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Preserving Food in Wyoming

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Recommendations follow U.S. Department of Agriculture (USDA) 2015 Canning Guidelines.

Food preservation research is continually being conducted and, based on the results of this research, recommendations may be updated. Please contact your local UW Extension office or use the UW Extension website (www.uwyo.edu/uwe) for the most current food preservation recommendations.

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Other UW Extension food preservation publications **MP-147 *Canning Problems and Preventions*** and **MP-152 *Food Preservation with Reduced or No Salt or Sugar*** can be downloaded at www.wyoextension.org/publications. Food preservation, safety, and nutrition information is available at uwyoextension.org/uwnutrition.

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SPECIAL CONSIDERATIONS FOR CANNING IN WYOMING

Altitude

Canning food in Wyoming differs from canning in many other locations because of the high altitudes found in our state. There is lower atmospheric pressure at high altitudes, which causes water to boil at a lower temperature. Consequently, altitude adjustments must be made when home canning.

The following guidelines have been established by the University of Wyoming Extension (UWE) and are recommended for all home canning in Wyoming.

High-altitude adjustments

Canning processes require adjustments for all Wyoming locations. Processing times for boiling water canning must be increased, while pressure canning requires higher pressure. The U.S. Department of Agriculture (USDA) changed the processing time for many foods in 1988 with the publication of the *Complete Guide to Home Canning*.[1] Additional revisions were made in 1994, 2009, and 2015. To ensure safe home canning, it is crucial to follow recipes with the most current processing times established by the USDA.

All recipes in this book are tailored for high altitude. Recipes included in the USDA *Complete Guide to Home Canning* also include processing times with altitude adjustments for each of the specific products. Canning recipes from other approved sources are based on elevations at or below 1,000 feet above sea level. Make adjustments to those recipes based on the specific altitude at which you are canning. Utilize the following charts to adjust the approved recipe you are using.

Chart 1. Boiling water canner altitude adjustments for high-acid foods

Altitude in Feet	Increase in Processing Time[2]
1,001–3,000	5 minutes
3,001–6,000	10 minutes
6,001–8,000	15 minutes
8,001–10,000	20 minutes

1 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.
2 Ball Blue Book. (2020). *Fresh preserving: Recipes and techniques for today's home canning* (37th ed.).

Chart 2. Pressure canner altitude adjustments for low-acid foods

Altitude in Feet	Weighted Gauge	Dial Gauge[3]
0–1,000	10	11
1,001–2,000	15	11
2,001–4,000	15	12
4,001–6,000	15	13
6,001–8,000	15	14
8,001–10,000	15	15

Reheating low-acid canned food with a margin of safety against botulism

Low-acid canned vegetables and meats can harbor *Clostridium botulinum* toxin(botulism) without exhibiting spoilage signs. Considering the challenges posed by high-altitude food preservation, the current recommendation from UW Extension emphasizes an additional safety precaution. To safeguard against potential botulism, boil ***all*** home-canned, low-acid vegetables and meats in an uncovered saucepan for 10 minutes, adding an additional minute for every 1,000 feet above sea level (e.g., 15 minutes at 5,000 feet). If the food appears spoiled, develops foam, or emits an unusual odor during heating, it should be promptly discarded.

Microwave heating, due to its uneven distribution of heat, is not an acceptable substitute for the recommended margin-of-safety heating process detailed above.[4]

It's essential to emphasize that reheating with the margin-of-safety method isn't a suggestion to eat canned foods that weren't processed correctly. Handling canned foods that may contain botulinum toxin is inherently dangerous and should be avoided. For instructions on how to detoxify questionable food jars, consult pages 1-26 and 1-27 of the 2015 edition of the USDA *Complete Guide to Home Canning*.[5]

See "Reheating fish with a margin of safety against botulism" on page 148.

Ingredients

Never personally create your own home-canning recipes. Do not add or change the ingredients or proportions in tested home-canning recipes unless using safe, tested, and approved changes and substitutions allowed from an approved and reliable source. Doing so could compromise the safety of the product. For approved changes and substitutions, please refer to the bulletin from North Dakota State University

3 Ball Blue Book. (2020). *Fresh preserving: Recipes and techniques for today's home canning* (37th ed.).
4 *Fundamentals of Consumer Food Safety and Preservation: Master Handbook*
5 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

Extension and the North Central Food Safety Extension Network entitled "Play it Safe! Safe Changes and Substitutions to Tested Canning Recipes" located on the University of Wyoming Extension Nutrition and Food Safety website.

Jars

For home canning, use standard canning jars crafted from tempered glass. Commercial jars, such as those used for mayonnaise, are unsuitable for canning due to their limited sealing surface area, which hinders the creation of a secure seal, and their susceptibility to breakage. It is of utmost importance to exercise careful handling of canning jars to facilitate their repeated use, as long as a fresh lid is employed for each subsequent use.

Jar cleaning and preparation guidelines

Cleaning

Before every use, wash empty jars in hot water with detergent and rinse well by hand, or wash in a dishwasher. Unrinsed detergent residues may cause unnatural flavors and colors. Jars should be kept hot until ready to fill with food. Submerge the clean, empty jars in enough water to cover them in a large stockpot or boiling water canner. Bring the water to a simmer (180°F) and keep the jars in the simmering water until it is time to fill them with food. A dishwasher may be used for preheating jars if they are washed and dried on a complete regular cycle. Keep the jars in the closed dishwasher until needed for filling. These washing and preheating methods do not sterilize jars.

Sterilizing

To sterilize empty jars, put them open side up on a rack in a boiling water canner. Fill the jars and canner with hot (not boiling) water to 1 inch above the top of the jars. Boil for 10 minutes at altitudes less than 1,000 feet elevation. Add 1 additional minute for each additional 1,000 feet of elevation. Using a jar lifter, carefully remove and drain hot jars one at a time and fill immediately with food. Sterilization is only necessary for foods that will be processed for less than 10 minutes in a boiling water canner or pressure canner.

Descaling

Some used jars may have a white film on the exterior surface caused by mineral deposits. This scale or hard-water film on jars is easily removed by soaking jars several hours in a solution containing 1 cup of vinegar (5% acidity) per gallon of water prior to washing and preheating the jars.

How to make a jelly bag

If you do not have a jelly bag, you can make one out of a clean old sheet or pillowcase using two pieces of material (8 inches by 12 inches) sewn together on three sides. Wash sheets or pillowcases before using. Do not use fabric softener. Dampen the jelly bag before adding fruit juice. This encourages the juice to start dripping through the bag. Squeezing the jelly bag forces through bits of pulp that will cloud the jelly.

JELLIES, JAMS, AND SPREADS

General Canning Procedures

Prepare products as described in the following pages. All products should be filled hot into half-pint or pint canning jars, leaving ¼-inch headspace (½-inch headspace for Zucchini Pineapple Spread, page 13).

Do not seal jars with paraffin.

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot jars with the product you are canning, being sure to leave the correct headspace as specified. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars in a boiling water canner for the specified time as recommended by the recipe you are following. This will ensure that the food is properly preserved and safe to eat.
8. *Do not seal jars with paraffin,* as this method is not safe for preserving food. Processing in a boiling water bath is necessary to destroy molds and yeasts that can cause spoilage.
9. After processing, follow the after-processing steps on page 6.

Boiling water canning

To process in a boiling water canner, fill canner halfway with water, and preheat to 180°F. Load filled jars into canner rack and lower with handles, or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When water boils vigorously, lower heat to maintain a gentle boil, and process jars for the recommended time listed in Table 1 (page 6).

Table 1. Recommended processing times for jellies, jams, and spreads in a boiling water canner at designated altitudes

Processing Time				
Product	**Style of Pack**	**Jar Size**	**3,001–6,000 feet (minutes)**	**Above 6,000 feet (minutes)**
All jellies and jams with or without added pectin	Hot	Half-pints or Pints	10	15
Zucchini Pineapple Spread	Hot	Half-pints or Pints	20	25
Peach Pineapple Spread	Hot	Half-pints Pints	20 30	25 35

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use the contents within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Jellies, jams, and spreads are best if used within one year.

Making jelly without added pectin

Use only firm fruits, which are naturally high in pectin. Select a mixture of about ¾ ripe and ¼ underripe fruit. Overripe fruit contains high amounts of mold spores and is not recommended. One pound of fruit should yield at least 1 cup of clear juice. Do not use commercially canned or frozen fruit juices because their pectin content is too low. Use of peels or cores adds pectin to the juice during cooking of the fruit and increases jelly firmness.

Wash all fruits thoroughly before cooking. Do not soak. Extract the juice with a steam juicer as directed by manufacturer or the following method. Cut firm, larger fruits into small pieces. Crush soft fruits and berries. Add water to fruits as listed in Table 2 (page 7). Put fruit and water in a large saucepan and bring to a boil. Simmer, stirring occasionally to prevent scorching, for the amount of time listed or until the fruit is soft and tender.

Table 2. Measures for preparing jellies without pectin

Fruit	Cups water added per pound of fruit	Minutes to simmer before extracting juice	Add to each cup of strained juice		Yield from 4 cups of juice (half-pints)
			Sugar (cups)	Commercially bottled lemon juice	
Apples	1	20–25	¾	1½ teaspoons	4–5
Blackberries	0–¼	5–10	¾–1	--	7–8
Crab Apples	1	20–25	1	--	4–5
Grapes	0–¼	5–10	¾–1	--	8–9
Plums	½	15–20	¾	--	8–9

Put the prepared fruit in a damp jelly bag (page 4) or a large sieve or strainer lined with two layers of damp cheesecloth on top of another pot. Let sit for several hours or overnight in the refrigerator. The clearest jelly comes from juice that has dripped through a jelly bag or cheesecloth without pressing or squeezing. If the juice is pressed, re-strain it through a double thickness of damp cheesecloth or a damp jelly bag; do not squeeze the cloth or bag. Avoid mixing or disturbing the sediment on the bottom of the pot. Pour off the clear liquid into a clean container to be used for making the jelly. Sediment on the bottom of the pot should be discarded.

Using no more than 6 to 8 cups of extracted fruit juice at a time, measure and combine the proper quantities of fruit juice, sugar, and commercially bottled lemon juice in Table 2 (page 7), and heat to boiling. Stir until the sugar is dissolved. Boil over high heat, stirring frequently, until the gelling point is reached.

Never double a jam or jelly recipe as this can cause gel failure.

To test jelly doneness, use one of the following methods:

- **Temperature test**—Use a jelly or candy thermometer, and boil until the temperature of the mixture reaches the temperature listed for your altitude:

  3,000 ft.–approximately 214°F
  4,000 ft.–approximately 212°F
  5,000 ft.–approximately 211°F
  6,000 ft.–approximately 209°F
  7,000 ft.–approximately 207°F
  8,000 ft.–approximately 205°F

  Note: The temperatures have been adjusted for each altitude by adding 9°F to the boiling point of water at that altitude.

- **Sheet or spoon test**—Dip a cool metal spoon in the boiling jelly mixture. Raise the spoon about 12 inches above the pan (out of steam). Turn the spoon so the liquid runs off the side. The jelly is done when the syrup forms two drops that flow together and sheet or hang off the edge of the spoon.

Once the jelly has reached the desired consistency, remove it from heat and quickly skim off any foam that has formed on the surface using a metal spoon. Using a wide-mouth funnel and a ladle, pour the jelly into hot pint or half-pint jars, leaving ¼ inch of headspace at the top. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Making jams without added pectin

For best flavor, use fully ripe fruit. Wash and rinse all fruits thoroughly before cooking. Do not soak. 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.

Using the ingredients in Table 3 (page 9), measure crushed fruit into a large saucepan. Add sugar, and bring to a boil while stirring rapidly and constantly. Continue

to boil until the mixture thickens. As you test for thickness, remember to allow for thickening during cooling.

Table 3. Measures for preparing jam without pectin

Fruit	Cups crushed fruit	Cups sugar	Tablespoons commercially bottled lemon juice	Jam yield (half-pints)
Apricots	4–4½	4	2	5–6
Berries*	4	4	0	3–4
Peaches	5½–6	4–5	2	6–7
Strawberries	4	4	0	4
*Includes blackberries, boysenberries, dewberries, gooseberries, loganberries, and raspberries				

To test for thickness, use one of the following methods:

- **Temperature test**—Use a jelly or candy thermometer, and boil until the temperature of the mixture reaches the temperature listed for your altitude:

  3,000 ft.–approximately 214°F
  4,000 ft.–approximately 212°F
  5,000 ft.–approximately 211°F
  6,000 ft.–approximately 209°F
  7,000 ft.–approximately 207°F
  8,000 ft.–approximately 205°F

  Note: The temperatures have been adjusted for each altitude by adding 9°F to the boiling point of water at that altitude.

- **Refrigerator test**—Jam should be removed from heat for this test. Pour a small amount of boiling jam onto 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 the jars.

Once the jam has reached the desired consistency, remove it from heat and quickly skim off any foam that has formed on the surface using a metal spoon. Using a wide-mouth funnel and a ladle, pour the jam into hot pint or half-pint jars, leaving ¼ inch of headspace at the top. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Jellies and jams with added pectin

When making jelly or jam, you can use commercially prepared powdered or liquid pectins with fresh fruits and juices, as well as commercially canned or frozen fruit juice. It's important to follow the specific order of combining ingredients according to the type of pectin being used, and to use the type of pectin (powdered or liquid) specified in the recipe. Packaged pectin usually comes with complete directions for a variety of fruits. Adding pectin to your jelly or jam recipe requires less cooking time, typically yields a larger amount, and results in a more natural fruit flavor. Additionally, adding pectin eliminates the need to test for doneness. It's worth noting that while adding ½ teaspoon of butter or margarine with the juice and pectin can reduce foaming, these ingredients may cause an off flavor in jellies and jams during long-term storage.

The following recipes are normally available with packaged pectin:

- **Jellies**—Fruits include apple, crab apple, blackberry, boysenberry, dewberry, currant, elderberry, grape, mayhaw, peach, plum, black raspberry, red raspberry, loganberry, rhubarb, and strawberry. Mint, an herb, also makes good jelly.
- **Jams**—Fruits include apricot, blackberry, boysenberry, dewberry, loganberry, red raspberry, youngberry, blueberry, cherry, currant, fig, gooseberry, grape, orange (for orange marmalade), peach, pear, plum, strawberry, and spiced tomato. Rhubarb, technically a vegetable, also makes good jam.

Be sure to use canning jars and self-sealing two-piece lids, and process the jars in boiling water as described in Table 1 (page 6). Purchase packaged pectin each year. Old pectin may result in poor gel.

The following jelly and jam recipes use packaged pectin.

Grape Plum Jelly with Pectin

3½ pounds ripe plums
3 pounds Concord grapes*
1 cup water
½ teaspoon butter (optional ingredient to reduce foaming**)
8½ cups sugar
1 box (1¾ ounces) or 6 tablespoons powdered pectin

Yield: about 10 half-pints or 5 pints

*Concord grapes are recommended; other varieties can be used but the texture of the final product may be less than optimal.
**May cause an off flavor in jellies and jams during long-term storage.

Wash and pit plums; do not peel. Wash grapes. Thoroughly crush plums and grapes, one layer at a time, in a saucepan. Add water. Bring to a boil, cover, and simmer 10 minutes. Strain juice through a jelly bag (page 4) or double layer of cheesecloth. Measure sugar and set aside. Combine 6½ cups juice with butter (if desired) and pectin in a large saucepan. Bring to a hard boil over heat, stirring constantly. Add the sugar and return to a full boil. Boil hard for 1 minute, stirring constantly. Remove from heat, quickly skim off foam using a metal spoon, and fill hot pint or half-pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Strawberry Rhubarb Jelly with Pectin

1½ pounds red-stalked rhubarb
1½ quarts ripe strawberries
½ teaspoon butter or margarine (optional ingredient to reduce foaming*)
6 cups sugar
6 ounces liquid pectin

Yield: about 7 half-pints or 3 pints

*May cause an off flavor in jellies and jams during long-term storage.

Wash and cut rhubarb into 1-inch pieces, and blend or grind. Wash, stem, and crush strawberries, one layer at a time, in a saucepan. Place both fruits in a jelly bag (page 4) or double layer of cheesecloth and gently squeeze out juice. Put 3½ cups of juice into a large saucepan. Add butter or margarine (if desired) and sugar, thoroughly mixing into juice. Bring to a boil over high heat, stirring constantly. Immediately stir in liquid pectin. Bring to a full rolling boil, and boil hard for 1 minute, stirring constantly. Remove from heat, quickly skim off foam using a metal spoon, and fill hot pint or half-pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Pear Apple Jam with Pectin

2 cups peeled, cored, and finely chopped pears (about 2 pounds)
1 cup peeled, cored, and finely chopped apples
6½ cups sugar
¼ teaspoon ground cinnamon
⅓ cup commercially bottled lemon juice
6 ounces liquid pectin

Yield: about 7 to 8 half-pints or 4 pints

Crush apples and pears in a large saucepan, and stir in cinnamon. Thoroughly mix sugar and commercially bottled lemon juice with fruits and bring to a boil over high heat, stirring constantly. Immediately stir in pectin. Bring to a full rolling boil, and boil hard 1 minute, stirring constantly. Remove from heat, quickly skim off foam using a metal spoon, and fill hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Blueberry Spice Jam with Pectin

2½ pints ripe blueberries
1 tablespoon commercially bottled lemon juice
½ teaspoon ground nutmeg or cinnamon
5½ cups sugar
¾ cup water
1 box (1¾ ounces) or 6 tablespoons powdered pectin

Yield: about 5 half-pints or 2 pints

Wash and thoroughly crush blueberries, one layer at a time, in a large saucepan. Add commercially bottled lemon juice, spice, and water. Stir in pectin and bring to a full rolling boil over high heat, stirring frequently. Add sugar, and return to a full rolling boil. Boil hard for 1 minute, stirring constantly. Remove from heat, quickly skim off foam using a metal spoon, and fill hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Zucchini Pineapple Spread

4 quarts cubed or shredded zucchini
46 ounces canned unsweetened pineapple juice
1½ cups commercially bottled lemon juice
3 cups sugar

Yield: about 8 to 9 pints or 16 to 18 half-pints

Peel zucchini. Cut into ½-inch cubes or shred. Mix zucchini with other ingredients in a large saucepan, and bring to a boil. Simmer 20 minutes. Fill hot pint or half-pint jars with hot mixture and cooking liquid, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Peach Pineapple Spread

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

Yield: 5 to 6 half-pints or 3 pints

Thoroughly wash 4 to 6 pounds of firm, ripe peaches. Drain well. Peel and remove pits. Grind fruit flesh with a food processor using a medium or coarse blade; or crush with a fork; or chop coarsely with a knife. Do not use a blender because fruit will be chopped too finely to make a true pulp. Place ground or crushed fruit in a 2-quart saucepan. Heat slowly to release juice, stirring constantly, until fruit is tender. Place cooked fruit in a jelly bag (page 4) or strainer lined with four layers of cheesecloth.

Allow juice to drip for about 15 minutes. Save the juice for jelly or other uses. Measure 4 cups of the drained fruit pulp for making spread. Combine the 4 cups of pulp, pineapple, and commercially bottled lemon juice in a 4-quart saucepan. Add up to 2 cups of sugar, if desired, and mix well. Heat and boil gently for 10 to 15 minutes, stirring enough to prevent sticking. Fill quickly into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process the jars as described in Table 1 (page 6). After processing, follow the after-processing steps on page 6.

Variations: This recipe can be made with any combination of peaches, nectarines, apricots, and plums. It can also be made without sugar or up to 2 cups sugar. Nonnutritive sweeteners may be added; however, if aspartame (a low-calorie sweetener) is used, the sweetening power may be lost within three to four weeks. Alternatively, nonnutritive sweeteners can be added after processing and just prior to serving.

Reduced Sugar Fruit Spread Recipes

A variety of fruit spreads can be made that are tasty, yet lower in sugars and calories than regular jams and jellies. The following are recipes for reduced sugar fruit spreads. Gelatin may be used as a thickening agent, as indicated in the two following recipes. Sweet fruits, apple juice, spices, and/or a liquid, low-calorie sweetener are used to provide the sweet flavor of these fruit spreads. When gelatin is used in the recipe, the jars of spread should not be processed (because heating will cause loss of the gel). These fruit spreads should be refrigerated and used within four weeks.

Refrigerated Grape Spread with Gelatin

2 tablespoons unflavored gelatin powder
24 ounces commercially bottled unsweetened grape juice
2 tablespoons commercially bottled lemon juice
2 tablespoons liquid low-calorie sweetener

Yield: 3 half-pints

In a saucepan, soften the gelatin in the grape and commercially bottled lemon juices. Bring to a full rolling boil to dissolve gelatin. Boil for 1 minute, and remove from heat. Stir in sweetener. Fill quickly into sterile half-pint jars, leaving ¼-inch headspace. Wipe rims of jars with a clean, damp paper towel. Add lids. **Do not process or freeze. Store in the refrigerator, and use within four weeks.**

Refrigerated Apple Spread with Gelatin

2 tablespoons unflavored gelatin powder
32 ounces commercially bottled unsweetened apple juice
2 tablespoons commercially bottled lemon juice
2 tablespoons liquid low-calorie sweetener
Food coloring, if desired

Yield: 4 half-pints

In a saucepan, soften the gelatin in apple and commercially bottled lemon juices. Bring to a full rolling boil to dissolve gelatin. Boil for 2 minutes, and remove from heat. Stir in sweetener and, if desired, food coloring. Fill quickly into hot sterile half-pint jars, leaving ¼-inch headspace. Wipe rims of jars with a clean, damp paper towel. Add lids. **Do not process or freeze. Store in the refrigerator, and use within four weeks.**

Variation: For spiced apple spread, add two 3-inch sticks of cinnamon and four whole cloves to mixture before boiling. Remove both spices before adding sweetener and food coloring.

FRUIT

Apples

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. (Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food.) Steam-blanch a single layer of sliced apples 3 minutes, or place 5 cups of apples at a time in 1 gallon of boiling water and blanch 1½ minutes after water returns to a boil. Cool in very cold water and drain. Cover surfaces with ½ cup sugar for every 4 cups of sliced apples. To prepare applesauce, follow procedure in canning section. To package sauce or slices for freezing, fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top, and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and leakage.

