

CANNING FOODS

•FRUITS •VEGETABLES •PICKLES •JAMS, JELLIES AND PRESERVES

Canning Foods

Fruit • Vegetables • Pickles •
Jams, Jellies and Preserves

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CONTENTS

| | |
|---|-----------|
| Tables | 5 |
| Introduction | 6 |
| Canning Food | 8 |
| Selecting Equipment for Canning | 8 |
| Using a Boiling Water Canner | 9 |
| Using a Pressure Canner | 10 |
| Filling Jars | 11 |
| Jars | 11 |
| Lids | 11 |
| Headspace | 11 |
| Methods of Filling Jars | 11 |
| Altitude Adjustments | 12 |
| Testing Jar Seals | 13 |
| Reprocessing Unsealed Jars | 13 |
| Storing Canned Foods | 13 |
| Identifying and Handling Spoiled Canned Food | 14 |
| Fruit | 15 |
| Selecting Fruit | 15 |
| Preparing Fruit for Canning | 15 |
| Sweeteners | 16 |
| Non-Nutritive Sweeteners | 16 |
| No Sugar | 16 |
| Processing Fruit | 16 |
| Fruit Juice | 20 |
| Tomatoes | 22 |
| Scorecard for Judging Canned Fruit | 24 |
| Canning Vegetables | 25 |
| Selecting Vegetables for Canning | 25 |
| Preparing Vegetables for Canning | 25 |
| Processing Vegetables | 26 |
| Guard Against Spoilage | 26 |
| Scorecard for Judging Canned Vegetables | 35 |
| Canning Questions and Answers | 36 |
| Canning Pickles and Relishes | 38 |

| | |
|--|-----------|
| Types of Pickles and Relishes | 38 |
| Quick Process Pickles | 38 |
| Ingredient Selection | 38 |
| Ingredients Found in Older Recipes | 39 |
| Equipment | 40 |
| Procedures for Safe Pickling | 40 |
| Pickles and Relish Recipes | 41 |
| Fermented Dill Pickles | 41 |
| Sauerkraut | 42 |
| Sweet Cucumber Pickles | 43 |
| Sour Cucumber Pickles | 44 |
| Sweet Pickle Sticks | 44 |
| Quick Dill Pickles | 45 |
| Dilled Green Beans | 45 |
| Cauliflower Pickles | 46 |
| Bread and Butter Pickles | 47 |
| Pickled Beets | 48 |
| Pearl Onion Pickles | 49 |
| Pickled Okra | 49 |
| Pickled Peaches | 50 |
| Pickled Pears | 50 |
| Quick Party Pickles | 51 |
| Pickled Peppers | 51 |
| Green Tomato Pickles | 52 |
| Corn Relish | 53 |
| Piccalilli or Chow-Chow | 54 |
| Tomato Apple Chutney | 55 |
| Watermelon Pickles | 56 |
| Chili Sauce | 57 |
| Tomato Catsup | 58 |
| Onion Pepper Relish | 58 |
| Bread and Butter Pickled Squash | 59 |
| Hot Squash Relish | 60 |
| Sweet Squash Relish | 60 |
| Fresh Pack Pickle Squash | 61 |
| No Sugar-Added Pickled Products | 62 |
| No Sugar-Added Sweet Cucumber Slices | 62 |
| Scorecard for Judging Pickles, Catsup, Chow-Chow and Relish | 63 |
| <i>Jams, Jellies and Preserves</i> | 65 |
| Ingredients | 65 |
| Equipment | 65 |
| Remaking Soft Jelly | 65 |
| Recipes | 65 |
| Containers | 66 |

| | |
|---|-----------|
| Processing Jams, Jellies and Preserves in a Boiling Water Canner | 66 |
| Paraffin | 66 |
| Selecting Fruit for Jelly Making | 66 |
| Extracting Juice | 66 |
| Fruits Ranked as to Acid and/or Pectin Content | 67 |
| High Acid – High Pectin | 67 |
| High Pectin – Low Acid | 67 |
| High Acid – Low Pectin | 67 |
| Jams | 68 |
| Blackberry Jam | 68 |
| Peach Jam | 69 |
| Plum Peach Jam (without added pectin) | 69 |
| Strawberry Jam | 69 |
| Jellies | 70 |
| General Directions for Making Jelly | 70 |
| Apple Jelly (without added pectin) | 70 |
| Blackberry Jelly (without added pectin) | 71 |
| Dewberry Jelly | 71 |
| Crab Apple Jelly | 71 |
| Grape Jelly | 72 |
| Plum Jelly | 72 |
| Strawberry Jam | 72 |
| PRESERVES | 73 |
| Cherry Preserves | 73 |
| Peach or Pear Preserves | 73 |
| Damson Plum Preserves | 73 |
| Strawberry Preserves | 74 |
| Uncooked Jams | 74 |
| Blackberry or Strawberry Jam — Uncooked | 74 |
| Fruit Butters | 75 |
| Apple Butter | 75 |
| Peach Butter | 75 |
| Pear Butter | 75 |
| Scorecard for Judging Jellies, Jams, Preserves and Fruit Butters | 76 |
| Index | 80 |

Tables

Table 1. Temperature of Food for Control of Bacteria

Table 2. Recommended process time for peaches, halved or sliced in a boiling water canner.

Table 3. Recommended process time for snap and Italian beans in a dial gauge pressure canner.

Table 4. Recommended process time for snap and Italian beans in a weighted gauge pressure canner.

Table 5. Approximate yields for canned or frozen fruits.

Table 6. Sugar and water ratios for syrup for canned fruit.

Table 7. Processing time for fruit in boiling water canner at 212 F (100 C) in minutes.

Table 8. Processing time for fruit juice in boiling water canner at 212 F (100 C) in minutes.

Table 9: Processing time for tomatoes in minutes in boiling water canner at 212 F (100 C) or dial gauge pressure canner at 11 pounds (240 F/116 C) or weighted gauge pressure canner at 10 pounds (240 F/116 C).

Table 10: Approximate yields for canned vegetables.

Table 11: Processing time (minutes) pressure canner at 240 F (116 C). 10 pounds pressure for weighted gauge and 11 pounds pressure for dial gauge.

Table 12: Pickle troubles and what causes them.

Table 13: Processing times for jams, jellies and preserves at different altitudes.

Table 14: Temperatures needed to form jam at different altitudes.

Table 15: Temperatures needed to form jelly at different altitudes.

Table 16: Common problems with jam, jelly and preserves.

Table 17: Metric conversion table.

Table 18: Definition of preservation terms.

Introduction

Preserving food is more than an art; it is a science. Food scientists have established that certain procedures are essential for a given food to make it safe, as well as retain its color, flavor, texture and nutrients. Standard recipes are designed with these research findings in mind and, when carefully followed, ensure both a high-quality and a safe product.

Food is preserved by using methods that destroy or hinder the growth of microorganisms, such as molds, yeast and bacteria. These organisms may be present in the soil, on the food, in the air, on equipment or on work surfaces.

Yeasts, molds and bacteria must be destroyed during processing to prevent the food from spoiling. The correct amount of time to process varies with the kind of food. Sufficient heat for a specified length of time kills microorganisms and ensures a safe product. Processing also helps to secure a vacuum seal that keeps microorganisms out of the jar.

Preventing enzymatic changes in food is another concern when preserving food. Enzymes are chemical substances found in all animals and plants. These enzymes aid in the maturing and ripening processes. If not destroyed or inactivated, enzymes cause changes in color, flavor and texture. In the canning process, enzymes are destroyed by heat.

Table 1. Temperature of Food for Control of Bacteria

| Temperature(s) | Effect |
|----------------|---|
| 240 F | Canning temperatures for low-acid vegetables, meat and poultry in a pressure canner. |
| 212 F | Temperature water boils at sea level. Canning temperature for high-acid fruits, tomatoes, pickles and jellied products in a boiling water canner. |
| 190 F | Average simmer. Canning temperatures are used to destroy most bacteria, yeasts and molds in acid foods. Time required to kill these decreases as temperatures increase. |
| 165 F | Warming temperatures prevent growth but may allow survival of some microorganisms. |
| 140 F | Temperature for drying foods in an oven or dehydrator. DANGER ZONE. Temperatures between 40 to 140 F allow rapid growth of bacteria, yeast and molds, as well as production of toxins by some bacteria and molds. |
| 95 F | Maximum storage temperature for canned foods. |
| 40 to 50 F | Best storage temperatures for canned and dried foods. |
| 32 F | Temperature water freezes. Cold temperatures permit slow growth of some bacteria, yeasts and molds. |
| -10 to 32 F | Freezing temperatures stop growth of microorganisms but may allow some to survive. |
| 0 to -10 F | Best storage temperatures for frozen foods. |

Adapted from the “Complete Guide to Home Canning,” *Agriculture Information Bulletin* no. 539, NIFA-USDA (revised 2015).

Canning Food

Canning is the process of sterilizing and sealing foods in airtight containers to preserve them. To retain nutrients and optimum quality, preserve fruits and vegetables when at their peak of freshness. Clean the food thoroughly before processing to reduce the number of microorganisms on the food. This is important for safety.

Selecting Equipment for Canning

Jars: Select standard Mason-type jars made for canning. Commercial jars such as mayonnaise, peanut butter and pickle jars have been designed for one-time use and may break during processing. Also, the rims may not work with two-piece metal lids, preventing jars from sealing.

Check the mouth of jars for nicks or cracks; defects prevent airtight seals. This is especially important since the sealing compound of the flat metal lid must stick to the rim of the jar seal.

Lids: Select the two-piece metal lid (self-sealing lid). The two-piece lid consists of a screw band with a flat metal lid; the flat metal lid contains the sealing compound.

The band is screwed on the jar mouth securely using fingertips. If the band is too loose, it will not hold the flat lid in place. If it is too tight, it will not allow air to escape during processing. This can result in a bent flat lid and sealing failure. When taken from the canner, the two-piece lid needs no further tightening. Often the lid has started to seal and further tightening will break the partial seal.

Follow directions given by the manufacturer for preparing the lids. Sealing compounds vary in composition and require different heat treatments or no treatment at all.

Canners: A **boiling water canner** is used for fruits, tomatoes and acidified foods such as pickles and salsa. These foods may be processed safely in boiling water for a specified length of time, depending on altitude. The container must be deep enough to hold jars upright on a rack and allow 2 to 4 inches of water above jar tops. A rack protects the bottom of the jars. The container must also have a cover. These canners may be purchased or any large container meeting the requirements of a boiling water canner may be used. If it is deep enough, a pressure canner may be used as a boiling water canner. Leave the petcock or vent wide open so that steam escapes and no pressure is built up inside the canner.

A **steam canner** can also be used for fruits, tomatoes and acidified foods such as pickles and salsa. Steam canners have a shallow bottom, a wire rack that holds jars above the base and a dome-shaped lid. Jars sit on a rack above the water-filled base. Processing is done by hot steam. The steam canner uses less water than a water bath canner. This helps speed up the processing time as there is less water to heat. It also makes it easier to remove from the heat after processing is complete.

IMPORTANT POINTS FOR USING STEAM CANNERS

Follow the recipes established for foods canned in boiling water and operating instructions provided with the canner.

Meat and vegetables cannot be canned in a steam canner safely.

Processing must take 45 minutes or less. If processing takes longer than 45 minutes, the canner may boil dry and not maintain the correct temperature range.

A **pressure canner** is used for all meats and vegetables. To safely process these low-acid foods, temperatures higher than boiling are needed. At least 240 F (116 C) is required. This is achieved by creating pressure in the canner. Use the pounds of pressure established for the process. Pressure canners are available in different designs, materials and sizes. Directions for use should accompany each canner. Follow these directions carefully.

Using a Boiling Water Canner

Follow these steps for successful boiling water canning:

1. Before you start preparing your food, fill the canner halfway with clean water. This is approximately the level needed for a canner load of pint jars. For other sizes and numbers of jars, the amount of water in the canner will need to be adjusted so it will be 1 to 2 inches over the top of the filled jars.
2. Preheat water to 140 F for raw-packed foods and to 180 F for hot-packed foods. Food preparation can begin while this water is preheating.
3. Load filled jars, fitted with lids, into the canner rack and use the handles to lower the rack into the water; or fill the canner with the rack in the bottom, one jar at a time, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Keep the jar upright at all times. Tilting the jar could cause food to spill into the sealing area of the lid.
4. Add more boiling water, if needed, so the water level is at least 1 inch above jar tops. For process times over 30 minutes, the water level should be at least 2 inches above the tops of the jars.
5. Turn heat to its highest position, cover the canner with its lid and heat until the water in the canner boils vigorously.
6. Set a timer for the total minutes required for processing the food. Keep the canner covered and maintain a boil throughout the process schedule. The heat setting may be lowered a little as long as a complete boil is maintained for the entire process time. If the water stops boiling at any time during the process, bring the water back to a vigorous boil and begin the timing of the process over, from the beginning.
7. Add more boiling water, if needed, to keep the water level above the jars. When jars have been boiled for the recommended time, turn off the heat and remove the canner lid. Wait 5 minutes before removing jars. Using a jar lifter, remove the jars and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.

Using a Pressure Canner

Follow these steps for successful pressure canning:

1. Put 2 to 3 inches of hot water in the canner. Some specific products require that you start with even more water in the canner. Always follow the directions with USDA processes for specific foods if they require more water added to the canner. Place filled jars on the rack, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Always keep the jar upright. Tilting the jar could cause food to spill into the sealing area of the lid. Fasten canner lid securely.
2. Leave weight off vent port or open petcock. Heat at the highest setting until steam flows freely from the open petcock or vent port.
3. While maintaining the high heat setting, let the steam flow (exhaust) continuously for 10 minutes, and then place the weight on the vent port or close the petcock. The canner will pressurize during the next 3 to 5 minutes.
4. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the canner manufacturer describes.
5. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars. Follow the canner manufacturer's directions for how a weighted gauge should indicate it is maintaining the desired pressure.

IMPORTANT: If at any time pressure goes below the recommended amount, bring the canner back to pressure and begin the timing of the process over, from the beginning (using the total original process time). This is important for the safety of the food.

6. When the timed process is completed, turn off the heat, remove the canner from heat if possible and let the canner depressurize. **Do not force-cool the canner.** Forced cooling may result in unsafe food or food spoilage. Cooling the canner with cold running water or opening the vent port before the canner is fully depressurized will cause loss of liquid from jars and seal failures. Force-cooling may also warp the bottom of the canner, or the lid in some older model canners, causing steam leaks. Depressurization of older models without dial gauges should be timed. Standard-size heavy-walled canners require about 30 minutes when loaded with pints and 45 minutes with quarts. Newer thin-walled canners cool more rapidly and are equipped with vent locks. These canners are depressurized when their vent lock piston drops to a normal position.
7. After the canner is depressurized, remove the weight from the vent port or open the petcock. Wait 10 minutes, unfasten the lid and remove it carefully. Lift the lid away from you so that the steam does not burn your face.
8. Remove jars with a jar lifter, and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.

