softer in texture than those canned with sugar.

Syrups for use in canning and freezing fruits:

Type of Syrup	Sugar (Cups)	Water (Cups)	Yield (Cups)
10% (very light)	½	4	4
20% (light)	1	4	4½
30% (medium)	2	4	5
40% (heavy)	3	4	5½
50% (very heavy)	4¾	4	6½

Honey and corn syrup can replace sugar in canning and freezing. Remember that honey has a distinctive flavor which will persist in the finished product. It is recommended that artificial sweeteners be added at the time the fruit is used rather than when preserved. Salt in brined and cured products and sugar in gelled products do have preservative properties.

FREEZING

Freezing is probably the most popular method of food preservation. Its popularity is due to two factors - (1) the ease with which foods can be prepared for freezing, and (2) the fresh flavor of frozen foods. Another plus factor is the convenience of having frozen foods available. One factor on the negative side is the energy cost of freezing.

COSTS

What are the costs involved in freezing? The cost of a freezer or of freezer space in a refrigerator or freezer locker is an obvious one. Some repairs are necessary over the 15-year life of a freezer - figure 2 percent of the purchase price each year. You won't spend that much each year but you'll spend more than that when a service call is needed.

Energy is needed to operate the freezer. A small amount of the energy is used for the initial freezing of foods but the principal energy usage is for maintaining 0° F in the freezer. Total energy usage will depend on a number of factors including the size of the freezer, its efficiency, and its location.

Packaging materials are another cost of freezing.

The cost of energy per pound of frozen food can be calculated by dividing the total costs of operating a freezer by the number of pounds of food frozen. A 12-cubic-foot freezer would hold about 420 pounds - 35 pounds per cubic foot. If it used $100 worth of energy in a year, the energy cost per pound of food would be 24 cents. One way to decrease the cost per pound is to increase the quantity of food going through the freezer. If you filled the freezer one and one half times during the year (630 lbs of food), then the energy cost per pound would be 16 cents.

PACKAGING MATERIALS FOR FREEZING

Frozen foods maintain high quality if all air is excluded from the package and a moisture-vapor-proof seal is achieved.

Many different packaging materials are used in the freezer. Some do a better job of keeping food at the peak of quality than others. A good packaging material should be **moisture and air tight, stand up to freezer temperatures, suit the food, and be strong.**

TO BLANCH OR NOT TO BLANCH?

Freezing does not destroy any of the microorganisms which cause changes in food quality and food safety. Bacterial growth is very slow at freezer temperatures so food is not apt to spoil in the freezer. There may be loss of quality, however. Changes in color, flavor, and texture of fruits and vegetables can be caused by the enzymes which are responsible for ripening.

Heating foods before freezing will destroy the enzymes. That's why blanching or steaming of vegetables is recommended. Heating does reduce the number of bacteria, yeasts, and molds present but its principal purpose is to destroy enzymes. Heating also makes vegetables easier to pack into containers.

To blanch, lower a small amount of vegetable into boiling water. The ratio of vegetable to water should be such that the water doesn't stop boiling - a pound of prepared vegetable to a gallon of water is a common proportion. The blanching time must be long enough for heat to penetrate the food. As a rule, the larger the piece, the longer the blanching time. Thus the extremes go from 1½ minutes for green peas to 11 minutes for large ears of corn. Start counting blanching time when water returns to a boil after food is added.

Enzyme action may be stopped by steaming foods rather than boiling them. The time required for heat penetration is greater for steaming than for blanching. Whether blanched, steamed, or par-cooked, it is important to cool the vegetable quickly to stop the cooking process. Plunge the vegetable into ice cold water for about the same length of time you heated it. Then drain, package, and freeze. For some foods, you may find it more satisfactory to set the containers of food in ice water for cooling.

Remember, enzymes affect food quality, not food safety. If food is used in a short time or heavily seasoned, changes in quality may not be detected.

MICROWAVE BLANCHING

Microwave blanching of vegetables would appear to be a quick, energy efficient method, but research designed to test its effectiveness has not shown it to be especially quick or effective. Some of the drawbacks - only a small amount of food can be handled at a time; the suggested blanching times are very similar to those for water blanching; the vegetable has to be stirred; and finally, tests after storage indicate that conventionally blanched vegetables are of better quality.

ENZYMES IN FRUITS

Enzymes are active in fruits, too. One obvious example of enzyme action is the darkening of light colored fruits. Blanching fruits to inactivate the enzymes would cause them to have a cooked flavor.

There are other ways of inhibiting enzyme activity. One way is to exclude oxygen (air) which the enzyme requires for activity. Packing fruits in syrup or water will achieve this, but the fruit on top may be poorly protected. Antioxidants are chemical substances which interfere with enzyme activity. Ascorbic acid (vitamin C) combines with the oxygen, sparing the fruit. Citric acid makes the food more acid; enzymes are less active in an acid medium. Ascorbic acid and citric acid are often combined in commercial products to keep fruits from darkening. Use according to package directions.

Older but less efficient methods include dropping light colored fruits into water to which salt and/or vinegar was added or coating them with lemon juice.

FOR BEST RESULTS

Keep the time between harvesting and freezing as short as possible. Work with a small quantity of food at any one time. Follow the procedures outlined. Remember to leave headspace - ½-inch for wide-topped containers with straight sides; 1½-inches for narrow topped glass jars.

Exclude as much air from the package as possible. Close the container, label, and freeze. Store at 0° F or below.

PREPARING FOODS FOR FREEZING

APPLES, SLICES

Wash, peel, and core apples. Slice into twelfths or sixteenths. Treat to prevent darkening.

SYRUP PACK: (Preferred if slices are to be used without cooking.) Slice apples into cold syrup. Package apple slices. If using rigid containers, add enough syrup to cover and put a piece of crumpled waxed paper on top to keep the apple slices down in the syrup.

SUGAR PACK: (Preferred for slices to be used in pies.) Sprinkle ½ cup sugar over each 4 cups of apples. Turn apples gently until sugar has dissolved. Package, leaving needed headspace.

UNSWEETENED PACK: Pack treated apples in water or drain and package dry.

APPLESAUCE

Make applesauce in usual way. Pack into containers, leaving needed headspace.

ASPARAGUS

Wash asparagus thoroughly. Cut or break off tough portions of the stalks; discard or package separately. Leave spears in lengths to fit the package, or cut in pieces. Sort according to thickness of stalk. Heat stalks in boiling water according to thickness of stalk; small stalks for 2 minutes, medium stalks for 3 minutes, and large stalks for 4 minutes. Lift out of boiling water and immerse in cold water to stop cooking. Drain. Package for the freezer, leaving needed headspace. Alternate tip and stem ends for a more compact pack.

BEANS, GREEN

Wash beans and drain. Cut or break off ends; cut or break into 1- to 2-inch pieces. Slice lengthwise for french-style beans.

Heat beans in boiling water for 3 minutes. Lift out of boiling water and immerse in cold water to stop cooking.

Drain thoroughly. Pack beans, leaving needed headspace.

BEANS, LIMA

Select well-filled pods. Beans should be green but not starchy or mealy. Shell and sort according to size, or leave beans in pods to be shelled after heating and cooling.

Heat in boiling water; small beans or pods for 2 minutes, medium beans or pods for 3 minutes, and large beans or pods for 4 minutes. Cool and drain. Pack into containers, leaving needed headspace.

BEANS, SHELLED, GREEN

Select pods that are plump, not dry or wrinkled. Shell the beans.

Heat in boiling water for 1 minute. Cool and drain. Pack into containers, leaving headspace.

BEETS

Wash beets and sort according to size. Trim tops, leaving ½-inch of stems and tap root.

Cook in boiling water until tender - 15 to 25 minutes depending on size. Cool promptly in cold water. Peel. Leave baby beets whole. Cut medium or large beets in ½-inch cubes or slices; halve or quarter very large slices. Pack into containers, leaving needed headspace.

BERRIES, OTHER THAN STRAWBERRIES

Sort berries and remove leaves, stems, and overripe berries. Wash and drain.

SYRUP PACK: Pack berries into containers and cover with cold 40- or 50-percent syrup, leaving needed headspace.

SUGAR PACK: To 1 quart berries, add ¾ cup sugar. Turn berries in sugar gently until most of the sugar is

dissolved. Fill containers, leaving needed headspace.

UNSWEETENED PACK: Pack berries into containers, leaving needed headspace.

BROCCOLI

Wash, peel stalks, and trim. If necessary to remove insects, soak for ½ hour in a solution made of 4 teaspoons salt to 1 gallon of cold water. Split lengthwise into pieces so that flowerets are not more than 1½-inches across.