Canning procedure

1. Prepare apple products as described in the following recipes.
2. Wash jars following jar cleaning and preparation guidelines (page 3).
3. Fill the hot jars with the product you are canning, being sure to leave ½-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. After screw bands are tightened, jars should be processed in a boiling water or pressure canner.

Process: Boiling water

To process in a boiling water canner, fill canner halfway with water, and preheat to 180°F. Load filled jars into canner rack and lower with handles, or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When water boils vigorously, lower heat to maintain a gentle boil, and process jars for the recommended time listed in Table 4 (page 17). Follow the after-processing steps on page 18.

Table 4. Recommended processing times for apple products in a boiling water canner at designated altitudes

Product	Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 feet (minutes)
Apple butter	Hot	Half-pints or Pints Quarts	10 15	15 20
Apple juice	Hot	Pints or Quarts Half-gallons	10 15	15 20
Applesauce	Hot	Pints Quarts	20 30	25 35
Apples, sliced	Hot	Pints or Quarts	30	35
Spiced apple rings	Hot	Half-pints or Pints	15	20
Spiced crab apples	Hot	Pints	30	35

Process: Pressure

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid, and heat canner on high setting. Allow steam to escape in a full, steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure, and process jars for the time given in Table 5 (page 18). Do not allow the pressure to drop below the recommended pressure for your altitude. Follow the after-processing steps on page 18.

Table 5. Recommended processing times and pressures for apples in a pressure canner at designated altitudes

Product	Style of pack	Jar size	Processing time (minutes)	Dial Gauge*			Weighted Gauge
				2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Apples, sliced	Hot	Pints or Quarts	8**	7	8	9	10
Applesauce	Hot Hot	Pints Quarts	8** 10	7 7	8 8	9 9	10 10

*Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.

**For products processed less than 10 minutes, use sterilized jars. To sterilize empty jars, put them open side up on a rack in a boiling water canner. Fill the jars and canner with hot (not boiling) water to 1 inch above the top of the jars. Boil for 10 minutes at altitudes less than 1,000 feet elevation. Add 1 additional minute for each additional 1,000 feet of elevation. Using a jar lifter, carefully remove and drain hot jars one at a time and fill immediately with food.

After processing

1. **Boiling water canning**: When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. **Pressure canning**: When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
3. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
4. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
5. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.

6. If the lid is unsealed, refrigerate the jar and use within recommended times:

   - Applesauce, slices, or juice—within 1 week
   - Spiced rings or crab apples—within 2 months
   - Apple butter—within 6 months

7. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
8. Wash the screw bands and store them separately.
9. Products are best if used within one year.

Apple Butter

Recommended varieties: Jonathan, Winesap, Stayman, Golden Delicious, McIntosh, or similar varieties.

8 pounds apples
2 cups cider
2 cups vinegar (5% acid)
2¼ cup white sugar
2¼ cups packed brown sugar
2 tablespoons ground cinnamon
1 tablespoon ground cloves

Yield: about 8 to 9 pints or 16 to 18 half-pints or 4 quarts

Wash, remove stems, quarter, and core apples. Cook slowly in cider and vinegar until soft. Press apples through a colander, food mill, or strainer. Cook fruit pulp with sugar and spices, stirring frequently.

To test for doneness, remove a spoonful and hold it away from steam for 2 minutes. It is done if the apple butter remains mounded on the spoon. Another way to determine when the butter is cooked adequately is to spoon a small quantity onto a plate. When a rim of liquid does not separate around the edge of the butter, it is ready for canning.

Fill hot product into hot half-pint, pint, or quart jars, leaving ¼-inch headspace. Remove air bubbles by running a rubber spatula through the filled jars and between the food and side of the jar in several places. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw band. Process jars as listed in Table 4 (page 17). Follow the after-processing steps on page 18.

Apple Juice

Good-quality apple juice is made from a blend of apple varieties. For best results, buy fresh juice from a local cider maker within 24 hours after it has been pressed (or make your own juice if you have a press).

Refrigerate juice for 24 to 48 hours. Without mixing, carefully pour off clear liquid and discard sediment. If desired, strain clear liquids through a paper coffee filter or double layers of damp cheesecloth.

Heat quickly, stirring occasionally, until juice begins to boil. Fill immediately into hot pint or quart jars, or fill into hot half-gallon jars, leaving ¼-inch headspace. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as listed in Table 4 (page 17). Follow the after-processing steps on page 18.

Applesauce

An average of 21 pounds is needed per canning load of 7 quarts; an average of 13½ pounds is needed per canner load of 9 pints. A bushel weighs 48 pounds and yields 14 to 19 quarts of sauce. An average of 3 pounds makes a quart of canned applesauce.

Select apples that are sweet, juicy, and crisp. For a tart flavor, add 1 to 2 pounds of tart apples to every 3 pounds of sweeter fruit. Apple varieties suitable for making applesauce include combinations of Golden Delicious, McIntosh, Johnathan, Granny Smith, Idared, and York Imperial. Red Delicious apples are best for eating fresh and are not a good choice for canning.

Wash, peel, core, and slice apples. If desired, slice apples into water containing ascorbic acid to prevent browning, as described for making sliced apples (page 21).

Place drained slices in an 8- to 10-quart pot. Add ½ cup water and heat, stirring occasionally to prevent burning. Heat the apples until tender (5 to 20 minutes, depending on maturity and variety).

Press through a sieve or food mill, or skip the pressing step if chunky-style sauce is preferred. If desired, add ⅛ cup sugar per quart of sauce. Taste and add more sugar if desired. Reheat sauce to boiling.

Fill hot pint or quart jars with hot sauce, leaving ½-inch headspace. Remove air bubbles by running a rubber spatula through the filled jars and between the food and side of the jar in several places. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 4 (page 17, boiling water canner) or Table 5 (page 18, pressure canner). Follow the after-processing steps on page 18.

Sliced Apples

An average of 19 pounds is needed per canner load of 7 quarts; an average of 12¼ pounds is needed per canner load of 9 pints. A bushel weighs 48 pounds and yields 16 to 19 quarts, which is an average of 2¾ pounds per quart.

Select apples that are juicy and crisp. If possible, use a combination of sweet (such as Golden Delicious) and tart varieties (such as Rome Beauty, Granny Smith, or Johnathan) or select varieties that have both a sweet and tart flavor like Empire, McIntosh, or Braeburn. The hot pack method described below yields higher-quality products than raw pack.

Wash, peel, core, and slice apples. **Keep apples in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration.** Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.

Place drained slices in a large saucepan, and add 1 pint water or very light or light syrup for each 5 pounds of sliced apples.

- To make **very light syrup** for a canner load of 7 quarts, mix 1¼ cups sugar in 10½ cups water and heat to dissolve sugar.
- To make a **light syrup**, mix 2¼ cups sugar in 9 cups water and heat to dissolve sugar.

Boil 5 minutes, stirring occasionally. Fill hot pint or quart jars with hot slices and hot syrup or water, leaving ½-inch headspace. Remove air bubbles by running a rubber

spatula through the filled jars and between the food and side of the jar in several places. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 4 (page 17, boiling water canner) or Table 5 (page 18, pressure canner). Follow the after-processing steps on page 18.

Spiced Apple Rings

12 pounds firm tart apples (maximum diameter 2½ inches)
12 cups sugar
6 cups water
1¼ cups white vinegar (5% acid)
3 tablespoons whole cloves
¾ cup red hot cinnamon candies or 8 cinnamon sticks
1 teaspoon red food coloring (optional, especially if using cinnamon candies)

Wash apples. Peel and core one apple at a time; then immediately cut crosswise into rings ½ inch thick. **Keep apples in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.**

To make **flavored syrup**, combine sugar, water, vinegar, cloves, cinnamon candies or cinnamon sticks, and, if desired, food coloring in a 6-quart saucepan. Stir, heat to boil, and simmer 3 minutes. Drain apple slices, add to hot syrup, and cook 5 minutes. Fill hot half-pint or pint jars (preferably wide-mouth) with apple rings and hot flavored syrup, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 4 (page 17). Follow the after-processing steps on page 18.

Spiced Crab Apples

5 pounds crab apples
4½ cups apple cider vinegar (5% acid)
3¾ cups water
7½ cups sugar
4 teaspoons whole cloves
4 sticks cinnamon
1 to 6 ½-inch cubes of fresh ginger root, depending on taste preference (1 cube for a hint of ginger; up to 6 cubes for a stronger ginger flavor)
Spice bag or cheesecloth to hold spices

Yield: about 9 pints

Remove blossom petals and wash apples, but leave stems attached. Puncture the skin of each apple four times with an ice pick or toothpick.

Mix vinegar, water, and sugar, and bring to a boil. Add spices, tied in the spice bag or cheesecloth. Using a blancher basket or sieve, immerse one-third of the apples at a time in the boiling vinegar/sugar solution for 2 minutes.

Place cooked apples and spice bag in a clean 1- or 2-gallon crock, and add hot syrup. Cover and let stand overnight.

Remove the spice bag, drain the syrup into a large saucepan, and reheat to boiling. Fill hot pint jars with apples and hot syrup, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace as needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as listed in Table 4 (page 17). Follow the after-processing steps on page 18.

Strawberries

Quantity

A 24-quart crate weighs 36 pounds and yields 18 to 24 quarts. An average of 1 pound makes 1 pint of frozen berries.

Quality

For best quality, freeze or preserve strawberries on the day they are harvested. They should be picked when they reach an ideal maturity for eating fresh. Select berries with fresh flavor, deep uniform color, and firm texture. Smaller, irregularly shaped, and seedy berries can make good-quality jams.

Preparation

Remove blossoms. Prepare 1 to 2 quarts at a time. Wash and drain berries. Do not soak.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Berries may be frozen in syrup, in a dry sugar pack, or frozen individually using a dry tray pack without any treatment.

Pack

- To make a **syrup pack**, mix and dissolve 1 cup sugar in 4 cups water. Add 1 cup of this syrup per quart of prepared fruit.
- To make a **dry sugar pack**, add ⅓–⅔ cup sugar per quart of prepared fruit. Mix carefully to avoid damaging the fruit.
- To make a **dry tray pack**, place individual berries on a parchment paper lined baking tray without sugar or syrup. Freeze berries for 24 hours.

Package

Fill pint or quart freezer bags to a level of 3 to 4 inches from the top, and squeeze out air. Seal, leaving 1-inch headspace, label, and freeze. Before freezing, bags may be inserted into reusable rigid freezer containers for added protection against punctures and leakage.

Berries (Other than strawberries)

Recommended varieties

Blackberries, blueberries, currants, dewberries, elderberries, gooseberries, huckleberries, loganberries, and raspberries. Canning strawberries does not result in a high-quality product; however, strawberries freeze well (see previous section).

Quantity

A 24-quart crate weighs 36 pounds and yields 18 to 24 quarts. An average of 12 pounds is needed per canner load of 7 quarts; an average of 8 pounds is needed per canner load of 9 pints. An average of 1 pound makes 1 pint of frozen berries.

Quality

Select fresh berries with a sweet flavor, deep color, and firm texture, and of ideal maturity for eating fresh.

Preparation

Prepare 1 or 2 quarts at a time. Wash and drain berries; do not soak. Remove blossoms and stem if appropriate. Snip off gooseberry heads and tails with scissors.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Berries may be frozen in syrup, in a dry sugar pack, or frozen individually using a dry tray pack without any treatment.

Pack

- To make a **syrup pack**, mix and dissolve 1 cup sugar in 4 cups water. Add 1 cup of this syrup per quart of prepared fruit.
- To make a **dry sugar pack**, add ⅓–⅔ cup sugar per quart of prepared fruit. Mix carefully to avoid damaging the fruit.
- To make a **dry tray pack**, place individual berries on a parchment paper lined baking tray without sugar or syrup. Freeze berries for 24 hours.

Package

Fill pint or quart freezer bags to a level of 3 to 4 inches from the top, and squeeze out air. Seal, leaving 1-inch headspace, label, and freeze. Before freezing, bags may be inserted into reusable rigid freezer containers for added protection against punctures and leakage.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Berries may be packed hot or raw in jars and covered with your choice of water; apple or white grape juice; or very light, light, or medium syrup. To make syrup, mix sugar and water in the desired proportions listed below, and heat to dissolve.

Syrup Type	Cups Water	Cups Sugar
Very light	10½	1¼
Light	9	2¼
Medium	8¼	3¾

- To make a **hot pack**, heat berries in boiling water for 30 seconds and drain. Fill hot jars with hot berries and liquid, leaving ½-inch headspace.
- To make a **raw pack**, place drained berries in hot jars and cover with your choice of warm liquid, leaving ½-inch headspace.

3. Fill the hot pint or quart jars with the product you are canning, being sure to leave ½-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. Process jars.

Process

To process in a boiling water canner, fill canner halfway with water, and preheat to 180°F for hot packs and 140°F for raw packs. Load filled jars into the canner rack and lower with handles, or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When the water boils vigorously, lower the heat to maintain a gentle boil, and process for the recommended time listed in Table 6 (page 26). Follow the after-processing steps on page 27.

Table 6. Recommended processing times for berries in a boiling water canner at designated altitudes

Product	Style of pack	Jar Size	Processing time	
			3,001–6,000 feet (minutes)	6,001–8,000 feet (minutes)
Berries–Whole	Hot	Pints or Quarts	20	25
Berries–Whole	Raw	Pints Quarts	20 30	25 35
Berries–Syrup	Hot	Half-pints or Pints	15	20

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use the contents within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Berries are best if used within one year.

Berry Syrup

Juices from fresh or frozen blueberries, cherries, grapes, black or red raspberries, and strawberries are easily made into toppings for use on ice cream or pastries.

Yield: about 9 half-pints or 4–5 pints

Select 6½ cups of fresh or frozen fruit. With fresh fruit, wash, cap, stem, and crush fruit into a saucepan. Heat to boiling, and simmer until soft (5 to 10 minutes).

Strain when hot through a colander, and drain until cool enough to handle. Strain the collected juice through a double layer of cheesecloth or jelly bag (page 4). Discard the dry pulp. The yield of the pressed juice should be about 4½ to 5 cups.

Combine the juice with 6¾ cups of sugar in a large saucepan, bring to boil, and simmer 1 minute. To make syrup with whole fruit pieces, save 1 to 2 cups of the fresh or frozen fruit, combine these with the sugar, and simmer as in making regular syrup.

Remove from heat, skim off foam with a metal spoon, and fill into clean hot half-pint or pint jars, leaving ½-inch headspace. Wipe rims of jars with a clean, damp paper

towel. Apply lids and screw bands; tighten screw bands. Process as listed in Table 6 (page 26). Follow the after-processing steps on page 31.

Cherries

Quantity

A lug weighs 25 pounds and yields 8 to 12 quarts. An average of 17½ pounds is needed to make a 7-quart canner load; 11 pounds is needed per canner load of 9 pints. An average of 2½ pounds of cherries is needed to make 1 quart of frozen product.

Quality

Select freshly harvested cherries with deep, uniform color and of ideal maturity for eating fresh.

Preparation

Stem and wash. Pit if desired. **If pitted, keep cherries in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.** If preserved unpitted, prick skins on opposite sides with a clean needle to prevent splitting.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Cherries may be frozen in syrup or in a dry sugar pack.

- To make a **syrup pack**, mix and dissolve 1 cup sugar in 4 cups water. (If cherries are sour, additional sugar may be needed.) Add 1 cup syrup to each quart of prepared cherries.
- To make a **dry sugar pack**, add ½–⅔ cup sugar per quart of sour cherries or ¼–⅓ cup sugar per quart of sweet cherries. Mix sugar and cherries carefully to avoid damaging the fruit.

To package, fill pint or quart freezer bags to a level 3 or 4 inches from their tops and squeeze out the air. Seal, leaving 1-inch headspace, label, and freeze. Before freezing, bags may be inserted into reusable rigid plastic freezer containers for added protection against punctures and leakage.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Cherries may be packed hot or raw in jars and covered with your choice of water; apple or white grape juice; or very light, light, or medium syrup. Medium syrup is suggested for sour cherries, and very light syrup for sweet cherries. To make syrup, mix sugar and water in the desired proportion listed below, and heat to dissolve.

Syrup Type	Cups Water	Cups Sugar
Very light	10½	1¼
Light	9	2¼
Medium	8¼	3¾

- To make a **hot pack**, place drained cherries in syrup, juice, or water and bring to a boil. Fill hot jars with hot cherries and cooking liquid, leaving ½-inch headspace.
- To make a **raw pack**, fill hot jars with drained cherries, and cover with your choice of boiling liquid, leaving ½-inch headspace.

3. Fill the hot pint or quart jars with the cherries, being sure to leave ½-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. Process jars as listed in Table 7 (page 30) or Table 8 (page 31). Follow the after-processing steps on page 31.

Process: Boiling water

To process in a boiling water canner, fill canner halfway with water and preheat to 180°F for hot packs and 140°F for raw packs. Load filled jars into the canner rack and

lower with handles, or load one jar at a time with a jar lifter onto canner rack Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When the water boils vigorously, lower the heat to maintain a gentle boil and process for the recommended time listed in Table 7 (page 30). Follow the after-processing steps on page 31.

Table 7. Recommended processing times for cherries in a boiling water canner at designated altitudes

Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 feet (minutes)
Hot	Pints	20	25
	Quarts	30	35
Raw	Pints or Quarts	35	40

Process: Pressure

To process in a pressure canner, place the jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a full, steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure, and process the jars for the times listed in Table 8 (page 31). Do not allow the pressure to drop below the recommended pressure for your altitude. Follow the after-processing steps on page 31.

Table 8. Recommended processing times and pressures for cherries in a pressure canner at designated altitudes

Style of pack	Jar Size	Processing time (minutes)	Dial Gauge*			Weighted Gauge
			2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Raw	Pints or Quarts	10	7	8	9	10
Hot	Pints	8**	7	8	9	10
	Quarts	10	7	8	9	10

*Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.

**For products processed less than 10 minutes, use sterilized jars. To sterilize empty jars, put them open side up on a rack in a boiling water canner. Fill the jars and canner with hot (not boiling) water to 1 inch above the top of the jars. Boil for 10 minutes at altitudes less than 1,000 feet elevation. Add 1 additional minute for each additional 1,000 feet of elevation. Using a jar lifter, carefully remove and drain hot jars one at a time and fill immediately with food.

After processing

1. **Boiling water canning:** When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. **Pressure canning:** When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
3. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
4. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
5. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.

6. If the lid is unsealed, refrigerate the jar and use within one week. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
7. Wash the screw bands and store them separately.
8. Products are best if used within one year.

Peaches, Apricots, and Nectarines

Quantity

A bushel of nectarines or peaches weighs 48 pounds and yields 16 to 24 quarts. An average of 17½ pounds is needed to make a 7-quart canner load; 11 pounds is needed per canner load of 9 pints.

A bushel of apricots weighs 50 pounds and yields 20 to 25 quarts. An average of 16 pounds is needed to make a 7-quart canner load; 10 pounds are needed to make 9 pints.

An average of 2¼–2½ pounds of peaches, apricots, or nectarines is needed to make 1 quart of frozen product.

Quality

Choose ripe, mature fruit of ideal quality for eating fresh. Canned hot packs are better than raw packs. Nectarines yield a lower-quality canned product than peaches or apricots. ***See sidebar regarding white-fleshed peaches and nectarines.***

Preparation for freezing and canning

With peaches, wash fruit and dip in boiling water for 30 to 60 seconds or until skins loosen. Nectarines should be washed, but for optimal quality, do not remove skins. Apricots should be washed; removing skins is optional. Dip quickly in cold water and slip off skins. Cut fruit in half, remove pits, and slice if desired. **Keep fruit in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.**

i The boiling water canning process for peaches and nectarines is only safe with yellow-fleshed varieties. White-fleshed peaches and nectarines have a natural pH above 4.6, which makes them low-acid foods. Therefore, water bath canning will not destroy harmful bacteria in these varieties. Currently there is no low-acid pressure canning process or a researched acidification procedure for safe boiling water canning for white peaches and nectarines. Freezing is the recommended food preservation method for these fruits.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. These fruits may be frozen in syrup or in a dry sugar pack. Follow preparation procedure above.

- To make a **syrup pack**, mix and dissolve 1 cup sugar in 4 cups water; also add ½ teaspoon of ascorbic acid or 3 crushed 500-milligram vitamin C tablets. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products. Add 1 cup of this syrup to each quart of prepared fruit.
- To make a **dry sugar pack**, add ¼–½ cup sugar per quart of prepared fruit. Mix carefully to avoid damaging the fruit.

To package, fill pint- or quart-sized freezer bags to a level of 3 to 4 inches from their tops, and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable rigid plastic freezer containers for added protection against punctures and leakage.

Canning Procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Follow preparation procedure above.
3. Peaches, apricots, and nectarines may be packed hot or raw, although raw packs yield a lower-quality product. Cover with your choice of water; apple or white grape

juice; or very light, light, or medium syrup. To make syrup, mix sugar and water in the desired proportion listed below, and heat to dissolve.

Syrup Type	Cups Water	Cups Sugar
Very light	10½	1¼
Light	9	2¼
Medium	8¼	3¾

- To make a **hot pack**, place drained fruit in syrup, water, or juice, and bring to boil. Fill hot jars with hot fruit and cooking liquid, leaving ½-inch headspace. If canning halves, place halves in layers, cut side down.
- To make a **raw pack**, fill hot jars with raw fruit, placing cut side down. Add hot water, juice, or syrup, leaving ½-inch headspace.

4. Fill the hot pint or quart jars with the product you are canning, being sure to leave the correct headspace as specified. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
5. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
6. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
7. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
8. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
9. Process jars as listed in Table 9 (page 35) or Table 10 (page 35).

Process: Boiling water

To process in a boiling water canner, fill canner halfway with water and preheat to 180°F for hot packs and 140°F for raw packs. Load filled jars into a canner rack and lower with handles, or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When the water boils vigorously, lower the heat to maintain a gentle boil, and process for recommended time listed in Table 9. Follow the after-processing steps on page 35.

Table 9. Recommended processing times for peaches, apricots, or nectarines in a boiling water canner at designated altitudes

Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 feet (minutes)
Hot	Pints	30	35
	Quarts	35	40
Raw	Pints	35	40
	Quarts	40	45

Process: Pressure

To process in a pressure canner, place the jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a full, steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure, and process the jars for the time listed in Table 10 (page 35). Do not allow the pressure to drop below the recommended pressure for your altitude. Follow the after-processing steps on page 35.