Filling Jars

Jars

Keep jars warm until ready to fill. They do not need to be sterilized when they are processed for at least 10 minutes. Just washed with soap and water.

Jars can be washed in soap and water or the dishwasher before filling. If the processing time is less than 10 minutes, jars should be sterilized. Cover jars with water in a deep pot. Boil jars for 10 minutes to sterilize.

Lids

Treat flat portion of two-piece lids according to manufacturer's directions. Some lids may not need to be heated to soften the sealing compound. Avoid boiling lids unless specified by the manufacturer because this may damage sealing compound. Wash rings in soap and water, rinse and set aside.

Headspace

Leave space between the packed food and the jar lid. This allows for the expansion of food during processing. Follow the amount of headspace specified in the recipe.

- Too much headspace can prevent formation of a vacuum seal and cause spoilage since processing time may not be long enough to exhaust air from jars.
- Too little headspace can force jar contents into the sealing surface and prevent the lid from sealing.

Release trapped air before measuring headspace. This can be done by running a bubble freer or a rubber or plastic spatula around the edges of the jar, gently shifting the food so that any trapped air is released. Always wipe rims with a clean, damp paper towel to remove any remaining food. Food on the rims may cause sealing failure.

Methods of Filling Jars

Some foods may be placed in containers raw, or they may be preheated then packed into the jars hot. Both methods have their advantages. Raw packs require less time because the food is not heated, but some foods have a lot of air and water that results in more liquid and less solid food in the jar after processing. If there is not a raw pack method established for a food, always follow the hot pack method.

Hot Pack: Food is heated before filling jars. Heat food in syrup, juice or water as directed by recipe before filling jars. Keep food at or near boiling temperature and do not pack jars too tightly. Hot is often the preferred pack since heating food releases trapped air and causes shrinkage. Quality also holds up well during storage.

Raw Pack: Food is not cooked before filling jars. Fill jars with raw food and cover with boiling hot syrup, juice or water. Pack raw fruits and vegetables tightly, because they tend to shrink during processing. Pack raw corn, lima beans and peas loosely because they expand. An advantage of raw pack is the time saved in heating the food. A disadvantage is it may take more jars.

Altitude Adjustments

Many locations in Tennessee have altitudes above 1,000 feet. Water boils at a lower temperature at higher altitudes, which is less effective for killing bacteria. For instructions on how to make adjustments for altitudes above 1,000 feet, consult tested recipes provided by USDA in the latest publication of “Complete Guide to Home Canning,” *Agriculture Information Bulletin* no. 539, or tested recipes from the National Center for Home Food Preservation (nchfp.uga.edu) from University of Georgia Cooperative Extension. The tables below are examples of how to make adjustments for altitudes above 1,000 feet for peaches in a boiling water canner and for green beans in a pressure canner.

Table 2. Recommended process time for peaches, halved or sliced in a boiling water canner.

| | | Process Time at Altitudes of | | | |
|---------------|----------|------------------------------|----------------|----------------|----------------|
| Style of Pack | Jar Size | 0-1,000 ft | 1,001-3,000 ft | 3,001-6,000 ft | Above 6,000 ft |
| Hot | Pints | 20 min | 25 | 30 | 35 |
| | Quarts | 25 | 30 | 35 | 40 |
| Raw | Pints | 25 | 30 | 35 | 40 |
| | Quarts | 30 | 35 | 40 | 45 |

Table 3. Recommended process time for snap and Italian beans in a dial gauge pressure canner.

| | | | Canner Pressure (PSI) at Altitudes of | | | |
|---------------|----------|--------------|---------------------------------------|----------------|----------------|----------------|
| Style of Pack | Jar Size | Process Time | 0-2,000 ft | 2,001-4,000 ft | 4,001-6,000 ft | 6,001-8,000 ft |
| Hot and Raw | Pints | 20 min | 11 lb | 12 lb | 13 lb | 14 lb |
| | Quarts | 25 | 11 | 12 | 13 | 14 |

Table 4. Recommended process time for snap and Italian beans in a weighted gauge pressure canner.

| | | | Canner Pressure (PSI) at Altitudes of | |
|---------------|----------|--------------|---------------------------------------|----------------|
| Style of Pack | Jar Size | Process Time | 0-1,000 ft | Above 1,000 ft |
| Hot and Raw | Pints | 20 min | 10 lb | 15 lb |
| | Quarts | 25 | 10 | 15 |

Testing Jar Seals

After cooling jars for 12 to 24 hours, remove the screw bands and test seals with one of the following options:

Option 1. Press the middle of the lid with a finger or thumb. If the lid springs up when you release your finger, the lid is unsealed.

Option 2. Tap the lid with the bottom of a teaspoon. If it makes a dull sound, the lid is not sealed. If food is in contact with the underside of the lid, it will also cause a dull sound. If the jar is sealed correctly, it will make a ringing, high-pitched sound.

Option 3. Hold the jar at eye level and look across the lid. The lid should be concave (curved down slightly in the center). If center of the lid is either flat or bulging, it may not be sealed.

Reprocessing Unsealed Jars

If a lid fails to seal on a jar, remove the lid and check the jar-sealing surface for tiny nicks. If necessary, change the jar; add a new, properly prepared lid and reprocess within 24 hours using the same processing time. Headspace in unsealed jars may be adjusted to 1½ inches and jars can be frozen instead of reprocessed. Foods in single unsealed jars can be refrigerated and consumed within three days.

Storing Canned Foods

If lids are tightly vacuum sealed on cooled jars, remove screw bands, wash the lid and jar to remove food residue, then rinse and dry jars. Label and date the jars and store them in a clean, cool, dark, dry place. Do not store jars above 95 F or near hot pipes, a range, a furnace, in an uninsulated attic or in direct sunlight. Under these conditions, food will lose quality and may spoil. Dampness may corrode metal lids, break seals and allow recontamination and spoilage.

Accidental freezing of canned foods will not cause spoilage unless jars become unsealed. If jars must be stored where they may freeze, wrap them in newspapers, place them in heavy cartons and cover with more newspapers and blankets.

Identifying and Handling Spoiled Canned Food

Do not taste food from a jar with an unsealed lid or food that shows signs of spoilage. You can more easily detect some types of spoilage in jars stored without screw bands. Growth of spoilage bacteria and yeast produces gas which pressurizes the food, swells lids and breaks jar seals. As each stored jar is selected for use, examine its lid for tightness and vacuum. Lids with concave centers have good seals.

Next, while holding the jar upright at eye level, rotate the jar and examine its outside surface for streaks of dried food originating at the top of the jar. Look at the contents for rising air bubbles and unnatural color.

While opening the jar, smell for unnatural odors and look for spurting liquid and cotton-like mold growth (white, blue, black or green) on the top food surface and underside of lid.

Spoiled low-acid foods, including tomatoes, may exhibit different kinds of spoilage evidence or very little evidence. Therefore, all suspect containers of spoiled low-acid foods, including tomatoes, should be treated as having produced botulinum toxin and handled carefully in one of two ways:

If the suspect glass jars or swollen metal cans are still sealed, place them in a heavy garbage bag. Close and place the bag in a regular trash container or dispose in a nearby landfill.

If the suspect glass jars or cans are unsealed, open or leaking, they should be detoxified before disposal.

Detoxification process: Wear disposable rubber or heavy plastic gloves. Carefully place the suspect containers and lids on their sides in an 8-quart volume or larger stock pot, pan, or boiling water canner. Wash your hands with gloves thoroughly. Carefully add water to the pot and avoid splashing the water. The water should completely cover the containers with a minimum of a 1-inch level above the containers. Place a lid on the pot and heat the water to boiling. Boil 30 minutes to ensure detoxifying the food and all container components. Cool and discard the containers, their lids and food in the trash or dispose in a nearby landfill.

Cleaning up the area: Contact with botulinum toxin can be fatal whether it is ingested or enters through the skin. Take care to avoid contact with suspect foods or liquids. Wear rubber or heavy plastic gloves when handling suspect foods or cleaning up contaminated work surfaces and equipment. A fresh solution of 1-part unscented liquid household chlorine bleach (5 to 6 percent sodium hypochlorite) to 5 parts clean water should be used to treat work surfaces, equipment, or other items, including can openers and clothing, that may have come in contact with suspect foods or liquids. Spray or wet contaminated surfaces with the bleach solution and let stand for 30 minutes. Wearing gloves, wipe up treated spills with paper towels being careful to minimize the spread of contamination. Dispose of these paper towels by placing them in a plastic bag before putting them in the trash. Next, apply the bleach solution to all surfaces and equipment again, and let stand for 30 minutes and rinse. As a last step, thoroughly wash all detoxified counters, containers, equipment, clothing, etc. Discard gloves when cleaning process is complete. (Note: Bleach is an irritant itself and should not be inhaled or allowed to come in contact with the skin.)

Fruit

Fruits, tomatoes and pickled vegetables are high-acid foods and can be safely canned in a boiling water canner. Tomatoes can be processed in a boiling water or pressure canner but require the addition of an acid such as citric acid or lemon juice to be safely canned in any type of canner.

Selecting Fruit

For best flavor and texture, select fresh, firm, ripe fruit and process as soon as possible. If fruit must be held a short time before canning, store in a cool place.

Preparing Fruit for Canning

Wash, peel and core fruit. To prevent darkening of light-colored fruits during preparation, drop pieces into a water solution containing 3,000 milligrams of ascorbic acid (vitamin C) per gallon. When using a commercial mixture to prevent discoloration of fruit, follow the manufacturer's directions. Drain or lift from the solution and proceed as directed under hot or raw pack methods to fill jars. Avoid leaving food in water solution longer than 20-25 minutes to prevent loss of nutrients.

Table 5. Approximate yields for canned or frozen fruits.

| Fruits | Weight (in pounds) | Approximate Number of Quart Jars |
|---|--|----------------------------------|
| Apples | 48 (1 bushel) 2½-3 | 11 1 |
| Apricots | 50 (1 bushel) 2-2 ½ | 18-22 1 |
| Berries (except strawberries and cranberries) | 36 (24-quart crate) 1½-2 (1-2 quarts) | 12-18 1 |
| Cherries with stems | 1 bushel (56) 2-2 ½ | 22-32 (unpitted) 1 (unpitted) |
| Peaches | 1 bushel (48) 2-3 | 18-24 1 |
| Pears | 50 (1 bushel) 2-3 | 20-25 1 |
| Plums | 56 (1 bushel) 1½-2½ | 22-30 1 |
| Strawberries | 36 (24-quart crate) 1½-3½ | 12-16 1 |
| Tomatoes | 53 (1 bushel) 2½-3½ | 15-20 1 |

Sweeteners

Can fruit with or without sweetening. Sugar helps cooked fruit to retain its shape, color and texture. For most fruits, sugar is combined with liquid (water or juice extracted from fruit) to form a syrup. The syrup may be thin, medium or heavy, depending on the sweetness of the fruit and personal preference.

To prepare the syrup, select from the following table:

Table 6. Sugar and water ratios for syrup for canned fruit.

| Type of syrup | Amount of water or juice (cups) | Amount of sugar (cups) | Yield (cups) |
|---------------|---------------------------------|-------------------------------|-------------------------------|
| Light | 4 | 1 | 4 ³ / ₄ |
| Medium | 4 | 1 ³ / ₄ | 5 |
| Heavy | 4 | 2 | 5 1/3 |

Boil sugar and liquid for one minute.

Light-colored corn syrup or mild-flavored honey may be used to replace half of the sugar for canning fruit. Do not use dark sugar or strong-flavored syrups, as they may darken or change the flavor of the fruit.

Non-Nutritive Sweeteners

It is possible to use non-nutritive sweetener when canning fruit, but it is best to add these just before serving. High temperatures can change the flavors of some non-nutritive sweeteners. Saccharin can turn bitter, and aspartame loses its sweetening power during processing. Granular sucralose can be used however some flavor changes may occur over storage time. Follow the directions given in the recipe and make small batches to be sure fruit is acceptable.

No Sugar

Sugar is not an essential ingredient in the canning of fruit, so it may be omitted. Fruit can be canned satisfactorily in water to lower calories; however, in addition to flavor, sugar provides color protection, plumping of some fruit tissues and thickness of syrup. Process unsweetened fruit the same as the sweetened fruit.

Processing Fruit

Headspace and processing times for fruit, fruit juice and tomatoes are listed in the following tables. Processing times are listed for altitudes from 0-1,000 feet.

For instructions on how to make adjustments for specific fruit at altitudes above 1,000 feet, consult tested recipes provided by USDA in the latest publication of "Complete Guide to Home Canning," *Agriculture Information Bulletin* no. 539, or tested recipes from the National Center for Home Food Preservation (nchfp.uga.edu) from University of Georgia Cooperative Extension.