Heat in steam 5 minutes or boiling water 3 minutes. Cool promptly in cold water and drain. Package for freezer, leaving needed headspace.

BRUSSELS SPROUTS

Select green, firm, and compact heads. Examine heads carefully to make sure they are free from insects. Trim, removing coarse outer leaves. Wash thoroughly. Sort into small, medium, and large sizes.

Heat in boiling water; small heads for 3 minutes, medium heads for 4 minutes, and large heads for 5 minutes. Cool promptly in cold water and drain. Package for the freezer, leaving needed headspace.

CARROTS

Select tender, mild-flavored carrots. Remove tops, wash and peel. Leave small carrots whole. Cut others into ¼-inch cubes, thin slices, or lengthwise strips.

Heat in boiling water; small, whole carrots for 5 minutes, diced or sliced for 2 minutes, and lengthwise strips for 2 minutes. Cool promptly in cold water and drain. Pack carrots into containers, leaving needed headspace.

CAULIFLOWER

Choose firm, tender, snow-white heads. Break or cut into pieces about 1-inch across. Wash well. If necessary to remove insects, soak for 30 minutes in a solution of salt and water - 4 teaspoons salt per gallon of water. Drain.

Heat in boiling water containing 4 teaspoons salt per gallon for 3 minutes. Cool promptly in cold water and drain. Pack cauliflower into containers, leaving no headspace.

CHERRIES, SOUR

Select bright-red, tree-ripened cherries. Stem, sort, and wash thoroughly. Drain and pit.

SYRUP PACK: Pack cherries into containers and cover with cold 60 to 65% syrup, depending on tartness of the cherries. Leave at least ½-inch headspace.

SUGAR PACK: To 1 quart (1⅓ pounds) cherries, add ¾ cup sugar. Mix until sugar is dissolved. Pack into containers, leaving at least ½-inch headspace.

CORN, CREAM-STYLE OR WHOLE-KERNEL

Heat ears in boiling water for 4 minutes. Cool quickly in ice water and drain.

For whole-kernel corn, cut kernels from cob at about two-thirds of the depth of the kernels. For cream-style, cut at about center of kernels, then scrape the cob to remove the juice and heart of the kernel. Pack corn into containers, leaving necessary headspace.

CORN, ON-THE-COB

Sort ears according to size. Heat in boiling water; small ears (less than 1¼-inch in diameter) for 7 minutes, medium ears for 9 minutes, and large ears (over 1½-inch in diameter) for 11 minutes. Drop ears of corn into ice water. Drain. Package ears.

GREENS

Wash greens several times. Lift greens out of water as grit settles to the bottom of the pan. Cut or tear out tough stems and midribs and discard.

Greens should be wilted before packaging for freezing. Very tender leaves of spinach will need less heating time than collards. Work with a small quantity of greens at a time. Don't overcook.

Greens may be dipped in cold water to stop cooking. A more acceptable practice is to package greens in half-pint or pint containers and freeze immediately. Filled containers can be set in cold water to speed cooling before freezing.

OKRA

Select young, tender, green pods. Wash thoroughly. Cut off stems in such a way as not to cut open seed cells.

Heat small pods in boiling water for 3 minutes, large pods for 4 minutes. Cool quickly and drain. Leave whole or slice crosswise. Pack into containers, leaving needed headspace.

PEAS, GREEN

Shell and wash peas. Drain.

Heat peas in boiling water for 1½ minutes in a blancher or in wire basket in a large kettle. Work with small quantities of peas for best results. Immerse in cold water to stop cooking. Drain thoroughly. Package, leaving needed headspace.

PEAS, BLACKEYE, CROWDER, AND FIELD

Shell peas, discarding those that are hard.

Heat peas in boiling water for 2 minutes. Cool in cold water and drain. Package, leaving needed headspace.

PEACHES

Wash peaches and remove skins and pits. It is better not to use a boiling water dip when peeling peaches for freezing. Treat to prevent darkening. Slice if desired.

SYRUP PACK: Drop peaches into cold syrup. Pack peaches into containers. Add syrup to cover. Place a piece of crumpled waxed paper on top of the peaches to hold them under the syrup.

SUGAR PACK: Add ⅔ cup sugar to each quart of prepared fruit. Mix well. Pack into containers, leaving needed headspace.

UNSWEETENED PACK: Pack peaches into containers and cover with cold water containing an antidarkening agent. Leave needed headspace.

POTATOES

Potatoes do not freeze especially well. French fries are the most satisfactory frozen potato product. Boiled potatoes can be frozen but there will be a loss of quality.

To freeze boiled potatoes, partially cook the potatoes as for immediate eating. Heat should reach the center of potato pieces. Cool quickly. Drain and package, leaving needed headspace.

To freeze French fries, select medium to large potatoes. Pare and cut lengthwise into uniform strips about ⅜-inch thick. Rinse quickly in cold water to remove surface starch. Dry thoroughly.

Deep fat fry at 375°F for about 4 minutes or until strips are cooked but not brown. Drain. Turn parfries onto paper towels or other absorbent paper. Cool to room temperature. Pack cooled strips in cartons or plastic bags.

SQUASH, SUMMER

Select young squash with small seeds and tender rind. Wash, cut in ½-inch slices.

Heat in boiling water for 3 minutes. Cool squash in cold water and drain. Package, leaving needed headspace.

STRAWBERRIES

Wash berries and remove cap stems. Slice berries into a large measuring cup or bowl. A quart of fresh berries will yield about 1½ pints frozen berries.

Sprinkle sugar over berries - ¾ cup sugar to each quart of sliced berries. Turn berries over and over until sugar is dissolved and some juice is formed. Package berries, leaving needed headspace.

TOMATOES

It's not possible to freeze fresh whole tomatoes for fresh use. Freezing and subsequent thawing cause loss of the characteristic texture of the fresh tomato. Stewed tomatoes and tomato juice can be frozen satisfactorily.

TO FREEZE STEWED TOMATOES, wash, remove stem scar and core, and halve or quarter. Cover and cook until tender, about 10 to 20 minutes. Set pan containing tomatoes in cold water to cool or pack tomatoes into containers and set the filled containers in cold water.

TO FREEZE TOMATO JUICE, prepare juice as for canning. Add 1 teaspoon salt for each quart juice. Pour into containers, leaving needed headspace.

CANNING

The processing equipment needed will depend on the food to be canned. A pressure canner is a necessity for canning low acid foods such as beans, peas, corn, and greens. A water bath canner will suffice if only fruits and tomatoes are to be canned.

PRESSURE CANNERS

Pressure canners and pressure saucepans can both be used for home canning. However, the pressure saucepan is practical only when the amount of food to be processed is small.

A gauge, whether a dial or a weight, is essential to control pressure. A dial gauge or a weight with sliding core shows the pressure within the utensil; you must adjust heat to keep the pressure steady. The weight type permits pressure to rise to a definite point and then releases excess steam to keep pressure from going higher. The sound of the weight rocking or jiggling indicates that the canner is maintaining the recommended pressure. A disadvantage of weight-gauge canners is that they cannot correct precisely for higher altitudes. At altitudes above 1000 feet they must be operated at canner pressures of 10 rather than 5, or 15 instead of 10 pounds pressure.

Gaskets of rubber or a rubberlike material keep steam from leaking out around cover. Most gaskets are removable for replacement. Keep gaskets clean. Gaskets in older canner models may need to be lightly coated with vegetable oil once per year. Newer models are pre-lubricated and do not benefit from oiling. Check the use and care book to see which type you have.

Safety plugs go into action only if pressure becomes dangerously high. Metal alloy plugs melt when pressure gets too high or the canner boils dry. Composition-type plugs are blown out by excessive pressure. Both types are replaceable.

Vents are provided to allow air to be exhausted from the canner and to permit the release of steam as needed. A petcock, safety valve, or weight on the vent is used to control the escape of air or steam.

BOILING WATER BATH CANNER

Boiling water bath canners are available on the market but any large container may be used if it is deep enough. There should be 2- to 4-inches above the tops of jars to allow water to boil freely. The water bath canner must have a rack and a lid. A flat bottom must be used on an electric range. Either a flat or ridged bottom can be used on a gas burner. To insure uniform processing of all jars with an electric range, the canner should be no more than 4-inches wider in diameter than the element on which it is heated. A pressure canner can be used as a water bath canner if it is deep enough. Put the lid on the pressure canner but do not seal. Leave petcock or safety valve open to allow steam to escape and to prevent the buildup of pressure in the canner.