Table 10. Recommended processing times and pressures for peaches, apricots, or nectarines in a pressure canner at designated altitudes

Style of pack	Jar Size	Processing time (minutes)	Dial Gauge*			Weighted Gauge
			2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Raw or Hot	Pints or Quarts	10	7	8	9	10
*Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. **Boiling water canning:** When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. **Pressure canning:** When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more

minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.

3. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
4. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
5. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
6. If the lid is unsealed, refrigerate the jar and use within one week. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
7. Wash the screw bands and store them separately.
8. Products are best if used within one year.

Fruit Pie Fillings

Each canned quart makes one 8-inch pie. To make safe, high-quality fillings, use a thickener called ClearJel®. ClearJel® is a form of corn starch that has been modified to give it special and unique characteristics when used in food products. It can be used for canned fruit pie fillings because it does not break down in the acidic food mixtures and does not thicken enough during heat processing to interfere with the intended effect of the heat on killing bacteria during canning. Foods thickened with ClearJel® may also be frozen.

In order to ensure safety from mold growth, the pie filling must be filled quickly into jars—without delay or interruptions—and then the jars must be placed immediately in the canner and processed.

There is no substitution for ClearJel® that can be made in the recipes in this publication. Do not use other corn starch, flour, tapioca, or other thickener, or any other form of ClearJel®, such as Instant ClearJel®. Note: No discrimination is intended and no endorsement is implied by UW Extension specifying ClearJel®. It is listed here because it is the only suitable product available to the general public for the stated purpose in given products.

ClearJel® is available only through a few supply outlets but generally not in grocery stores. Find out about its availability in your area prior to gathering other ingredients

to make these pie fillings. If you cannot find it, contact the University of Wyoming Extension Community Vitality and Health educator who serves your county. Contact information is at www.uwyo.edu/uwe/county-offices.html.

Because the variety of fruit may alter the flavor of a fruit pie, first make a single quart, prepare a pie with it, and serve. Then adjust the sugar and spices in the recipe to suit personal preferences. The amount of commercially bottled lemon juice should not be altered because it aids in controlling the safety and storage stability of the fillings.

When using frozen cherries and blueberries, select unsweetened fruit; if sugar has been added, rinse it off while fruit is frozen. Collect, measure, and use juice from thawing fruit to partially replace the water specified in the recipe.

Procedure for canning all pie fillings

Wash jars following jar cleaning and preparation guidelines (page 3). Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.

Fill fruit mixtures quickly into hot pint or quart jars, leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing surface of jars with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 11 (page 37).

To process in a boiling water canner, fill canner halfway with water and preheat to 180°F. Load filled jars into a canner rack and lower with handles, or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When the water boils vigorously, lower the heat to maintain a gentle boil, and process for the recommended time listed in Table 11 (page 37). Follow the after-processing steps on page 38.

Table 11: Recommended processing times for fruit pie fillings in a boiling water canner at designated altitudes

Fruit Filling	Jar Size	3,001–6,000 Feet (minutes)	6,001–8,000 feet (minutes)
Apple	Pints or Quarts	35	40
Blueberry		40	45
Cherry		40	45
Peach		40	45

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within three days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Apple Pie Filling

Ingredients	1 Quart	7 Quarts
Fresh sliced apples (blanched)	3½ cups	6 quarts
Granulated sugar	¾ cup + 2 tablespoons	5½ cups
ClearJel®	¼ cup	1½ cups
Cinnamon	½ teaspoon	1 tablespoon
Cold water	½ teaspoon	2½ cups
Apple juice	¾ cup	5 cups
Commercially bottled lemon juice	2 tablespoons	¾ cup
Nutmeg (optional)	⅛ teaspoon	1 teaspoon
Yellow food coloring (optional)	1 drop	7 drops

Use firm, crisp apples. Stayman, Golden Delicious, Rome, or other similar varieties are suitable. If apples lack tartness, use an additional ¼ cup commercially bottled lemon juice for each 6 quarts of slices.

Wash, peel, and core apples. Prepare slices ½ inch thick. **Keep slices in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.**

Place 6 cups of fruit at a time in 1 gallon of boiling water. Boil each batch for 1 minute after the water returns to a boil. Drain but keep fruit in a covered bowl or pan so it will stay warm while other batches of fruit are being blanched. Combine sugar, ClearJel®, cinnamon, and nutmeg (if desired) in a large saucepan and mix. Add water, apple juice, and, if desired, food coloring. Stir and cook on medium-high heat until mixture thickens and begins to bubble. Add commercially bottled lemon juice to sauce and boil for 1 minute, stirring constantly, and then fold in drained apple slices. Immediately fill hot pint or quart jars with mixture, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 11 (page 37). Follow the after-processing steps on page 38.

Blueberry Pie Filling

Ingredients	1 Quart	7 Quarts
Fresh blueberries	3½ cups	6 quarts
Granulated sugar	¾ cup + 2 tablespoons	6 cups
ClearJel®	¼ cup + 1 tablespoon	2¼ cups
Cold water	1 cup	7 cups
Commercially bottled lemon juice	3 tablespoons	½ cup
Blue food coloring (optional)	3 drops	20 drops
Red food coloring (optional)	1 drop	7 drops

Select sweet, deep-blue fruit that is ripe but firm.

Wash and drain blueberries. Combine sugar and ClearJel® in a large saucepan and mix. Add water and food coloring (if desired). Cook on medium-high heat until mixture thickens and begins to bubble. Add commercially bottled lemon juice and boil for 1 minute, stirring constantly. Immediately fold in berries and, without delay, fill hot pint or quart jars with mixture, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 11 (page 37). Follow the after-processing steps on page 38.

Cherry Pie Filling

Ingredients	1 Quart	7 Quarts
Fresh sour cherries	3⅓ cups	6 quarts
Granulated sugar	1 cup	7 cups
ClearJel®	¼ cup + 1 tablespoon	1¾ cups
Cold water	1⅓ cups	9⅓ cups
Commercially bottled lemon juice	1 tablespoon + 1 teaspoon	½ cup
Cinnamon (optional)	⅛ teaspoon	1 teaspoon
Almond extract (optional)	¼ teaspoon	2 teaspoons
Red food coloring (optional)	6 drops	¼ teaspoon

Select ripe, firm cherries.

Rinse and pit cherries. **Keep cherries in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.** Combine sugar and ClearJel® and mix. Add water and, if desired, cinnamon, almond extract, and food coloring. Stir mixture, and cook over medium-high heat until

mixture thickens and begins to bubble. Add commercially bottled lemon juice and boil for 1 minute, stirring constantly. Immediately fold in drained cherries, and, without delay, fill hot pint or quart jars with mixture, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 11 (page 37). Follow the after-processing steps on page 38.

Peach Pie Filling

Ingredients	1 Quart	7 Quarts
Fresh sliced peaches	3½ cups	6 quarts
Granulated sugar	1 cup	7 cups
ClearJel®	¼ cup + 1 tablespoon	2 cups +3 tablespoons
Cold water	¾ cup	5¼ cups
Commercially bottled lemon juice	¼ cup	1¾ cups
Cinnamon (optional)	⅛ teaspoon	1 teaspoon
Almond extract (optional)	⅛ teaspoon	1 teaspoon

Select ripe, but firm, peaches. Red Haven, Sun High, and similar varieties make excellent pie filling.

Peel peaches. To loosen skins, submerge peaches in boiling water for 30–60 seconds, and then place in cold water for 20 seconds. Slip off skins and prepare slices ½ inch thick. **Keep slices in 1 gallon of water containing 1 teaspoon of ascorbic acid or 6 crushed 500-milligram vitamin C tablets to help prevent discoloration. Commercially prepared mixes of ascorbic acid and citric acid can also be used. Be sure to follow manufacturer's directions for these products.**

Combine water, sugar, and ClearJel®, and if desired, cinnamon and/or almond extract. Stir and cook on medium-high heat until mixture thickens and begins to bubble. Add commercially bottled lemon juice to sauce and boil for 1 minute more, stirring constantly. Fold in drained peach slices, and continue to heat for 3 minutes. Immediately fill hot pint or quart jars with mixture, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process jars as listed in Table 11 (page 37). Follow the after-processing steps on page 38.

WILD BERRIES AND OTHER WILD FRUIT

Gathering Wild Berries and Other Wild Fruit

Safety tips

Wearing proper clothing is important when gathering wild fruit. You may walk through weeds and brush, so wear slacks or jeans, a long-sleeved shirt, and sturdy shoes. Wear gloves because berries and other fruit can stain your hands and some bushes have thorns. Wear a wide-brimmed hat to protect your face from the sun and your hair from the bushes.

Be careful where you walk, watching out for anthills, sharp sticks, snakes, and poison ivy. Refer to the photo below to help you identify poison ivy, which is characterized by its branched three leaves. The oil contained in practically all parts of the plant is poisonous to most people when it comes in contact with their skin.

Equipment needed

A small pail with a handle is useful when picking berries and other wild fruit. Attach the handle to your belt or tie a string through the handle and then tie the string around your waist. This leaves both hands free for gathering fruit; it also keeps you from needing to bend over as much.

What to pick

Pick only firm berries and fruit, which are naturally high in pectin. Select a mixture of ¾ ripe and ¼ underripe fruits. The underripe fruit will increase the pectin content, making for better jelly. Be gentle on the bushes when you pick so there will be fruit to harvest next year. If unable to identify plants, berries, or fruit from the illustrations in this booklet, check with your local University of Wyoming Extension office or a wild plant expert before using.

When to harvest

Optimal times for picking berries and fruit vary with several factors, including temperatures during spring and summer months, amount of moisture during the growing season, and location of the bushes. At lower elevations, berries and other fruit may ripen one to two weeks earlier than those growing a few hundred feet higher in elevation. Late summer (from early August until frost) is usually the best time to harvest. One exception is buffaloberries, which are best picked after the majority of berries are ripe and after a frost.

Care of fruit

To avoid crushing berries and other fruit during transport, put no more than a couple quarts in any single container. Refrigerate berries and other fruit until you preserve them and, for optimal quality, preserve them as soon as possible after harvest.

General Canning Procedures

Prepare products as described in the following pages.

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot jars with the product you are canning, being sure to leave the correct headspace as specified. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.

6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars in a boiling water canner for the specified time as recommended by the recipe you are following. This will ensure that the food is properly preserved and safe to eat.
8. *Do not seal jars with paraffin,* as this method is not safe for preserving food. Processing in a boiling water bath is necessary to destroy molds and yeasts that can cause spoilage.

To process in a boiling water canner, fill canner halfway with water and preheat to 180°F. Load filled jars into canner rack and lower with handles or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When water boils vigorously, lower heat to maintain a gentle boil and process jars for the appropriate time described in Table 12 (page 45) or Table 13 (page 48). Follow the after-processing steps on page 44.

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Preparing Wild Berry and Other Wild Fruit Juices

Pick over the fruit and discard any that are overripe, damaged, or spoiled.

Wash the fruit quickly but thoroughly, and lift out of water. Do not let the fruit soak in water. Because the juice is strained from the pulp, you do not need to remove stems and pits.

Place fruit in a large saucepan and barely cover with water. Heat the fruit at a high temperature until it boils and then reduce the heat so the fruit gently boils.

Cook for 10 minutes or until a deep-colored liquid forms. The fruit can be crushed as it cooks or the first juice can be drained into another saucepan and the fruit cooked a second time. As it cooks the second time, crush the fruit to release more juice.

Strain all cooked fruit juice through a jelly bag (page 4) or three layers of cheese cloth. Leftover pulp can be used to make jams and butters along with the cooked fruit still in the saucepan. Note: If the fruit does not yield enough juice, you can add other fruit juice to the wild fruit juice. If the shortage is ½ cup or less, you can add water.

The juice can be used immediately to make jelly or syrup, and the pulp can be used to make jam. Alternatively, the juice can be canned and made into jelly at a later time. To preserve the juice by canning, pour the hot juice into hot pint or quart jars, leaving ¼-inch headspace. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 12. Follow the after-processing steps on pages 45-46.

Table 12. Recommended processing times for wild berry and other wild fruit juices in a boiling water canner at designated altitudes

Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 (minutes)
Hot	Pints or Quarts	10	15

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.

2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Information about pectin

Proper amounts of fruit, pectin, acid, and sugar are needed to make a jellied fruit product. Some kinds of fruit have enough natural pectin to gel. Others require added pectin, particularly when they are used for making jellies, because jelly should be firm enough to hold its shape. All fruits have more pectin when they are underripe.

Commercial fruit pectin made from apples or citrus fruits are available in either liquid or powdered form. Follow manufacturer's instructions when using added pectin. Many home canners prefer the added pectin method for making jellied fruit products because fully ripe fruit can be used, cooking time is shorter, there is no need to test for doneness, and the yield from a given amount of fruit is greater. Store commercial fruit pectin in a cool, dry place so it will keep its gel strength. Do not hold it from one year to the next. You can use added pectin with any fruit.

Make sure to use the form of pectin recommended in each specific recipe.

Making Jelly

Whether you are a first-time jelly maker or a seasoned expert, be sure to review these steps before starting:

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot jars with the product you are canning, being sure to leave ¼-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.

3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars in a boiling water canner for the specified time as recommended by the recipe you are following. This will ensure that the food is properly preserved and safe to eat.
8. *Do not seal jars with paraffin,* as this method is not safe for preserving food. Processing in a boiling water bath is necessary to destroy molds and yeasts that can cause spoilage.

Review process for preparing juice on page 45. For a clear jelly, strain the juice through a jelly bag (page 4) or several layers of cheese cloth for several minutes. Do not squeeze the bag because pulp may be forced through, resulting in a cloudy jelly. For the clearest juice, refrigerate it overnight. By morning, the sediment will have settled to the bottom. Carefully pour off the juice so as not to disturb the sediment. Measure the juice accurately into a large (4-quart) saucepan. **Caution:** Be aware that when jelly boils, it increases two or three times in volume.

If commercial pectin is used, the volume will be larger. The order of combining ingredients depends on the type of pectin used. Complete directions for using pectin are included in the packages. Bring strained fruit juice to a quick, hard boil over high heat, stirring occasionally. Add pre-measured sugar all at once. Bring to a full rolling boil (a boil that cannot be stirred down). Boil hard for 1 minute, stirring constantly.

If commercial pectin is not used, you must boil the juice until a natural gel forms. Use one of the following tests to see if the juice has cooked long enough to form a gel:

- **Temperature test**—Use a jelly or candy thermometer, and boil until the temperature of the mixture reaches the temperature listed for your altitude:

  3,000 ft.–approximately 214°F
  4,000 ft.–approximately 212°F
  5,000 ft.–approximately 211°F
  6,000 ft.–approximately 209°F
  7,000 ft.–approximately 207°F
  8,000 ft.–approximately 205°F

  Note: The temperatures have been adjusted for each altitude by adding 9°F to the boiling point of water at that altitude.

- **Sheet or spoon test**—Dip a cool metal spoon in the boiling jelly mixture. Raise the spoon about 12 inches above the pan (out of steam). Turn the spoon so the liquid runs off the side. The jelly is done when the syrup forms two drops that flow together and sheet or hang off the edge of the spoon.

Remove from heat and quickly skim off foam with a metal spoon.

Pour hot jelly mixture immediately into hot jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rim clean with damp cloth or paper towel. Add lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 . Follow the after-processing steps on page 48.

Table 13. Recommended processing times for wild berry and other wild fruit jellies, jams, syrups, and butters in a boiling water canner at designated altitudes

Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 (minutes)
Hot	Half-pints or Pints	10	15

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.

3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Soft jelly: Possible causes and tips to use or improve

Causes

Because some jellies, such as chokecherry, do not set up right away, let the jars remain undisturbed for 24 hours before checking for gel.

Soft jellies may be caused by one or more of the following: too much juice in the mixture, too little sugar added, mixture not acidic enough, too much jelly made at one time, not cooking mixture long enough, and/or cooking commercial pectin too long.

Tips to use or improve

If the jelly does not gel, use it as syrup for pancakes or ice cream.

Soft jellies can sometimes be improved by re-cooking according to the directions given below. It is best to re-cook only 4 to 6 cups of jelly at one time:

- To remake jelly with powdered pectin, for each quart (4 cups) of jelly, mix ¼ cup sugar, ½ cup water, 2 tablespoons commercially bottled lemon juice, and 4 teaspoons powdered pectin. Bring mixture to a boil, stirring constantly. Boil hard for 30 seconds. Remove from heat, quickly skim off foam, and fill hot jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Adjust new lids and process jars as described in Table 13 (page 48). Follow the after-processing steps on page 48.
- To remake jelly with liquid pectin, for each quart (4 cups) of jelly, measure ¾ cup sugar, 2 tablespoons commercially bottled lemon juice, and 2 tablespoons liquid pectin. Bring jelly to a boil over high heat, stirring constantly. Remove from heat and quickly add the sugar, commercially bottled lemon juice, and pectin. Bring to a full rolling boil, stirring constantly. Boil hard for 1 minute.

Remove from heat, quickly skim off foam, and fill hot jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Adjust new lids and process jars as described in Table 13 (page 48). Follow the after-processing steps on page 48.

- To remake jelly without added pectin, for each quart (4 cups) of jelly, add 2 tablespoons commercially bottled lemon juice. Heat to boiling and boil for 3 to 4 minutes. Use one of the gel tests described on page 48 to determine doneness. Remove from heat, quickly skim off the foam, and fill hot jars, leaving ¼-inch headspace. Adjust new lids and process jars as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Sheri Hagwood, USDA-NRCS PLANTS Database

USDA-NRCS PLANTS Database / USDA NRCS. Wetland flora: Field office illustrated guide to plant species. USDA Natural Resources Conservation Service.

Chokecherries

The main species of chokecherry is *Prunus virginiana*, with three subspecies found in almost every state of the continental U.S., including Alaska. Only one of these subspecies, the black chokecherry (*Prunus virginiana* var. *melanocarpa*), is found throughout Wyoming. Two other subspecies, common chokecherry (*P. virginiana* var. *virginiana*) and western chokecherry (*P. virginiana* var. *demissa*), occur in Nebraska, but they have not yet been reported in either Wyoming or Colorado. Chokecherries are found along stream banks and roadside rights-of-way where extra runoff from paved surfaces increases available moisture.

Chokecherries are in the rose family, and, by definition, the white flowers have five petals and five sepals. The chokecherry bloom is easily recognized as a large cluster of white flowers in a long cylindrical shape, referred to as a raceme. Anyone gathering chokecherries should do their scouting for good chokecherry stands in May because this tall shrub can be easily spotted and identified when in bloom. In contrast, when

the fruit appears in August, the plants are not as easy to spot, even though they may be covered with dense clusters of dark purplish-black berries. Although chokecherries can be pruned to form a small single-stemmed tree, they sucker so readily that this is unlikely to occur in the wild and the plant is best described as a tall, multi-stemmed shrub, usually not exceeding 15 feet in height.

Young chokecherry leaves look very similar to wild plum leaves, but the older leaves have a distinct oval shape with an abruptly pointed tip. The entire leaf edge has very fine toothlike indentations, like the blade of a saw, called serrations. The stems are reddish brown and covered with distinct, white, raised bumps. These are lenticels, which function to cool the plant. Older stems are gray but still show the scars of the lenticels. The stems, leaves, and fruit pits of chokecherry are poisonous because they contain hydrocyanic acid (cyanide). Only the soft fruit should be used for human consumption, and the pits should be discarded. Additionally, the recipes provided in this bulletin would also work for the native Wyoming sand cherry (*Prunus pumila*), pincherry (*Prunus pensylvanica*), and the domesticated Nanking cherry (*Prunus tomentosa*).

Chokecherry fruit is popular with wild berry jelly makers. Mixtures of half chokecherry juice and half apple juice make a tasty product. If you prefer a jelly without an apple flavor, add red currant juice with the chokecherry juice to make a jelly with a true wild berry flavor.

Chokecherry Jelly

5 cups chokecherry juice
7 cups sugar
1 package (1.75 ounces) or 6 tablespoons powdered pectin

Follow steps for preparing juice on page 45. Then follow steps for making jelly beginning on page 46, processing times in Table 13 (page 48), and after-processing steps on page 48.

Chokecherry Syrup with Added Pectin

4 cups chokecherry juice
4 cups sugar
1 package (1.75 ounces) or 6 tablespoons powdered pectin

Follow steps for preparing juice on page 45. Combine juice, sugar, and pectin in a large saucepan. Bring to a boil and cook until mixture coats a metal spoon (similar to the way gravy coats a spoon). Pour into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing edge of jars

with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Chokecherry Syrup without Added Pectin

4 cups chokecherry juice
2 cups sugar
1 cup light corn syrup

Follow steps for preparing juice on page 45. Combine ingredients in saucepan and boil for 3 minutes. Pour into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Pioneer Chokecherry Syrup

4 cups chokecherry juice
4 cups sugar
1 teaspoon cream of tartar

Follow steps for preparing juice on page 45. Combine all ingredients and cook in a saucepan over medium heat until mixture coats a metal spoon (similar to the way gravy coats a spoon). Refrigerate small quantity for immediate use. Pour remaining syrup into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

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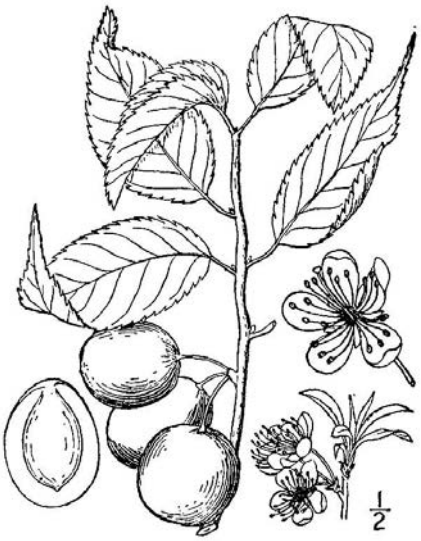

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Wild Plums

The American plum (*Prunus americana*) is native to the United States. Although not found in as many states as chokecherry, it is native to Wyoming. In contrast, apples, which are also in the rose family, are not native to the U.S., although there are a few species of native crab apples found in isolated and scattered locations.