Table 7. Processing time for fruit in boiling water canner at 212 F (100 C) in minutes.

| Fruit | Headspace | Pints | Quarts |
|--|-----------|-------|--------|
| <p>APPLES—SLICED</p> <p>Pare, core and cut into slices. Drop slices in a solution containing 3,000 mg ascorbic acid (vitamin C)* per gallon of water to prevent darkening. Drain.</p> <p>Hot Pack: Boil apple slices 5 minutes in thin syrup or water. Adjust lids. Process.</p> | ½ inch | 20 | 20 |
| <p>APPLESAUCE</p> <p>Select apples that mash easily when cooked. Pare, quarter and core. Add only enough water to prevent apples from scorching and simmer until fruit is tender. Mash or put fruit through a sieve. Reheat sauce.</p> <p>Pack hot. Adjust lids. Process</p> | ½ inch | 15 | 20 |
| <p>APRICOTS—HALVED OR SLICED</p> <p>Follow directions for peaches. The boiling water dip and removal of skin process is optional. Wash fruit well if skins are not removed; use either hot or raw pack and use the same process time.</p> | | | |
| <p>BERRIES—WHOLE</p> <p>NOTE: It is not safe to can elderberries unless they are used in jams, jellies and preserves.</p> <p>Wash berries: lift out of water and drain.</p> <p>Hot Pack: Add ½ cup of sugar to each quart of fruit. Put in covered pan and heat to boiling Pack hot fruit in jars. Adjust lids. Process.</p> <p>Raw Pack: Fill jar with fruit. To ensure a full pack, shake jar while filling. Cover fruit with boiling syrup. Adjust lids. Process.</p> | ½ inch | 15 | 15 |
| | ½ inch | 15 | 20 |

| Fruit | Headspace | Pints | Quarts |
|--|-----------------------------|---------------------|---------------------|
| <p>CHERRIES Sweet or Sour</p> <p>Wash cherries. Remove pits, if desired. Prick skins on opposite sides of cherries that will be canned with pits to prevent splitting. Place cherries in an anti-darkening solution then remove and drain.</p> <p>Hot Pack: Add ½ cup water, juice (apple or white grape) or syrup per quart of fruit. Cover pan. Bring to boil. Pack hot. Adjust lids. Process.</p> <p>Raw Pack: Fill jar with fruit. To ensure a full pack, shake jar while filling. Cover with boiling syrup. Adjust lids. Process.</p> | <p>½ inch</p> <p>½ inch</p> | <p>15</p> <p>25</p> | <p>20</p> <p>25</p> |
| <p>NECTARINES—HALVED OR SLICED NOTE: Use yellow only. It is not safe to can white-flesh peaches or nectarines</p> <p>Choose ripe, mature fruit of ideal quality for eating fresh or cooking. Follow directions for peaches except do not dip in hot water or remove skins. Wash fruit and use either hot or raw pack and use the same process time.</p> | | | |
| <p>PEACHES—HALVED OR SLICED NOTE: Use yellow only. It is not safe to can white-flesh peaches or nectarines</p> <p>Wash peaches and remove skins. Skins may be removed by peeling, but an easier method is to dip fruit into boiling water for about one minute or until skin slips. Cool immediately in cold water. Drain and remove skins. Place peaches in an anti-darkening solution then remove and drain.</p> <p>Hot Pack: Heat peaches through in hot syrup, water or juice (apple or white grape) to a boil. Pack hot. Cover with hot liquid. Adjust lids. Process.</p> <p>Raw Pack: Fill jar with raw fruit. Cover with hot liquid. Adjust lids. Process.</p> | <p>½ inch</p> <p>½ inch</p> | <p>20</p> <p>25</p> | <p>25</p> <p>30</p> |

| Fruit | Headspace | Pints | Quarts |
|---|----------------------|--------------|--------------|
| <p>PEARS—HALVES NOTE: This procedure is not safe for Asian pears.</p> <p>Wash and peel. Cut in halves and core. Place pears in an anti-darkening solution then remove and drain. Follow directions for hot pack as recommended for peaches, except boil 5 minutes in syrup before filling jars.</p> <p>Note: A hot pack produces a better product than raw. If a raw pack is used, follow the directions and processing times for raw packing peaches.</p> | ½ inch | 20 | 25 |
| <p>PLUMS—HALVED OR WHOLE</p> <p>Wash fruit. Freestone varieties may be halved and pitted. When canning whole plums, prick skins to prevent bursting of fruit.</p> <p>Hot Pack: Heat plums in water or syrup to boiling and boil 2 minutes. Let stand 20 to 30 minutes. Pack hot. Cover with cooking liquid. Adjust lids. Process.</p> <p>Raw Pack: Fill jar with raw fruit. Cover with boiling water or syrup. Adjust lids. Process.</p> | ½ inch ½ inch | 20 20 | 25 25 |
| <p>RHUBARB—STEWED</p> <p>Wash and trim. Cut into ½- to 1-inch pieces. Add ½ cup sugar to each quart of fruit. Let stand until juice appears. Heat gently to boiling. Pack hot. Cover with boiling liquid. Adjust lids. Process.</p> | ½ inch | 15 | 15 |

**Or use commercial mixture according to manufacturer's instructions.*

Fruit Juice

Table 8. Processing time for fruit juice in boiling water canner at 212 F (100 C) in minutes.

| Fruit | Headspace | Pint | Quart | ½ Gallon |
|--|-----------|------|-------|----------|
| <p>GRAPE JUICE</p> <p>Select sweet, well-colored, firm, mature fruit of ideal quality for eating fresh or cooking. Wash and stem grapes. Place grapes in saucepan, crush and add just enough boiling water to cover grapes. Heat to simmering and simmer slowly until skin is soft about 10 minutes. Strain through a damp jelly bag or double layers of cheesecloth. Refrigerate juice for 24 to 48 hours. Without mixing, carefully pour off clear liquid and save; discard sediment. If desired, strain through a paper coffee filter for a clearer juice. Add juice to a saucepan and sweeten to taste. Heat and stir until sugar dissolves. Continue heating with occasional stirring until juice begins to boil. Fill immediately into sterile pint or quart jars. If using half-gallon jars, they do not need to be sterilized. Adjust lids. Process.</p> | ¼ inch | 5 | 5 | 10 |
| <p>APPLE JUICE</p> <p>Good quality apple juice is made from a blend of varieties. For best results, buy fresh juice from a local cider maker within 24 hours after it has been pressed. Refrigerate juice for 24 to 48 hours. Without mixing, carefully pour off clear liquid and discard sediment. Strain clear liquid through a paper coffee filter or double layers of damp cheesecloth. Heat quickly, stirring occasionally, until juice begins to boil. Fill immediately into sterile pint or quart jars. If using half-gallon jars, they do not need to be sterilized. Adjust lids. Process.</p> | ¼ inch | 5 | 5 | 10 |

| Fruit | Headspace | Pint | Quart | ½ Gallon |
|---|-----------------------------|---------------------|---------------------|---|
| <p>TOMATO JUICE</p> <p>Select firm ripe tomatoes. Do not use tomatoes from dead or frost-killed vines. Wash, remove stem ends and trim away bruised or decayed spots. Work fast — juice is less likely to separate if you heat tomatoes immediately after cutting. To prevent juice from separating, quarter three or four tomatoes and place in a large kettle. Heat tomatoes to boiling while stirring and crushing them. Keep heat high under the kettle while adding tomatoes at a rate slow enough to sustain a boiling temperature. Stir and crush tomatoes at frequent intervals. Boil five minutes after all tomatoes have been added; remove kettle from heat. Put tomatoes through sieve or food mill. (If juice separation is not a concern, simply slice or quarter tomatoes in a large saucepan. Crush, heat and simmer five minutes before juicing.) Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart jar. Heat juice again to boiling. Fill hot jars with hot juice, leaving ½-inch headspace. Adjust lids. Process in:</p> <p>Boiling Water Canner</p> <p>Pressure Canner</p> | <p>½ inch</p> <p>½ inch</p> | <p>35</p> <p>15</p> | <p>40</p> <p>15</p> | <p>Not recommended</p> <p>Not recommended</p> |

Tomatoes

Table 9: Processing time for tomatoes in minutes in boiling water canner at 212 F (100 C) or dial gauge pressure canner at 11 pounds (240 F/116 C) or weighted gauge pressure canner at 10 pounds (240 F/116 C).

| Fruit | Headspace | Pint | Quart |
|---|--------------------------|------------------|------------------|
| <p>TOMATOES—WHOLE OR HALVES (no added liquid)</p> <p>Wash gently to avoid bruising. Remove stem ends and trim. Dip in boiling water for 30 to 60 seconds, then quickly dip in cold water. Slip off skins and remove core. Leave whole or cut in half.</p> <p>Raw Pack: Add 2 tablespoons of bottled lemon juice or ½ teaspoon citric acid to each quart jar. One teaspoon salt may also be added if desired. Fill jars with raw tomatoes pressing until spaces between them fill with juice. Adjust lids. Process in:</p> <p>Boiling Water Canner Pressure Canner</p> | <p>½ inch ½ inch</p> | <p>85 25</p> | <p>85 25</p> |
| <p>TOMATOES—WHOLE OR HALVES (in tomato juice)</p> <p>Wash gently to avoid bruising. Remove stem ends and trim. Dip in boiling water for 30 to 60 seconds, then quickly dip in cold water. Slip off skins and remove core. Leave whole or cut in half.</p> <p>Hot Pack: Add tomatoes to a large saucepan and cover with tomato juice. Boil tomatoes and juice gently for 5 minutes. Add 2 tablespoons of bottled lemon juice or ½ teaspoon of citric acid to each quart jar. One teaspoon of salt may also be added if desired. Fill jars with tomatoes and hot liquid, leaving ½-inch headspace. Adjust lids and process.</p> <p>Raw Pack: Add 2 tablespoons of bottled lemon juice or ½ teaspoon citric acid to each quart jar. One teaspoon salt may also be added if desired. Fill jars with raw tomatoes. Cover tomatoes with hot liquid, leaving ½-inch headspace. Adjust lids. Process in:</p> <p>Boiling Water Canner Pressure Canner</p> | <p>½ inch ½ inch</p> | <p>85 25</p> | <p>85 25</p> |

| Fruit | Headspace | Pint | Quart |
|---|---------------------------|-------------------|-------------------|
| <p>TOMATOES—CRUSHED (with no added liquid)</p> <p>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 with a spoon as they are added to the pot. This will exude juice. 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 five minutes. Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart jar. Add 1 teaspoon of salt per quart to the jars, if desired. Fill jars immediately with hot tomatoes. Adjust lids. Process in:</p> <p>Boiling Water Canner Pressure Canner</p> | <p>½ inch ½ inch</p> | <p>35 15</p> | <p>45 15</p> |
| <p>TOMATO SAUCE</p> <p>Wash and trim firm, ripe tomatoes. Cut into pieces. Simmer, stirring frequently until softened. Press through a sieve. Cook pulp until reduced by one-half. Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart jar. Add ¼ teaspoon salt to each cup. Pour hot sauce into jars. Adjust lids. Process in:</p> <p>Boiling Water Canner Pressure Canner</p> | <p>½ inch ½ inch</p> | <p>35 15</p> | <p>40 15</p> |

Scorecard for Judging Canned Fruit

| | | <i>Excellent</i> | <i>Good</i> | <i>Fair</i> | <i>Poor</i> |
|-----------|--|------------------|-------------|-------------|-------------|
| Product | Uniformly well-ripened, uniform and appropriate size, no defects, shape well-preserved, fills without crowding container, evenly distributed in jar. | | | | |
| Color | Natural, clear, bright, no artificial coloring or preservative used. | | | | |
| Texture | Tender, plump, firm, neither overcooked, mushy or uncooked in appearance. | | | | |
| Syrup | Clear, bright, natural color of fruit, no sediment or foreign matter. | | | | |
| Container | Standard canning jar, clear glass, clean, neatly labeled. | | | | |

Canning Vegetables

Selecting Vegetables for Canning

Most varieties of vegetables grown and harvested for eating purposes are suitable for canning. Some varieties are selected because they grow well in a particular area and are family favorites. Only fresh, properly matured vegetables should be canned. A good rule to follow is to can them when they are just right for table use. For uniform products, it is wise to sort some vegetables according to size and degree of maturity.

Preparing Vegetables for Canning

Regardless of which vegetable is canned, a good rule to follow is “from garden to the canner as quickly as possible.” If the vegetable must be kept longer, store in the refrigerator or in the coolest place available.

Wash small amounts of vegetables quickly under running water or through several changes of water. Lift food out of water each time so dirt will not collect on food again.

Table 10: Approximate yields for canned vegetables.

| Vegetables | Weight (in pounds) | Approximate Number of Quart Jars |
|--------------------------|-----------------------|------------------------------------|
| Asparagus | 24 (1 bushel) 4 | 8-12 1 |
| Beans, Lima (in pod) | 30 (1 bushel) 4-5 | 5-8 1 |
| Beans, Green or Wax | 30 (1 bushel) 1½-2 | 15-20 1 |
| Beets (without tops) | 52 (1 bushel) 2½-3 | 17-20 1 |
| Broccoli | 25 (1 crate) 2-3 | 10-12 1 |
| Carrots (without tops) | 50 (1 bushel) 2½-3 | 16-20 1 |
| Corn, Sweet (in husks) | 35 (1 bushel) 6-16 | 8-9 (as kernels) 1 (as kernels) |
| Okra | 26 (1 bushel) 1½ | 17 1 |
| Peas, Field | 25 (1 bushel) 3½-4 | 6-7 1 |
| Green (in pods) | 30 (1 bushel) 4-5 | 6-8 1 |
| Potatoes, Irish | 60 (1 bushel) 2½-3 | 18-22 1 |
| Pumpkin | 50 1½-3 | 15 (cubed) 1 (cubed) |
| Spinach | 20 (1 bushel) 2-6 | 4-9 1 |
| Squash, Summer or Winter | 40 (1 bushel) 2½-3 | 16-20 1 |
| Sweet Potatoes (dry) | 50 (1 bushel) 2-3 | 16-25 1 |

Processing Vegetables

Guard Against Spoilage

Process all vegetables that are not acidified in a pressure canner. Acidified foods include pickled food and salsa. Acidified foods have an acid added to reduce their pH. Tomatoes also can be safely canned in a boiling water canner. Low-acid vegetables require a higher temperature (240 F, 116 C) than boiling water canners to destroy spores of *Clostridium botulinum*.

Clostridium botulinum spores are found in soil, air and on raw foods. Under most conditions they are not dangerous if eaten, as these spores do not grow or produce a toxin in the presence of air. A high-acid medium also hinders growth. But spores of *Clostridium botulinum*, if not destroyed, grow well without air in sealed jars of low-acid foods. As these spores grow, they produce a very

poisonous toxin. This is the toxin responsible for the food-borne illness known as botulism. Food inside a pressure canner can be heated to high enough temperatures to destroy the spores of *Clostridium botulinum*. Food in boiling water canners cannot since temperatures only reach 212 F (116 C).

Do not use an oven for canning. The temperature of the food in jars does not reach the 240 F (116 C) necessary to destroy the spores of *Clostridium botulinum*. The temperature used for an oven is not the same as the temperature inside the jar of food. Oven canning is also dangerous, due to the possibility of the jars bursting.

There are serious errors that can make pressure canned foods unsafe. These include:

1. **Air is trapped in the closed canner during the process.** Air trapped in a pressure canner lowers the temperature obtained for a given pressure (for example, 10- or 15-pounds pressure) and results in under-processing. To be safe, USDA recommends that all pressure canners must be vented 10 minutes before they are pressurized.
To vent a canner, leave the vent pipe (steam vent) uncovered (or manually open the petcock on some older models) after you fill the canner and lock the canner lid in place. Heat the canner on high until the water boils and generates steam that can be seen escaping through the open vent pipe or petcock. When a visible funnel shape of steam is continuously escaping the canner, set a timer for 10 minutes. After 10 minutes of continuous steam, you can close the petcock or place the counterweight or weighted gauge over the vent pipe to begin pressurizing the canner.
2. **An inaccurate dial gauge is used.** Dial gauges should be checked for accuracy each year before use or if the gauge has been dropped or damaged. If the gauge reads high or low by more than two pounds at 5-, 10- or 15-pounds pressure, replace it. If it is less than 2 pounds off in accuracy, you can make adjustments to be sure you have the required pressure in your canner. Contact your local Extension office to have your dial gauge checked.
3. **The altitude at which the canner is operated is above sea level and adjustments in pressure are not made.** Internal canner pressures (and therefore temperatures) are lower at higher altitudes. Canners must be operated at increased pressures as the altitude increases.

Headspace and processing times for vegetables are listed in the following table. Processing times are listed for altitudes from 0-1,000 feet. For instructions on how to make adjustments for specific vegetables at altitudes above 1,000 feet, consult tested recipes provided by USDA in the latest publication of “Complete Guide to Home Canning,” *Agriculture Information Bulletin* no. 539, or tested recipes from the National Center for Home Food Preservation (nchfp.uga.edu) from University of Georgia Cooperative Extension.