JARS AND LIDS

Glass jars are made in different shapes and sizes and are tempered (strengthened) for heat and cold. The Mason jar is the most widely used type. It is generally made in a round-square shape, and with standard or wide mouth. Mason jars are available in half-pint, pint, quart, and half-gallon sizes. They have a screw-thread neck and a sloping shoulder.

Be sure all jars are perfect. Discard any with cracks or chips as these defects can prevent sealing.

Glass jars and lids do not need to be sterilized before use if food will be processed for more than 10 minutes in a boiling water bath or pressure canner. Jars for jellies, jams, and pickled products which will be processed 10 minutes or less should be sterilized.

The two-piece metal lid is a lid and screw band combination. The lid is fitted with a sealing compound, and no other rubber is needed. The lid is used only once but the band may be reused. Follow the manufacturers' recommendations for lid preparation.

To use, wipe jar rim clean after produce is packed. Put lid on with sealing compound next to glass. Screw metal band tight by hand. This lid has enough give to allow air to escape during processing. There is no need to tighten the screwband after taking jars from canner.

Test the seal on the day after canning by pressing the center of lid, or tap with a spoon. The lid should stay down and give a clear, ringing sound when tapped.

OPERATING THE PRESSURE CANNER

Put jars on rack in canner which contains 2- to 3-inches of hot water. More water may be needed for long processing times. Fasten canner cover on securely. Heat the canner rapidly.

Leave petcock open or weight gauge off until steam is coming out in a steady stream - about 10 minutes after the first steam appears. This permits air to be expelled and thus insures that pressure obtained will be true steam pressure.

Close the vent. Watch the gauge closely. When it nears the desired pressure, reduce heat. Start timing when desired pressure is reached. Adjust heat throughout processing period to keep the pressure constant. When processing time is up, turn off heat or remove canner from heat. Let canner cool until pressure reaches zero. Open petcock or remove weight to let remainder of steam escape. Never hurry the cooling of a canner. This is a frequent cause of loss of liquid from jars.

Let canner stand a few additional minutes before loosening the cover. Loosening the cover too soon can cause damage to jars and injury to the user. It is sometimes difficult to loosen the cover because of the vacuum which forms in the utensil. Let the canner cool for a few more minutes and try again. Always lift the back edge of the lid first so that escaping steam will be directed away from the face.

Set jars top-side-up on a rack or folded cloth to cool. Allow space for air to circulate around jars.

Check the seal on the day after canning.

USING THE BOILING WATER BATH CANNER

Fill the water bath canner half full of water and start to heat while filling jars. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods. Place the jars of food on a rack in the canner, allowing sufficient space for free circulation of water. Add boiling water to bring water level one-inch above tops of jars. Cover and bring to a boil. Start counting processing time when the water returns to a full rolling boil. Adjust heat to keep water boiling during the processing period.

Using a jar lifter, remove jars from the canner as soon as the processing time is up. Set jars top-side-up on a rack or folded cloth to cool. Allow space for air to circulate around jars.

ALTITUDE

Altitude affects processing. Water boils at lower temperatures as altitude increases. Lower boiling temperatures are less effective for killing bacteria. The times given in this publication are for use at altitudes of less than 1,000 feet. If the altitude is greater than 1,000 feet, you'll need to increase processing time if using a boiling water bath canner, or increase pounds pressure if using a pressure canner. In the boiling water bath canner, add 5 minutes to processing time for altitudes between 1,000 and 6,000 feet. In the dial gauge pressure canner, process at 12 lbs. pressure at altitudes of 2,000 to 4,000 feet, at 13 lbs. if altitude is 4,000 to 6,000 feet. If using a pressure canner with a weighted gauge, use 15 pounds rather than 10. Process for the same length of time.

EQUIPMENT AND METHODS NOT RECOMMENDED

Open-kettle canning and the processing of freshly filled jars in conventional ovens, microwave ovens, and dishwashers are not recommended because these practices do not prevent all risks of spoilage. Steam canners are not recommended because processing times for use with current models have not been adequately researched. Because steam canners may not heat foods in the same manner as boiling water canners, their use with boiling-water process times may result in spoilage. It is not recommended that pressure processes in excess of 15 PSIG be applied when using new pressure canning equipment. So-called canning powders are useless as preservatives and do not replace the need for proper heat processing. Jars with wire bails and glass caps make attractive antiques or storage containers for dry food ingredients but are not recommended for use in canning. One-piece zinc porcelain-lined caps are also no longer recommended. Both glass and zinc caps use flat rubber rings for sealing jars, but too often fail to seal properly.

PROCESSING TEMPERATURE

Ten (10) pounds pressure (240°F) is the usual temperature for processing. In recent years, there has been interest in processing at 15 pounds pressure on the assumption that processing at a higher temperature would cut down on the time and energy used for processing.

Actually the time and energy savings reported are not great since it takes longer (using time and energy) to get the canner to 15 pounds pressure than to 10. Similarly, processing acid foods under pressure rather than in a boiling water bath canner does not result in an overall saving of time. The process time is shorter but the pressure canner has to

cool for 30 to 60 minutes before it can be opened and jars of food removed.

FOR BEST RESULTS

Keep the time between harvesting and canning as short as possible. Follow the procedures outlined. The processing times are for canning in glass jars in a large pressure canner.

Store canned foods in a cool, dry place. Ideally, the temperature should be below 70° F. Warmer storage temperatures allow microorganism activity, discoloration, flavor changes and even bacterial spoilage. Freezing does not make canned food unsafe unless the jar or seal is broken. The texture of canned food may be softer after freezing and thawing.

REPROCESSING

If you find a jar within 24 hours which has not sealed, use unspoiled food right away or reprocess. Remove the lid and check the jar-sealing surface for tiny nicks. If jar is nicked, change the jar. Prepare a new lid. Process for the full time. To freeze food in unsealed jars, remove some food so that there is 1½-inches of headspace.

PREPARATION OF FOOD FOR CANNING

APPLES, SLICED

Wash, peel, and core apples. Quarter or slice. Treat apples to prevent darkening.

Boil apple slices in a medium syrup for 5 minutes. Pack hot fruit into jars. Cover with hot syrup, leaving ½-inch headspace. Remove air bubbles by running knife or spatula between food and jar. Adjust jar lids and process.

APPLESAUCE

Make applesauce in usual way. Pack hot applesauce into jars, leaving ½-inch headspace. Remove air bubbles by running knife or spatula between jar and food. Adjust jar lids and process.

ASPARAGUS

Wash asparagus thoroughly. Cut or break off tough portions of the stalks. Cut asparagus into 1-inch pieces.

RAW PACK: Pack raw asparagus pieces in jars as tightly as possible without crushing. Leave 1-inch space at top of jars. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Cover with boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula between jar and food. Adjust jar lids and process.

HOT PACK: Cover pieces of asparagus with boiling water. Bring to a boil and boil 2 or 3 minutes.

Pack hot asparagus loosely to 1-inch of top of jars. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts. Cover with boiling-hot cooking liquid or boiling water. Leave 1-inch headspace. Remove air bubbles by running spatula between jar and food. Adjust jar lids and process.

BEANS, SNAP & ITALIAN

Wash beans and drain. Cut or break off ends; cut or break into 1 or 2-inch pieces. Slice lengthwise for french-style beans.

RAW PACK: Pack raw beans tightly to 1-inch below top of jars. Cover with boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula or knife between food and jar. Adjust jar lids and process.

HOT PACK: Cover cut beans with boiling water and boil for 5 minutes. Pack hot beans loosely to 1-inch of top of jar. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Cover with boiling-hot liquid, leaving 1-inch headspace. Adjust jar lids and process.

BEANS, LIMA

Shell young, tender beans and wash.

RAW PACK: Pack raw beans into jars. Fill to 1-inch of top of jars for pints; 1½-inch for quarts. Do not press or shake beans. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Fill jar with boiling water leaving same headspace as above. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

HOT PACK: Cover beans with boiling water and bring to boil. Pack hot beans loosely to 1-inch of top. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Cover with boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

BEETS

Wash beets and sort according to size. Trim tops, leaving 1-inch of stems and tap root to reduce bleeding of color.

Cook in boiling water until tender -- about 15 to 25 minutes depending on size. Cool promptly in cold water. Peel. Leave baby beets whole. Cut medium or large beets in ½-inch cubes or slices; halve or quarter very large slices.

Pack cooked beets in jars, leaving 1-inch space at top. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Cover with boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

BERRIES, OTHER THAN STRAWBERRIES

Fill jars to ½-inch from top. For a full pack, shake berries down while filling jars. Cover with boiling syrup, leaving ½-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

CARROTS

Wash and scrape carrots. Slice or dice.