Plums and chokecherries are in the same genus so they are very similar in appearance. Because plum bushes do not sucker as readily as chokecherry shrubs, plums are more accurately described as a small tree up to 15 feet in height. The serrated leaves are very similar to chokecherry leaves; in fact, the young leaves of chokecherries are almost identical to a plum leaf. Older plum leaves, however, taper more gradually toward the tip than older chokecherry leaves. Luckily, the woody stems of plums are distinctly different from the reddish chokecherry stems. Young plum stems are brown, turning gray as they mature, and the raised white markings (lenticels) are not as distinct as those found on chokecherry. Flowering plum trees have individual flowers, usually white or slightly pinkish, scattered throughout the tree, in contrast to the large flower clusters on chokecherry shrubs. Fruiting plum trees are easy to tell from chokecherry shrubs because plums are larger (up to ¾ inch in diameter) and are individually scattered. The green fruit gets an orange to reddish blush as it ripens, turning dark red at maturity. Plums also are much sweeter than chokecherries.

Procedure

Wash plums. Boil for 15–20 minutes or until the skins are tender. Tart wild plums are high in pectin. The fruit can be boiled a second time for extra juice. To make jam or

butter, squeeze out the pits. Some recipes call for whole seeded plums. Other recipes recommend pressing plums through a sieve to remove skins and pits.

Wild Plum Jelly

5½ cups juice
1 package (1.75 ounces) or 6 tablespoons powdered pectin
7½ cups sugar

Follow steps for preparing juice on page 45. Then follow steps for making jelly beginning on page 46, processing times in Table 13 (page 48), and after-processing steps on page 48.

Pioneer Wild Plum Jam

Wash plums. For every cup of pulp (with skins), add ¾ cup sugar. Cook over low heat until the consistency is desirable for spreading. Stir often to prevent scorching. The mixture will thicken as it cools. Fill hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Wild Plum Butter

Prepare plums as described above in Procedure on page 53.

Pour off juice and use for jelly.

Squeeze pits out of the remaining fruit. Press through sieve to remove skins. If you prefer, puree pitted fruit in a blender instead of sieving it.

Measure sieved or pureed fruit and add one-half as much sugar, if desired, for each pint of fruit. If you prefer a tart flavor rather than a sweet one, sugar can be decreased or eliminated.

For each two cups of fruit, add ¼ teaspoon cinnamon and 8 teaspoons cloves.

Bring to a boil and simmer uncovered, stirring frequently until desired spreading consistency. Plum butter will thicken as it cools.

Spoon mixture into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling

water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Canned Wild Plums

Whole plums can be canned and served as a whole fruit during the winter months. Wash plums and discard any that are damaged or spoiled.

- To **can in syrup**, heat plums to boiling in syrup made of 2 cups sugar and 4 cups water.
- To **can in water**, heat plums in water only. Although plums canned in water have fewer calories than those canned in syrup, canning in water results in less firm fruit.

Place hot fruit to ½ inch from top of hot pint or quart jars. Cover with either boiling syrup or boiling water, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 14. Follow the after-processing steps on page 55.

Table 14. Recommended processing times for canned wild plums in a boiling water canner at designated altitudes

Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 (minutes)
Hot	Pints	30	35
	Quarts	35	40

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.

4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

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Serviceberries

Serviceberries are yet another native species from the rose family. Three species of serviceberry are found in Wyoming: Saskatoon serviceberry (*Amelanchier alnifolia*), Utah serviceberry (*Amelanchier utahensis*), and dwarf serviceberry (*Amelanchier pumila*). Serviceberries produce prolific clusters of attractive white star-shaped blooms. The leaves are oval to nearly round, from ¾ to 2 inches in length, and serrated on the upper half toward the leaf tip. Stems are alternately arranged with relatively short internodes. The fruit is a small berry-like pome (or small apple). The immature red fruit turns a dark purple to black when it ripens. Found on open hillsides, serviceberry bushes frequently grow among mountain mahogany shrubs. Serviceberries can grow up to 15 feet tall but seldom attain this height because they are heavily browsed by deer. Four to five feet is a more typical height for this shrub.

Serviceberry Jelly

3½ cups juice
1 package (1.75 ounces) or 6 tablespoons powdered pectin
5 cups sugar

Follow steps for preparing juice on page 45. Then follow steps for making jelly beginning on page 46, processing times in Table 13 (page 48), and after-processing steps on page 48.

Variation: To add a little tartness to the jelly, add ¼ cup commercially bottled lemon juice to the serviceberry juice before cooking.

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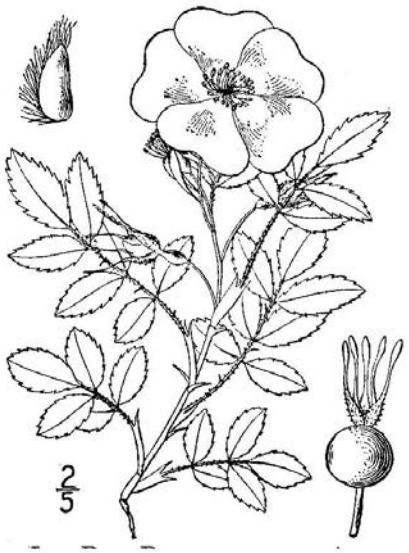

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Rose Hips

The Woods' rose (*Rosa woodsii*) is the most common native rose shrub found in Wyoming. Other species found in Wyoming include the prickly rose (*Rosa acicularis*), prairie rose (*Rosa arkansana*), and Nootka rose (*Rosa nutkana*). The fruits of all these species are edible throughout the year and were an important source of vitamin C for the native people and early explorers of the Rocky Mountains. Dried rose hips persist on plants and remain edible throughout the winter. Rose hips are bright red in color and range in flavor from tasteless to sweet. Although never bitter, they are very seedy. The blooms of wild roses are usually light to dark pink, or even red, and they have five petals with five sepals. Each leaf is composed of multiple oppositely arranged leaflets forming a pinnate compound leaf up to 6 inches in length. The leaflets are more deeply serrated at the tip and measure ½ to 1 inch in length, half as wide as they are long. Stems are dark

brown and covered with light-colored thorns shaped like a cat's claw. Shrubs are 3 to 4 feet in height and found in open to wooded habitats.

Dried Rose Hips

Rose hips should be gathered after the first frost. Cut rose hips in half and remove the seeds with the point of a knife. Dry as quickly as possible in a slightly warm oven or food dehydrator. Use as potpourri to add a light rose fragrance to a room.

Rose Hip Jelly

4 cups rose hips
2 pounds sugar

Wash rose hips and remove outside covering. Add just enough water to cover and bring to a boil. Add sugar and simmer until the fruit is soft. Strain and return juice to kettle. Bring juice to boil again and test for gel following the procedure on page 48. Pour into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Candied Rose Hips

1½ cups rose hips
½ cup water
¼ cup sugar

Wash rose hips and remove seeds. Combine sugar and water to make a syrup. Add rose hips and boil 10 minutes. Lift rose hips from syrup with a skimmer or slotted spoon and drain on waxed paper. Dust with sugar and dry in a very warm oven (150–175°F) or food dehydrator. If the rose hips seem sticky, add more sugar. After rose hips have dried, remove from oven and cool. Store rose hips between sheets of waxed paper in a covered metal container. Candied rose hips can be added to your favorite cookie recipes (oatmeal cookies, bar cookies, sugar cookies, etc.). They can also be added to puddings or used in place of nuts or fruits in other baked products; for extra flavor, you can add grated lemon rind.

R. A. Howard, USDA-NRCS PLANTS Database

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Buffaloberries

Two species of buffaloberry are found in Wyoming: silver buffaloberry (*Shepherdia argentea*) and russet buffaloberry (*Shepherdia canadensis*). A closely related species called silverberry or wolfwillow (*Elaeagnus commutata*) is also found in Wyoming. All three species are in the same plant family as the Russian olive (*Elaeagnus angustifolia*), a common invasive species. Buffaloberry shrubs grow up to 8 feet in height and are similar in appearance to Russian olive, with narrow, blunt-shaped leaves.

Silver buffaloberry leaves have a distinct sage coloration similar to Russian olive.

Russet buffaloberry leaves are dark green on the upper surface and fuzzy underneath with star-shaped hairs. Stems are light brown with alternately arranged lateral branches sometimes forming a spine at the tip.

Buffaloberry is a dioecious species, which means plants have either imperfect male or female flowers on separate plants. The imperfect flowers are yellowish to pale green. The fruit, which is found only on plants that bear female flowers, is pale orange to bright red in color.

Silver buffaloberries make the best jams and jellies. Although suitable for jams and jellies, raw russet buffaloberries have a soapy taste and can cause diarrhea if consumed in large quantities. When eaten raw, the dry, mealy berries of silverberry or wolfberry shrubs are less palatable than either of the buffaloberries, but they can still be used to make jam.

Buffaloberry Jelly

This jelly is clear with a color of golden honey, and the taste is similar to currant jelly. Follow steps for preparing juice on page 45. Buffaloberry juice will be pale in color (a peachy pink) and will look soapy. For every cup of buffaloberry juice, use ¾ cup of sugar. Because buffaloberries make a tart jelly, you can add some apple juice if you desire a milder flavor. If so, use one cup of apple juice for every cup of buffaloberry juice. Follow steps for making jelly beginning on page 46. If made with pectin, follow proportions given for currant jelly on page 62. Refer to Table 13 (page 48) for processing times. Follow the after-processing steps on page 48.

Dried Buffaloberries

Wash berries and remove stems and leaves. Put berries in a food grinder and grind to a mushy consistency. Form crushed berries into patties. Dry patties in a food dehydrator. When they are brittle and break when bent, they are dry. Store in an airtight jar in a cool, dry place.

Dried Buffaloberry Syrup

3 cups dried berries
2 cups water
2 cups sugar

Soak berries in water until tender. Bring berries to a boil and strain to remove seeds. Add sugar and stir until sugar is dissolved. Refrigerate and use within one month.

Berry Gravy

Make buffaloberry syrup using recipe above. In a separate container, use a wire whip to thoroughly mix 5 to 6 tablespoons all-purpose flour with 1 cup water. If you prefer more translucent gravy, use corn starch instead of flour. Stir until lumps are dissolved. Slowly pour flour (or cornstarch) and water mixture into boiling berry syrup. Boil until thick, stirring constantly. Remove from heat and store in refrigerator in a clean, covered container, and use within one week. Berry gravy can be used like jam on toast or like syrup on pancakes or waffles. Berry gravy can also be used as a glaze for pork loin roast.

Black currant

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Golden currant

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Al Schneider, USDA-NRCS PLANTS Database

Wax currant

Stan Shebs, https://commons.wikimedia.org/wiki/File:Ribes_cereum_var_cereum_6.jpg

Wild Currants

Three main species of wild currants are found in Wyoming. All three are small shrubs growing to a maximum height of 5 feet.

Black currant shrubs (R*ibes hudsonianum*) are found in moist, shady locations in stands of timber or along streams. Their leaves have three to five lobes and look like a small maple leaf. The leaves also have tooth-like indentations (serrations) around the entire edge of the leaf. The white flowers are funnel shaped, and the black berries are very sweet.

Golden currant shrubs (R*ibes aureum*) are found in open, sunny areas. The leaves have three to five blunt or rounded lobes, without serrations around the lower portion of the leaf. The flowers are bright yellow, and the berries can be yellow, orange, red, or purple. Because golden currant berries range in flavor from sweet to bitter, you should sample the berries of each shrub to test the flavor. Darker berries are usually sweeter.

The berries from **wax currant** shrubs (R*ibes cereum*), the third species of wild currants found in Wyoming, are not recommended for making jams and jellies. This species grows in the same location and even frequently alongside golden currant bushes. Leaves are smaller and not as deeply lobed as either of the other two species. The leaves and buds are sticky. Flowers are trumpet shaped and usually pink in color, and the berries are orange to red. Wax currants are usually very bitter.

Currant Ice Cream Sauce

1 cup currants, washed and stemmed
½ cup water
½ cup sugar or honey (or use ¼ cup sugar and ¼ cup honey)

Cook currants in water for 10 minutes. Add sugar and/or honey and boil gently 5 more minutes. Serve hot or chilled over vanilla ice cream.

Currant Jelly

6½ cups currant juice
1 package (1.75 ounces) or 6 tablespoons powdered pectin
7 cups sugar

Wash currants. To prepare the juice, crush the fully ripe fruit before cooking. Follow steps for preparing juice on page 45. Then follow steps for making jelly beginning on page 46. Refer to Table 13 (page 48) for processing times. Follow the after-processing steps on page 48.

Variation: Mix currant juice with equal parts apple juice.

Currant Punch

Follow steps for preparing juice on page 45. Sweeten hot currant juice to taste, stirring to dissolve sugar. Cool. Add club soda or ginger ale at serving time. Other fruit juices may be combined with the currant juice for a flavorful variation. For a special touch, add a small scoop of ice cream at serving time.

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Canadian gooseberry

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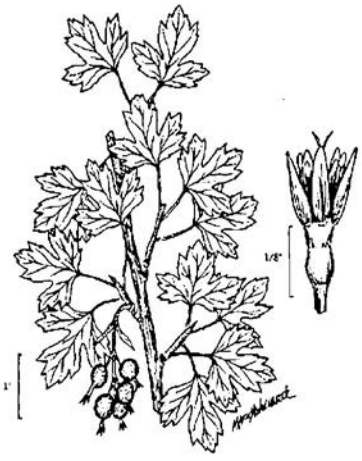
David Wayne Wilson



Whitestem gooseberry

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols. Charles Scribner's Sons, New York. Vol. 2: 577.

Gooseberries

Gooseberries are closely related to currants and differ mainly by the presence of prickles or thorns on the stem of the gooseberry. In contrast, currant shrubs lack thorns. Gooseberry shrubs usually produce a larger fruit than currant shrubs. Gooseberries are

sour when green but very flavorful as they ripen to a reddish purple color. Most people prefer gooseberries to currants for making pies and jams. There are two main species of gooseberry in Wyoming; both are small shrubs that generally do not exceed 3 feet in height.

Canadian gooseberry or redshoot gooseberry (*Ribes oxyacanthoides*, formerly *Ribes setosum*) has rust-colored younger shoots covered with fine spines. The older grayish stems have one to three large spines at the base of the leaves.

Whitestem gooseberry (*Ribes inerme*) has very few thorns at the base of the leaves of the older white stems; however, young shoots are covered with fine spines.

Gooseberry leaves are similar to those of golden currant and are deeply lobed with blunt tips. Whitestem gooseberry tends to produce slightly larger fruit (up to ½ to ¾ inch in diameter) than that of Canadian gooseberry (an average diameter of ¼ to ⅜ inch). Gooseberry flowers are small and bell shaped, usually white with a pale greenish-yellow tint.

Gooseberry Jelly

3½ cups gooseberry juice
¼ cup commercially bottled lemon juice
1 package (1.75 ounces) or 6 tablespoons powdered pectin
5 cups sugar

Prepare the juice by grinding stemmed fruit through a food grinder or follow steps for preparing juice on page 45. It will take between 5 to 6 cups of berries to make 3½ cups of juice. Add ½ cup of water to the ground berries and boil for 5 minutes. Follow the steps for making jelly beginning on page 46. Refer to Table 13 (page 48) for processing times. Follow the after-processing steps on page 48.

Gooseberry Jam

5½ cups ground fruit
7 cups sugar
1 package (1.75 ounces) or 6 tablespoons powdered pectin

Add sugar and pectin to fruit and stir well, then cook jam according to the directions on pectin package. Pour into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

Canned Gooseberries

Canned gooseberries can be eaten as a sauce or used in pies. Wash and stem berries. Put ½ cup water for each quart of fruit in a large saucepan and bring to a boil. Add berries, boil for 30 seconds, and drain. Fill hot pint or quart jars and cover with hot juice, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands and process in boiling water canner as described in Table 15 (page 65). Follow the after-processing steps on page 65.

Table 15. Recommended processing times for canned gooseberries in a boiling water canner at designated altitudes

Style of pack	Jar Size	3,001–6,000 feet (minutes)	6,001–8,000 (minutes)
Hot	Pints or Quarts	20	25

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.

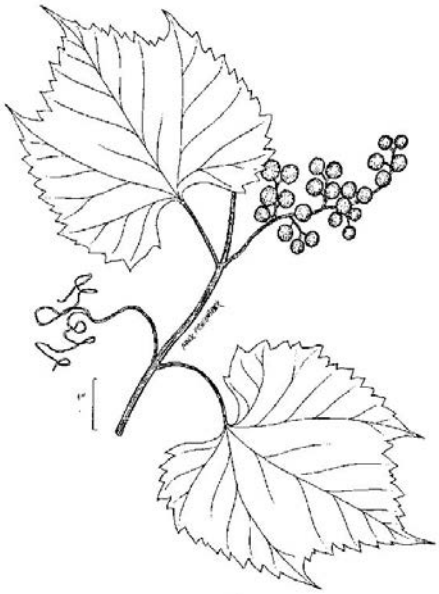
7. Products are best if used within one year.

Gooseberry Pie

2 cups fresh or canned gooseberries
¾ to 1 cup sugar
2 tablespoons quick-cooking tapioca
1 tablespoon butter
Grated rind of 1 lemon
1 unbaked pie shell and top

If using fresh gooseberries, first wash and stem the fruit. Add sugar and tapioca to gooseberries and let stand while preparing the pastry shell and top. Pour gooseberry mixture into pastry-lined pie pan. Dot mixture with butter and add the top of the pastry to form a two-crust pie. Bake at 450°F for 10 minutes. Reduce temperature to 350°F and continue baking for another 30 minutes.

Bill Summers. USDA SCS, 1991, Southern wetland flora: Field office guide to plant species. Provided by USDA NRCS Wetland Science Institute (WSI), Fort Worth.



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Wild Grapes

Only one species of wild grape, riverside grape (*Vitis riparia*), is found throughout Wyoming. Six other species, however, occur along the southern and eastern borders of the state. These six species are mapleleaf grape (*Vitis acerifolia*), summer grape (*Vitis aestivalis*), canyon grape (*Vitis arizonica*), graybark grape (*Vitis cinerea*), fox grape (*Vitis labrusca*), and frost grape (*Vitis vulpina*). The domesticated vineyard or wine grape (*Vitis vinifera*) is cultivated in Wyoming.

Riverside grape is a vining plant with opposite leaf arrangement and a unique leaf shape. The leaf lacks the typical deep-lobed characteristic common to most grapes, but it still has three distinct and prominent leaf tips. The base of the leaf is concave, with large rounded ears to each side of the petiole. The leaves are deeply serrated. The white flowers occur in clusters, forming into a dark blue fruit.

Wild Grape Jelly

To make wild grape jelly, follow the directions for making cultivated grape jelly as provided with commercial pectin packages (page 10).

Wild Grape Butter

6 quarts grapes, washed and stemmed
Water to cover
4 quarts apples, washed and quartered but not peeled
4 cups sugar
Jelly bag (page 4) or three layers of cheesecloth

Cover the grapes with water and simmer for 20 minutes. Strain off juice and make into jelly as described beginning on page 46. Put the grape pulp into the jelly bag or cheesecloth layers. Return to the kettle, keeping the pulp in the bag. Add apples. The bag keeps grape seeds out of the apples but allows the seeds to impart a richer grape flavor to the butter. Cover apples and bag of grapes with water. Bring to a boil and simmer 20 minutes. Drain. Juice can be used for Grape Apple Jelly (page 67). Put apples through a sieve and measure out 5 cups. Place in kettle, add sugar, and heat to boiling, stirring constantly. Cook to desired consistency. Spoon butter into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

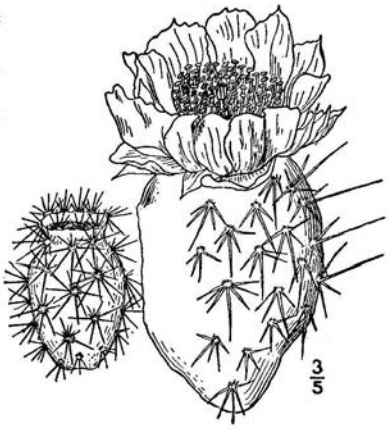
Grape Apple Jelly

5 cups of grape/apple juice (from previous recipe)
7 cups sugar
1 package (1.75 ounces) or 6 tablespoons powdered pectin

Follow the steps for making jelly on beginning on page 46. Refer to Table 13 (page 48) for processing times. Follow the after-processing steps on page 48.

Wild Grape Juice

To make Wild Grape Juice, follow the directions for making cultivated grape juice (page 7) or Wild Berry Fruit Juices (page 45).



USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols. Charles Scribner's Sons, New York. Vol. 2: 577.

Prickly Pear Cactus

This is one of the easiest plants to identify because almost everyone knows what these cacti look like. The most common species found in Wyoming is the plains prickly pear (*Opuntia polyacantha*). Cacti are desert-dwelling succulents found in the drier sections of every state and province of North America. The leaves of plains prickly pear are large fleshy lobes covered with two types of spines. The large woody spines are intimidating, but it is the smaller hair-like spines, which are barbed, that can be far more problematic. They are difficult to see and remove after they become imbedded in the skin. The large yellow cactus flower occurs at the top of a fleshy leaf. The fruit is a reddish purple and covered with fine spines. Because of the spines on the leaves and fruit, use tongs and gloves to gather and handle the fruit.

Prickly Pear Jelly

3 cups of cactus juice (made from approximately 12 cups ripe cactus fruit)
½ cup commercially bottled lemon juice
1 package (1.75 ounces) or 6 tablespoons powdered pectin
4½ cups of sugar
Jelly bag (page 4) or three layers of cheesecloth

Caution: Use tongs and gloves to gather and handle cactus fruit.

To prepare cactus juice, rinse and scald the fleshy fruits. If possible, remove any damaged spots (you do not need to remove the small spines or prickles). Cut into halves, barely cover with water, and simmer 15 minutes. Pour into jelly bag (page 4) or cheesecloth layers and squeeze out cactus juice. Discard pulp. Mix cactus juice and commercially bottled lemon juice with powdered pectin. Place over high heat and stir until the mixture comes to a rolling boil. Add sugar, bring to a vigorous boil again, and boil for 1½ minutes, stirring constantly. Remove from heat, skim off any foam with a metal spoon, and pour quickly into hot half-pint or pint jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe sealing edge of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 13 (page 48). Follow the after-processing steps on page 48.

TOMATOES

Canning Reminders for Salsa

Follow the directions carefully for each recipe. Use the amounts of each vegetable listed in the recipe. Add the amount of vinegar or commercially bottled lemon juice listed. You may change the amount of spices if desired.