Note: The raw pack filling method is not recommended for all foods. Do not use a raw pack if no directions are provided.

Table 11. Processing time (minutes) pressure canner at 240 F (116 C). 10 pounds pressure for weighted gauge and 11 pounds pressure for dial gauge.

| Vegetable | Headspace | Pints | Quarts |
|--|-----------------------------|---------------------|---------------------|
| <p>ASPARAGUS</p> <p>Wash asparagus and trim off tough scales. Break off tough stems and wash again. Cut into 1-inch pieces or can whole.</p> <p>Hot Pack: Cover asparagus with boiling water. Boil 2 or 3 minutes. Loosely fill hot jars with hot asparagus. Adjust lids and process.</p> <p>Raw Pack: Fill hot jars with raw asparagus, packing as tightly as possible without crushing. Add boiling water. Adjust lids and process.</p> <p>Add 1 teaspoon of salt per quart to the jars, if desired.</p> | <p>1 inch</p> <p>1 inch</p> | <p>30</p> <p>30</p> | <p>40</p> <p>40</p> |
| <p>BEANS OR PEAS—SHELLED, DRIED</p> <p>All varieties</p> <p>Select mature, dry seeds. Sort out and discard discolored seeds.</p> <p>Hot Pack: Place dried beans or peas in a large pot and cover with water. Soak 12 to 18 hours in a cool place. Drain water. To quickly hydrate beans, you may cover sorted and washed beans with boiling water in a saucepan. Boil 2 minutes, remove from heat, soak 1 hour and drain. Cover beans soaked by either method with fresh water and boil 30 minutes. Fill hot jars with beans or peas and cooking water. Adjust lids and process.</p> <p>Add 1 teaspoon salt per quart jar, if desired.</p> | <p>1 inch</p> | <p>75</p> | <p>90</p> |

| Vegetable | Headspace | Pints | Quarts |
|---|-----------------------------|---------------------|---------------------|
| <p>BEANS, SNAP AND ITALIAN—PIECES</p> <p>Green and wax</p> <p>Select filled but tender, crisp pods. Remove and discard diseased and rusty pods. Procedure: Wash beans and trim ends. Leave whole or cut or snap into 1-inch pieces.</p> <p>Hot Pack: Cover with boiling water; boil 5 minutes. Fill hot jars loosely. Adjust lids and process.</p> <p>Raw Pack: Fill hot jars tightly with raw beans. Add boiling water. Adjust lids and process.</p> <p>Add 1 teaspoon salt per quart to jars, if desired.</p> | <p>1 inch</p> <p>1 inch</p> | <p>20</p> <p>25</p> | <p>20</p> <p>25</p> |
| <p>BEETS—WHOLE, CUBED OR SLICED</p> <p>Beets with a diameter of 1 to 2 inches are preferred for whole packs. Beets larger than 3 inches in diameter are often fibrous. Trim off beet tops, leaving an inch of stem and roots to reduce bleeding of color. Scrub well.</p> <p>Hot Pack: Cover with boiling water. Boil until skins slip off easily; about 15 to 25 minutes depending on size. Cool, remove skins, and trim off stems and roots. Leave baby beets whole. Cut medium or large beets into 1/2-inch cubes or slices. Halve or quarter very large slices. Fill hot jars with hot beets and fresh hot water. Adjust lids and process.</p> <p>Add 1 teaspoon of salt per quart jar, if desired.</p> | <p>1 inch</p> | <p>30</p> | <p>35</p> |
| <p>CARROTS—SLICED OR DICED</p> <p>Select small carrots, preferably 1 to 1-1/4 inches in diameter. Larger carrots are often too fibrous. Wash, peel, and rewash carrots. Slice or dice.</p> <p>Hot Pack: Cover with boiling water; bring to boil and simmer for 5 minutes. Fill hot jars. Add hot cooking liquid or water. Adjust lids and process.</p> <p>Raw Pack: Fill hot jars tightly with raw carrots. Add hot cooking liquid or water. Adjust lids and process.</p> <p>Add 1 teaspoon of salt per quart to the jar, if desired.</p> | <p>1 inch</p> <p>1 inch</p> | <p>25</p> <p>25</p> | <p>30</p> <p>30</p> |

| Vegetable | Headspace | Pints | Quarts |
|--|----------------------|--------------|-----------------|
| <p>CORN, CREAM STYLE</p> <p>Select slightly immature ears of corn of high quality. Husk, remove silk and wash. Blanch ears 4 minutes in boiling water. Cut corn from cob at center of kernel, then scrape cob.</p> <p>Hot Pack: To each quart of corn, add 2 cups of boiling water. Bring to boil. Pack hot. Add ½ teaspoon salt to each pint jar, if desired. Adjust lids and process.</p> | 1 inch | 85 | Not recommended |
| <p>CORN, WHOLE KERNEL</p> <p>Select slightly immature ears of corn of high quality. Canning of some sweeter varieties or too immature kernels may cause browning. It is best to can in small amounts, then check color and flavor before canning large quantities. Husk, remove silk and wash. Blanch 3 minutes. Cut corn from cob at ¾ the depth of the kernel. Caution: Do not scrape.</p> <p>Hot Pack: To each quart of corn, add 1 cup boiling water. Bring to boil and simmer 5 minutes. Pack hot. Cover with boiling cooking liquid. Adjust lids and process.</p> <p>Raw Pack: Pack raw corn into jars. Do not shake or press down. Cover with boiling water. Adjust lids and process.</p> <p>Add 1 teaspoon salt to quart jars, if desired.</p> | 1 inch 1 inch | 55 55 | 85 85 |

| Vegetable | Headspace | Pints | Quarts |
|--|-----------|-------|--------|
| <p>MIXED VEGETABLES</p> <p>Yield: about 7 quarts</p> <p>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</p> <p>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.</p> <p>Wash and peel carrots, wash again and slice or dice. Husk corn, remove silk and wash. Cut corn from cob at 2/3 the depth of the kernel. Wash and trim green beans. Snap or cut into 1-inch pieces. Shell young, tender lima beans and wash. Trim, and slice or cube zucchini.</p> <p>Hot Pack: Combine all vegetables including tomatoes in a large kettle and add enough water to cover pieces. Add ½ teaspoon salt per pint, if desired; 1 teaspoon salt per quart. Boil 5 minutes and fill hot jars with hot pieces and liquid. Adjust lids and process.</p> | 1 inch | 75 | 90 |
| <p>OKRA</p> <p>Select tender pods. Wash and trim. Leave pods whole or cut into 1-inch pieces.</p> <p>Hot Pack: Cover with hot water and boil for 2 minutes. Fill jars with okra and cooking liquid. Add 1 teaspoon salt per quart to the jar, if desired. Adjust lids and process.</p> | 1 inch | 25 | 40 |

| Vegetable | Headspace | Pints | Quarts |
|---|-----------------------------|---------------------|---------------------|
| <p>PEAS, GREEN OR ENGLISH—SHELLED</p> <p>Shell and wash peas.</p> <p>Hot Pack: Cover peas with boiling water. Bring to boil and boil for 2 minutes. Pack hot peas loosely in jars. Cover with boiling cooking liquid. Adjust lids and process.</p> <p>Raw Pack: Fill hot jars with raw peas, cover with boiling water. Do not shake or press down peas. Adjust lids and process.</p> <p>Add 1 teaspoon salt to quart jars, if desired.</p> | <p>1 inch</p> <p>1 inch</p> | <p>40</p> <p>40</p> | <p>40</p> <p>40</p> |
| <p>POTATOES, SWEET—PIECES OR WHOLE</p> <p>Choose small to medium-sized potatoes. They should be mature and not too fibrous. Can within 1 to 2 months after harvest. Wash potatoes.</p> <p>Hot Pack: Boil or steam until partially soft (15 to 20 minutes). Remove skins. Cut medium potatoes, if needed, so that pieces are uniform in size.</p> <p>Caution: Do not mash or puree pieces. Add 1 teaspoon salt per quart jar, if desired. Fill hot jars, Cover with your choice of fresh boiling water or syrup. Adjust lids and process.</p> | <p>1 inch</p> | <p>65</p> | <p>90</p> |
| <p>POTATOES, WHITE—CUBED OR WHOLE</p> <p>Wash and peel potatoes. Place potatoes in ascorbic acid solution to prevent darkening. If desired, cut into ½-inch cubes and drain.</p> <p>Hot Pack: Cook 2 minutes in boiling water and drain again. For whole potatoes, boil 10 minutes and drain. Fill jars with hot potatoes and fresh hot water. Adjust lids and process.</p> <p>Add 1 teaspoon salt to quart jars, if desired.</p> | <p>1 inch</p> | <p>35</p> | <p>40</p> |

| Vegetable | Headspace | Pints | Quarts |
|---|-----------|-----------------------------------|-----------------------------------|
| <p>PUMPKIN AND WINTER SQUASH—CUBED</p> <p>Wash and cut into 1-inch-wide slices. Peel, remove seeds and cut into 1-inch cubes.</p> <p>Hot Pack: Boil 2 minutes. Fill jars with cubes and cooking liquid. Caution: Do not mash or puree. Adjust lids and process.</p> <p>Add 1 teaspoon salt to quart jars, if desired.</p> | 1 inch | 55 | 90 |
| <p>SOUPS</p> <p>Vegetable, dried bean or pea, meat, poultry or seafoods</p> <p>Caution: Do not add noodles or other pasta, rice, flour, cream, milk or other thickening agents to home-canned soups. If dried beans or peas are used, they must be fully rehydrated first.</p> <p>Select, wash and prepare vegetables, meat and seafoods as described for the specific foods. Cover meat with water and cook until tender. Cool meat and remove bones. Cook vegetables. For each cup of dried beans or peas, add 3 cups of water, boil 2 minutes, remove from heat, soak 1 hour and heat to boil.</p> <p>Drain all foods and combine with meat broth, tomatoes or water to cover. Boil 5 minutes. Caution: Do not thicken. Salt to taste, if desired.</p> <p>Fill hot jars only halfway with mixture of solids. Add and cover with remaining liquid. Adjust lids and process.</p> <p>NOTE: Processing times for tomato-vegetable mixtures (no meat) may be different in some recipes tested by USDA and Extension. Follow the times specified in the tested recipe. Otherwise, use the times in this publication.</p> | 1 inch | 60 (100 if soup contains seafood) | 75 (100 if soup contains seafood) |

| Vegetable | Headspace | Pints | Quarts |
|---|-----------|-------|--------|
| <p>SPINACH AND OTHER GREENS</p> <p>Select fresh tender greens. Pick over and wash thoroughly, lifting greens out of wash water each time. Remove tough stems.</p> <p>Hot Pack: Place 1 pound of greens at a time in cheesecloth bag or blancher basket and steam 3 to 5 minutes or until well wilted. Fill hot jars loosely with greens and add fresh boiling water. Adjust lids and process.</p> <p>Add 1 teaspoon salt to quart jars, if desired.</p> | 1 inch | 70 | 90 |
| <p>TOMATOES</p> <p>Follow directions for pressure canning tomatoes in Table 9.</p> | | | |

Scorecard for Judging Canned Vegetables

| | | <i>Excellent</i> | <i>Good</i> | <i>Fair</i> | <i>Poor</i> |
|-----------|--|------------------|-------------|-------------|-------------|
| Product | Uniform size, proper degree of maturity, no defects, shape well-preserved, container filled but not crowded, evenly distributed in jar, but not artistically arranged. | | | | |
| Color | Natural uniform color, no dark spots. | | | | |
| Texture | Tender, plump, firm but not overcooked. | | | | |
| Liquid | Clear, covers product, not cloudy, no bubbles, no sediment or foreign matter. | | | | |
| Container | Standard canning jar, clear glass, clean, neatly labeled. | | | | |

Canning Questions and Answers

Q. Is it safe to can vegetables without using salt?

A. Yes, salt is not a necessary part of the canning process.

Q. What is the meaning of the term “process?”

A. In canning, “processing” is the method used in cooking the food to preserve it. For vegetables, this is done in a pressure canner. In other words, vegetables are put into jars and processed in a pressure canner.

Q. What causes white sediment in the bottom of jars of vegetables?

A. The white sediment may be due to minerals in the water, starch in the food or it may indicate spoilage. If food is soft or liquid is dark and murky, do not use.

Q. What is meant by blanching?

A. Food is dipped or plunged into boiling water or steam for a given length of time.

Q. What is meant by precooking?

A. Food is cooked in a small amount of water before it is put into jars.

Q. Should all vegetables be blanched or precooked before processing?

A. No, but blanching or precooking serves to set color and shrink certain products.

Q. Should the water in which foods are precooked be used in packing?

A. Yes, if vitamins and minerals are to be retained.

Q. Why do beets lose their color?

A. When cut, the red juice bleeds from the beet. To prevent this color loss when canning, precook beets with part of the stem and all of the roots left on.

Q. Why do foods darken in the top of jars?

A. Liquid did not cover food or food was not processed long enough to destroy enzymes.

Q. Does it damage vegetables to over-process them?

A. Over-processing may alter the texture and flavor of a product, but this will not affect its safety. If there is any doubt about timing, it is better to over-process than to under-process. Vegetables must be processed long enough to destroy spoilage organisms.

Q. How long should vegetables stand after gathering before they are canned?

A. The shortest time possible. If vegetables are to be held over for a time before canning, store them in a cool, well-ventilated place. Spread them out carefully or store in refrigerator.

Q. Why is there sometimes a loss of liquid during processing?

A. Loss of liquid may be due to fluctuating pressure in the pressure canner, food packed too tightly in jars or lowering pressure too suddenly. Constant pressure should be maintained during processing time. At the end of processing time, allow pressure to drop to zero naturally and wait two to five minutes before opening the lid.

Q. Can fruits be canned without heating if aspirin is used?

A. No, aspirin cannot be relied on to prevent spoilage or to give satisfactory products. Adequate heat treatment is the only safe procedure.

Q. Is it safe to process food in the oven?

A. No, oven canning is dangerous. Jars may explode. The temperature of the food in jars during oven processing may not get high enough to ensure destruction of spoilage bacteria.

Q. What causes fruit to float in jars?

A. Fruit is lighter than the syrup. Pack fruit tightly in jar, but do not crush it. Use a light syrup.

Q. When canned fruits are bought in large containers, is it safe to can them in smaller containers?

A. Canned fruit may be heated through, packed and processed the same length of time as recommended for hot packs. Food canned in this way may be lower quality than if fruit had been canned when fresh.

Canning Pickles and Relishes

Pickles, crisp and spicy, stimulate the sense of taste and enhance the flavor of bland foods.

Pickles and relishes contain small amounts of nutrients, depending on ingredients used in making them. Most pickle products are low in calories, except for the sweet varieties.

Pickling is the process of preserving foods in brine or vinegar or a combination of the two.