RAW PACK: Pack raw carrots tightly into clean jars, to 1-inch of top. Add ½ teaspoon salt to pints; 1 teaspoon to quarts, if desired. Fill jar to 1-inch of top with boiling water. Adjust lids and process.

HOT PACK: Put sliced or diced carrots into saucepan. Cover with boiling water and bring to boil and simmer for 5 minutes. Pack hot carrots into clean jars, leaving 1-inch headspace. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling cooking liquid or water, leaving 1-inch headspace. Adjust jar lids and process.

CHERRIES, SOUR OR SWEET

Wash cherries; remove pits, if desired.

RAW PACK: Pack raw cherries into clean jars, leaving ½-inch headspace. For a full pack, shake cherries down while filling jars. Cover with boiling syrup, leaving ½-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

HOT PACK: Measure cherries into saucepan. Add ½ cup sugar for each quart of cherries. If cherries have not been pitted, add a little water to keep them from sticking while heating. Cover pan and bring to a boil.

Pack hot cherries into clean jars, leaving ½-inch headspace. Cover with boiling cooking liquid. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

CORN, CREAM-STYLE

Husk corn, remove silk, and wash ears. Blanch ears 4 minutes in boiling water. Cut corn from cob at about center of kernel, then scrape the cob to remove the juice and heart of the kernel. Use pint jars only.

HOT PACK: Add 2 cups of boiling water for each 4 cups of corn and bring to a boil.

Pack hot corn to 1-inch of top of pint jar. Add ½ teaspoon salt to each jar. Remove air bubbles by running spatula or knife between food and jar. Adjust jar lids and process.

CORN, WHOLE-KERNEL

Husk corn, remove silk, and wash. Blanch 3 minutes in boiling water. Cut corn from cob at about ¾ the depth of the kernel. Do not scrape cob.

HOT PACK: Add 1 cup of boiling water for each 4 cups of corn, bring to a boil and simmer 5 minutes. Pack hot corn and liquid to 1-inch of top of jars. Add ½ teaspoon salt to pint jars; 1 teaspoon to quart jars, if desired. Remove air bubbles by running spatula or knife between food and jar. Adjust jar lids and process.

RAW PACK: Fill jars with raw kernels, leaving 1-inch headspace. Do not shake or press down. Add ½ teaspoon salt to pint jars; 1 teaspoon to quart jars. Add fresh boiling water, leaving 1-inch headspace. Adjust jar lids and process.

FRUIT JUICES

Wash, remove pits, if desired, and crush fruit. Heat to simmering (185°F-210°F). Strain through cloth bag. Add sugar, if desired -- about 1 cup to 1 gallon juice. Reheat to simmering.

Pour hot juice into jars, leaving ¼-inch headspace. Adjust lids and process.

GREENS

Wash greens several times. Lift greens out of water as grit settles to the bottom of the pan. Cut or tear out tough stems and midribs and discard.

Steam or partially cook greens until well wilted. Pack hot greens loosely to 1-inch of top of jar. Add ¼ teaspoon salt to pint jars; ½ teaspoon to quarts, if desired. Cover with boiling water; leaving 1-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

MIXED VEGETABLES

6 cups sliced carrots
6 cups cut, whole kernel sweet corn
6 cups cut green beans
6 cups shelled lima beans
4 cups whole or crushed tomatoes
4 cups diced zucchini

Optional mix -- You may change the suggested proportions or substitute other favorite vegetables except leafy greens, dried beans, cream-style corn, squash, and sweet potatoes.

Wash and prepare vegetables as described for each vegetable. Combine all vegetables in a large pot or kettle, and add enough water to cover pieces. Add 1 teaspoon salt per quart to the jar, if desired. Boil 5 minutes and fill jars with hot pieces and liquid, leaving 1-inch headspace. Adjust jar lids and process.

OKRA

Can only tender pods. Wash and trim ends. Cut into 1-inch lengths or leave pods whole. Cover with hot water in a saucepan, boil 2 minutes and drain.

Pack hot okra to 1-inch of top. Add ½ teaspoon salt to pints; 1 teaspoon to quarts, if desired. Cover with boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

PEAS, GREEN

Shell and wash peas. Drain.

RAW PACK: Pack raw peas to 1-inch below top of jar; do not shake or press down. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Cover with boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

HOT PACK: Cover shelled peas with boiling water. Bring to a boil and boil 2 minutes. Pack peas loosely in jars to 1-inch of top of jar. Add ½ teaspoon salt to pints; 1 teaspoon to quarts, if desired. Cover with boiling-hot cooking liquid or boiling water leaving 1-inch of headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

PEACHES

Wash peaches and remove skins. Dip each peach in boiling water, then in cold water to make peeling easier. Cut peaches in halves; remove pits. Slice if desired. Treat to prevent darkening.

RAW PACK: Pack raw peaches in jars. Cover with boiling syrup, leaving ½-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

HOT PACK: Heat peaches in syrup. Pack hot peaches in jars. Cover with boiling syrup, leaving ½-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

PEARS

Wash pears, peel, cut in half and core. Treat to prevent darkening.

HOT PACK: Heat pear halves in syrup and pack in jars. Cover with boiling syrup, leaving ½-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

PLUMS

Wash plums. To can whole, prick skins. Freestone varieties may be halved and pitted.

Pack raw plums in jars or heat plums in syrup before packing. Cover with boiling syrup, leaving ½-inch headspace. Remove air bubbles by running spatula or knife between food and jar. Adjust jar lids and process.

HOT PACK: Add plums to hot syrup and boil 2 minutes. Cover saucepan and let stand 20 to 30 minutes. Fill jars with hot plums and cooking syrup, leaving ½-inch headspace. Adjust jar lids and process.

POTATOES, WHITE

Wash potatoes and peel. Treat to prevent darkening.

Cook cubed potatoes for 2 minutes in boiling water. Drain. For whole potatoes (1- to 2-inches in diameter), boil 10 minutes and drain.

Pack hot potatoes in jars. Add ½ teaspoon salt to pint jars; 1 teaspoon to quarts, if desired. Cover with fresh boiling water, leaving 1-inch headspace. Remove air bubbles by running spatula or knife between jar and food. Adjust jar lids and process.

PROCESSING TIMES FOR FRUITS AND VEGETABLES

	Style of Pack	Jar Size	Boiling Water	Pressure Canner[1] 5 PSIG[2]	10 PSIG[2]	15 PSIG[2]
Apples, sliced	Hot	Pints	20 min	8 min	NA[3]	NA[3]
		Quarts	20 min	8 min	NA[3]	NA[3]
Applesauce	Hot	Pints	15 min	8 min	NA	NA
		Quarts	20 min	10 min	NA	NA
Asparagus	Hot & Raw	Pints	No	No	30 min	NA
		Quarts	No	No	40 min	NA
Beans, snap and Italian	Hot & Raw	Pints	No	No	20 min	NA
		Quarts	No	No	25 min	NA
Beans, lima	Hot & Raw	Pints	No	No	40 min	NA
		Quarts	No	No	50 min	NA
Beets	Hot	Pints	No	No	30 min	NA
		Quarts	No	No	35 min	NA
Berries	Hot	Pints	15 min	8 min	NA	NA
		Quarts	15 min	8 min	NA	NA
	Raw	Pints	15 min	8 min	NA	NA
		Quarts	20 min	10 min	NA	NA

[1]USDA recommends processing foods in a dial gauge canner at 6 pounds pressure rather than 5 and at 11 pounds pressure rather than 10.

[2]PSIG = Pressure in pounds per square inch measured by a gauge.

[3]NA = Not available.

PROCESSING TIMES FOR FRUITS AND VEGETABLES (cont.)