Do not can salsas that do not follow these or other research-tested recipes. Instead, these products must be served immediately, refrigerated, or frozen.

Do not thicken salsas with flour or cornstarch before canning. Thickening salsa prior to canning would result in under-processing because heat penetration takes longer through a thick food product, and the salsa could spoil during storage. After you open a jar to use, you can pour off some of the liquid or thicken with cornstarch.

Spices

Spices add flavoring to salsas. The amount of spices and herbs may be altered in these recipes. Cilantro and cumin are often used in spicy salsas. You may leave them out if you prefer salsa with a milder taste. For a stronger cilantro flavor, add fresh cilantro just before serving the salsa.

Important reminder

The only changes you can safely make in these salsa recipes are to substitute commercially bottled lemon juice for vinegar and to change the amount of spices and herbs. Do not alter the proportions of vegetables to acid and tomatoes because doing so may make the salsa unsafe.

Handling peppers

Caution: Wear rubber gloves while handling peppers or wash hands thoroughly with soap and water before touching your face.

Wear rubber gloves while handling peppers or wash hands thoroughly with soap and water before touching your face.

Wash and dry peppers. Slit each pepper along its side to allow steam to escape. Prepare peppers for peeling by placing them either in an oven at 400°F or a broiler for 6 to 8 minutes until skins blister. Allow peppers to cool. Peel each pepper. (Note: jalapeños do not need to be peeled.) Some skins may slip off. Discard seeds and chop peppers.

Canning procedure

When making salsa, only use pint jars—do not pack into quart jars.

1. Wash pint jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot pint jars with the product you are canning, being sure to leave the correct headspace as specified. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time and method as recommended by the recipe you are following. This will ensure that the food is properly preserved and safe to eat.

Process

Process in a boiling water canner. Fill canner halfway with water and preheat to 180°F. Load filled jars into the canner rack and lower with handles or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars and cover. When water boils vigorously, lower heat to maintain a gentle boil and process for time given in Table 16 (page 72). Follow the after-processing steps on page 72.

Table 16. Recommended processing times for all salsa recipes in a boiling water canner at designated altitudes

Jar size	Pack style	3,001–6,000 feet (minutes)	Above 6,000 feet (minutes)
Pints	Hot	20	25

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within four weeks. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Chile Salsa

5 pounds tomatoes
2 pounds chile peppers
1 pound onions
1 cup vinegar (5% acid)
3 teaspoons canning or pickling salt
½ teaspoon pepper

Yield: 6 to 8 pints

Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water, slip off skins, and remove cores. Coarsely chop tomatoes and combine chopped onions, peppers, and remaining ingredients in a large saucepan. Heat to boiling and simmer 12 to 15 minutes. Follow canning procedure on page 71.

Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Salsa (Using slicing tomatoes)

4 cups peeled, cored, chopped tomatoes
2 cups seeded, chopped long green chiles
½ cup seeded, chopped jalapeño peppers
¾ cup chopped onions
4 cloves garlic, finely chopped
2 cups vinegar (5% acid)
1 teaspoon ground cumin (optional)
1 tablespoon oregano leaves (optional)
1 tablespoon fresh cilantro (optional)
1½ teaspoons canning or pickling salt

Yield: 4 pints

Combine all ingredients in a large saucepan and bring the mixture to a boil, stirring frequently. Reduce heat and simmer 20 minutes, stirring occasionally. Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Tomato Salsa (Using paste tomatoes)

7 quarts peeled, cored, and chopped paste tomatoes (i.e., Roma tomatoes)
4 cups seeded, chopped long green chiles
5 cups chopped onion
½ cup seeded, finely chopped jalapeño peppers
6 cloves garlic, finely chopped
2 cups commercially bottled lemon or lime juice
2 tablespoons canning or pickling salt
1 tablespoon black pepper
2 tablespoons ground cumin (optional)
3 tablespoons oregano leaves (optional)
2 tablespoons fresh cilantro (optional)

Yield: 16 to 18 pints

Combine all ingredients except cumin, oregano, and cilantro in a large pot and bring to a boil, stirring frequently. Reduce heat and simmer 10 minutes. Add spices and simmer for another 20 minutes, stirring occasionally. Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Tomato/Green Chile Salsa

3 cups peeled, cored, chopped tomatoes
3 cups seeded, chopped long green chiles
¾ cup chopped onions
1 jalapeño peppers, seeded, finely chopped
6 cloves garlic, finely chopped
1½ cups vinegar (5% acid)
½ teaspoon ground cumin (optional)
2 teaspoons oregano leaves (optional)
1½ teaspoons canning or pickling salt

Yield: 3 pints

Combine all ingredients in a large saucepan and bring the mixture to a boil, stirring frequently. Reduce heat and simmer 20 minutes, stirring occasionally. Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Tomatillo Green Salsa

5 cups chopped tomatillos (remove dry outer husks before chopping)
1½ cups seeded, chopped long green chiles
½ cup seeded, finely chopped jalapeño peppers
4 cups chopped onions
1 cup commercially bottled lemon or lime juice
6 cloves garlic, finely chopped
1 tablespoon ground cumin (optional)
3 tablespoons oregano leaves (optional)
1 tablespoon canning or pickling salt
1 teaspoon black pepper

Yield: 5 pints

Combine all ingredients in a large saucepan and bring the mixture to a boil, stirring frequently. Reduce heat and simmer 20 minutes, stirring occasionally. Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Tomato Taco Sauce

8 quarts peeled, cored, finely chopped paste tomatoes (i.e., Roma tomatoes)
2 cloves garlic, crushed
5 cups chopped onions
4 jalapeño peppers, seeded, chopped
4 long green chiles, seeded, chopped
2½ cups vinegar (5% acid)
2 tablespoons canning or pickling salt
1½ tablespoons black pepper
1 tablespoon sugar
2 tablespoons oregano leaves (optional)
1 teaspoon ground cumin (optional)

Yield: 16 to 18 pints

Combine ingredients in a large saucepan. Bring to a boil, then reduce heat and simmer, stirring frequently until thick (about 1 hour). Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Tomato/Tomato Paste Salsa

3 quarts peeled, cored, chopped slicing tomatoes
3 cups chopped onions
6 jalapeño peppers, finely chopped
4 long green chiles, chopped
4 cloves garlic, finely chopped
2 12-ounce cans tomato paste
2 cups commercially bottled lemon or lime juice
1 tablespoon canning or pickling salt
1 tablespoon sugar
1 tablespoon cumin (optional)
2 tablespoons oregano leaves (optional)
1 teaspoon black pepper

Yield: 7 to 9 pints

Combine all ingredients in a large saucepan. Bring to a boil. Reduce heat and simmer 30 minutes, stirring occasionally. Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Chile Salsa (Hot Tomato Pepper Sauce)

10 cups peeled, cored, chopped tomatoes
6 cups seeded, chopped chile peppers (use mixture of mild and hot peppers)
4 cups chopped onions
1 cup vinegar (5% acid)
3 teaspoons canning or pickling salt
½ teaspoon pepper

Yield: 6 to 8 pints

Combine ingredients in a large saucepan. Heat to a boil and simmer 10 minutes. Follow canning procedure on page 71. Ladle hot mixture into hot pint jars, leaving ½-inch headspace. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process in a boiling water canner as described in Table 16 (page 72). Follow the after-processing steps on page 72.

Tomatoes and Other Tomato Products

Quantity

A bushel of tomatoes weighs approximately 53 pounds.

Table 17. Quantities of fresh tomatoes needed for tomato products

Product	Average number of pounds of fresh tomatoes needed for:			
	1 Quart	1 Pint	7 Quarts	9 Pints
Juice	3¼	—	23	14
Juice blend; crushed	3	1½	22	14
Whole or halved	3	1½	21	13
Thin sauce	5	2½	35	21
Thick sauce	6½	3	46	28

Quality

Select only disease-free, firm fruit for canning. Vine-ripened tomatoes are preferred. Do not can tomatoes from dead or frost-killed vines. Green tomatoes are more acidic than ripened fruit and can be canned safely with any of the following recommendations.

Acidification

To ensure the safe acidity of canned whole, crushed, or juiced tomatoes, it is recommended to add either 2 tablespoons of commercially bottled lemon juice or ½ teaspoon citric acid per quart of tomatoes. For pints, use 1 tablespoon commercially bottled lemon juice or ¼ teaspoon citric acid. The acid can be added directly to the jar before filling it with the tomato product. In place of lemon juice or citric acid, you can also use 4 tablespoons of 5% vinegar per quart, but this may result in an undesirable flavor change. To offset an acidic taste, you can add sugar to the tomatoes before canning.

Freezing

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer per day. To freeze tomatoes, wash, scald for 30 to 60 seconds to loosen skins, peel, and

core. Cut into pieces and freeze or, for stewed tomatoes, simmer tomato pieces for 10 to 20 minutes until tender. To package, fill pint or quart freezer bags to a level 1 to 2 inches from top and squeeze out air. Seal, leaving room at the top of the bag for expansion of the food during freezing. Label and freeze. Before freezing, bags may be inserted into reusable rigid freezer containers for added protection against punctures and leakage.

Canning procedure

1. Wash pint jars following jar cleaning and preparation guidelines (page 3).
2. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
3. Fill the hot jars with the product you are canning, being sure to leave the correct headspace as specified. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time and method as recommended by the recipe you are following. This will ensure that the food is properly preserved and safe to eat.

Process: Boiling water

To process in a boiling water canner, preheat canner filled halfway with water to 180°F for hot packs and 140°F for raw packs. Load filled jars onto the canner rack and lower rack with handles, or load one jar at a time with a jar lifter onto canner rack. Add water (boiling water for hot packs and hot water for raw packs), if needed, to a level of 1 inch above jars and add canner cover. When water boils vigorously, lower heat to maintain a gentle boil and process jars as described in Table 18 (page 79). Follow the after-processing steps on page 80.

Table 18. Recommended processing times for tomato products in a boiling water canner at designated altitudes

Product	Style of pack	Jar size	3,001–6,000 feet (minutes)	Above 6,000 feet (minutes)
Tomato juice; tomato vegetable juice blend	Hot Hot	Pints Quarts	45 50	50 55
Whole or halved tomatoes packed in water	Hot or raw	Pints Quarts	50 55	55 60
Crushed tomatoes	Hot Hot	Pints Quarts	45 55	50 60
All tomato ketchups	Hot	Pints	20	25
Standard tomato sauce	Hot Hot	Pints Quarts	45 50	50 55

Process: Pressure

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 19 (page 80). Do not allow the pressure to drop below the recommended pressure for your altitude. Follow the after-processing steps on page 80.

Table 19. Recommended processing times and pressures for tomato products in a pressure canner at designated altitudes

Product	Style of pack	Jar size	Processing time (minutes)	Dial Gauge*			Weighted Gauge
				2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Tomato juice; tomato vegetable juice blend; or crushed tomatoes	Hot	Pints Quarts	20 15	7 12	8 13	9 14	10 15
Whole or halved tomatoes packed in water	Hot or Raw	Pints Quarts	15 10	7 12	8 13	9 14	10 15
Tomatoes with okra or zucchini**	Hot	Pints Quarts	30 35	12 12	13 13	14 14	15 15
All tomato ketchups	Hot	Pints	10	12	13	14	15
Standard tomato sauce	Hot	Pints Quarts	20 15	7 12	8 13	9 14	10 15
Spaghetti sauce without meat**	Hot	Pints Quarts	20 25	12 12	13 13	14 14	15 15
Spaghetti sauce with meat**	Hot	Pints Quarts	60 70	12 12	13 13	14 14	15 15
Mexican tomato sauce**	Hot	Pints Quarts	20 25	12 12	13 13	14 14	15 15

* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.

** Products are considered low acid. UW Extension recommends all low-acid home-canned foods be boiled for 15–20 minutes before eating.[6] See page 116 for reheating directions.

After processing

1. **Boiling water canning**: When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. **Pressure canning**: When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully

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depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.

3. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
4. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
5. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
6. If the lid is unsealed, refrigerate the jar and use within one week. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
7. Wash the screw bands and store them separately.
8. Products are best if used within one year.

Tomato Juice

See Table 17 (page 77) for guidelines regarding the quantity of tomatoes needed.

Wash, remove stems, and trim off bruised or discolored portions. To prevent juice from separating, quickly cut about 1 pound of fruit into quarters and put directly into saucepan. Heat immediately to boiling while crushing. Continue to slowly add and crush freshly cut tomato quarters to the boiling mixture. Make sure the mixture boils constantly and vigorously while adding the remaining tomatoes. Simmer 6 to 8 minutes after adding all pieces.

If you are not concerned about juice separation, simply slice or quarter tomatoes into a large saucepan. Crush, heat, and simmer 5 minutes before juicing. For either method, press heated juice through a sieve or food mill to remove skins and seeds. Add commercially bottled lemon juice or citric acid to jars. See acidification instructions on page 77. Reheat juice to boiling. Add up to 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint, if desired. Fill hot jars with hot tomato juice, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Tomato and Vegetable Juice Blend

See Table 17 (page 77) for guidelines regarding the quantity of tomatoes needed.

Crush and simmer tomatoes as described for tomato juice. Add no more than 3 cups of any combination of finely chopped celery, onions, carrots, and peppers for every 22 pounds of tomatoes. Simmer mixture for 25 minutes. Press hot cooked tomatoes and vegetables through sieve or food mill to remove skins and seeds. Add commercially bottled lemon juice or citric acid to jars. See acidification instructions on page 77. Add up to 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint, if desired. Reheat tomato-vegetable juice blend to boiling and fill immediately into hot jars, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Whole or Halved Tomatoes Packed in Water

See Table 17 (page 77) for guidelines regarding the quantity of tomatoes needed.

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. Leave whole or halved. Add

commercially bottled lemon juice or citric acid to jars. See acidification instructions on page 77.

- **Hot pack**—Bring tomatoes to a boil in water and boil 5 minutes. Fill hot jars with hot tomatoes. Add up to 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint, if desired, and add enough hot cooking water to cover tomatoes, leaving ½-inch headspace.
- **Raw pack**—Fill hot jars with raw peeled tomatoes. Add up to 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint, if desired. Add hot water to cover tomatoes, leaving ½-inch headspace.

Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Crushed Tomatoes

See Table 17 (page 77) for guidelines regarding the quantity of tomatoes needed.

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 ⅙ of the quarters quickly in large pan, crushing with wooden spoon as they are added to extract the juice. Continue to heat to boiling, stirring to prevent burning. Gradually add remaining tomatoes (without crushing). Boil gently for 5 minutes. Add commercially bottled lemon juice or citric acid to jars; see acidification instructions on page 77. Add up to 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint, if desired. Fill hot jars immediately with hot tomatoes, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Tomatoes and Okra/Tomatoes and Zucchini

An average of 12 pounds of tomatoes and 4 pounds of okra or zucchini are needed for 7 quarts. For 9 pints, an average of 7 pounds of tomatoes and 2½ pounds of okra or zucchini are needed.

Wash tomatoes and okra or zucchini. Dip tomatoes in boiling water for 30 to 60 seconds or until skins split. Then dip in cold water, slip off skins, remove cores,

and quarter. Trim stems from okra, and slice into 1-inch pieces or leave whole. Slice or cube zucchini if used. Bring tomatoes to a boil and simmer 10 minutes. Add okra or zucchini and boil gently for 5 minutes. Add up to 1 teaspoon canning or pickling salt to each quart or ½ teaspoon per pint, if desired. Fill hot jars with mixture, leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 19 (page 80). Follow the after-processing steps on page 80.

Standard Tomato Ketchup

24 pounds ripe tomatoes
3 cups onions, chopped
¾ teaspoon ground red pepper (cayenne)
3 cups cider vinegar (5% acid)
4 teaspoons whole cloves
3 sticks cinnamon
1½ teaspoons whole allspice
3 tablespoons celery seeds
1½ cups sugar
¼ cup canning or pickling salt
Spice bag or cheesecloth to hold spices

Yield: 6 to 7 pints

Wash tomatoes. Dip in boiling water for 30 to 60 seconds or until skins are split. Dip in cold water. Slip off skins and remove cores; quarter tomatoes and place in a large saucepan. Add onions and red pepper; bring to a boil and simmer uncovered for 25 minutes. Combine spices, tie them in the spice bag or cheesecloth, and add to vinegar in a separate 2-quart saucepan. Bring to a boil. Cover, turn off heat, and let stand 20 minutes. Then remove spice bag and combine vinegar and tomato mixture. Boil for 30 minutes. Put boiled mixture through a food mill or sieve. Return to heat, add sugar and salt, boil gently, and stir frequently until volume is reduced by half or until mixture rounds up on spoon without separation. Fill hot pint jars, leaving ⅛-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Country Western Ketchup

24 pounds ripe tomatoes
5 chile peppers, sliced and seeded
¼ cup canning or pickling salt
2 ⅔ cups vinegar (5% acid)
1¼ cups sugar
½ teaspoon ground red pepper (cayenne)
4 teaspoons paprika
4 teaspoons whole allspice
4 teaspoons dry mustard
1 tablespoon whole peppercorns
1 teaspoon mustard seeds
1 tablespoon bay leaves

Yield: 6 to 7 pints

Follow directions for Standard Tomato Ketchup on page 84.

Blender Ketchup

Electric blender (eliminates need for pressing or sieving)
24 pounds ripe tomatoes
2 pounds onions
1 pound sweet red peppers
1 pound sweet green peppers
9 cups vinegar (5% acid)
9 cups sugar
¼ cup canning or pickling salt
3 tablespoons dry mustard
1½ tablespoons ground red pepper
1½ teaspoons whole allspice
1½ tablespoons whole cloves

Yield: about 9 pints

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

solids. Remove spice bag and fill hot pint jars, leaving ⅛-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands; tighten screw bands. Process jars as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Standard Tomato Sauce

See Table 17 (page 77), for guidelines regarding the quantity of tomatoes needed.

Wash, remove stems, and trim off bruised or discolored portions. To prevent sauce from separating, quickly cut about 1 pound of tomatoes into quarters and put directly into saucepan; heat immediately to boiling while crushing. Continue to slowly add and crush freshly cut tomato quarters to the boiling mixture. Make sure the mixture boils constantly and vigorously while adding remaining tomatoes. Simmer 5 minutes after all tomatoes are added. If you are not concerned about sauce separating, simply slice or quarter tomatoes in a large saucepan. Crush, heat, and simmer 5 minutes before pressing. Press either type of heated sauce through a sieve or food mill to remove skins and seeds. Heat sauce again until boiling; simmer in a large-diameter saucepan until sauce reaches desired consistency. Boil until volume is reduced by about one-third for thin sauce or by one-half for thick sauce. Tomato sauce must be acidified. See acification requirements on page 77. Fill hot jars, leaving ¼-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands and process as described in Table 18 (page 79) or Table 19 (page 80). Follow the after-processing steps on page 80.

Mexican Tomato Sauce

2½ to 3 pounds chiles
18 pounds tomatoes
3 cups onions, chopped
1 tablespoon canning or pickling salt
1 tablespoon oregano
½ cup vinegar (5% acid)

Yield: about 7 quarts

Caution: Wear rubber gloves while handling peppers or wash hands thoroughly with soap and water before touching your face.

Wash and dry peppers. Slit each pepper along its side to allow steam to escape. Prepare peppers for peeling by placing them either in an oven at 400°F or a broiler for 6 to 8 minutes until skins blister. Allow peppers to cool. Peel each pepper. (Note: Jalapeños do not need to be peeled.) Some skins may slip off. Discard seeds and chop peppers.

Wash tomatoes, dip in boiling water for 30 to 60 seconds or until skins split, dip in cold water, slip off skins, and remove cores. Coarsely chop tomatoes and combine chopped peppers and remaining ingredients in large saucepan. Bring to a boil. Cover. Simmer for 10 minutes. Fill hot jars, leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands and process as described in Table 19 (page 80). Follow the after-processing steps on page 80.

Spaghetti Sauce without Meat

30 pounds tomatoes
1 cup onions, chopped
5 cloves garlic, minced
1 cup celery or green peppers, chopped
1 pound fresh mushrooms, sliced (optional)
4½ teaspoons canning or pickling salt
2 tablespoons oregano
4 tablespoons parsley, minced
2 teaspoons black pepper
¼ cup brown sugar
¼ cup vegetable oil

Yield: about 9 pints or 4 quarts

Do not increase the portion of onions, peppers, or mushrooms. Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water and slip off skins. Remove cores and quarter tomatoes; boil 20 minutes uncovered in large saucepan.

Put tomatoes through a food mill or sieve. Sauté onions, garlic, celery or peppers, and mushrooms (if desired) in vegetable oil until tender. Combine sautéed vegetables and tomatoes and add remainder of spices, canning or pickling salt, and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. At this time, the initial volume will have been reduced by nearly half. Stir frequently to avoid burning. Fill hot pint or quart jars, leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw

bands; tighten screw bands. Process jars as described in Table 19 (page 80). Follow the after-processing steps on page 80.

Spaghetti Sauce with Meat

30 pounds tomatoes
2½ pounds lean ground beef or sausage (any type—pork, beef, or venison)
5 cloves garlic, minced
1 cup chopped onions
1 cup chopped celery or green peppers
1 pound fresh mushrooms, sliced (optional)
4½ tablespoons canning or pickling salt
2 tablespoons oregano
4 tablespoons minced parsley
2 teaspoons black pepper
¼ cup brown sugar

Yield: about 9 pints or 4 quarts

To prepare tomatoes, follow directions for spaghetti sauce without meat. Sauté beef or sausage until brown; drain off fat. Add garlic, onion, celery or green pepper, and mushrooms (if desired). Cook until vegetables are tender. Combine with tomato pulp in large saucepan. Add spices, canning or pickling salt, and sugar; bring to boil. Simmer, uncovered, until thick enough for serving. At this time, initial volume will have been reduced by nearly half. Stir frequently to avoid burning. Fill hot pint or quart jars, leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Wipe rims of jars with a clean, damp paper towel. Apply lids and screw bands and process as described in Table 19 (page 80). Follow the after-processing steps on page 80.

PICKLES AND SAUERKRAUT

Cucumbers

Quantity

A bushel of cucumbers weighs 48 pounds and yields 16 to 24 quarts. An average of 14 pounds is needed per canner load of 7 quarts; an average of 9 pounds is needed per canner load of 9 pints. This is an average of 2 pounds per quart.

Quality

Select firm cucumbers of the appropriate size, about 2 inches long for gherkins and 5 inches for dills. Use odd-shaped and more mature cucumbers for relishes and bread and butter pickles.