Brine is made by combining salt with water in proportions to make either a weak, medium or strong solution. In some instances, salt is added directly to the food in the dry form, and the brine is formed as juices are drawn out of the food.

Vinegar, an acid, acts as a preservative and contributes flavor different from the flavor produced by lactic acid fermentation that occurs during the brining process.

The method using both salt and vinegar calls for a short brining period before the vinegar is added.

Kinds of pickles and relishes are varied and numerous. Processing methods for each should be selected in keeping with the food to be processed and the desired product.

Types of Pickles and Relishes

Brined pickles go through a fermenting process for about three to five weeks. Dilled cucumbers and sauerkraut are in this group. During this curing process, color of the cucumber changes from a bright green to an olive or yellow green. The interior of the cucumber becomes uniformly translucent, and the pickle develops a desirable flavor. When properly cured, the skin and interior of pickles are firm and tender. To prevent sour, salty, hard, rubbery, shriveled or mushy pickles, carefully follow recommended fermentation procedures.

Quick Process Pickles

This method includes:

Pickles that are brined for several hours, drained and then combined with boiling hot vinegar or heated with vinegar and processed.

Pickles that are combined with boiling hot vinegar or heated with vinegar to boiling temperature and processed without a previous brining period.

Fruit Pickles: These pickles are usually made from small whole fruits or fruit chunks and simmered in a spicy, sweet-sour syrup.

Relishes: Relishes are mixtures of chopped fruits or vegetables. They may be mild in flavor or hot and spicy.

Chutney: A mixture of fruits with dates and/or raisins seasoned with spices.

Ingredient Selection

Produce: Use only good-quality fruits and vegetables. Select tender vegetables and fruit. Pears and peaches may be slightly underripe for pickling. Wax-coated cucumbers are not suitable for

pickling whole because wax interferes with penetration of brine. Sort for uniformity of size and select the size best suited for the recipe being followed. Use foods soon after gathering or purchasing when possible. If fruits and vegetables cannot be used immediately, store in the refrigerator or in a well-ventilated, cool place. Discard fruits and vegetables that show any evidence of mold.

Salt: Pure, granulated salt is best. This is often sold as pickling or canning salt. It is sometimes called meat-curing salt. The non-caking material added to iodized and non-iodized table salt may make the brine cloudy. The iodine in iodized table salt may cause pickles to darken. Salt is important for the safety of pickled foods. Do not reduce the amount of salt in a tested recipe or use a salt substitute. Use recipes developed with less sodium if needed.

Vinegar: Use either cider or white distilled vinegar of 5 to 6 percent acidity (50 to 60 grain strength). Cider vinegar, used in most recipes, has a good flavor and aroma but may discolor light foods. Distilled (white) vinegar is often used for onions and cauliflower where clearness of color is desirable.

Spices: Spices add flavor and aroma to pickles and both whole and ground spices are used in making them. For best flavor, always use fresh spices and store amounts that are not used immediately in air-tight containers.

Sugar: Use either granulated or brown sugar, depending on recipe.

Water: If hard water is used in brining, it may interfere with the formation of acid and prevent pickles from curing properly. Boil hard water for 15 minutes and remove from heat. Cover and let stand for 24 hours. Remove any scum that might have formed. Slowly pour water from containers so that sediment will not be disturbed. Discard sediment. Water is now ready to use.

Ingredients Found in Older Recipes

The following ingredients are still used in some of the older pickling recipes. These substances are not essential for making crisp, colorful pickles if up-to-date methods and good-quality ingredients are used in making them.

Lime: Lime is not essential for making crisp, firm pickles if good-quality ingredients are used and up-to-date methods are followed. If recipe calls for lime, use food-grade pickling lime from the grocery store. Do not use agricultural or burnt lime. Rinse produce thoroughly according to a tested recipe. Excess lime in pickled foods can lead to spoilage.

Alum: Alum is not needed to make pickles crisp and firm if good-quality ingredients are used and up-to-date methods are followed. It is better not to use alum, but if alum is used be sure to measure it accurately and rinse produce thoroughly as directed in a tested recipe. This ingredient can be purchased from the grocery store.

Grape Leaves: Grapes are not needed to make pickles crisp and firm if good-quality ingredients are used and up-to-date methods are followed.

Equipment

Utensils: For brining, use a clean crock or stone jar, unchipped enamel-lined utensils or a large glass container. To cover vegetables while they are in brine, use a heavy plate or large glass lid that fits inside the container. Use a filled jar of water to hold the cover down so the vegetables are kept below the surface of the brine. Another method is to use a water-filled plastic bag, the kind intended for use with food. The bag covers the container, keeping contents at a correct level so that a plate is not needed. For heating pickling liquids, use unchipped enamelware, aluminum, stainless steel or glass. Do not use brass, copper, galvanized or iron utensils. Containers of these metals may react with acids or salts and form undesirable compounds or cause color changes in the pickles. Use large wooden or stainless steel spoons for stirring pickles.

Jars: Use standard canning jars with the word Mason on them or jars designed for canning. Most jars from commercially canned food have not been heat-treated and may break when subject to home-canning methods.

Pack pickles or relish in jars and cover with liquid. Wipe the jar mouth with a clean, damp cloth or paper towel. Adjust the lid according to the manufacturer's directions.

Lids: Use the two-piece closure, which has a metal screw band and a metal lid with sealing compound. The metal screw bands may be re-used, but metal lids containing sealing compound may be used only once.

Boiling Water Canner: Boiling water canners are needed to process pickled foods safely.

Procedures for Safe Pickling

To ensure a safe and quality product, use fresh fruits and vegetables following standardized recipes and process as recommended for the product.

Filling Jars: Fill jars, leaving headspace at the top of the jar after brine or syrup has covered the pickles. Avoid over-packing jars so there will be enough headspace. Wipe the rim and threads of jars thoroughly. Small food particles left on the rim may prevent an airtight seal.

Adjusting Lids: Select the two-piece metal lid (a screw band with a flat metal lid; the flat metal lid contains the sealing compound). The closure is screwed on the jar mouth firmly by hand. When metal screw band is tight, this lid has enough "give" to let air escape during processing. When taken from the canner, the two-piece lid needs no further tightening.

Sometimes the bands on the two-piece metal lids are loose when the hot jars are removed from the canner. DO NOT ATTEMPT TO TIGHTEN. Often the lid has started to seal and further tightening will break the partial seal. After a hot jar is removed from the canner, some time may elapse before a "popping" sound is heard. This sound indicates the jar has sealed. Follow directions of the manufacturer concerning the heating of the flat metal lids.

Heat Treatment: Heating is needed to destroy microorganisms that cause spoilage and to inactivate enzymes that may affect flavor, color and texture. Processing jars of pickles in a boiling water canner or steam canner is the best way to prevent spoilage and maintain quality. An open-kettle method is not recommended, since there is always danger of spoilage from microorganisms entering the food when it is transferred from kettle to jar.

For safe pickle products made from low-acid vegetables, always use vinegar of 5 percent acidity. *Clostridium botulinum* bacteria present in air, soil and raw foods grow well in sealed, air-tight jars of low-acid foods. As these bacteria grow, they produce a poisonous toxin. The use of strong vinegar in combination with the heat treatment prevents the growth of these organisms.

Pickles and Relish Recipes

Processing times as given in these recipes are for altitudes of 1,000 feet or less. For instructions on how to make adjustments for specific pickled foods at altitudes above 1,000 feet, consult tested recipes provided by USDA in the latest publication of “Complete Guide to Home Canning,” *Agriculture Information Bulletin* no. 539, or tested recipes from the National Center for Home Food Preservation (nchfp.uga.edu) from University of Georgia Cooperative Extension.

Fermented Dill Pickles

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

4 pounds of 4-inch pickling cucumbers
2 tablespoons dill seed or 4 to 5 heads fresh or dry dill weed
½ cup canning or pickling salt
¼ cup vinegar (5%)
8 cups water and one or more of the following ingredients:

2 cloves garlic (optional)
2 dried red peppers (optional)
2 teaspoons whole mixed pickling spices (optional)

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 a 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 and 75 F for about 3 to 4 weeks while fermenting. Temperatures of 55 to 65 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 hot jar with pickles and hot brine, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process in a water bath canner for 10 minutes for pints and 15 minutes for quarts.

Sauerkraut

Yield: About 9 quarts

25 pounds of cabbage (For the best sauerkraut, use firm heads of fresh cabbage. Shred cabbage and start kraut between 24 and 48 hours after harvest.)

$\frac{3}{4}$ cup canning or pickling salt

Work with about 5 pounds of cabbage at a time. Discard outer leaves. Rinse heads under cold running water and drain. Cut heads in quarters and remove cores. Shred or slice to a thickness of a quarter. Put cabbage in a suitable fermentation container and add 3 tablespoons of salt. Mix thoroughly, using clean hands. Pack firmly until salt draws juices from cabbage. container. Be sure it is deep enough so that its rim is at least 4 to 5 inches above the cabbage. If juice does not cover cabbage, add boiled and cooled brine ($1\frac{1}{2}$ tablespoons of salt per quart of water). Add plate and weights, cover container with a clean towel. Store 70 to 75 F while fermenting. At temperatures between 70 and 75 F, kraut will be fully fermented in about 3 to 4 weeks; at 60 to 65 F, fermentation may take 5 to 6 weeks. At temperatures lower than 60 F, kraut may not ferment. Above 75 F, kraut may become soft.

If you weigh the cabbage down with a brine-filled bag, do not disturb the crock until normal fermentation is completed (when bubbling ceases). If you use jars as weight, you will have to check the kraut two to three times each week and remove scum if it forms. Fully fermented kraut may be kept tightly covered in the refrigerator for several months or it may be canned as follows:

Hot Pack—Bring kraut and liquid slowly to a boil in a large kettle, stirring frequently. Remove from heat and fill hot jars rather firmly with kraut and juices, leaving $\frac{1}{2}$ -inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process in a boiling water canner 10 minutes for pints and 15 minutes for quarts.

Raw Pack—Fill hot jars firmly with kraut and cover with juices, leaving $\frac{1}{2}$ -inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process in a boiling water canner 20 minutes for pints and 25 minutes for quarts.

Sweet Cucumber Pickles

Yield: About 4 pints

½ gallon cucumbers (about 3 pounds)

6 cups of vinegar

3 cups of sugar

1 tablespoon pickling spices*

**Use 1 tablespoon cloves and 1 tablespoon ginger root in place of pickling spices, if desired.*

Remove cucumbers from brine and soak in water to remove salt as described above. Leave small pickling size cucumbers whole; larger ones may be cut into pieces.

Combine vinegar, sugar and spices (tied loosely in a cheesecloth bag). Bring mixture to boiling point, add drained cucumbers and boil 2 to 3 minutes.

Remove spice bag and pour into container. Allow to stand for three days. Each day, pour off liquid, bring to boiling point and pour over cucumbers. Pack pickles in hot jars. Bring the same vinegar solution to boiling point and pour over pickles, leaving ½-inch headspace; adjust lids and process in boiling water canner at 212 F for 15 minutes.

Sour Cucumber Pickles

Use recipe for Sweet Cucumber Pickles above except omit most or all of sugar.

Sweet Pickle Sticks

Yield: 7 to 9 pints

8 pounds of 3- to 4-inch pickling cucumbers

1/3 cup canning or pickling salt

4½ cups sugar

3½ cups vinegar (5%)

2 teaspoons celery seed

1 tablespoon whole allspice

2 tablespoons mustard seed

These pickles may be canned as either strips or slices. Wash cucumber and cut off 1/16 of blossom end. Slice or cut into strips. Sprinkle with a cup of salt. Cover with 2 inches of crushed or cubed ice. Refrigerate 3 to 4 hours. Add more ice as needed. Drain well.

Combine sugar, vinegar, celery seed, allspice and mustard seed in a 6-quart kettle. Heat to boiling.

Hot Pack: Add cucumbers and heat slowly until vinegar solution returns to boil. Stir occasionally to make sure mixture heats evenly. Fill sterile jars with cucumbers and cover with vinegar solution leaving ½-inch headspace. Adjust lids. Process in boiling water canner, either pints or quarts, for 5 minutes.

Raw Pack: Fill jars, leaving ½-inch headspace. Add hot vinegar solution, leaving ½-inch headspace. Adjust lids and process in a boiling water canner, pints for 10 minutes; quarts for 15 minutes.

Store jars of processed pickles four to five weeks to develop ideal flavor.

Quick Dill Pickles

Yield: 7 to 9 pints

8 pounds fresh cucumbers, 3 to 5 inches in length

1¼ cups canning or pickling salt (divided)

2 gallons water

6 cups vinegar (1½ quarts)

¼ cup sugar

8 cups water (2 quarts)

3 tablespoons whole mustard seed (1 teaspoon per pint)

2 tablespoons mixed pickling spices

1½ teaspoons dill seed per pint (1½ head of dill per pint may be substituted for dill seed).

Wash and drain cucumbers. Cut off 1/16 inch of blossom end and discard. Make a brine of ¾ cup salt and the 2 gallons of water and pour over cucumbers. Let stand 12 hours. Drain.

Combine vinegar and remaining ½ cup of salt, ½ cup sugar, 2 quarts water and pickling spices (tied in thin white cloth).

Heat mixture to boiling. Pack cucumbers into clean hot jars; add mustard and dill seed to each jar. Cover with boiling vinegar solution to within ½ inch of top of jar. Adjust jar lids. Process in boiling water canner (pints 10 minutes and quarts 15 minutes).

Dilled Green Beans

4 pounds green beans, whole (about 4 quarts)

Hot red pepper, crushed (¼ teaspoon per pint jar)

Whole mustard seed (½ teaspoon per pint jar)

Dill seed (½ teaspoon per pint jar)

Garlic (1 clove per pint jar)

5 cups vinegar

5 cups water

½ cup canning or pickling salt

Wash beans thoroughly; drain and cut into lengths to fill pint jars. Pack beans into clean, sterile, hot jars; add pepper, mustard seed, dill seed and garlic.

Combine vinegar, water and salt; heat to boiling. Pour boiling liquid over beans, filling to ½ inch from top of jar. Adjust lids.

Process in boiling water canner for 5 minutes (start to count processing time as soon as water in canner returns to boiling).

Cauliflower Pickles

Yield: 5 pints

3 quarts cauliflower florets (about 3 medium heads)

2 cups sliced onion

1 cup sweet red pepper strips

¼ cup canning or pickling salt

2 quarts ice cubes (2 trays)

1 quart white vinegar

2 cups sugar

1 tablespoon mustard seed 1 tablespoon celery seed

1 teaspoon turmeric 1 hot red pepper pod

Wash cauliflower; divide into florets. Combine cauliflower, sliced onion and red pepper strips; add salt. Cover with ice and let stand 3 to 4 hours. Drain well.

Combine remaining ingredients. Bring to a boil. Add vegetables; boil 10 minutes or until vegetables are tender-crisp.