	Style of Pack	Jar Size	Boiling Water	Pressure Canner[1] 5 PSIG[2]	10 PSIG[2]	15 PSIG[2]
Carrots	Hot & Raw	Pints	No	No	25 min	NA[3]
		Quarts	No	No	30 min	NA
Cherries, sour or sweet	Hot	Pints	15 min	8 min	NA	NA
		Quarts	20 min	10 min	NA	NA
	Raw	Pints	25 min	10 min	NA	NA
		Quarts	25 min	10 min	NA	NA
Corn, cream-style	Hot	Pints	No	No	85 min	NA
Corn, whole-kernel	Hot & Raw	Pints	No	No	55 min	NA
		Quarts	No	No	85 min	NA
Fruit Juices	Hot	Pints	5 min	No	No	No
		Quarts	5 min	No	No	No
		Half-Gal	10 min	No	No	No
Greens	Hot	Pints	No	No	70 min	NA
		Quarts	No	No	90 min	NA
Mixed Vegetables	Hot	Pints	No	No	75 min	NA
		Quarts	No	No	90 min	NA
Okra	Hot	Pints	No	No	25 min	NA
		Quarts	No	No	40 min	NA
Peas, Green	Hot & Raw	Pints	No	No	40 min	NA
		Quarts	No	No	40 min	NA
Peaches	Hot	Pints	20 min	10 min	NA	NA
		Quarts	25 min	10 min	NA	NA
	Raw	Pints	25 min	10 min	NA	NA
		Quarts	30 min	10 min	NA	NA
Pears	Hot	Pints	20 min	10 min	NA	NA
		Quarts	25 min	10 min	NA	NA
Plums	Hot & Raw	Pints	20 min	10 min	NA	NA
		Quarts	25 min	10 min	NA	NA
Potatoes, white	Hot	Pints	No	No	35 min	NA
		Quarts	No	No	40 min	NA

[1]USDA recommends processing foods in a dial gauge canner at 6 pounds pressure rather than 5 and at 11 pounds pressure rather than 10.
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[3]NA = Not available.

TOMATOES

Tomatoes are near the dividing line for classifying a food as acid. Most varieties of tomatoes when grown under normal conditions and harvested at optimum ripeness can be treated as an acid food. However, a number of factors can change the acidity - weather extremes (moisture and heat), condition of the vines (killed by disease or frost), and ripeness.

It is not possible for the home food preserver to determine the exact acidity of a batch of tomatoes, so **it is recommended that either bottled lemon juice or citric acid be added as a safety measure. The amounts recommended are two tablespoons of bottled lemon juice or ½ teaspoon crystalline citric acid per quart; one tablespoon of bottled lemon juice or ¼ teaspoon of citric acid per pint.** Vinegar is less effective than bottled lemon juice or citric acid and has an adverse effect on flavor. The acid can be added directly to the jars before filling. Add sugar to offset acid taste, if desired.

TOMATO JUICE

Wash, remove stems, and trim off bruised or discolored portions. 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 freshly cut tomato quarters to the boiling mixture. Make sure the mixture boils constantly and vigorously while you add the remaining tomatoes. Simmer 5 minutes after you add all pieces.

If you are not concerned about juice separation, simply slice or quarter tomatoes into a large saucepan. Crush, heat, and simmer for 5 minutes before juicing.

Press both types of heated juice through a sieve or food mill to remove skins and seeds. Add bottled lemon juice or citric acid to jars. Heat juice again to boiling. Add 1 teaspoon of salt per quart to the jars, if desired. Fill jars with hot tomato juice, leaving ½-inch headspace. Adjust jar lids and process.

TOMATO AND VEGETABLE JUICE BLEND

Crush and simmer tomatoes as for making tomato juice. Add no more than 3 cups of any combination of finely chopped celery, onions, carrots, and peppers for each 22 pounds of tomatoes. Simmer mixture 20 minutes. Press hot cooked tomatoes and vegetables through a sieve or food mill to remove skins and seeds. Add bottled lemon juice or citric acid to jars. Add 1 teaspoon of salt per quart to the jars, if desired. Reheat tomato-vegetable juice blend to boiling and pour immediately into jars, leaving ½-inch headspace. Adjust jar lids and process.

TOMATOES, CRUSHED

Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Then dip in cold water, slip off skins, and remove cores. Trim off any bruised or discolored portions and quarter. Heat one-sixth of the quarters quickly in a large pot, crushing them as they are added to the pot. Continue heating the tomatoes, stirring to prevent burning. Once the tomatoes are boiling, gradually add remaining quartered tomatoes, stirring constantly. These remaining tomatoes do not need to be crushed. They will soften with heating and stirring. Continue until all tomatoes are added. Then boil gently 5 minutes. Add bottled lemon juice or citric acid to jars. Add 1 teaspoon of salt per quart to the jars, if desired. Fill jars immediately with hot tomatoes, leaving ½-inch headspace. Adjust jar lids and process.

TOMATO SAUCE

Prepare and press as for making tomato juice. Simmer in large-diameter saucepan until sauce reaches desired consistency. Volume will be reduced by about one-third for thin sauce and by one-half for thick sauce. Add bottled lemon juice or citric acid to jars. Add 1 teaspoon of salt per quart to the jar, if desired. Fill jars, leaving ¼-inch headspace. Adjust jar lids and process.

TOMATOES -- WHOLE OR HALVED (PACKED IN WATER)

Wash tomatoes. Dip in boiling water for 30 to 60 seconds or until skins split; then dip in cold water. Slip off skins and remove cores. Leave whole or halve. Add bottled lemon juice or citric acid to jars. Add 1 teaspoon of salt per quart to the jars, if desired. For hot pack products, add enough water to cover the tomatoes and boil them gently for 5 minutes. Fill jars with hot tomatoes or with raw peeled tomatoes. Add the hot cooking liquid to the hot pack, or hot water for raw pack to cover, leaving ½-inch headspace. Adjust jar lids and process.

TOMATOES -- WHOLE OR HALVED (PACKED IN TOMATO JUICE)

Wash tomatoes. Dip in boiling water for 30 to 60 seconds or until skins split, then dip in cold water. Slip off skins and remove cores. Leave whole or halve. Add bottled lemon juice or citric acid to the jars. Add 1 teaspoon of salt per quart to the jars, if desired.

RAW PACK: Heat tomato juice in a saucepan. Fill jars with raw tomatoes, leaving ½-inch headspace. Cover tomatoes in the jars with hot tomato juice, leaving ½-inch headspace. Adjust jar lids and process.

HOT PACK: Put tomatoes in a large saucepan and add enough tomato juice to completely cover them. Boil tomatoes and juice gently for 5 minutes. Fill jars with hot tomatoes, leaving ½-inch headspace. Add hot tomato juice to the jars to cover the tomatoes, leaving ½-inch headspace. Adjust jar lids and process.

SPAGHETTI SAUCE WITHOUT MEAT

30 lbs. tomatoes
¼ cup vegetable oil
1 cup chopped onions
5 cloves garlic, minced
1 cup chopped celery or green pepper
1 lb. fresh mushrooms, sliced (optional)
4½ tsp. salt
2 tbsp. oregano
4 tbsp. minced parsley
2 tsp. black pepper
¼ cup brown sugar

Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water and slip off skins. Remove cores and quarter tomatoes. Boil 20 minutes, uncovered, in large saucepan. Put through food mill or sieve. Saute onions, garlic, celery or peppers, and mushrooms (if desired) in vegetable oil until tender. Combine sauteed vegetables and tomatoes and add remainder of spices, salt, and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. At this time the initial volume will have been reduced by nearly one-half. Stir frequently to avoid burning. Fill jars, leaving 1-inch headspace. Adjust jar lids and process.

SPAGHETTI SAUCE WITH MEAT

30 lbs. tomatoes
2½ lbs. ground beef or sausage
1 cup chopped onions
5 cloves garlic, minced
1 cup chopped celery or green pepper
1 lb. fresh mushrooms, sliced (optional)
4½ tsp. salt
2 tbsp. oregano
4 tbsp. minced parsley
2 tsp. black pepper
¼ cup brown sugar

To prepare tomatoes, follow directions for Spaghetti Sauce Without Meat. Saute beef or sausage until brown. Drain off fat. Add garlic, onion, celery or green pepper, and mushrooms, if desired. Cook until vegetables are tender. Combine with tomato pulp in large saucepan. Add spices, salt, and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. At this time the initial volume will have been reduced by nearly one-half. Stir frequently to avoid burning. Fill jars, leaving 1-inch headspace. Adjust jar lids and process.

TOMATO KETCHUP

24 lbs. ripe tomatoes
3 cups chopped onions
¾ tsp. ground red pepper (cayenne)
3 cups cider vinegar
4 tsp. whole cloves
3 sticks cinnamon, crushed
1½ tsp. whole allspice
3 tbsp. celery seeds
1½ cups sugar
¼ cup salt

Wash tomatoes. Dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water. Slip off skins and remove cores. Quarter tomatoes into 4-gallon stock pot or a large kettle. Add onions and red pepper. Bring to boil and simmer 20 minutes, uncovered. Combine spices in a spice bag and add vinegar in a 2-quart saucepan. Bring to boil. Cover, turn off heat and let stand for 20 minutes. Then, remove spice bag and combine vinegar and tomato mixture. Boil about 30 minutes. Put boiled mixture through a food mill or sieve. Return to pot. Add sugar and salt, boil gently, and stir frequently until volume is reduced by one-half or until mixture rounds up on spoon without separation. Fill pint jars, leaving ⅛-inch headspace. Adjust jar lids and process.