Containers, weights, and covers for fermenting food

Follow the fermentation procedures below to make Fermented Dill Pickles, recipe on page 92. Other cucumber pickle recipes do not involve fermentation.

A 1-gallon container holds 5 pounds of fresh cucumbers, and a 5-gallon container holds 25 pounds. Glass and food-grade plastic containers are excellent substitutes for stone crocks. Many restaurants receive foods and ingredients in 5-gallon plastic pails, which make ideal fermentation containers. Other 1- to 3-gallon non-food-grade containers may be used if lined inside with a clean, food-grade plastic bag. **Caution:** Do not use garbage bags or trash liners.

Cucumbers must be kept 1 to 2 inches under the brine while fermenting. To do so, after adding prepared cucumbers and brine, insert a dinner plate or glass pie plate just small enough to fit inside the fermentation container. The plate must be slightly smaller than the container opening but large enough to cover most of the cucumbers.

- To keep the plate under the brine, weigh it down with 2 to 3 sealed quart jars filled with water.
- Alternatively, weigh down the plate using a large, clean, sealed food-grade plastic bag containing 3 quarts clean water and 4½ tablespoons canning or pickling salt.

Cover the container opening above the jars or plastic bag serving as the weight

with a heavy, clean bath towel to prevent contamination from molds and insects during fermentation.

Caution: The fermentation container, plate, and jars should be washed in hot, soapy water and rinsed well with very hot water before use.

Preparation

Wash cucumbers. Cut 1/16 inch off blossom end and discard.

Variation using pickling lime for firmer pickles with some recipes as indicated: If you prefer especially firm pickles, mix 1 cup food-grade pickling lime and ½ cup non-iodized salt to 1 gallon of water in a 2- to 3-gallon crock container. **Caution:** Avoid inhaling the lime dust while mixing the lime-water solution**.** Cut cucumbers in slices or strips and soak in lime water for 12 to 24 hours. Remove from lime solution, rinse, and re-soak for 1 hour in fresh cold water. Repeat rinsing and soaking steps in fresh water two more times. Handle carefully, as slices or strips will be brittle. Drain well. **Caution:** To ensure they are safe to eat, cucumber slices or strips must be soaked and rinsed thoroughly three times.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot jars with the product you are canning, being sure to leave the correct headspace as specified for each recipe. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time in a boiling water canner (or use the low-temperature pasteurization method on page 91 when indicated as an option). This will ensure that the food is properly preserved and safe to eat.

Process: Boiling water

To process in a boiling water canner, fill canner halfway with water and preheat to 180°F. Load filled jars into canner rack and lower with handles or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When water boils vigorously, lower heat to maintain a gentle boil, and process jars for the recommended time listed in Table 20 (page 91). Follow the after-processing steps on page 92.

Table 20. Recommended processing times for pickles in a boiling water canner at designated altitudes

Product	Style of pack	Jar size	3,001–6,000 feet (minutes)	6,001–8,000 feet (minutes)
Fermented dill pickles	Raw	Pints Quarts	15 20	20 25
Quick fresh pack dills	Raw	Pints Quarts	15 20	20 25
Quick sweet	Raw	Pints Quarts	15 20	20 25
	Hot	Pints or Quarts	10	15
Sweet gherkin	Raw	Pints	10	15
Bread and butter	Hot	Pints or Quarts	15	20
Pickle relish	Hot	Half-pints or Pints	15	20
Reduced sodium sweet pickles	Hot	Pints	15	20

Process: Low-temperature pasteurization

To process using low-temperature pasteurization treatment, place jars in a canner filled halfway with warm (120° to 140°F) water. Add hot water to a level 1 inch above jars. Heat the water enough to maintain 180° to 185°F water temperature for 30 minutes. Use a candy or jelly thermometer to be certain the water temperature is at least 180°F during the entire 30 minutes. Temperatures higher than 185°F may cause unnecessary softening of pickles. This treatment results in better product texture but must be carefully managed to avoid possible spoilage. **Caution:** Use this method only when the recipe indicates this option. Follow the after-processing steps on page 92.

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within two to three months. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Fermented Dill Pickles

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

4 pounds 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% acid)
8 cups water
One or more of the following ingredients, if desired:

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

Wash cucumbers. Cut 1/16 inch off blossom end and discard, but leave ¼ inch of cucumber stem attached. Place half of dill and spices on bottom of a clean, suitable container as described on page 89. Add cucumbers, remaining dill, and spices. In a separate large bowl or pan, dissolve salt in vinegar and water and pour over cucumbers. Add suitable cover and weight as described on page 89. Store in a location where the temperature is between 70° and 75°F for about 3 to 4 weeks while fermenting. Temperatures between 55° and 65°F are acceptable, but 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 or slimy or if they 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 coffee filters to reduce cloudiness, if desired. Fill hot pint or quart jars with pickles and hot brine, leaving ½-inch headspace. Remove air bubbles by running a rubber spatula through the filled jars and between the food and side of the jar in several places. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars in a boiling water canner. Process jars as listed in Table 20 (page 91) or use the low-temperature pasteurization treatment as described on page 91. Follow the after-processing steps on page 92.

Quick Fresh Pack Dill Pickles

8 pounds 3- to 5-inch pickling cucumbers
2 gallons water
1¼ cups canning or pickling salt
6 cups vinegar (5% acid)
¼ cup sugar
2 quarts water
2 tablespoons whole mixed pickling spice
5 tablespoons whole mustard seed (2 teaspoons per pint jar)
21 heads fresh dill (3 heads per pint jar) or 7 tablespoons dill seed (1 tablespoon per pint)
Spice bag or cheesecloth

Yield: about 7 to 9 pints or 4 quarts

Wash cucumbers. Cut 1/16 inch off blossom end but leave ¼ inch of cucumber stem attached. Dissolve ¾ cup salt in 2 gallons water. Pour brine water over cucumbers and let stand 12 hours. Drain. Combine vinegar, ½ cup salt, sugar, and 2 quarts water. Tie spices in a spice bag or cheesecloth and add to vinegar mixture. Heat to boiling. Fill hot pint or quart jars with pickles. Add 2 teaspoons mustard seed and 3 heads fresh dill per quart. Cover with boiling liquid, leaving ½-inch head space. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten

screw bands. Process jars as listed in Table 20 (page 91) or use the low-temperature pasteurization treatment as described on page 91. Follow the after-processing steps on page 92.

Quick Sweet Pickles

8 pounds 3- to 4-inch pickling cucumbers
⅓ cup canning or pickling salt
4½ cups sugar
3½ cups vinegar (5% acid)
2 teaspoons celery seed
1 tablespoon whole allspice
2 tablespoons mustard seed
1 cup pickling lime (optional)

Yield: about 7 pints or 3 to 4 quarts

Wash cucumbers. Cut 1/16 inch off blossom end and discard, but leave ¼ inch of cucumber stem attached. Cut into strips or slices. Place in bowl and sprinkle with ⅓ cup salt. Cover with 2 inches crushed or cubed ice. Refrigerate 3 to 4 hours. Add more ice as needed. Drain well. For firmer pickles, use the pickling lime treatment described on page 90.

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

To make a hot pack, add cucumbers and heat slowly until vinegar mixture returns to boil. Stir occasionally to make sure vinegar mixture heats evenly. Fill hot pint or quart jars with cucumbers and add hot pickling syrup, leaving ½-inch headspace.

To make a raw pack, fill hot pint or quart jars with cucumbers and add hot pickling syrup, leaving ½-inch headspace.

Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 20 (page 91) or use the low-temperature pasteurization treatment as described on page 91. Follow the after-processing steps on page 92.

Variation: Add 2 slices raw whole onion to each jar before filling with cucumbers.

Sweet Gherkins

7 pounds cucumbers (2 inches or shorter in length)
½ cup canning or pickling salt
8 cups sugar
6 cups vinegar (5% acid)
¾ teaspoon turmeric
2 teaspoons celery seed
2 teaspoons whole mixed pickling spice
2 cinnamon sticks
½ teaspoon fennel (optional)
2 teaspoons vanilla (optional)

Yield: about 6 to 7 pints

Wash cucumbers. Cut 1/16 inch off blossom end and discard, but leave ¼ inch of cucumber stem attached. Place cucumbers in large container and cover with boiling water. Six to eight hours later, and again on the second day, drain and cover with 6 quarts of fresh boiling water containing ¼ cup salt. On the third day, drain and prick cucumbers with a table fork. Combine and bring to boil 3 cups vinegar, 3 cups sugar, turmeric, and other spices. Pour over cucumbers. Six to eight hours later, drain and save the pickling syrup. Add another 2 cups each sugar and vinegar and reheat syrup to boil. Pour over pickles. On the fourth day, drain and save syrup. Add another 2 cups sugar and 1 cup vinegar. Heat to boiling and pour over pickles. Six to 8 hours later, drain and save pickling syrup. Add 1 cup sugar and 2 teaspoons vanilla to syrup and heat to boiling. Fill hot pint jars with pickles and cover with hot syrup, leaving ½-inch headspace.

Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 20 (page 91) or use the low-temperature pasteurization treatment as described on page 91. Follow the after-processing steps on page 92.

Bread and Butter Pickles

6 pounds 4- to 5-inch pickling cucumbers
8 cups onion, thinly sliced (about 3 pounds)
½ cup canning or pickling salt
4 cups vinegar (5% acid)
4½ cups sugar
2 tablespoons mustard seed
1½ tablespoons celery seed
1 tablespoon ground turmeric
1 cup pickling lime (optional)

Yield: about 8 pints or 4 quarts

Wash cucumbers. Cut 1/16 inch off blossom end and cut into slices approximately 3/16 inch thick. Combine cucumber and onion slices in a large bowl. Add salt. Cover with 2 inches crushed or cubed ice. Refrigerate for 3 to 4 hours, adding more ice as needed. For firmer pickles, use the pickling lime treatment described on page 90.

Mix sugar, vinegar, and remaining ingredients in a large pot and heat to boiling. Boil 10 minutes. Fill hot pint or quart jars with slices and cooking syrup, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 20 (page 91) or use the low-temperature pasteurization treatment as described on page 91. Follow the after-processing steps on page 92.

Variation using squash: Substitute slender zucchini or yellow squash (1½ to 2 inches in diameter) for cucumbers.

Pickle Relish

3 quarts fresh chopped cucumbers
3 cups chopped sweet green peppers
3 cups chopped sweet red peppers
1 cup chopped onion
¾ cup canning or pickling salt
8 cups water
4 cups ice
2 cups sugar
4 teaspoons each of mustard seed, turmeric, whole allspice, and whole cloves
6 cups white vinegar (5% acid)
Spice bag or cheesecloth

Yield: 8 to 9 pints or 16 to 18 half-pints

Combine water, salt, ice, cucumbers, peppers, and onions and let stand 4 hours. Drain and cover vegetables with fresh ice water for another hour. Drain again. Mix sugar and vinegar in a saucepan. Tie spices in a spice bag or cheesecloth and add to vinegar and sugar mixture. Heat to boiling and pour mixture over vegetables. Cover and refrigerate 24 hours. Heat mixture to boil and fill hot pint or half-pint jars with hot mixture, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 20 (page 91). Follow the after-processing steps on page 92.

Reduced Sodium Sliced Sweet Pickles

4 pounds 3- to 4-inch pickling cucumbers
Brining solution:
4 cups distilled white vinegar (5% acid)
1 tablespoon canning or pickling salt
1 tablespoon mustard seed
½ cup sugar
Canning syrup:
1⅔ cups white vinegar (5% acid)
3 cups sugar
1 tablespoon whole allspice
2¼ teaspoon celery seed

Yield: about 4 to 5 pints

Wash cucumbers. Cut 1/16 inch off blossom end and discard but leave ¼ inch of cucumber stem attached. Cut cucumbers into ¼-inch slices. In a large kettle, mix ingredients for brining solution. Add the cucumber slices, cover, and simmer until the cucumbers change color from bright to dull green (about 6 to 8 minutes). In a separate pan, mix ingredients for canning syrup and heat to boiling. Drain cucumber slices. Fill hot pint jars with slices and cover with hot canning syrup, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 20 (page 91). Follow the after-processing steps on page 92.

Peppers

Types of peppers and pickled products

- **Sweet pickled**—made with banana, bell, Hungarian, or pimiento peppers
- **Hot pickled**—made with chile or jalapeño peppers
- **Pickled pepper relish**—generally made with sweet red, yellow, or green peppers

Quantity

An average of 9 pounds is needed per canner load of 9 pints. A bushel weighs 25 pounds and yields 20 to 30 pints, an average of 1 pound per pint.

Quality

Select firm yellow, green, or red peppers free of disease and insect damage.

Handling and preparation

Select your favorite pepper(s). **Caution:** If you choose hot peppers, wear rubber gloves while handling them or wash hands thoroughly with soap and water before touching your face. Small peppers can be left whole, and jalapeños do not have to be peeled. Wash and quarter large peppers and remove cores and seeds. Slit each pepper along its side to allow steam to escape. Prepare peppers for peeling by placing them either in an oven at 400°F or under a broiler for 6 to 8 minutes until skins blister. Cool peppers in water and peel or slip skins off. Flatten small whole peppers.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).

2. Fill the hot jars with the product you are canning, being sure to leave ½-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time in a boiling water canner. This will ensure that the food is properly preserved and safe to eat.

Process

To process in a boiling water canner, preheat canner filled halfway with water to 180°F for hot packs and 140°F for raw packs. Load filled jars onto the canner rack and lower rack with handles or load one jar at a time with a jar lifter onto canner rack. Add water (boiling water for hot packs and hot water for raw packs), if needed, to a level of 1 inch above jars and add canner cover. When water boils vigorously, lower heat to maintain a gentle boil and process jars as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Table 21. Recommended processing times for pickled peppers in a boiling water canner at designated altitudes

Product	Style of pack	Jar size	3,001–6,000 feet (minutes)	Above 6,000 feet (minutes)
Pickled bell peppers	Hot	Half-pints or Pints	10	15
Pickled hot peppers	Raw	Half-pints or Pints	15	20
Marinated peppers	Raw	Half-pints or Pints	20	25
Pickled pepper onion relish	Hot	Half-pints or Pints	10	15
Pickled corn pepper relish	Hot	Half-pints or Pints	20	25
Piccalilli	Hot	Half-pints or Pints	10	15

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.

5. If the lid is unsealed, refrigerate the jar and use within two to three months. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Pickled Bell Peppers

7 pounds firm bell peppers
3½ cups sugar
3 cups vinegar (5% acid)
3 cups water
9 cloves garlic
4½ teaspoons canning or pickling salt

Yield: about 9 pints or 18 half-pints

Select and wash your favorite sweet peppers, cut into quarters, remove cores and seeds, and cut away any blemishes. Slice peppers in strips. Combine vinegar, water, and sugar and boil for 1 minute. Add peppers and bring to a boil. Place ½ clove garlic and ¼ teaspoon salt in each hot half-pint jar or double the amounts for pint jars. Add pepper strips and cover with hot vinegar mixture, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Pickled Hot Peppers

4 pounds hot, long red, green, or yellow peppers—use Hungarian, banana, chile, or jalapeño peppers
3 pounds sweet red and green peppers, mixed
5 cups vinegar (5% acid)
1 cup water
4 teaspoons canning or pickling salt
2 tablespoons sugar
2 cloves garlic

Yield: about 9 pints or 18 half-pints

Wash peppers. Peel as described in "Handling and preparation" on page 98. If small peppers are left whole, cut 2 to 4 slits in each. Flatten small peppers and quarter large peppers. Fill hot pint or half-pint jars, leaving ½-inch headspace. Combine and heat other ingredients to boiling and simmer 10 minutes. Remove garlic. Pour pickling solution over peppers, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Marinated Peppers

4 pounds firm peppers
1 cup commercially bottled lemon juice
2 cups white vinegar (5% acid)
1 tablespoon oregano leaves
1 cup olive or other vegetable oil
½ cup onions, chopped
2 cloves garlic, quartered (optional)
2 tablespoons prepared horseradish (optional)
2 teaspoons canning or pickling salt

Yield: about 9 half-pints or 4 to 5 pints

Select and wash your favorite sweet or hot peppers. Peel as described in "Handling and preparation" on page 98. Mix all remaining ingredients in a saucepan and heat to boiling. If desired, place ¼ garlic clove and ¼ teaspoon canning or pickling salt in each half-pint, or ½ garlic clove and ½ teaspoon salt in each pint. Fill hot jars with peppers and pour hot, well-mixed oil/pickling solution over peppers, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Pickled Pepper Onion Relish

6 cups onion, finely chopped
3 cups sweet red peppers, finely chopped
3 cups green peppers, finely chopped
1½ cups sugar
6 cups vinegar (5%), preferably white distilled
2 tablespoons canning or pickling salt

Yield: about 9 half-pints or 4 to 5 pints

Wash and chop vegetables. Combine all ingredients in a large kettle and heat to boiling. Boil gently until mixture thickens and volume is reduced by half (about 30 to 35 minutes). Fill hot pint or half-pint jars with hot relish, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe sealing surface of the jar with a clean, damp paper towel. Store in refrigerator and use within one month. **Caution:** If extended storage is desired, jars must be processed immediately after filling as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Pickled Corn Pepper Relish

10 cups fresh whole-kernel corn (16 to 20 medium-sized ears) or six 10-ounce packages of frozen corn
2½ cups sweet red peppers, diced
2½ cups sweet green peppers, diced
2½ cups celery, chopped
1¼ cups small onions, diced
1¾ cups sugar
5 cups vinegar (5% acid)
2½ tablespoons canning or pickling salt
2½ teaspoons celery seed
2½ tablespoons dry mustard
1¼ teaspoon turmeric

Yield: about 9 pints or 18 half-pints

If starting with corn on the cob, boil ears for 6 to 7 minutes, dip in cold water, and cut kernels from cob. Alternatively, use six 10-ounce packages of frozen corn. Combine peppers, celery, onions, sugar, vinegar, salt, and celery seed in a saucepan. Bring to a boil and simmer 6 to 7 minutes, stirring occasionally. Mix mustard and turmeric in ½ cup of simmered mixture. Add this mixture and corn to the hot mixture. Simmer another 6 to 7 minutes. Fill hot pint or half-pint jars with hot mixture, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Piccalilli

6 cups green tomatoes, chopped
1½ cups sweet red peppers, chopped
1½ cups sweet green peppers, chopped
2¼ cups onions, chopped
7½ cups cabbage, chopped
½ cup canning or pickling salt
4½ cups vinegar (5% acid)
3 cups brown sugar
3 tablespoons whole mixed pickling spice
Clean white cloth to drain vegetables
Spice bag or cheesecloth to hold spices

Yield: about 9 half-pints or 4 to 5 pints

Wash, chop, and combine vegetables with ½ cup salt. Cover with hot water and let stand for 12 hours. Drain and press in a clean white cloth to remove all possible liquid. Tie spices loosely in spice bag or cheesecloth and add to combined vinegar and brown sugar. Add vegetables, bring to a boil, and boil gently for 30 minutes or until the volume of the mixture is reduced by half. Remove spice bag. Fill hot pint or half-pint jars with hot mixture, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 21 (page 100). Follow the after-processing steps on page 100.

Pickled Vegetables

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot jars with the product you are canning, being sure to leave ½-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.

5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time in a boiling water canner. This will ensure that the food is properly preserved and safe to eat.

Process

To process in a boiling water canner, fill canner halfway with water, and preheat to 180°F for hot packs or 140°F for raw packs. Load filled jars into canner rack and lower with handles or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When water boils vigorously, lower heat to maintain a gentle boil, and process jars for the recommended time listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Table 22. Recommended processing times for pickled vegetables in a boiling water canner at designated altitudes

Pickled product	Style of pack	Jar size	3,001–6,000 feet (minutes)	Above 6,000 feet (minutes)
Dilled beans	Raw	Pints	10	15
Three bean salad	Hot	Half-pints or Pints	20	25
Beets	Hot	Pints or Quarts	40	45
Cauliflower or Brussels sprouts	Hot	Half-pints or Pints	15	20
Sweet green tomatoes	Hot	Pints Quarts	15 20	20 25
Green tomato relish	Hot	Pints	10	15
Mixed vegetables	Hot	Pints Quarts	10 15	15 20
Bread and butter zucchini	Hot	Pints or Quarts	15	20

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within two to three months. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

Pickled Dilled Beans

4 pounds fresh tender green or yellow beans (5 to 6 inches long)
8 to 16 heads fresh dill
8 cloves garlic (optional)
½ cup canning or pickling salt
4 cups white vinegar (5% acid)
4 cups water
1 teaspoon hot red pepper flakes (optional)

Yield: about 8 pints

Wash and trim ends from beans and cut to 4-inch lengths. In each hot pint jar, place 1 to 2 dill heads and, if desired, 1 clove of garlic. Place whole beans upright in hot pint jars, leaving ½-inch headspace. Trim beans to ensure proper fit if necessary. Combine salt, vinegar, water, and, if desired, pepper flakes. Bring to a boil. Pour hot solution over beans, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Pickled Three Bean Salad

1½ cups cut and blanched green or yellow beans (prepared as below)
1½ cups canned, drained kidney beans
1 cup canned, drained garbanzo beans
½ cup peeled and thinly sliced onion (about 1 medium onion)
½ cup trimmed and thinly sliced celery (about 1½ medium stalks)
½ cup sliced green pepper (about ½ medium pepper)
½ cup white vinegar (5% acid)
¼ cup commercially bottled lemon juice
¾ cup sugar
¼ cup oil
½ teaspoon canning or pickling salt
1¼ cups water

Yield: about 5 to 6 half-pints or 3 pints

Wash and snap off ends of fresh beans. Cut or snap into pieces 1 to 2 inches long. Blanch for 3 minutes and cool immediately. Rinse kidney and garbanzo beans with tap water and drain again. Prepare and measure all other vegetables. Combine vinegar, commercially bottled lemon juice, sugar, and water and bring to a boil. Remove from heat. Add oil and salt and mix well. Add beans, onions, celery, and green pepper to solution and bring to a simmer. Refrigerate and marinate for 12 to 14 hours, then heat entire mixture to a boil. Fill hot half-pint or pint jars with solids. Add hot liquid, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Pickled Beets

7 pounds beets, 2 to 2½ inches in diameter
4 cups vinegar (5% acid)
1½ teaspoons canning or pickling salt
2 cups sugar
2 cups water
2 cinnamon sticks
12 whole cloves
4 to 6 onions, 2 to 2½ inches in diameter (optional)
Spice bag or cheesecloth to hold spices

Yield: about 8 pints or 4 quarts

Trim beet tops, leaving 1 inch of stem and roots to prevent bleeding of color. Wash thoroughly. Sort for size. Cover similar sizes together with boiling water and cook until tender (about 30 to 35 minutes). Carefully drain and discard hot liquid. Cool beets. Trim off roots and stems and slip off skins. Cut into ¼-inch slices. Peel and thinly slice onions, if desired. Combine vinegar, salt, sugar, and fresh water. Tie spices in spice bag or cheesecloth and add to vinegar mixture. Bring to a boil. Add beets and onions and simmer 5 minutes. Remove spice bag. Fill hot pint or quart jars with beets and onions, leaving ½-inch headspace. Add hot vinegar solution, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Variation: Pickled whole baby beets. Follow above directions but use beets that are 1 to 1½ inches in diameter. Pack whole; do not slice. Onions may be omitted.