Remove hot red pepper from vegetable mixture. Pour hot vegetables into hot pint jars. Cover with boiling vinegar mixture to ½ inch from jar top. Cut hot red pepper into five pieces and add one piece to each jar. Adjust lids.

Process in boiling water canner for 10 minutes. Remove jars.

Bread and Butter Pickles

Yield: 8 pints

4 quarts cucumber, medium size (about 6 pounds), sliced

8 cups onions, thinly sliced (about 3 pounds)

2 large garlic cloves

½ cup canning or pickling salt

1-2 quarts (2 trays) ice, crushed or cubes

4½ cups sugar

1½ teaspoons turmeric

1½ teaspoons celery seed

2 tablespoons mustard seed

4 cups vinegar (5%)

Wash cucumbers thoroughly, using a vegetable brush; drain on rack. Slice unpeeled cucumbers into 3/16-inch slices. Add onions and garlic. Add salt and mix thoroughly. Cover with crushed ice or ice cubes; refrigerate for 3 hours, adding more ice as needed.

Drain and remove garlic.

Combine sugar, spices and vinegar; heat to boiling and boil 10 minutes.

Add cucumbers and onion slices and heat to boiling. Fill hot jars with slices and cooking syrup. Adjust lids.

Process in boiling water canner (212 F) for 10 minutes. Start to count processing time as soon as the water in canner returns to boiling.

Pickled Beets

Yield: 6 pints

3 quarts beets, sliced (about 7 pounds without tops)

1 tablespoon allspice, whole 2 cinnamon sticks

2 cups sugar

1½ teaspoons canning or pickling salt

3½ cups vinegar

1½ cups water

Wash beets. Leave 2-inch stem and taproots. Cover with boiling water and cook whole until tender.

Drain, peel and slice.

Loosely tie allspice and cinnamon sticks in a clean, thin, white cloth.

Combine sugar, salt, vinegar and water, add spice bag. Bring to a boil. Add beets, bring to a boil and boil 5 minutes.

Remove spice bag. Pack beets into hot pint jars. Cover with hot cooking liquid, filling to ½ inch from top.

Adjust jar lids. Process pints or quarts in boiling water canner for 30 minutes.

Pearl Onion Pickles

Yield: 7 pints

4 quarts small onions

1 cup canning or pickling salt

2 cups sugar

2 tablespoons prepared horseradish (3½ tablespoons of mixed pickling spices may be substituted for the horseradish and mustard seed)

3-4 tablespoons mustard seeds

2 quarts vinegar (white vinegar will help to retain white color)

7 small hot, red peppers

7 small bay leaves

Select fresh tender onions, cover with boiling water and let stand for 2 minutes. Drain, dip at once into cold water and peel. Sprinkle onions with salt and add cold water to cover (about 2 quarts water to 1 cup salt). Let stand at least 12 hours or overnight. Drain off salt water; rinse and drain thoroughly. Combine sugar, horseradish, mustard seed and vinegar. Simmer 15 minutes.

Pack onions into jars, leaving ¼-inch headspace. To each jar, add 1 bay leaf and 1 pepper. Pour boiling hot vinegar mixture over onions; adjust lids according to manufacturer's directions. Process pints for 10 minutes in boiling water canner.

Pickled Okra

Yield: 3 to 4 pints

3 pounds small tender okra pods

½ cup canning or pickling salt

4 cups vinegar (5%) 1 tablespoon mustard seed 1 cup water

6 pods hot pepper

6 garlic cloves

Wash okra, pack in hot clean pint jars. Add 1 pepper and 1 garlic clove to each jar. Heat salt, vinegar, mustard seed and water to boiling. Cover okra with hot mixture. Adjust lids. Process in boiling water canner (212 F) for 10 minutes.

Pickled Peaches

Yield: 5 quarts.

5 quarts peeled peaches

6½ cups sugar

1 quart cider vinegar

1¼ teaspoon mixed pickling spices

10 cloves

5 small pieces stick cinnamon

Use firm, ripe peaches. Wash peaches and peel.

Make a syrup of 6½ cups of sugar and 1 quart of cider vinegar. Heat and add peaches. Let fruit and syrup simmer for 10 minutes. To each jar add: ¼ teaspoon of mixed pickling spices, 2 cloves and 1 small piece of stick cinnamon. Add hot fruit to jar, cover with hot syrup, adjust the lid.

Process in boiling water canner for 25 minutes. Let peaches “season” at least one week; for best flavor, wait 6 weeks.

Pickled Pears

Yield: 8 pints.

4 quarts pears

2 quarts sugar

1 pint water

1 quart cider vinegar

2½ sticks cinnamon

2 tablespoons whole allspice

Wash pears, peel, cut in half or quarters and core. Boil pears in a covered pan in 1 pint of water for 10 minutes. Tie spices loosely in a thin cloth bag. Combine water that the pears were cooked in, sugar, vinegar and spices and heat to boiling. Pour over pears and let stand overnight in a covered pan. Drain and boil syrup until thick. Add pears and cook until tender. Do not stir, but keep pears under syrup. Pack into hot jars and cover with syrup.

Process in a boiling water canner (212 F) for 10 minutes. Keep pears at least 2 weeks to develop flavor.

Quick Party Pickles

1 quart commercial dill pickles

1 quart commercial sour pickles

Drain pickles and slice (or you may buy the hamburger dills). Put in 2½-quart jar and add alternate layers of pickles and the following mixture:

4 cups of sugar

2 tablespoons whole allspice

2 or more cloves of garlic, sliced

These pickles will make their own syrup. Store in refrigerator.

Pickled Peppers

Yield: About 8 pints

4 quarts pepper, banana, Hungarian or other

10 cups vinegar

2 cups water

Cut two small slits in each pepper and cover with a salt brine (1½ cups salt in 1 gallon water). Let stand overnight in a cool place. Drain, rinse and drain. Combine 10 cups of vinegar with the 2 cups water; bring to boiling temperature and boil gently for 10 to 15 minutes. Pack peppers into hot jars, leaving ½-inch headspace. Cover with the hot pickling solution. Adjust lids and process in boiling water canner — half pints 10 minutes; pints 10 minutes.

Variations: Add to Pickled Peppers recipe one or more of the following:

1 to 2 tablespoons prepared horseradish

1 head of dill

1 to 2 cloves of garlic (remove before packing into jars)

2 to 3 tablespoons sugar

Green Tomato Pickles

Yield: about 9 pints.

1 gallon (16 cups) sliced tomatoes

2 cups sliced onions

¼ cup canning or pickling salt

4 cups vinegar (5%)

3 cups brown sugar

1 tablespoon whole cloves 1 tablespoon allspice

1 tablespoon celery seed

1 tablespoon mustard seed

Wash, core and slice tomatoes and onions thinly.

Sprinkle with ¼ cup salt and let stand 4 to 6 hours. Drain; heat and stir sugar into vinegar until dissolved. Tie cloves, allspice, celery and mustard seed in a cheesecloth or spice bag. Add to vinegar with tomatoes and onions. Bring to boil, reduce heat and simmer 30 minutes, stirring as needed to prevent scorching. Tomatoes should be tender and transparent when properly cooked. Remove spice bag. Fill jars and cover with vinegar solution. Leave ½-inch headspace. Adjust lids and cover with vinegar solution. Adjust lids and process in boiling water canner — pints 10 minutes; quarts 15 minutes.

Corn Relish

Yield: About 9 pints

10 cups fresh whole kernel corn (16 to 20 medium-size ears) or six

10-ounce packages of frozen whole kernel corn

2½ cups diced sweet red pepper (4 to 5 medium)

2½ cups diced sweet green pepper (4 to 5 medium)

2½ cups chopped celery

1¼ cups diced onions (8 to 10 small)

1¾ cups sugar

5 cups vinegar

2½ tablespoons canning or pickling salt

2 teaspoons dry mustard

1 teaspoon turmeric

Fresh corn: Remove husks and silks. Cook ears of corn in boiling water for 5 minutes; remove and plunge into cold water. Drain; cut corn from cob. Do not scrape cob.

Frozen corn: Defrost overnight in refrigerator.

Combine peppers, celery, onions, sugar, vinegar, salt and celery seed. Cover pan until mixture starts to boil, then boil uncovered for 5 minutes, stirring occasionally. Mix dry mustard and turmeric and blend with liquid from boiling mixture; add, with corn, to boiling mixture. Return to boiling and cook for 5 minutes, stirring occasionally.

Fill jars loosely with mixture while boiling hot into clean, hot half pint or pint jars, filling to ½ inch from top. Adjust lids. Process in hot water bath canner for 15 minutes (start to count processing time as soon as water in canner returns to boiling).

Piccalilli or Chow-Chow

Yield: 3 pints

1 quart chopped green tomatoes

1 cup chopped red sweet pepper

1 cup chopped green pepper

1½ cup chopped onion

5 cups (about 2 pounds) chopped cabbage

1/3 cup canning or pickling salt

3 cups vinegar

2 cups brown sugar, packed

2 tablespoons whole mixed pickling spice

Combine vegetables, mix with salt and let stand overnight. Drain and press in a clean, thin, white cloth to remove all liquid possible.

Combine vinegar and sugar. Place spices loosely in a clean cloth; tie with a string. Add to vinegar mixture. Bring to boil.

Add vegetables, bring to boil, and boil gently about 30 minutes, or until mixture is reduced one-half in volume.

Remove spice bag. Pack hot relish into clean, sterile, hot pint jars.

Fill jars to ½ inch from top. Adjust lids. Process in boiling water canner for 5 minutes.

Tomato Apple Chutney

Yield: 7 to 8 pint jars

3 quarts tomatoes, pared and chopped

3 quarts apples, pared and chopped

2 cups raisins, seedless, white

2 cups chopped onions

1 cup chopped green pepper (2 medium)

2 pounds brown sugar

1 quart white vinegar

4 teaspoons canning or pickling salt

1 teaspoon ground ginger

¼ cup whole pickling spices

Combine all ingredients except the whole spices. Tie spices loosely in a clean cloth and add to tomato apple mixture. Bring to a boil; cook slowly, stirring frequently until mixture is thickened (about 1 hour). Remove spice bag. Pack the boiling hot mixture into hot pint jars to within ½ inch from top of jars. Adjust lids and process in boiling water canner for 10 minutes. Start counting processing time when water in canner returns to boiling.

Watermelon Pickles

Yield: 4 to 5 pints

3 quarts watermelon rind

$\frac{3}{4}$ cup canning or pickling salt

3 quarts water

2 trays ice cubes

9 cups sugar

3 cups vinegar, white

3 cups water

1 tablespoon whole cloves

6 1-inch pieces stick cinnamon

1 lemon, thinly sliced, with seeds removed

Pare rind and all pink edges; cut into 1-inch pieces. Cover with brine made by mixing the salt with 3 quarts of water. Add ice cubes. Let stand 5 or 6 hours.

Drain, rinse in cold water. Cover with cold water and cook until fork-tender, about 10 minutes (do not overcook). Drain.

Combine sugar, vinegar, 3 cups water and spices (tied in thin white cloth); boil 5 minutes and pour over rind with spices; add lemon slices. Let stand overnight.

Heat rind in syrup to boiling and cook until translucent (about 10 minutes). Pack hot pickles loosely into clean, hot pint jars. Add 1 stick cinnamon from spice bag to each jar. Cover with boiling syrup to $\frac{1}{2}$ inch from top of jar. Adjust lids. Process in boiling water canner 10 minutes.

Chili Sauce

Yield: 5 pints

2 gallons large ripe tomatoes

6 green peppers

1½ pints vinegar

2 tablespoons cinnamon

1 tablespoon mustard

6 large onions

1 cup brown sugar

2½ tablespoons salt

1 tablespoon ginger

2-3 teaspoons nutmeg

Peel, core and slice tomatoes. Chop the onions and peppers. Put into a large kettle. Add other ingredients. Cook on top of the range, stirring frequently, until sauce reaches the consistency of ketchup (about 4 hours). Fill pint jars with hot sauce. Leave ½-inch headspace. Process in a boiling water canner for 15 minutes.

Tomato Catsup

Yield: 3 pints

1 gallon chopped ripe tomatoes, (peeled)

2 medium onions, chopped

1 cup chopped red peppers

2 tablespoons salt

4 tablespoons sugar

1 tablespoon mustard, powdered

1 teaspoon whole allspice

1 teaspoon whole cloves

3 2-inch sticks cinnamon

2 cups vinegar

Cook chopped vegetables until tender; about 30 minutes. Press through a fine sieve. Add spice, tied in a bag, to the pulp and heat slowly.

Cook 1½ hours, or until slightly thick. Remove spice bag. Add vinegar and cook until desired thickness. Pour into hot pint jars. Leave ½-inch head- space. Process in a boiling water canner (212 F) for 15 minutes.

Onion Pepper Relish

6-8 large onions, finely chopped (1 quart)

4-5 medium sweet red peppers, finely chopped (1 pint)

4-5 medium green peppers, finely chopped (1 pint)

1 cup sugar

1 quart vinegar

4 teaspoon canning or pickling salt

Combine all ingredients and bring to a boil. Cook until thickened and reduced about one-half in volume (about 45 minutes), stirring occasionally.

Pack the boiling hot relish into clean, hot pint jars to ½ inch from top of jar, adjust lids. Process in boiling water canner for 10 minutes (start to count processing time when water in canner returns to boiling).

Bread and Butter Pickled Squash

Yield: About 7 pints

1 gallon (4¼ pounds) sliced squash (yellow) or zucchini

2 green bell peppers, diced

5 medium onions, diced

½ cup canning or pickling salt

5 cups vinegar

4½ cups sugar

1 teaspoon ground mustard

1½ teaspoons turmeric

1 teaspoon celery seed

20 whole cloves

Cut squash into ¼-inch slices and combine with peppers and onions. Cover with ½ cup salt; let stand 3 hours. Drain.

Mix vinegar with sugar and spices; heat mixture to boiling temperature. Fill pint jars with squash and cover with boiling vinegar solution. Leave ½-inch headspace.

Adjust lids; place in boiling water canner and process for 10 minutes. Begin counting time as soon as all jars are in boiling water canner.

Hot Squash Relish

Yield: About 7 pints

- 4 pounds (7 quarts) diced squash
- 2 cups diced green bell peppers
- 1 large bunch celery (1 quart) diced
- 1 cup diced onion
- 1½ cups sugar
- 4 cups vinegar
- 2 tablespoons canning or pickling salt
- 2 teaspoons celery seed
- 3 hot peppers, medium size*
- 2 tablespoons powdered mustard
- 1 teaspoon turmeric

**¼ to ½ teaspoon crushed red peppers to each pint of vegetables may be substituted for hot peppers. Start with ¼ teaspoon and add as desired.*

Prepare vegetables, discarding leaves from celery.

Combine peppers, celery and onion with vinegar, sugar, salt, celery seed and 3 pods of hot pepper.** Heat mixture to boiling and boil 5 minutes. Stir in squash, mustard and turmeric. Return to boiling and boil 5 minutes.