BLENDER KETCHUP

Use electric blender and eliminate need for pressing or sieving.

24 lbs. ripe tomatoes
2 lbs. onions
1 lb. sweet red peppers
1 lb. sweet green peppers
9 cups vinegar
9 cups sugar
¼-½ cup canning or pickling salt
3 tbsp. dry mustard
1½ tbsp. ground red pepper
1½ tsp. whole allspice
1½ tbsp. whole cloves
3 sticks cinnamon

Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Then dip in cold water, slip off skins, core, and quarter. Remove seeds from peppers and slice into strips. Peel and quarter onions. Blend tomatoes, peppers and onions at high speed for 5 seconds in electric blender. Pour into a 3- to 4-gallon stock pot or large kettle and heat. Boil gently 60 minutes, stirring frequently. Add vinegar, sugar, salt, and a spice bag containing dry mustard, red pepper, and other spices. Continue boiling and stirring until volume is reduced one-half and ketchup rounds up on a spoon with no separation of liquid and solids. Remove spice bag and fill jars, leaving ⅛-inch headspace. Adjust jar lids and process.

PROCESSING TIMES FOR TOMATO PRODUCTS

	Style of Pack	Jar Size	Boiling Water	Pressure Canner[1] 5 PSIG[2]	10 PSIG[2]	15 PSIG[2]
Tomato Juice	Hot	Pints	35 min	20 min	15 min	10 min
		Quarts	40 min	20 min	15 min	10 min
Tomato/Vegetable Juice Blend	Hot	Pints	35 min	20 min	15 min	10 min
		Quarts	40 min	20 min	15 min	10 min
Tomatoes, crushed	Hot	Pints	35 min	20 min	15 min	10 min
		Quarts	45 min	20 min	15 min	10 min
Tomato sauce	Hot	Pints	35 min	20 min	15 min	10 min
		Quarts	40 min	20 min	15 min	10 min
Tomatoes in water	Hot & Raw	Pints	40 min	15 min	10 min	1 min
		Quarts	45 min	15 min	10 min	1 min
Tomatoes in juice	Hot & Raw	Pints	85 min	40 min	25 min	15 min
		Quarts	85 min	40 min	25 min	15 min
Spaghetti sauce without meat	Hot	Pints	No	No	20 min	NA[3]
		Quarts	No	No	25 min	NA
Spaghetti sauce with meat	Hot	Pints	No	No	60 min	NA
		Quarts	No	No	70 min	NA
Tomato Ketchup	Hot	Pints	15 min	NA	NA	NA
Blender Ketchup	Hot	Pints	15 min	NA	NA	NA

[1]USDA recommends processing foods in a dial gauge canner at 6 pounds pressure rather than 5 and at 11 pounds pressure rather than 10.
[2]PSIG = Pressure in pounds per square inch measured by a gauge.
[3]NA = Not available.

PICKLING

Brined pickles, also called fermented pickles, go through a curing process of about 3 weeks. Curing changes cucumber color from a bright green to an olive or yellow green. The interior of the cucumber becomes uniformly tender and firm; not hard, rubbery, shriveled, soft, or mushy. The salt used in making brined pickles and sauerkraut not only provides characteristic flavor but is also vital to safety.

Stone crocks, glass jars and bowls, and food-grade plastic containers are suitable containers for fermenting fresh vegetables. Non-food-grade plastic containers may be used if lined with a food-grade plastic bag. Be certain that foods contact only food-grade products. Do not use garbage bags or trash liners. A one-gallon container will hold 5 pounds of fresh vegetables.

Vegetables must be kept under the brine while fermenting. A dinner plate or glass pie plate weighted down with glass jars or a plastic bag filled with water works nicely.

Fresh-pack or quick-process pickles are brined for several hours or overnight, then drained and combined with boiling-hot vinegar, spices, and other seasonings. These are quick and easy to prepare. They have a tart, pungent flavor. Fresh-pack whole cucumbers are olive green, crisp, tender, and firm. While these products may be prepared safely with reduced or no salt, both flavor and texture will be poorer.

The fruits and vegetables from which pickles are made should be of good quality, firm in texture, and free from bruises, decay, or mold. Overmature fruits and vegetables will shrivel during the pickling procedure. Use fruits and vegetables as soon as possible. If there is a delay of more than a few hours, refrigerate. Use unwaxed cucumbers for pickling whole so the brine can penetrate.

Wash thoroughly. Be sure to remove all blossoms from cucumbers as they may contain enzymes which cause softening of cucumbers. Sort for uniform size.

Correct proportions of fruit or vegetable, sugar, salt, vinegar, and spices are essential for successful pickling. Calcium in lime does improve pickle firmness. Food-grade lime may be used as a lime-water solution for soaking fresh cucumbers 12 to 24 hours before pickling them. Excess lime must be removed by a series of fresh-water soaks.

Vinegar serves two purposes in pickle making -- that of preserving the product and of modifying its taste. The addition of water weakens the vinegar. If a less sour product is preferred, add sugar rather than decrease vinegar. Use a cider or white distilled vinegar of 4- to 6-percent acidity. Cider vinegar, with its mellow acid taste, gives a nice blending of flavors but may darken white or light-colored fruits and vegetables. White distilled vinegar has a sharp, pungent, acetic acid taste and is desirable when light color is important.

Either white granulated or brown sugar may be used. White sugar gives a product with a lighter color.

Use fresh spices for best flavor.

Use canning or pickling salt. Table salt can be used but the materials added to prevent caking may make the brine cloudy. Iodized salt will cause the pickles to be dark in color. Since flake salt varies in density, it is not recommended for pickling.

Heat processing is recommended for all pickle products to destroy organisms that cause spoilage and to inactivate enzymes that may affect flavor, color, and texture.

CROSS CUT PICKLE SLICES

4 quarts sliced cucumbers (about 6 pounds medium-sized cucumbers)
1½ cups sliced onions
2 large garlic cloves
½ cup salt
2 quarts crushed or cube ice
4½ cups sugar
1½ tsp. turmeric
1½ tsp. celery seed
2 tbsp. mustard seed
3 cups white vinegar

Wash cucumbers thoroughly, using a vegetable brush. Drain. Slice unpeeled cucumbers into ⅛ to ¼-inch slices; discard ends. Add onions and garlic.

Add salt and mix thoroughly; cover with ice; let stand 3 hours. Drain thoroughly; remove garlic cloves.

Combine sugar, spices, and vinegar; heat just to boiling. Add drained cucumber and onion slices and heat 5 minutes. Pack hot pickles loosely into clean, hot pint jars. Fill to ½-inch of top with pickling mixture. Adjust jar lids and process.

DILL PICKLES

Use the following quantities for each gallon capacity of your container.

4 lbs. of 4-inch pickling cucumbers
2 tbsp. dill seed or 4 to 5 heads fresh or dry dill weed
½ cup salt
¼ cup vinegar
8 cups water
One or more of the following ingredients: (optional)
  2 cloves garlic
  2 dried red peppers
  2 tsp. whole mixed pickling spices

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard. Leave ¼-inch of stem attached. Place half of dill and spices on bottom of clean, suitable container. Add cucumbers, remaining dill, and spices. Dissolve salt in vinegar and water and pour over cucumbers. Add suitable cover and weight. Store where temperature is between 70°F and 75°F for about 3 to 4 weeks while fermenting. Temperatures of 55°F to 75°F are acceptable, but the fermentation will take 5 to 6 weeks. Avoid temperatures above 80°F, or pickles will become too soft during fermentation. Fermenting pickles cure slowly. Check the container several times a week and promptly remove surface scum or mold. **Caution:** If the pickles become soft, slimy, or develop a disagreeable odor, discard them. Fully fermented pickles may be stored in the original container for about 4 to 6 months, provided they are refrigerated and surface scum and molds are removed regularly. Canning fully fermented pickles is a better way to store them. To can them, pour the brine into a pan, heat slowly to a boil, and simmer 5 minutes. Filter brine through paper coffee filters to reduce cloudiness, if desired. Fill jar with pickles and hot brine, leaving ½-inch headspace. Adjust jar lids and process.