Pickled Cauliflower or Brussels Sprouts

12 cups of 1- to 2-inch cauliflower flowerets or small Brussels sprouts
4 cups white vinegar (5% acid)
2 cups sugar
2 cups onions, thinly sliced
1 cup sweet red peppers, diced
2 tablespoons mustard seed
1 tablespoon celery seed
1 teaspoon turmeric
1 teaspoon hot red pepper flakes
4 teaspoons canning or pickling salt

Yield: about 9 half-pints or 4 pints

Wash cauliflower flowerets or Brussels sprouts (remove stems and blemished outer leaves) and boil in salt water (4 teaspoons canning or pickling salt per gallon of water) for 3 minutes for cauliflower and 4 minutes for Brussels sprouts. Drain and cool. Combine vinegar, sugar, onion, diced red pepper, and spices in large saucepan. Bring to a boil and simmer for 5 minutes. Distribute onion slices and diced pepper among hot half-pint or pint jars. Fill with cauliflower or Brussels sprouts and pickling solution, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Pickled Sweet Green Tomatoes

10 to 11 pounds green tomatoes (16 cups sliced)
2 cups onions, sliced
¼ cup canning or pickling salt
4 cups vinegar (5% acid)
3 cups brown sugar
1 tablespoon mustard seed
1 tablespoon allspice
1 tablespoon celery seed
1 tablespoon whole cloves
Spice bag or cheesecloth to hold spices

Yield: about 9 pints or 4 quarts

Wash and slice tomatoes and onions. Place in bowl, sprinkle with ¼ cup salt and let stand 4 to 6 hours. Drain. Heat vinegar, add sugar, and stir until dissolved. Tie mustard seed, allspice, celery seed, and cloves in the spice bag or cheesecloth. Add to vinegar mixture along with tomatoes and onions. Bring to a boil and simmer 30 minutes, stirring as needed to prevent burning. Tomatoes should be tender and transparent when properly cooked. Remove spice bag. Fill hot pint or quart jars and cover with hot pickling solution, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Pickled Green Tomato Relish

10 pounds small, hard green tomatoes
1½ pounds red bell peppers
1½ pounds green bell peppers
2 pounds onions
½ cup pickling or canning salt
1 quart water
4 cups sugar
1 quart vinegar (5% acid)
⅓ cup prepared yellow mustard
2 tablespoons cornstarch

Yield: about 7 to 9 pints

Wash and coarsely grate or finely chop tomatoes, peppers, and onions. Dissolve salt in water and pour over vegetables in a large kettle. Heat to boiling and simmer 5 minutes. Drain in colander. Return vegetables to kettle. Add sugar, vinegar, mustard, and cornstarch, and mix. Heat to boiling and simmer 5 minutes. Fill hot pint jars with hot relish, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Pickled Mixed Vegetables

4 pounds pickling cucumbers, 4 to 5 inches long, cut into 1-inch slices (with 1/16 inch cut off and discarded from the blossom ends)
2 pounds peeled and quartered small onions
4 cups cut celery (1-inch pieces)
2 cups peeled and cut carrots (½-inch pieces)
2 cups cut sweet red peppers (½-inch pieces)
2 cups cauliflower flowerets
5 cups white vinegar (5% acid)
¼ cup prepared mustard
½ cup canning or pickling salt
3½ cups sugar
3 tablespoons celery seed
2 tablespoons mustard seed
½ teaspoon whole cloves
½ teaspoon ground turmeric

Yield: about 10 pints or 5 quarts.

Wash and prepare vegetables. Combine vegetables, cover with 2 inches of cubed or crushed ice, and refrigerate 3 to 4 hours. In an 8-quart kettle, combine vinegar and mustard and mix well. Add salt, sugar, celery seed, mustard seed, cloves, and turmeric. Bring to a boil. Drain vegetables and add them to hot pickling solution. Cover and slowly bring to a boil. Drain vegetables but save pickling solution. Fill vegetables in hot pint or quart jars, leaving ½-inch headspace. Add pickling solution, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Pickled Bread and Butter Zucchini

16 cups fresh zucchini, sliced
4 cups onions, thinly sliced
½ cup canning or pickling salt
4 cups white vinegar (5% acid)
2 cups sugar
4 tablespoons mustard seed
2 tablespoons celery seed
2 teaspoons ground turmeric

Yield: about 8 to 9 pints or 4 quarts

Cover zucchini and onion slices with 1 inch of cool water and salt. Let stand 2 hours and drain thoroughly. Combine vinegar, sugar, and spices. Bring to a boil and add zucchini and onions. Simmer 5 minutes and fill hot pint or quart jars with mixture and pickling solution, leaving ½-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Add lids and screw bands; tighten screw bands. Process jars as listed in Table 22 (page 105). Follow the after-processing steps on page 106.

Sauerkraut

Quantity

A 50-pound bag of fresh cabbage makes 16 to 20 quarts of kraut.

Quality

To make good kraut, use disease-free, firm, sweet, mature heads of cabbage from mid- and late-season crops. Prepare and start the fermentation one to two days after harvesting the cabbage.

Containers, weights, and covers for fermenting food

A 1-gallon container holds 5 pounds of fresh cabbage, and a 5-gallon container holds 25 pounds. Glass and food-grade plastic containers are excellent substitutes for stone crocks. Many restaurants receive foods and ingredients in 5-gallon plastic pails, which make ideal fermentation containers. Other 1- to 3-gallon non-food-grade containers may be used if lined inside with a clean, food-grade plastic bag. **Caution:** Do not use garbage bags or trash liners.

Cabbage must be kept 1 to 2 inches under the brine while fermenting. To do so, after adding cabbage and brine, insert a dinner plate or glass pie plate just small enough to fit inside the fermentation container. The plate must be slightly smaller than the container opening but large enough to cover most of the shredded cabbage.

To keep the plate under the brine, weigh it down with 2 to 3 sealed quart jars filled with water.

Alternatively, weigh down the plate using a large, clean, sealed food-grade plastic bag containing 3 quarts clean water and 4½ tablespoons canning or pickling salt.

Cover the container opening above the jars or plastic bag serving as the weight with a heavy, clean bath towel to prevent contamination from molds and insects during fermentation.

Caution: The fermentation container, plate, and jars should be washed in hot, soapy water and rinsed well with very hot water before use.

Preparation

Work with about 5 pounds of fresh cabbage at a time. Discard outer leaves. Rinse heads with cold water and drain. Cut heads in quarters and remove cores, trim, and discard damaged tissue. Shred or slice cabbage to a thickness of 1/16 to 1/8 inch.

Filling and packing containers

Place 5 pounds shredded cabbage in the fermentation container. Add 3 tablespoons of canning or pickling salt and mix thoroughly. Using clean hands, mix until the level of natural juices drawn from the cabbage covers the surface. Continue preparing and packing 5-pound quantities of shredded cabbage and 3 tablespoons of canning or pickling salt at a time until finished or until the fermentation container is filled within 3 to 4 inches from its top. Add the plate and weight to keep the cabbage under the brine solution. Cover the cabbage-filled container with a heavy, clean bath towel.

Fermentation temperature, time, and management

Store the container at 70° to 75°F while fermenting. At these temperatures, kraut will be fully fermented in about 3 to 4 weeks; at 60° to 65°F, fermentation may take 6 weeks. Below 60°F, kraut may not ferment. Above 75°F, kraut may become soft and spoil.

If you weigh down the cabbage with a brine-filled bag, do not disturb the crock until the normal fermentation is completed (when bubbling ceases). If you use jars as weight, you must 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 be canned or frozen.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food. Bring kraut and liquid slowly to a boil in a large kettle, stirring frequently. Remove from heat. Cool. Fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and leakage.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. To make a **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 ½-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
3. To make a **raw pack**, fill hot jars firmly with unheated kraut and cover with juices, leaving ½-inch headspace.

4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. Process the jars for the specified time in a boiling water canner. This will ensure that the food is properly preserved and safe to eat.

To process in a boiling water canner, fill canner halfway with water and preheat to 180°F for **hot packs** and 140°F for **raw packs**. Load filled jars into the canner rack and lower with handles or load one jar at a time with a jar lifter onto canner rack. Add boiling water, if needed, to a level of 1 inch above jars. Cover the canner. When the water boils vigorously, lower the heat to maintain a gentle boil and process for the recommended time listed in Table 23 (page 114). Follow the after-processing steps on page 114.

Table 23. Recommended processing times for sauerkraut in a boiling water canner at designated altitudes

Style of pack	Jar size	3,001–6,000 feet (minutes)	Above 6,000 feet (minutes)
Hot	Pints	15	20
	Quarts	20	25
Raw	Pints	30	35
	Quarts	35	40

After processing

1. When the jars have processed for the recommended time, turn off the heat under the canner and remove the canner lid away from you to avoid steam burning your face. Wait 5 minutes before removing jars.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.

4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within two to three months. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.

VEGETABLES

Blanching

When freezing vegetables, **blanching** is an important step to ensure quality.

> *Enzymes in vegetables are slowed down, but not destroyed, during freezing. If not inactivated, these enzymes can cause color and flavor changes as well as loss of nutrients.*
>
> *Enzymes in vegetables are inactivated by blanching. Blanching is the exposure of the vegetables to boiling water or steam for a brief period of time. The vegetable must then be rapidly cooled in ice water to prevent cooking.*
>
> *Blanching also helps to destroy microorganisms on the surface of the vegetables. It makes vegetables, such as broccoli and spinach, more compact, so they do not take up as much room in the freezer.*
>
> *Follow the time recommended for blanching each vegetable carefully. Over-blanching results in a cooked product and a loss of flavor, color, and nutrients. Under-blanching stimulates enzyme activity and is worse than no blanching at all.*[7]

All vegetables are low-acid foods and must be processed in a pressure canner.

Reheating low-acid canned food with a margin of safety against botulism

Low-acid canned vegetables and meats can harbor botulinum toxin without exhibiting spoilage signs. Considering the challenges posed by high-altitude food preservation, the current recommendation from UW Extension emphasizes an additional safety precaution. To safeguard against potential botulism, ***boil all home-canned, low-acid vegetables and meats*** in an uncovered saucepan for 10 minutes, adding an additional minute for every 1,000 feet above sea level (e.g., 15 minutes at 5,000 feet). If the food appears spoiled, develops foam, or emits an unusual odor during heating, it should be promptly discarded.

Microwave heating, due to its uneven distribution of heat, is not an acceptable substitute for the recommended margin-of-safety heating process detailed above.[8]

It's essential to emphasize that reheating with the margin-of-safety method isn't a suggestion to eat canned foods that weren't processed correctly. Handling canned foods

7 *So Easy to Preserve*, 2014.
8 *Fundamentals of Consumer Food Safety and Preservation: Master Handbook*

that may contain botulinum toxin is inherently dangerous and should be avoided.For instructions on how to detoxify questionable food jars, consult pages 1-26 and 1-27 of the 2015 edition of the USDA *Complete Guide to Home Canning*.[9]

Snap Beans

Quantity

An average of 14 pounds is needed per canner load of 7 quarts; an average of 9 pounds is needed per canner load of 9 pints. A bushel weighs 30 pounds and yields 12 to 20 quarts. An average of ¾ pound makes 1 pint of frozen beans.

Quality

Select filled, but tender, crisp pods. Remove and discard diseased and discolored pods.

Preparation

Wash beans, snip off and discard ends, and remove strings, if applicable. Leave beans whole, or cut or snap them into 1-inch pieces. Wash and drain prepared pieces.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food. Blanch 6 cups raw, prepared beans at one time. Place each batch in 1 gallon boiling water. Blanch small pieces for 3 minutes and large pieces for 4 minutes after the water returns to a boil. Cool beans quickly in several changes of cold water and drain in a colander. Fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and freezer burn.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Add 1 teaspoon of canning or pickling salt per quart jar or ½ teaspoon of canning or pickling salt per pint jar, if desired.
3. To make a **hot pack**, place prepared beans in a large pot and cover with boiling water. Boil for 5 minutes. Fill hot jars with beans and cooking liquid, leaving 1-inch headspace.

9 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

4. To make a **raw pack**, fill hot jars tightly with prepared beans, leaving 1-inch headspace. Add boiling water over beans, leaving 1-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
5. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
6. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
7. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
8. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
9. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
10. Follow the after-processing steps on page 119.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 24 (page 118). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 24. Recommended processing times and pressures for snap beans in a pressure canner at designated altitudes

			Dial Gauge*			Weighted Gauge
Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Hot or raw	Pints	20	12	13	14	15
	Quarts	25	12	13	14	15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

Beets

Quantity

An average of 21 pounds (without tops) is needed per canner load of 7 quarts; an average of 13½ pounds is needed per canner load of 9 pints. A bushel (without tops) weighs 52 pounds and yields 15–20 quarts, an average of 3 pounds per quart.

Quality

Beets with a diameter of 1 to 2 inches are preferred for whole packs. Beets larger than 3 inches in diameter are often fibrous.

Preparation for freezing and canning

Trim off beet tops, leaving an inch of stem and roots to reduce bleeding of color. Scrub

well. Cover with boiling water. Boil until skins slip off easily, about 15–25 minutes depending on size. Cool, remove skins, and trim off stems and roots. Leave baby beets whole. Cut medium or large beets into ½-inch cubes or slices. Halve or quarter very large slices.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food. Fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and freezer burn.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. If desired, add 1 teaspoon canning or pickling salt per quart jar or ½ teaspoon per pint jar.
3. Fill the hot jars with hot beets and water, being sure to leave 1-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
9. Follow the after-processing steps on page 121.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 25 (page 121). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 25. Recommended processing times and pressures for beets in a pressure canner at designated altitudes

			Dial Gauge*			Weighted Gauge
Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Hot	Pints	30	12	13	14	15
	Quarts	35	12	13	14	15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.

7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

Carrots

Quantity

An average of 17½ pounds (without tops) is needed per canner load of 7 quarts; an average of 11 pounds is needed per canner load of 9 pints. A bushel (without tops) weighs 50 pounds and yields 17 to 25 quarts, an average of 2½ pounds per quart.

Quality

Select small carrots, preferably 1 to 1¼ inches in diameter. Larger carrots are often too fibrous.

Preparation

Wash, peel, and rewash carrots. To freeze, slice or dice or leave whole. To can, slice or dice; do not can whole carrots.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food. Blanch 1 pound of carrots in 1 gallon boiling water. Blanch whole carrots for 5 minutes and diced or sliced carrots 3 minutes. Cool carrots quickly in several changes of cold water, and drain in colander. Fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and freezer burn.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. If desired, add 1 teaspoon canning or pickling salt per quart jar or ½ teaspoon per pint jar.
3. To make a **hot pack**, place carrots in a large pot and cover with boiling water. Boil for 5 minutes. Fill hot jars with carrots and cooking liquid, leaving 1-inch headspace.
4. To make a **raw pack**, fill hot jars tightly with carrots, leaving 1-inch headspace. Add boiling water over carrots, leaving 1-inch headspace. The headspace is the amount

of empty space left at the top of the jar, which helps to allow for expansion during processing.

5. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
6. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
7. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
8. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
9. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
10. Follow the after-processing steps on page 124.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 26 (page 123). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 26. Recommended processing times and pressures for carrots in a pressure canner at designated altitudes

			Dial Gauge*			Weighted Gauge
Style of pack	**Jar size**	**Processing time (minutes)**	**2,001–4,000 feet (pounds)**	**4,001–6,000 feet (pounds)**	**6,001–8,000 feet (pounds)**	**Above 1,000 feet (pounds)**
Hot or raw	Pints	25	12	13	14	15
	Quarts	30	12	13	14	15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

Sweet Corn

Quantity

A bushel of ears weighs 35 pounds and yields 6 to 11 quarts of whole kernel style corn or 12 to 20 pints of cream style corn. An average of 31 pounds (in husks) is needed for a 7-quart canner load of whole kernel corn. An average of 20 pounds is needed for a 9-pint canner load of cream style corn. An average of 2½ pounds makes 1 pint of frozen whole kernel corn.

Quality

Preserve corn within 2 to 6 hours after harvest for best quality. Select ears containing slightly immature kernels or those of ideal quality for eating fresh. Sweeter varieties may turn brown when canned, especially if processed at 15 pounds of pressure. Can a small amount to check color and flavor before canning large amounts.

Preparation

Husk ears, remove silk, trim out insect-damaged kernels if needed, and trim off ends of ears to remove small, fibrous kernels. Wash ears.

- To prepare **whole kernel corn** for freezing or canning, place ears in 1 gallon of boiling water and blanch for 3 minutes after the water returns to a boil. Cool ears and cut kernels from cob at about three-fourths of their depth. Do not scrape the cob.
- To prepare **cream style corn** for freezing and canning, blanch ears for 4 minutes in boiling water. Cool ears and cut kernels from cob at about one-half their depth. Scrape the cob with a knife to remove the remainder of the kernels and combine with half-kernels.
- To prepare **corn on the cob** for freezing, blanch medium-sized ears for 10 minutes and large ears for 12 minutes. Cool in several changes of cold water and drain. If desired, cut ears into uniform 4-, 6-, or 8-inch pieces.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food.

- To package **whole kernels or cream style corn**, fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and freezer burn.
- To package **corn on the cob**, fill quart or half-gallon freezer bags. Squeeze out air, seal, label, and freeze.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
    - Whole kernel corn may be canned in pints or quarts.
    - Cream style corn must be packed in half-pint or pint jars only.

2. If desired, add 1 teaspoon canning or pickling salt per quart ,½ teaspoon per pint, or ¼ teaspoon per half-pint.
3. To make a **hot pack**, in a large pan add 1 cup hot water to each quart of whole kernel corn or 2 cups hot water to each quart of cream style corn. Heat to boiling. Fill hot jars with hot corn and cooking liquid, leaving 1-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. To make a **raw pack**, fill hot jars tightly with whole kernels, leaving 1-inch headspace. Add boiling water over kernels, leaving 1-inch headspace. **Do not raw pack cream style corn.**
5. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
6. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
7. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
8. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
9. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
10. Follow the after-processing steps on page 127.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 27 (page 127). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 27. Recommended processing times and pressures for corn in a pressure canner at designated altitudes

				Dial Gauge*			Weighted Gauge
	Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Cream style	Hot	Pints	85	12	13	14	15
Whole kernel	Raw or hot	Pints Quarts	55 85	12 12	13 13	14 14	15 15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.							

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

Peppers

Recommended varieties

Hot or sweet, including bell, chile, jalapeño, and pimiento peppers.

Quantity

An average of 9 pounds is needed per canner load of 9 pints. A bushel weighs 25 pounds and yields 20 to 30 pints, an average of 1 pound per pint.

Quality

Select firm yellow, green, or red peppers free of disease and insect damage.

Freezing procedure[10]

Hot: Select crisp, tender green or red pods. Wash and drain. Pack peppers into plastic freezer jars or plastic freezer containers, or vacuum package. Seal, label, and freeze.
Note: When cutting or seeding hot peppers, wear rubber gloves to prevent hands from being burned.

Pimientos: Select fully ripe pods of deep red color. Wash and drain. Remove stems and seeds. Peel by roasting at 400°F until skins blister, or cover with water and boil until peppers are tender. Cool, drain, and peel. Pack pimientos into plastic freezer jars or plastic freezer containers. Seal, label, and freeze.

Sweet: Select crisp, tender green, red, yellow, or orange pods. Remove stems and seeds. Freeze peppers whole, cut into halves or strips, or dice. Do not blanch. Pack peppers into plastic freezer jars, plastic freezer containers, or vacuum package. Seal, label, and freeze.

Handling and preparation for freezing

Select your favorite pepper(s). **Caution:** If you choose hot peppers, wear rubber gloves while handling them or wash hands thoroughly with soap and water before touching your face. Small peppers may be left whole, and jalapeños do not have to be peeled. Wash and quarter large peppers and remove cores and seeds. Slit each pepper along its side to allow steam to escape. Prepare peppers for peeling by placing them either in an oven at 400°F or under a broiler for 6 to 8 minutes until skins blister. Cool peppers in water and peel or slip skins off. Flatten small whole peppers.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).

10 *Ball® Blue Book® Guide to Preserving, 37th Edition*

2. Add ½ teaspoon of canning or pickling salt to each pint jar or ¼ teaspoon to each half-pint jar, if desired.
3. Fill the hot jars loosely with peppers and add fresh boiling water, leaving 1 inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
9. Follow the after-processing steps on page 130.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 28 (page 130). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 28. Recommended processing times and pressures for peppers in a pressure canner at designated altitudes

			Dial Gauge*			Weighted Gauge
Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Hot	Half-pints or Pints	35	12	13	14	15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.

6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

Pumpkin and Winter Squash

Quantity

An average of 16 pounds is needed per canner load of 7 quarts; an average of 10 pounds is needed per canner load of 9 pints; an average of 2¼ pounds is needed per quart.

Quality

Pumpkins and squash should have a hard rind and be stringless, with mature pulp of ideal quality for cooking fresh. Small-size pumpkins (sugar or pie varieties) make better products than larger pumpkins. Winter squash varieties include acorn, banana, buttercup, butternut, golden delicious, and hubbard. Spaghetti squash is considered a winter squash, but because its flesh does not stay cubed upon heating, it should be frozen instead of canned.

Preparation

Wash pumpkins or squash, cut into pieces, and remove seeds.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food. Cut into cooking-size pieces and bake at 350°F until tender, or steam until tender. Cool, scoop from rind, and mash. Fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and freezer burn.