Spoon into clean pint jars; adjust lids. Place jars in boiling water to cover, boil 15 minutes. Begin counting time as soon as all jars are in boiling.

***Add 2 hot peppers, heat mixture, taste for hotness and add the third pepper if desired.*

Sweet Squash Relish

Follow recipe for making hot relish but decrease amount of hot pepper.

Use about ½ to 1 pod of hot pepper, or just enough to give desired flavor.

Fresh Pack Pickle Squash

Yield: About 6 pints

5 pounds (11/8 gallon) squash

1/3 cup canning or pickling salt

1 cup water

4 cups vinegar

Cut squash into 1/4-inch slices; combine with salt. Let stand for 1 hour; drain. Pack drained squash into jars. Mix vinegar with water; heat to boiling temperature. Cover squash with the boiling vinegar solution.

Adjust lids; process pint jars in boiling water canner for 5 minutes.

Start to count processing time as soon as the water in canner returns to boiling temperature.

Variation: To vinegar and water solution, add 2 cups sugar and heat to boiling temperature. Proceed as given above.

No Sugar-Added Pickled Products

No Sugar-Added Sweet Cucumber Slices

Yield: About 4 or 5 pint jars

3½ pounds of pickling cucumbers boiling water to cover sliced cucumbers

4 cups cider vinegar (5%)

3 cups Splenda

1 tablespoon canning salt

1 cup water

1 tablespoon mustard seed

1 tablespoon allspice

1 tablespoon celery seed

4 1-inch cinnamon sticks

Wash and rinse pint canning jars; keep hot until ready to use. Prepare lids according to manufacturer's directions.

Wash cucumbers. Slice 1/16 inch off the blossom ends and discard. Slice cucumbers into ¼-inch-thick slices. Pour boiling water over the cucumber slices and let stand 5 to 10 minutes. Drain off the hot water and pour cold water over the cucumbers. Let cold water run continuously over the cucumber slices, or change water frequently until cucumbers are cooled. Drain slices well.

Mix vinegar, 1 cup water, Splenda and all spices in a 10-quart Dutch oven or stockpot. Bring to a boil. Add drained cucumber slices carefully to the boiling liquid. Return to a boil.

Place one cinnamon stick in each jar, if desired. With a slotted spoon, fill hot pickle slices into clean, hot pint jars, leaving ½ inch at top to allow for headspace. Cover with boiling hot pickling brine with ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel; apply two-piece metal canning lids. Process in a boiling water canner for 10 minutes.

Scorecard for Judging Pickles, Catsup, Chow-Chow and Relish

| | Pickles | Catsup | Chow-Chow and Relish | Excellent | Good | Fair | Needs Improving |
|-----------|---|---|--|-----------|------|------|-----------------|
| Color | Natural except for spices — no artificial color | Deep tomato red | Natural except for spice — no artificial color | | | | |
| Flavor | Pleasing — in keeping with ingredients used | Pleasing — in keeping with ingredients used | Pleasing — in keeping with ingredients used | | | | |
| Texture | Crisp and tender | Smooth and thick | Vegetables cut fine and fairly uniform | | | | |
| Container | Standard | Standard | Standard | | | | |
| | Mason-type jar — clean and neatly labeled | Mason-type jar — clean and neatly labeled | Mason-type jar — clean and neatly labeled | | | | |
| | | | | | | | |

Table 12: Pickle troubles and what causes them.

| Problem | Cause |
|------------------------|---|
| Soft, slippery pickles | failure to remove 1/16 inch of blossom cucumbers exposed above the brine vinegar or brine too weak precooked at too high temperature (overcooked) |
| Shriveled pickles | salt solution too strong too much sugar vinegar solution too strong |
| Hollow pickles | faulty development of the cucumber excessive delay in placing cucumbers in brine |
| Effect of scum | spoilage from top layer of cucumbers or cabbage will occur unless the scum (yeasts, molds and bacteria) is frequently removed scum may also weaken the acidity of the brine and cause spoilage |
| Black spots | iodine in the salt iron in the water |
| Darkened pickles | use of hard water using ground spices leaving spices in the jar storing pickles in a light place, especially peaches |

Jams, Jellies and Preserves

Jams, jellies and preserves are similar in that they all contain sugar and fruit or fruit juice.

Jam is made from crushed fruit and is less firm than jelly.

Jelly is a clear, tender gel made from fruit juice yet firm enough to hold its shape when cut.

Preserves are small whole fruit or large pieces of fruit in a thick syrup.

Ingredients

To make a jellied fruit product, four basic ingredients are needed:

Fruit furnishes flavor, color and part or all of the acid and pectin necessary for successful gels. Apples, crab apples, blackberries, grapes and plums, when slightly underripe, contain enough pectin, acid and flavor for successful jelly making. These fruits may be combined with fruits that contain smaller amounts of pectin and acid.

Pectin occurs naturally in fruit; some fruits have enough to make high-quality products. Other fruits require added pectin for making jellies. Commercial fruit pectin is made from apples or citrus fruits are available in liquid or powder form and may be used with any fruit.

The use of commercial pectin shortens the cooking time, permits use of fully ripe fruit and ensures a greater yield from a given amount of fruit. *To make jams, jellies or preserves using commercial pectin, follow the recipes that are included with the pectin.*

Acid is higher in underripe than in fully ripe fruits and is necessary for flavor and for gel formation. Lemon juice is frequently added to fruits that are low in acid.

Sugar helps in forming a gel, aids in firming fruit, acts as a preservative and gives flavor. Use either bean or cane sugar unless the recipe specifies other kinds.

Equipment

Select a large kettle, allow enough space for fruit or juice to bubble when boiling. Use standard measuring cups and spoons.

When making jelly, a cheesecloth or jelly bag will be needed to strain juice. Other equipment should include a long-handled spoon, ladle, paring knife, jelly or candy thermometer and bowls.

Remaking Soft Jelly

To remake soft jellies without added pectin, add 2 tablespoons bottled lemon juice for each quart of jelly. Heat to boiling and boil for 3 to 4 minutes.

Recipes

Recipes in this publication contain proportions of ingredients suitable for making jams, jellies and preserves without the addition of commercial pectin.

Containers

Use standard canning jars as containers for jams, jellies and preserves. Seal only with lids.

Wash glasses, jars and lids in warm soapy water and rinse. Sterilize jelly containers in boiling water for 10 minutes. To seal with lids, follow manufacturer's instructions for preparing the flat metal lid that is held in place by a screw band.

Processing Jams, Jellies and Preserves in a Boiling Water Canner

To prevent mold growth and to make a strong vacuum seal, process all jams, jellies and preserves in a boiling water canner.

Processing times recommended in this publication are correct for much of the state except in high elevations. For these high areas, add processing time according to your altitude according to the table below.

Table 13: Processing times for jams, jellies and preserves at different altitudes.

| 0-1,000 ft | 1,001-6000 ft | Above 6,000 ft |
|--|---|--|
| Use time given for specific recipe in this publication | Add 5 minutes to time given for specific recipes. | Add 10 minutes to time given for specific recipes. |

Paraffin

Sealing with paraffin is no longer recommended.

Selecting Fruit for Jelly Making

Select about one quarter underripe fruit and three quarters ripe fruit. When all fruit is fully ripe, for best results, use a commercial pectin and follow manufacturer's directions.

Extracting Juice

Wash fruits in cold water, lifting them out of water after each washing. Do not leave fruit standing in water. Discard damaged parts; remove stems and blossom ends. Cut large fruits into pieces. Crush berries and grapes.

Pour hot fruit into a damp jelly bag or one made from unbleached muslin, or two layers of closely woven cheesecloth. For clear jelly, allow juice to drip through without pressing, but for a greater yield, press or twist bag to extract juice. Straining the juice extracted by pressing or twisting will help to clarify. Strain through muslin or cheesecloth.

Fruits Ranked as to Acid and/or Pectin Content

High Acid – High Pectin

Fruits containing sufficient acid and pectin for making jellied products include:

Apples, tart varieties

Gooseberries

Blackberries, tart or underripe

Grapefruit

Crab apples

Lemons

Cranberries

Plums, sour varieties

Currants

Grapes, sour varieties

High Pectin – Low Acid

Fruits containing sufficient pectin but low in acid:

Apples, sweet varieties

Quinces

High Acid – Low Pectin

Fruit containing sufficient acid but low in pectin:

Apricots

Strawberries

Peaches, sour

Rhubarb

Jams

Wash and rinse all fruits thoroughly before cooking. Do not soak. For best flavor, use fully ripe fruit. Remove stems, skins, and pits from fruit; cut into pieces and crush. For berries, remove stems and blossoms and crush. Seedy berries may be put through a sieve or food mill. Measure crushed fruit into large saucepan using the ingredient quantities specified.

Add sugar and bring to a boil while stirring rapidly and constantly. Continue to boil until mixture thickens. Use one of the following tests to determine when jams and jellies are ready to fill. Remember to allow for thickening during cooling.

Temperature test: Use a jelly or candy thermometer and boil until mixture reaches the temperature for your altitude (see the table below).

Table 14: Temperatures needed to form jam at different altitudes.

| Sea Level | 1,000 ft | 2,000 ft | 3,000 ft | 4,000 | 5,000 ft | 6,000 | 7,000 | 8,000 |
|-----------|----------|----------|----------|-------|----------|-------|-------|-------|
| 220 F | 218 F | 216 F | 214 F | 212 F | 211 F | 209 F | 207 F | 205 F |

Refrigerator test: Remove the jam mixture from the heat. Pour a small amount of boiling jam on a cold plate and put it in the freezing compartment of a refrigerator for a few minutes. If the mixture gels, it is ready to fill.

To distribute fruit through syrup in the finished product, stir mixture gently at frequent intervals, after removing it from the heat. This helps prevent fruit from rising to the top.

Blackberry Jam

Yield: 4 to 5 half-pint jars

4 cups crushed blackberries

4 cups of sugar

To prepare fruit: Sort and wash berries; remove any stems and caps. Crush berries.

To make jam: Measure crushed blackberries into a kettle. Add sugar and stir well. Boil rapidly, stirring constantly or until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Pour into hot, sterile jars; adjust lids. Process in boiling water canner 5 minutes.

Peach Jam

Yield: 4 to 5 half-pint jars.

4 cups crushed peaches (tart variety)

3¼ cups sugar

Combine crushed fruit and sugar. Heat slowly in a heavy saucepan until boiling. Boil rapidly until thickened, about 15 minutes. Stir frequently during cooking to prevent sticking. Pour hot jam into hot jars; adjust lids and process into boiling water canner — pints: 10 minutes; quarts: 10 minutes.

Plum Peach Jam (without added pectin)

Yield: 9 half-pint jars

5 cups red plums (about 3 pounds)

4 cups peaches (about 3 pounds)

8 cups sugar

1 lemon (sliced very thin)

To prepare fruit: sort and wash fruit. Peel and pit peaches; pit plums.

To make jam: Measure the prepared fruit into a kettle. Add sugar and sliced lemon; stir well. Boil rapidly, stirring constantly until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Fill hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

Strawberry Jam

Yield: 4 to 5 half-pint jars.

4 cups crushed strawberries (about 2 quarts)

4 cups sugar

To prepare fruit: Sort and wash strawberries; remove stems and caps. Crush the berries.

To make jam: Measure crushed strawberries into a kettle. Add sugar and stir well. Boil rapidly, stirring constantly, or until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Pour into hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

Jellies

General Directions for Making Jelly

1. Measure juice and sugar into a large container, large enough to prevent jelly from boiling over. Better results will be obtained if jelly is made in small quantities, about 3 to 4 cups of juice.
2. Place on hot unit and quickly bring to a rolling boil.
3. Test doneness. If a thermometer is used, the bulb of the candy thermometer should be covered with the jelly mixture but must not touch bottom of the kettle. Gel stage is reached at 220 F (104 C) at an altitude less than 1,000 feet. At higher elevations, follow the temperatures in the table below.

Table 15: Temperatures needed to form jelly at different altitudes.

| Sea Level | 1,000 ft | 2,000 ft | 3,000 ft | 4,000 | 5,000 ft | 6,000 | 7,000 | 8,000 |
|-----------|----------|----------|----------|-------|----------|-------|-------|-------|
| 220 F | 218 F | 216 F | 214 F | 212 F | 211 F | 209 F | 207 F | 205 F |

If a spoon or sheet test is used, dip spoon into the boiling jelly mixture. Raise spoon 10 to 12 inches above the kettle and turn spoon until syrup runs off the side. If two drops form and drip off the spoon, syrup is near gel state. When the two drops flow together and fall off spoon as one sheet, the jelly should be done.

Another suitable home method is to pour a small amount of boiling jelly syrup on a cold dish and put into the refrigerator for a few minutes. If mixture gels, jelly should be done.

Apple Jelly (without added pectin)

Yield: 3 to 4 half pints

4 cups apple juice (about 3 pounds apples and 3 cups of water)

2 tablespoons strained lemon juice, if desired

3 cups sugar

To prepare juice: Select about one quarter underripe and three quarters fully ripe tart apples. Sort, wash and remove stem and blossom ends. Do not pare or core. Cut apples into small pieces. Add water, cover and bring to boil on high heat. Reduce heat and simmer for 20 to 25 minutes, or until apples are soft. Extract juice.

To make jelly: Measure apple juice into a kettle. Add lemon juice and sugar; stir well. Boil over high heat to 8 F (4 C) above boiling point* of water or until jelly mixture sheets from a spoon.

Remove from heat; skim off foam quickly. Pour jelly immediately into hot, sterile containers. Adjust lids. Process in boiling water canner for 5 minutes.

**The boiling point of water in most areas of Tennessee is 212 F (100 C).*

Blackberry Jelly (without added pectin)

Yield: 3 to 4 pints

4 cups blackberry juice (about 2½ quarts blackberries, ¾ cup water)

3 cups sugar

To prepare juice: select about one-fourth underripe and three-fourths ripe berries. Sort and wash; remove any stems or caps. Crush berries, add water, cover and bring to a boil on high heat. Reduce heat and simmer for 5 minutes. Extract juice.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 F (4 C) above boiling point* of water or until jelly mixture sheets from a spoon.

Remove from heat; skim off foam quickly. Pour jelly immediately into hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

**The boiling point of water in most areas of Tennessee is 212 F (100 C).*

Dewberry Jelly

Follow directions for making blackberry jelly.

Crab Apple Jelly

Yield: 5 half pints

4 cups crab apple juice (about 3 pounds crab apples, 3 cups water)

4 cups sugar

To prepare juice: Select firm, crisp crab apples, about one quarter under-ripe, the rest fully ripe. Sort, wash and remove stem and blossom ends; do not pare or core. Cut apples into small pieces. Add water, cover and bring to boil on high heat. Reduce heat and simmer for 20 to 25 minutes, or until crab apples are soft. Extract juice.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 F (4 C) above boiling point* of water or until jelly mixture sheets from a spoon.