REFRIGERATOR DILLS -- WHOLE PACK

6 lbs. of 3- to 4-inch pickling cucumbers
18 to 24 large heads of fresh dill weed or ¾ cup dill seeds
1½ gal. water
¾ cup canning or pickling salt
2 to 3 cloves garlic, peeled and sliced
6 tbsp. mixed pickling spices

Wash cucumbers. Cut 1/16-inch slice from blossom end and discard. Leave ¼-inch stem attached. Place cucumbers in a suitable 3-gallon container. Add dill. Combine water, salt, garlic, and pickling spices. Bring to a boil. Cool and pour over cucumbers in container. Add a suitable cover and weight. Keep at room temperature for 1 week. Then fill jars with pickles and brine. Seal and store in a refrigerator. Pickles may be eaten after 3 days and should be consumed within 2 months.

PICKLED THREE-BEAN SALAD

1½ cups cut and blanched green or yellow beans (prepared as below)
1½ cups canned, drained, red kidney beans
1 cup canned, drained garbanzo beans
½ cup peeled and thinly sliced onion (about 1 medium onion)
½ cup trimmed and thinly sliced celery (1½ medium stalks)
½ cup sliced green peppers (½ medium pepper)
½ cup white vinegar
¼ cup bottled lemon juice
¾ cup sugar
1¼ cups water
¼ cup oil
½ tsp. canning or pickling salt

Wash and snap off ends of fresh beans. Cut or snap into 1- to 2-inch pieces. Blanch 3 minutes and cool immediately. Rinse kidney beans with tap water and drain again. Prepare and measure all other vegetables. Combine vinegar, lemon juice, sugar, and water and bring to a boil. Remove from heat. Add oil and salt and mix well. Add beans, onions, celery, and green pepper to solution and bring to a simmer. Marinate 12 to 14 hours in refrigerator, then heat entire mixture to a boil. Fill clean jars with solids. Add hot liquid, leaving ½-inch headspace. Adjust jar lids and process.

PICKLED BEETS

7 lbs. of 2- to 2½-inch diameter beets
4 to 6 onions (2- to 2½-inch diameter), if desired
4 cups vinegar
1½ tsp. canning or pickling salt
2 cups sugar
2 cups water
2 cinnamon sticks
12 whole cloves

Trim off beet tops, leaving 1-inch of stem and roots to prevent bleeding of color. Wash thoroughly. Sort for size. Cover similar sizes together with boiling water and cook until tender (about 25 to 30 minutes). Caution: Drain and discard liquid. Cool beets. Trim off roots and stems and slip off skins. Slice into ¼-inch slices. Peel and thinly slice onions. Combine vinegar, salt, sugar, and fresh water. Put spices in cheese-cloth bag and add to vinegar mixture. Bring to a boil. Add beets and onions. Simmer 5 minutes. Remove spice bag. Fill jars with beets and onions, leaving ½-inch headspace. Add hot vinegar solution, allowing ½-inch headspace. Adjust jar lids and process. Variation: Pickled whole baby beets. Follow above directions but use beets that are 1 to 1½-inches in diameter. Pack whole; do not slice. Onions may be omitted.

PICKLED CAULIFLOWER OR BRUSSELS SPROUTS

12 cups of 1- to 2-inch cauliflower flowerets or small brussels sprouts
4 cups white vinegar
2 cups sugar
2 cups thinly sliced onions
1 cup diced sweet red peppers
2 tbsp. mustard seed
1 tbsp. celery seed
1 tsp. turmeric
1 tsp. hot red-pepper flakes

Wash cauliflower flowerets or brussels sprouts (remove stems and blemished outer leaves) and boil in salt water (4 tsp. canning salt per gallon of water) for 3 minutes for cauliflower and 4 minutes for brussels sprouts. Drain and cool. Combine vinegar, sugar, onion, diced red pepper, and spices in large saucepan. Bring to a boil and simmer 5 minutes. Distribute onion and diced pepper among jars. Fill jars with pieces and pickling solution, leaving ½-inch headspace. Adjust jar lids and process.

PICKLED BELL PEPPERS

7 lbs. firm bell peppers
3 cups vinegar
3½ cups sugar
3 cups water
9 cloves garlic
4½ tsp. canning or pickling salt

Wash peppers, cut into quarters, remove cores and seeds, and cut away any blemishes. Slice peppers in strips. Boil vinegar, water, and sugar for 1 minute. Add peppers and bring to a boil. Place ½ clove of garlic and ¼ teaspoon salt in each sterile half-pint jar; double the amounts for pint jars. Add pepper strips and cover with hot vinegar mixture, leaving ½-inch headspace. Adjust jar lids and process.

PICKLED HOT PEPPERS (HUNGARIAN, BANANA, CHILE, JALAPENO)

4 lbs. hot long red, green, or yellow peppers
3 lbs. sweet red and green peppers, mixed
5 cups vinegar
1 cup water
4 tsp. canning or pickling salt
2 tbsp. sugar
2 cloves garlic

Wear rubber gloves when handling hot peppers or wash hands thoroughly with soap and water before touching your face. Wash peppers. If small peppers are left whole, slash 2 to 4 slits in each. Quarter large peppers. Blanch in boiling water or blister in order to peel. Cool and peel off skin. Flatten small peppers. Fill jars, leaving ½-inch headspace. Combine and heat other ingredients to boiling and simmer 10 minutes. Remove garlic. Pour hot pickling solution over peppers, leaving ½-inch headspace. Adjust lids and process.

REDUCED-SODIUM SLICED DILL PICKLES

4 lbs. (3- to 5-inch) pickling cucumbers
6 cups vinegar
6 cups sugar
2 tbsp. canning or pickling salt
1½ tsp. celery seed
1½ tsp. mustard seed
2 large onions, thinly sliced
8 heads fresh dill

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard. Cut cucumbers in ¼-inch slices. Combine vinegar, sugar, salt, celery and mustard seeds in large saucepan. Bring mixture to boiling. Place 2 slices of onion and ½ dill head in each pint jar. Fill jars with cucumber slices, leaving ½-inch headspace. Add 1 slice of onion and ½ head dill on top. Pour hot pickling solution over cucumbers, leaving ¼-inch headspace. Adjust lids and process.

REDUCED-SODIUM SLICED SWEET PICKLES
4 lbs. (3- to 4-inch) pickling cucumbers

Brining solution:
1 qt. distilled white vinegar
1 tbsp. canning or pickling salt
1 tbsp. mustard seed
½ cup sugar

Canning syrup:
1⅔ cups distilled white vinegar
3 cups sugar
1 tbsp. whole allspice
2¼ tsp. celery seed

Wash cucumbers and cut 1/16-inch off blossom end, and discard. Cut cucumbers into ¼-inch slices. In a large kettle, mix the ingredients for the brining solution. Add the cut cucumbers, cover, and simmer until the cucumbers change color from bright to dull green (about 5 to 7 minutes). Heat to a boil. Drain the cucumber slices. Fill jars, cover with hot canning syrup, leaving ½-inch headspace. Adjust jar lids and process.

PICKLED BREAD-AND-BUTTER ZUCCHINI
16 cups fresh zucchini, sliced
4 cups onions, thinly sliced
½ cup canning or pickling salt
4 cups white vinegar
2 cups sugar
4 tbsp. mustard seed
2 tbsp. celery seed
2 tsp. ground turmeric

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 ½-inch headspace. Adjust jar lids and process.

PROCESSING TIMES FOR PICKLE PRODUCTS

	Style of Pack	Jar Size	Boiling Water	Pressure Canner[1]		
				5 PSIG[2]	10 PSIG[2]	15 PSIG[2]
Cross Cut Pickles	Hot	Pints	5 min	No	No	No
		Quarts	5 min	No	No	No
Dill Pickles	Hot Brine	Pints	10 min	No	No	No
		Quarts	15 min	No	No	No
Three Bean Salad	Hot	Half-Pints	15 min	No	No	No
		Pints	15 min	No	No	No
Pickled Beets	Hot	Pints	30 min	No	No	No
		Quarts	30 min	No	No	No
Pickled Cauliflower or Brussel Sprouts	Hot	Half-Pints	10 min	No	No	No
		Pints	10 min	No	No	No
Pickled Bell Peppers	Hot	Half-Pints	5 min	No	No	No
		Pints	5 min	No	No	No
Pickled Hot Peppers	Hot	Half-Pints	10 min	No	No	No
		Pints	10 min	No	No	No
Reduced Sodium Sliced Dill Pickles	Raw	Pints	15 min	No	No	No
Reduced Sodium Sliced Sweet Pickles	Hot	Pints	10 min	No	No	No
Pickled Bread and Butter Zucchini	Hot	Pints	10 min	No	No	No
		Quarts	10 min	No	No	No

[1]USDA recommends processing foods in a dial gauge canner at 6 pounds pressure rather than 5 and at 11 pounds pressure rather than 10.
[2]PSIG = Pressure in pounds per square inch measured by a gauge.