Canning procedure

Cut into 1-inch slices and peel. Cut flesh into 1-inch cubes. Boil for 2 minutes in water. **Caution:** Do not mash or puree.

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot pint or quart jars with cubes and hot cooking liquid, being sure to leave 1-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.

3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
8. Follow the after-processing steps on page 133.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 29 (page 132). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 29. Recommended processing times and pressures for pumpkin and winter squash in a pressure canner at designated altitudes

			Dial Gauge*			Weighted Gauge
Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Hot	Pints	55	12	13	14	15
	Quarts	90	12	13	14	15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

Spinach and Other Leafy Greens

Quantity

A bushel weighs 18 pounds. An average of 28 pounds makes a 7-quart canner load; an average of 18 pounds makes 9 pints. An average of 1¼ pounds makes 1 pint of frozen greens.

Quality

Preserve only freshly harvested greens. Leaves should be mature, attractive in color, and tender. Discard wilted, discolored, diseased, or insect-damaged leaves.

Freezing procedure

For optimal quality, freeze no more than 2 to 3 pounds of food per cubic foot of freezer capacity per day. Larger volumes can slow the process of freezing, and slower freezing lowers the quality of the food. Wash, cut off stems, and blanch for 2 minutes. Fill pint- or quart-size freezer bags to a level of 3 to 4 inches from the top and squeeze out air. Seal, label, and freeze. Before freezing, bags may be inserted into reusable, rigid plastic freezer containers for added protection against punctures and freezer burn.

Preparation for canning

Wash only small amounts of greens at one time. Drain and continue rinsing until water is clear and free of grit. Do not soak greens. Cut out tough stems and midribs. Place 1 pound of greens at a time in a cheesecloth bag or blancher basket and steam 3 to 5 minutes or until well wilted, or place 6 cups of raw greens at a time in 1 gallon boiling water and blanch for 3 to 4 minutes after the water returns to a boil. Cool greens in cold water and drain.

Canning procedure

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Add ½ teaspoon of canning or pickling salt to each quart jar or ¼ teaspoon of canning or pickling salt to each pint jar.
3. Fill the hot jars loosely with greens and add fresh boiling water, leaving 1-inch headspace. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.
4. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
5. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
6. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
7. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
8. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
9. Follow the after-processing steps on page 135.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 30 (page 135). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 30. Recommended processing times and pressures for spinach and other greens in a pressure canner at designated altitudes

			Dial Gauge*			Weighted Gauge
Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Hot	Pints	70	12	13	14	15
	Quarts	90	12	13	14	15
* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.						

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within five days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.

6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating instructions on page 116.

MEATS

General Procedures for Poultry, Rabbit, Red Meat, Wild Game, Fish, and Tuna

Guidance provided here applies to many different types of meats. See options below for more details.

Tips for quality canned meat[11]

Check out reheating meats (page 140) and fish (page 148) .

The following procedures and processing information apply only to fresh meat and poultry products. The processing recommendations do not apply to cured, brined, smoked, or corned meats or poultry products. Do not attempt to can those products. Freezing is a safe alternative.

- Use only good-quality poultry, red meat, and wild game for canning.
- Chill meat soon after slaughter to 40°F or lower to keep it from spoiling.
- If you are not able to can the meat within a few days of slaughter, freeze it. Keep frozen until you're ready to can it, and then thaw in a refrigerator.
- Keep all work areas clean and sanitary.
- Trim gristle and bruised spots off meat before canning.
- Trim excess fat from meat before canning. Fat left on meat will melt and climb the sides of the jar during processing. If the fat comes in contact with the sealing edge of the lid, the jar may not seal.

Canning procedure

All meats must be processed in a pressure canner.

Prepare poultry and rabbit, red meat, wild game, fish, and tuna according to the directions provided for each type of meat.

1. Wash jars following jar cleaning and preparation guidelines (page 3).
2. Fill the hot jars with the product you are canning, being sure to leave the correct headspace as specified. The headspace is the amount of empty space left at the top of the jar, which helps to allow for expansion during processing.

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3. Remove air bubbles from the jar by pressing a rubber spatula between the food and the side of the jar at several locations. This helps to ensure that there are no air pockets that can cause spoilage. Adjust headspace if needed.
4. Use a clean, damp paper towel to remove any food residue from the jar-sealing edge. This will help to ensure a proper seal.
5. Use new two-piece canning lids that have been prepared according to the manufacturer's directions. These lids are designed for one-time use and should not be reused.
6. Apply lids and screw band to jar. Tighten the screw bands on the jars, but be careful not to overtighten them.
7. Process the jars for the specified time in a pressure canner. This will ensure that the food is properly preserved and safe to eat.
8. Follow the after-processing steps on page 140.

Process

To process in a pressure canner, place jar rack, 2 inches of water, and filled jars in canner. Fasten lid and heat canner on high setting. Allow steam to escape in a fully steady stream for 10 minutes. Add weighted gauge or close petcock to pressurize the canner. When the desired pressure is reached, start timing the process. Regulate heat to maintain a uniform pressure and process jars for the time given in Table 31 (page 139). Do not allow the pressure to drop below the recommended pressure for your altitude.

Table 31. Recommended processing times and pressures for meats in a pressure canner at designated altitudes

				Dial Gauge*			Weighted Gauge
	Style of pack	Jar size	Processing time (minutes)	2,001–4,000 feet (pounds)	4,001–6,000 feet (pounds)	6,001–8,000 feet (pounds)	Above 1,000 feet (pounds)
Chicken or rabbit without bones	Hot or raw	Pints Quarts	75 90	12 12	13 13	14 14	15 15
Chicken or rabbit with bones	Hot or raw	Pints Quarts	65 75	12 12	13 13	14 14	15 15
Ground or chopped meat	Hot	Pints Quarts	75 90	12 12	13 13	14 14	15 15
Chili con carne	Hot	Pints	75	12	13	14	15
Strips, cubes, or chunks of meat	Hot or raw	Pints Quarts	75 90	12 12	13 13	14 14	15 15
Meat stock (broth)	Hot	Pints Quarts	20 25	12 12	13 13	14 14	15 15
Soup	Hot	Pints Quarts	60 75	12 12	13 13	14 14	15 15
Mince-meat pie filling	Hot	Quarts	90	12	13	14	15
Fish (other than tuna)	Raw	Pints	100	12 12	13 13	14 14	15 15
Tuna	See directions	Pints or half-pints	100	12 12	13 13	14 14	15 15

* Reminder: Check the accuracy of your dial pressure gauge annually. For more information, contact your local UW Extension office.

After processing

1. When processing is complete, turn off the heat under the canner and remove it from heat, if possible. Air cool the canner until it is fully depressurized. Slowly remove weighted gauge or open petcock, wait 10 more minutes, unfasten, and carefully remove canner lid away from you to avoid steam burning your face.
2. Use a jar lifter to remove the jars from the canner, being careful not to tilt them, and place them in a draft-free area on a towel, wood cutting board, or rack. Leave at least 1 inch of space between the jars to allow for proper cooling.
3. Do not retighten the bands on the jars. Allow them to cool at room temperature for 12 to 24 hours.
4. After the jars have cooled, remove the screw bands and check the lid seals. If the center of the lid is indented, the jar is properly sealed. Wash, dry, label, and store the jar in a clean, cool, dark place without the screw band.
5. If the lid is unsealed, refrigerate the jar and use within three days. Alternatively, examine and replace the jar if defective, use a new lid, and reprocess the jar as before.
6. Wash the screw bands and store them separately.
7. Products are best if used within one year.
8. Follow the reheating recommendations on page 140.

Reheating low-acid canned food with a margin of safety against botulism

Low-acid canned vegetables and meats can harbor botulinum toxin without exhibiting spoilage signs. Considering the challenges posed by high-altitude food preservation, the current recommendation from UW Extension emphasizes an additional safety precaution. To safeguard against potential botulism, boil ***all*** home-canned, low-acid vegetables and meats in an uncovered saucepan for 10 minutes, adding an additional minute for every 1,000 feet above sea level (e.g., 15 minutes at 5,000 feet). If the food appears spoiled, develops foam, or emits an unusual odor during heating, it should be promptly discarded.

Microwave heating, due to its uneven distribution of heat, is not an acceptable substitute for the recommended margin-of-safety heating process detailed above.[12]

It's essential to emphasize that reheating with the margin-of-safety method isn't a suggestion to eat canned foods that weren't processed correctly. Handling canned foods

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that may contain botulinum toxin is inherently dangerous and should be avoided. For instructions on how to detoxify questionable food jars, consult pages 1-26 and 1-27 of the 2015 edition of the USDA *Complete Guide to Home Canning*.[13]

Poultry or Rabbit

Poultry includes chicken, turkey, duck, goose, and game birds.

Procedure

1. Choose freshly killed and dressed, healthy animals. Large chickens are more flavorful than fryers.
2. Dressed chickens should be chilled 6 to 12 hours before canning. Dressed rabbits should be soaked 1 hour in water containing 1 tablespoon canning or pickling salt per quart and then rinsed.
3. Remove excess fat. Cut the chicken or rabbit into suitable sizes for canning. Can with or without bones.
4. For **hot packs**, boil, steam, or bake meat until about two-thirds done. If desired, add 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint. Fill hot jars with pieces of meat and hot broth, leaving 1¼-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 138). Follow all after-processing steps on page 140.
5. For **raw packs**, if desired, add 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint. Fill hot jars loosely with raw pieces of meat, leaving 1¼-inch headspace. Do not add liquid. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 139). Follow all canning procedures (page 137), processing procedures (page 138), and all after-processing steps (page 140).

13 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

Ground or Chopped Meat

Bear, beef, buffalo, lamb, mutton, pork, sausage, veal, and venison (including antelope, deer, elk, and moose) can be processed using these directions.

Procedure

1. Choose fresh, high-quality chilled meat. With venison, add up to one part high-quality pork fat to four to six parts venison before grinding. Use freshly made sausage seasoned with salt and cayenne pepper (sage may cause a bitter off flavor).
2. Shape chopped meat into patties or balls, or cut cased sausage into 3- to 4-inch links. Cook until lightly browned. Ground meet may be sautéed without shaping. Remove excess fat.
3. Fill hot jars with pieces. Add boiling meat broth, tomato juice, or water, leaving 1-inch headspace. If desired, add 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint.
4. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed.
5. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel.
6. Apply the lids and screw bands; tighten screw bands.
7. Process in a pressure canner as listed in Table 31 (page 138).
8. Follow all canning procedures (page 137), processing procedures (page 138).
9. Follow all after-processing steps page 140.

Chili con carne

3 cups dried pinto or red kidney beans
5½ cups water
5 teaspoons canning or pickling salt (separated into 2 teaspoons with beans and 3 teaspoons with chili)
3 pounds ground beef or ground venison (antelope, deer, elk, or moose)
1½ cups chopped onions
1 cup chopped peppers of your choice (optional)
1 teaspoon black pepper
3 to 6 tablespoons chili powder (smaller amount for milder flavor, larger amount for spicier flavor)
2 quarts crushed or whole tomatoes

Yield: 9 pints

Wash beans thoroughly and place them in a 2-quart saucepan. Add cold water to a level of 2 to 3 inches above the beans and soak 12 to 18 hours. Drain and discard water. Combine beans with 5½ cups of fresh water and 2 teaspoons canning or pickling salt. Bring to a boil. Reduce heat and simmer 30 minutes. Drain and discard water. Brown ground beef or ground venison, chopped onions, and peppers (if desired) in a skillet. Drain off fat and add 3 teaspoons salt, pepper, chili powder, tomatoes, and drained cooked beans. Simmer 5 minutes. **Caution:** Do not thicken. Doing so could cause an under-processed and unsafe product.

Fill hot pint jars, leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 139). Follow all canning procedures (page 137), processing procedures (page 138), and all after-processing steps (page 140).

Strips, Cubes, or Chunks of Meat

Bear, beef, buffalo, lamb, pork, veal, and venison (including antelope, deer, elk, and moose) can be processed using these directions.

Procedure

1. Choose fresh, high-quality chilled meat. Remove excess fat. If desired, soak strong-flavored wild meats for 1 hour in brine water containing 1 tablespoon canning or pickling salt per quart. Rinse. Remove large bones.

2. For **hot packs**, precook meat until rare by roasting, stewing, or browning in a small amount of fat. If desired, add 1 teaspoon canning or pickling salt per quart or ½ teaspoon per pint. Fill hot jars with pieces of meat and add boiling broth, meat drippings, water, or tomato juice (especially good with wild game), leaving 1-inch headspace. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 138). Follow all canning procedures (page 137), processing procedures (page 138), and after-processing steps (page 140).
3. For **raw packs**, if desired, add 1 teaspoon canning or pickling salt per quart or 1/2 teaspoon per pint. Fill hot jars with raw meat pieces, leaving 1-inch headspace. Do not add liquid. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 139). Follow all canning procedures (page 137), processing procedures (page 138), and after-processing steps (page 140).

Meat Stock (Broth)

Beef

Saw or crack fresh trimmed beef bones to enhance extraction of flavor. Rinse bones and place in a large stockpot or kettle, cover bones with water, cover pot, and simmer three to four hours. Remove bones, cool broth, and pick off meat. Skim off fat, add meat removed from bones to broth, and reheat to boiling.

Chicken or turkey

Place large carcass bones (with most of the meat removed) in a large stockpot, add enough water to cover bones, cover pot, and simmer for 30 to 45 minutes or until remaining meat can be easily stripped from bones. Remove bones and pieces of meat, cool broth, strip meat, discard excess fat, return meat to broth, and reheat to boiling.

Fill hot jars, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 139). Follow all canning procedures (page 137), processing procedures(page 138), and all after-processing steps (page 140).

Vegetable and Meat Soup[14]

Select, wash, and prepare dried beans or peas, meat or poultry, and vegetables individually as directed below.

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.

Dried beans or peas: For each cup of dried beans or peas, add 3 cups of water. Boil 2 minutes, remove from heat, and soak 1 hour. Reheat to boiling. Drain.

Meat or poultry: Cover with water and cook until tender. Cool meat and remove bones.

Vegetables: All vegetables should be prepared as you would for canning a hot pack product according to this publication or to the USDA[15] directions.

- Combine meat or poultry, vegetables, and drained beans or peas. Add sufficient broth, canned tomatoes, water, or a combination to cover. **Caution:** Do not thicken. Boil 5 minutes. Salt to taste, if desired.
- Fill jars halfway with solid mixture. Add remaining liquid, leaving 1-inch headspace.
- Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed.
- Food residue should be removed from the jar-sealing edge with a clean, damp paper towel.
- Apply the lids and screw bands; tighten screw bands.
- Process in a pressure canner as listed in Table 31 (page 139).
- Follow all canning procedures (page 137), processing procedures (page 138), and after-processing steps (page 140).

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15 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

Mincemeat Pie Filling [16]

2 cups finely chopped suet
4 pounds ground beef or ground venison
7–8 pounds apples (5 quarts chopped apples)
2 pounds dark seedless raisins
1 pound white raisins
2 quarts apple cider
2 tablespoons ground cinnamon
2 teaspoons ground nutmeg
5 cups sugar
1 tablespoon canning or pickling salt

Yield: about 7 quarts

- Cook meat and suet in water to avoid browning.
- Peel, core, and quarter apples.
- Put meat, suet, and apples through food grinder using a medium blade.
- Combine all ingredients in a large saucepan, and simmer 1 hour until slightly thickened. Stir often.
- Fill hot jars with mixture without delay, leaving 1-inch headspace.
- Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed.
- Food residue should be removed from the jar-sealing edge with a clean, damp paper towel.
- Apply the lids and screw bands; tighten screw bands.
- Process in a pressure canner as listed in Table 31 (page 139).
- Follow all canning procedures (page 137), processing procedures (page 138), and after-processing steps (page 140.)

Fish Other Than Tuna (in pint jars)

Blue fish, halibut, mackerel, salmon, steelhead, trout, and other fatty fish ***except tuna*** can be processed in pint jars using these directions. See page 147 for directions for processing tuna.

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Caution: Bleed and eviscerate fish within 2 hours after they are caught. Keep cleaned fish on ice until ready to can.

Note: Glass-like crystals of magnesium ammonium phosphate or struvite sometimes form in canned salmon. There is no way for home canners to prevent these crystals from forming, but they usually dissolve when heated and are safe to eat.

Procedure

If the fish is frozen, thaw in refrigerator before canning. Rinse the fish in cold water. You can add vinegar to the water (2 tablespoons per quart) to help remove slime. Remove head, tail, fins, and scales; it is not necessary to remove the skin. You can leave the bones in most fish because the bones become very soft and are a good source of calcium. With halibut, remove the head, tail, fins, scales, skin, and bones. Wash and remove all blood. Refrigerate all fish until you are ready to pack in jars.

If desired, split fish lengthwise. Cut cleaned fish into 3½-inch lengths. If the skin has been left on the fish, pack the fish skin side out for a nicer appearance; alternatively, pack skin side in for easier jar cleaning. Leave 1-inch headspace. If desired, add 1 teaspoon canning or pickling salt per pint. Do not add liquids. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel; wipe with a dry paper towel to remove any fish oil. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 138). Follow all canning procedures (page 137), processing procedures(page 138), and after-processing steps (page 140).

Fish in half-pint or 12 ounce jars is processed for the same amount of time as a pint jar.

For processing fish in quart jars, refer to pages 5-11 and 5-12 in the USDA's 2015 *Complete Guide to Home Canning*.[17]

See page 148 for reheating procedures for fish.

Tuna

Tuna may be canned either precooked or raw. Precooking removes most of the strong-flavored oils. The strong flavor of dark tuna affects the delicate flavor of white tuna, so most people prefer not to can dark tuna flesh. Dark tuna can be used for pet food.

17 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

Note: Glass-like crystals of magnesium ammonium phosphate or struvite sometimes form in canned tuna. There is no way for home canners to prevent these crystals from forming, but they usually dissolve when heated and are safe to eat.

Procedure

Keep tuna on ice until ready to can. Remove viscera and wash fish well in cold water. Allow blood to drain from stomach cavity. Place fish belly down on a rack or metal tray in the bottom of a large baking pan. Cut tuna in half crosswise if necessary. Precook fish by baking at 250°F for 2½–4 hours or 350°F for 1 hour. The fish may also be cooked in a steamer for 2 to 4 hours. If a thermometer is used, cook to 165° to 175°F internal temperature. Refrigerate cooked fish overnight to firm the meat. Peel off skin with a knife, removing blood vessels and any discolored flesh. Cut meat away from bones; cut out and discard all bones, fin bases, and dark flesh. Quarter, then cut quarters crosswise into lengths suitable for half-pint or pint jars.

Fill into hot jars, pressing down gently to make a solid pack. Tuna may be packed in water or vegetable oil (for example, canola or soybean). Add water or oil to jars, leaving 1-inch headspace. If desired, add ½ teaspoon canning or pickling salt per half-pint or 1 teaspoon per pint. Remove air bubbles by pressing a rubber spatula between food and side of jar at several locations. Adjust headspace if needed. Food residue should be removed from the jar-sealing edge with a clean, damp paper towel; wipe with a dry paper towel to remove any fish oil. Apply the lids and screw bands; tighten screw bands. Process in a pressure canner as listed in Table 31 (page 139). Follow all canning procedures (page 137), processing procedures (page 138), and after-processing steps (page 140).

See page 148 for reheating procedures for fish.

Reheating fish with a margin of safety against botulism

Specific margin-of-safety recommendations for oven reheating have been developed for home-canned fish because boiling adversely affects the appearance and palatability of this product. The steps for oven-heating fish are:

- Open the jar of fish and examine for spoilage. If spoilage is evident, detoxify the suspect food, and discard. For instructions on how to detoxify questionable food jars, consult pages 1-26 and 1-27 of the 2015 edition of the USDA *Complete Guide to Home Canning*.[18]

18 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

- If no spoilage is evident, insert a meat thermometer upright into the center of the jar. The tip should be at the approximate center of the fish.
- Cover the jar loosely with foil and place in an oven preheated to 350°F.
- Take the jar out of the oven when the thermometer reads 185°F. It typically takes around 30 to 35 minutes to reach this desired temperature.
- Let the jar stand at room temperature for about 30 minutes. This will allow the temperature to become uniform throughout. By using a thermometer to determine the temperature of the fish, this treatment is equivalent to boiling.
- Serve the fish hot or refrigerate immediately for later use.
- Seafood used in a casserole dish baked at 350°F may be baked as usual, and the temperature checked at the end of the cooking as outlined above for jars.

Microwave heating, due to its uneven distribution of heat, is not an acceptable substitute for the recommended margin-of-safety heating process detailed above.[19]

It's essential to emphasize that reheating with the margin-of-safety method isn't a suggestion to eat canned foods that weren't processed correctly. Handling canned foods that may contain *botulinum toxin* is inherently dangerous and should be avoided. For instructions on how to detoxify questionable food jars, consult pages 1-26 and 1-27 of the 2015 edition of the USDA *Complete Guide to Home Canning*.[20]

19 *Fundamentals of Consumer Food Safety and Preservation: Master Handbook*
20 See "Sources of Information" (page 150) for how to obtain a copy of the USDA's *Complete Guide to Home Canning*.

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Florence Anderson, pioneer woman from Pocatello, Idaho.

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David Wayne Wilson (senior lecturer, agroecology and horticulture, University of Wyoming) updated plant descriptions and identified sources for or provided images of plants, berries, and fruit.

Photos courtesy of Jimmy Emerson (Gooseberry Pie, Attribution-NonCommercial-NoDerivs 2.0 Generic (CC BY-NC-ND 2.0) with adjustments for exposure and color). *Adobe Stock*: bendicks, BigNazik, Brent Hofacker, Charlie, cooperr, Danny Hooks, Diana Taliun, dragon_fang, emberiza, Felix, fosin, Gresei, Jiri Hera, jlmcanally, kolesnikovserg, lewal2010, Mara Zemgaliete, MaskaRad, monticellllo, New Africa, Nick Taurus, nmelnychuk, Olga Nayashkova, pamela_d_mcadams, Picture Partners, respiro888, raksyBH, Rokfeler, romantsubin, Ruta, Scisetti Alfio, Stephanie Frey, Stockphototrends, supersomik, Tatiana, timolina, V. J. Matthew, valery121283, volff, zigzagmtart, Евгений Логвиненко

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