Remove from heat; skim off foam quickly. Pour jelly immediately into hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

**The boiling point of water in most areas of Tennessee is 212 F (100 C).*

Grape Jelly

Yield: 3 to 4 half pints

4 cups grape juice (about 3½ pounds Concord grapes, ½ cup water)

3 cups sugar

To prepare juice: Select about one quarter underripe and three quarters fully ripe grapes. Sort, wash and remove grapes from stems. Crush grapes, add water, cover and bring to boil on high heat. Reduce heat and simmer for 10 minutes. Extract juice. To prevent formation of tartrate crystals in the jelly, let juice stand in a cool place overnight, then strain through two thicknesses of damp cheesecloth to remove crystals that have formed.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 F (4 C) above boiling point* of water or until jelly mixture sheets from a spoon.

Remove from heat; skim off foam quickly. Pour jelly immediately into hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

**The boiling point of water in most areas of Tennessee is 212 F (100 C).*

Plum Jelly

Yield: 3 to 4 pints

4 cups plum juice (about 3½ pounds plums and 1½ cups water)

3 cups sugar

To prepare juice: Select about one quarter underripe and three quarters fully ripe plums. Sort, wash and cut into pieces; do not peel or pit. Crush the fruit, add water, cover and bring to a boil on high heat. Reduce heat and simmer for 15 to 20 minutes, or until fruit is soft. Extract juice.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 F (4 C) above boiling point of water or until mixture sheets from a spoon. Remove from heat, skim off foam quickly. Pour jelly immediately into hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

Strawberry Jam

Yield: 4 to 5 half-pint jars.

4 cups crushed strawberries (about 2 quarts)

4 cups sugar

To prepare fruit: Sort and wash strawberries; remove stems and caps. Crush the berries.

To make jam: Measure crushed strawberries into a kettle. Add sugar and stir well. Boil rapidly, stirring constantly, or until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Pour into hot jars. Adjust lids and process in boiling water canner 5 minutes.

PRESERVES

Select firm ripe fruit of uniform size and shape, or cut large fruit into uniform pieces. During cooking, stir fruit mixture gently and constantly to prevent sticking to pan.

In testing preserves for doneness, use the same methods given for jams.

Cherry Preserves

Yield: 6 half-pint jars

1½ quarts pitted cherries

5½ cups sugar

1 cup water

To prepare fruit: Wash, sort and pit cherries.

To make preserves: Dissolve the sugar in water; bring to boil. Add cherries and boil, stirring gently until fruit is translucent and syrup is thick.

Remove from heat. Fill hot, sterile jars; adjust lids and process in boiling water canner for 5 minutes.

Peach or Pear Preserves

Prepare fruit, cutting into uniform pieces. Use 1 pound of prepared fruit to $\frac{3}{4}$ pound sugar. Combine sugar with enough water to make a thin syrup. Add 1 lemon, thinly sliced, to fruit mixture if desired. Follow directions for making strawberry preserves.

Damson Plum Preserves

Yield: 6 half-pint jars

1½ quarts prepared Damson plums (about 3 pounds)

5½ cups sugar

1 cup water

To prepare fruit: Sort and wash plums; remove pits with pitting spoon, leaving plums whole.

To make preserves: Dissolve the sugar in the water and bring to boiling. Add plums and boil, stirring gently until the fruit is translucent and the syrup is thick.

Remove preserves from the heat and pour at once into hot, sterile jars. Adjust lids and process in boiling water canner for 5 minutes.

Strawberry Preserves

Yield: 4 half-pint jars

6 cups prepared strawberries (about 2 quarts berries)

4½ cups sugar

To prepare fruit: Select large, firm, tart strawberries. Wash and drain; remove caps.

To make preserves: Combine prepared fruit and sugar in alternate layers and let stand for 8 to 10 hours or overnight in the refrigerator or other cool place.

Heat the fruit mixture to boiling, stirring gently. Boil rapidly, stirring as needed to prevent sticking. Cook until the syrup is somewhat thick (about 15 or 20 minutes).

Removes preserves from heat and skim. Pour into hot jars; adjust lids and process in boiling water canner for minutes.

Uncooked Jams

Blackberry or Strawberry Jam — Uncooked

Yield: 5 to 6 half-pint jars

2 cups crushed strawberries or blackberries

4 cups sugar

1 package powdered pectin 1 cup water

Sort, wash and drain berries. Remove caps and crush.

Mix sugar and berries in a large bowl; let stand for 20 minutes. Stir occasionally.

Dissolve pectin in water and bring to a rolling boil. Boil 1 minute. Add hot solution to berry and sugar mixture; stir until thoroughly mixed.

Pour jam into freezer containers or jars to ½ inch from top of container. Cover and let stand at room temperature for 24 hours. Store in refrigerator or freezer. If jam separates, stir to blend. If jam is too soft, heat to boiling temperature. Jam will thicken on cooling.

Uncooked jam may be held in the refrigerator for 3 weeks and in the freezer for a year.

Uncooked jam held at room temperature will become moldy or ferment.

Fruit Butters

Fruit butters are made by cooking the pulp of fruit, usually with sugar and spices, until thick and smooth but soft enough to spread.

Apple Butter

Wash fruit, remove stems and blossom ends and cut in quarters. Add one third to one half as much water* as fruit. Cook apples until soft. Put through a colander, food mill or sieve.

Combine pulp with sugar, using 2 cups pulp to 1 cup sugar. Add spices as desired. Cook mixture slowly, stirring frequently until thick — about 1 to 1½ hours.

Pour hot butter into hot jars, leaving ½-inch headspace. Adjust caps and process in boiling water canner — pints 10 minutes; quarts 10 minutes. If you live at an altitude above 1,000 feet, add extra minutes according to Table 14.

**Sweet cider may be used in place of water if desired.*

Peach Butter

Wash peaches, scald, peel, pit and slice. Cook in own juice or add just enough water to prevent sticking.

Follow recipe for making apple butter but cook mixture for about 30 minutes or until thick.

Pear Butter

Follow recipe for preparing apple butter.

Scorecard for Judging Jellies, Jams, Preserves and Fruit Butters

| | Jellies | Jams | Preserves | Butters | Excellent | Good | Fair | Needs Improving |
|-----------|---|---|---|---|-----------|------|------|-----------------|
| Color | Clear, translucent, natural color of fruit juice | Natural color of fruit – somewhat darker than preserves | Translucent jelly with whole or large pieces of fruit – natural color | Natural color of fruit except spices | | | | |
| Flavor | Natural for product delicate flavor | Rich flavor natural for product | Rich flavor natural for product | Natural for product and spices | | | | |
| Texture | Tender, cuts easily, holds shape – not tough or sticky | Tender, thick consistency, fruit uniformly distributed | Tender, thick consistency; fruit uniformly distributed | Smooth, Medium Thick | | | | |
| Container | Jelly glasses or canning jars, clean and neatly labeled | Standard Mason jar – clean and neatly labeled | Standard Mason jar – clean and neatly labeled | Standard Mason jar – clean and neatly Labeled | | | | |

Table 16: Common problems with jam, jelly and preserves.

| Problem | Cause |
|-----------------------------------|---|
| Jelly soft, does not hold shape | too much juice in proportion to sugar juice low in acid insufficient cooking time |
| Weeping of jelly (syneresis) | juice mixture contains too much acid storage place too warm |
| Fermentation of jelly (syneresis) | not enough sugar in proportion to ice improper seal (not airtight) |
| Jelly too firm | too much pectin overcooking |
| Tough jelly | not enough sugar in proportion to juice resulting in overcooking |
| Mold on jam or jelly | improper seal allows mold to enter container |
| Crystals in jelly | too much sugar for amount of juice too little cooking after adding sugar jelly exposed to air — causing formation of crystals on top due to evaporation of liquid crystals on grape jelly may be tartrate crystals (see page 40) |
| Cloudy jelly | improper extraction of juice — pressing juice from fruit instead of letting it drip using green fruit (underripe) in preparing juice |
| Excessive shrinking of preserves | syrup too heavy for fruit used — juice drawn out of fruit much faster than syrup enters fruit |

Table 17. Metric conversion table.

| To change: | to | Multiply by: |
|----------------------------|-------------------------|--------------------------|
| ounces (oz.) | grams (g) | 28 |
| pounds (lbs.) | kilograms (kg) | 0.45 |
| teaspoons | milliliters (ml) | 5 |
| tablespoons | milliliters (ml) | 15 |
| fluid ounces | milliliters (ml) | 30 |
| cups | liters (l) | 0.24 |
| pints (pt.) | liters (l) | 0.47 |
| quarts (qt.) | liters (l) | 0.95 |
| gallons (gal.) | liters (l) | 3.8 |
| Fahrenheit temperature (F) | Celsius temperature (C) | 5/9 after subtracting 32 |

Table 18: Definition of preservation terms.

| | |
|------------------------------|--|
| Bacteria | Microorganisms (invisible to naked eye) are always present in the air, soil and water. |
| Blanching | Heating a food in boiling water or steam a given length of time. |
| Boiling water canner | Any large metal container may be used if it is deep enough for water to cover the tops of jars as much as 2 to 4 inches and boil freely. A rack is needed to hold jars off the bottom of the canner to allow water to circulate under them. The canner must also have a cover or lid. All acid foods such as fruits and pickles are processed in a boiling water canner. |
| Brining | A curing process using salt. For pickles or kraut, salt is combined with the raw food and cured (fermented) for about three to five weeks. |
| <i>Clostridium botulinum</i> | A spore-forming bacterium that can produce a poisonous toxin under certain conditions if the spore is not destroyed. These bacteria do not grow in air. High-acid content of foods also deters their growth. But these bacteria, if not destroyed, grow well in closed jars of low-acid foods. |
| Enzymes | Enzymes are chemical substances found in all animals and plants. Enzymes in foods help them grow and mature. After maturity, continued activity of enzymes causes loss of flavor and color if they are not destroyed or inactivated. |

| | |
|-----------------|---|
| Fermentation | A curing process using salt. For pickles or kraut, salt is combined with the raw food and cured (fermented) for about three to five weeks. |
| Microorganisms | Organisms invisible without the use of a microscope. |
| Molds | A microorganism — fungi that form filaments and if not controlled, cause food spoilage. |
| Pickling | <ol style="list-style-type: none"> 1. Fermenting food in a salt brine. An acid (lactic acid) is formed during the fermenting or brining process. 2. Using vinegar, (acetic acid) to make food high in acid. |
| Pressure canner | A large kettle with a lid designed to hold steam in the kettle. The lid is also equipped with a gauge for controlling pounds of pressure. All low-acid foods such as meat and vegetables are processed in a pressure canner. |
| Processing | The heating of food to destroy spoilage organisms. |
| Yeast | A microorganism — a very small plant that if not controlled may cause food spoilage. |

Index

- acid foods, 7, 9, 14, 15, 26, 41, 78, 79
- altitude, 8, 27, 66, 68, 70, 75
- altitude tables, 12, 13
- alum, 39
- answers to canning questions, 36
- apple butter, 75
- apple jelly, 70, 71
- applesauce, 17
- approximate yields, 15, 26
- apricots, 15, 67
- asparagus, 26
- bacteria, 6, 7, 12, 14, 37, 41, 64, 78
- beans, 11, 12, 13, 28, 29, 31, 33, 45
- beets, 26, 29, 48
- berries, 15
- blackberries, 65, 68, 71, 74
- blanch, 30
- boiling water canner, 7, 8, 12, 14, 15, 17, 20, 22, 26, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58, 59, 61, 62, 66, 68, 69, 70, 71, 72, 73, 74, 75, 79
- botulism, 27
- bread and butter pickled squash, 59
- bread and butter pickles, 47
- Canning
 - Vegetables, 25
- canning jars, 40, 62, 66
- carrots, 26
- catsup, 58, 63, See also ketchup
- cherries, 15, 18, 73
- chili sauce, 57
- chow-chow (piccalilli), 54, 63
- chutney, 38, 55
- Clostridium botulinum*, 26, 27, 41, 78
- corn, 11, 16, 30, 31, 53
- corn relish, 53
- corn, cream style, 30
- corn, whole kernel, 30, 31, 53
- cucumber pickles, 43, 44
- Damson plum, 73
- dill pickles, 41, 45, 51
- dilled green beans, 45
- enzymes, 6, 78
- equipment, 6, 8, 14, 40, 65
- fermentation, 38, 41, 42
- fruit butters, 75
- fruit juice, 16, 20, 65, 76
- fruits, 7, 8, 11, 15, 16, 37, 38, 39, 40, 65, 66, 67, 68, 79
- grape jelly, 72, 77
- grape juice, 20, 72
- green tomato pickles, 52
- greens, 31, 34
- honey, 16
- hot pack, 11, 17, 18, 19, 22, 28, 29, 30, 31, 32, 33, 34, 42, 44
- jam, 65, 68, 69, 72, 74
- jam, uncooked, 74
- jar lid, 11, 45, 48
- jelly, 20, 65, 66, 68, 70, 71, 72, 76, 77
- ketchup, 57, See also catsup
- lima beans, 31
- lime, 39
- low-acid foods, 14, 26, 41, 78, 79
- metric conversion table, 78
- mold, 6, 7, 14, 39, 41, 64, 66, 74, 77, 78
- no sugar-added pickled products, 62
- okra, 26, 31, 49
- peach butter, 75
- peaches, 12, 15, 17, 18, 19, 38, 50, 64, 69, 75
- pear butter, 75
- pears, 15, 19, 38, 50
- peas, 11, 26, 28, 32, 33
- pectin, 65, 66, 67, 69, 70, 71, 74, 77
- peppers, 41, 49, 51, 53, 57, 58, 59, 60
- pickle troubles and what causes them, 64
- plums, 15, 19, 65, 67, 69, 72, 73
- potatoes, 26, 31, 32
- potatoes, Irish, 26
- potatoes, sweet, 26, 31
- potatoes, white, 32
- preserves, 17, 65, 66, 73, 74, 76, 77
- pressure canner, 7, 8, 9, 10, 12, 13, 15, 21, 22, 23, 26, 27, 28, 36, 37, 79
- processing time tables, 17, 20, 22, 28
- pumpkin, 26, 33
- quick party pickle, 51
- relish, 41, 58, 60, 63
- remaking soft jelly, 65
- reprocessing, 13

rhubarb, 19, 67
sauerkraut, 38, 42
scorecards for judging, 24, 35, 63, 76
sealing jars, 8, 9, 10, 11, 13, 40, 66
spinach, 26, 34
squash, 26, 31, 33, 59, 60, 61
steam canner, 8, 40
strawberries, 15, 67, 69, 72, 74
sweet pickle sticks, 44

.....

syrup for canning, 11, 16, 17, 18, 19, 32, 37, 38,
40, 47, 50, 51, 56, 65, 68, 70, 73, 74, 77
terms, 78
tests for jams and jellies, **68**
tomato apple chutney, 55
utensils, 40
watermelon pickles, 56
yeast, 6, 7, 14, 64, 79

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