JELLY MAKING

Fruit, pectin, sugar, and acid are all essential ingredients of a good jelly. This may seem unusual since we often combine only two ingredients -- fruit juice and sugar -- when making jelly.

How do we get by with using just 2 ingredients? It is possible because some fruits contain enough pectin and acid to make a good jelly with added sugar. Other fruits have enough pectin but not enough acid. Some have enough acid but lack pectin, while a few fruits lack both acid and pectin. Fruits have less pectin and acid when fully ripe so it is recommended that some underripe fruit be used when extracting juice for jelly.

It is possible to add pectin and/or acid or to combine fruit juices to get the necessary balance for a jellied product.

SUGAR

Sugar obviously adds flavor to jellies and jams but it does much more than that. Sugar combines with pectin to form a gel. You might picture this gel as an invisible sponge which holds the fruit juice. The quantity of sugar used in jellies is sufficient to prevent bacterial growth.

Beet and cane sugars can be used with equal success. Corn sugar can be used in recipes calling for added pectin. Corn syrup or honey can be used in place of part, but not all, of the sugar.

Honey can replace up to one-half of the sugar in recipes without added pectin. In products made with added pectin, 2 cups of honey can replace 2 cups of sugar if the yield is more than 5 to 6 cups. In smaller recipes, replace only ¾ to 1 cup of the sugar with honey.

Artificial sweeteners cannot be used in place of sugar. They will sweeten the product but do not combine with pectin to give a gel nor do they have a preservative effect.

Reducing the amount of sugar won't give a less sweet jelly. A certain amount of sugar (65%) is necessary for jelly to set. Either the necessary amount must be added at the beginning or the mixture is boiled down until the proper proportion is reached.

PECTIN

Pectin is available commercially in both powdered and liquid forms. Both forms make equally acceptable products but they cannot be used interchangeably.

Powdered pectin will not dissolve in high sugar concentrations so it must be added to the fruit before the sugar. The liquid pectin is added after the sugar. Commercial fruit pectins are made from apples or citrus fruits. Fruit pectins should be stored in a cool, dry place and used in the year in which purchased, to have maximum gel strength.

ADD PECTIN OR NOT?

Many homemakers prefer the added pectin method as fully ripe fruits can be used and the cooking time is shorter and standardized. Because of the shorter cooking time, the yield is greater and the product tastes more like the fresh fruit.

Others prefer the concentrated flavor of jelly cooked for a longer period of time; and they point out the greater quantity of sugar needed in recipes with added pectin.

Adequate Pectin and Acid	Adequate Pectin Low Acid	Low Pectin Adequate Acid	Low Pectin and Acid
Apples, tart	Bananas	Apricots	Figs, ripe
Blackberries, sour	Cherries, sweet	Rhubarb	Peaches
Cherries, sour	Figs, unripe	Strawberries	Pears
Crabapples	Quinces		
Cranberries			
Currants			
Grapefruit			
Grapes			
Lemons			
Limes			
Loganberries			
Plums			

TESTS FOR DONENESS

Products made with added pectin start with a higher proportion of sugar; consequently, the time needed to reach the desired concentration of sugar is shorter and more predictable.

Judging when products made without added pectin are done can be a problem. There are three tests which are used for determining doneness. Probably the most reliable is the temperature test. The boiling point of a sugar-water mixture is a reflection of the sugar concentration. Water will boil at approximately 212°F, but add sugar and the temperature at which the mixture boils goes up. A mixture that's 65% sugar will boil at about 220°F.

1. Temperature Test: Cook jelly until temperature of mixture is 8°F above boiling point of water; cook jam to 9°F above the boiling point of water.

2. Refrigerator Test: Remove the jam or jelly mixture from the heat. Pour a small amount of the boiling mixture onto a chilled plate. Put the plate in the freezer for a few minutes. If jelly sets, the mixture has cooked long enough. Jam will not be as firm when done as jelly.

3. Spoon or Sheet Test: Dip a cold metal spoon in the boiling jelly mixture. Lift the spoon out so that the jelly mixture runs off the side. When the drops run together and fall off the spoon in a sheet, the jelly is done.

PROCESSING JELLIES

Containers for jellies have not merited much attention until recent years. Jelly glasses and odd jars were considered adequate for storing jelly. This was possible because the high sugar content of jellied products inhibits the growth of most spoilage organisms, with mold being an exception.

Jelly makers have minimized mold growth by using sterilized jars and by covering the jelly with a thin layer of paraffin. Even so, there was often mold growth on top of and even through the paraffin. Consumers have removed the mold with the paraffin and eaten the jelly. In recent years there has been evidence that some molds produce toxins which can be injurious to health. USDA now recommends packaging jellied products in jars which can be sealed and processing the jars for a few minutes in a boiling water bath. The heat treatment is short -- 5 minutes after the water returns to a full rolling boil. It is sufficient to destroy mold but won't hurt the consistency of the jellied product.

REDUCED-SUGAR FRUIT SPREADS

Consumers who are interested in lowering the sugar content of the diet may want to try one of the new pectin products on the market. One brand will make a gelled product with one-third less sugar than regular pectin while another requires no sugar. Jellies and jams made without sugar have a short storage life and are better if made in small quantities as needed.

Combinations of fruit juice and fruit pulp make tasty spreads with less sugar.

PEACH-PINEAPPLE SPREAD

4 cups drained peach pulp (procedure as below)
2 cups drained unsweetened crushed pineapple
¼ cup bottled lemon juice
2 cups sugar (optional)

This recipe may be made with any combination of peaches, nectarines, apricots, and plums. This recipe may also be made without sugar. Nonnutritive sweeteners may be added; however, the sweetening power of aspartame may be lost within 3 to 4 weeks.

Thoroughly wash 4 to 6 pounds of firm, ripe peaches. Drain well. Peel and remove pits. Grind fruit flesh with a medium or coarse blade, or crush with a fork (do not use a blender). Place ground or crushed fruit in a 2-qt. saucepan. Heat slowly to release juice, stirring constantly, until fruit is tender. Place cooked fruit in a jelly bag or strainer lined with four layers of cheesecloth. Allow juice to drip about 15 minutes. Save the juice for jelly or other uses. Measure 4 cups of drained fruit pulp for making spread. Combine the 4 cups of pulp, pineapple, and lemon juice in a 4-qt. saucepan. Add up to 2 cups of sugar, if desired, and mix well. Heat and boil gently for 10 to 15 minutes, stirring enough to prevent sticking. Fill jars quickly, leaving ¼-inch headspace. Adjust jar lids and process.

	Style of Pack	Jar Size	Boiling Water
Peach-Pineapple Spread	Hot	Half-Pints	15 min
		Pints	20 min

REMAKING JELLIES

There are a number of reasons why jellies and jams do not set up. They may have been undercooked, cooked at too low a temperature, or contain too little pectin, acid, or sugar. If it's a small quantity, use as pancake syrup, a topping for ice cream, or as a glaze for meats. If the decision is to remake, review the ingredients and procedures used to see if you can determine the cause.

Remaking soft jellies is not an exact science. It works sometimes but not everytime.

Measure jelly to be recooked. Work with no more than 4 to 6 cups at a time.

To remake with powdered pectin: For each 4 cups of jelly, mix ¼ cup sugar, ½ cup water, 2 tablespoons bottled lemon juice, and 4 teaspoons powdered pectin in a saucepan. Bring to a boil while stirring. Add jelly and bring to a rolling boil over high heat, stirring constantly. Boil hard for ½ minute. Remove from heat, quickly skim foam off jelly, and fill sterile jars, leaving ¼-inch headspace. Adjust new lids and process for 5 minutes in a boiling water bath.

To remake with liquid pectin: For each 4 cups of jelly, measure ¾ cup sugar, 2 tablespoons bottled lemon juice, and 2 tablespoons liquid pectin. Put jelly in a saucepan and bring to a boil over high heat while stirring. Remove from heat and add the sugar, lemon juice, and pectin. Set back on heat and bring to a full rolling boil, stirring constantly. Boil hard for 1 minute. Remove from heat, quickly skim off foam, and fill sterile jars, leaving ¼-inch headspace. Adjust new lids and process for 5 minutes in a boiling water bath.

To remake without added pectin: To each 4 cups of jelly, add 2 tablespoons bottled lemon juice. Heat to boiling and boil for 3 to 4 minutes. Test for doneness. Remove from heat, quickly skim off foam, and fill sterile jars, leaving ¼-inch headspace. Adjust new lids and process for 5 minutes in a boiling water bath.

INDEX OF FOOD PRODUCTS

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