



## FOOD PRESERVATION

# Steps to Success in Home Canning

Nutritional Sciences  
University of Missouri Extension

Your home-canned products will be only as good as the fresh foods you start with. For high-quality, safe, home-canned foods, select the freshest foods possible. Discard diseased and moldy foods. Don't can foods that you wouldn't serve at your table fresh.

Fruits and vegetables are at peak quality for six to 12 hours after being picked. For this reason, produce picked from your garden or purchased from "you pick" stands or nearby farmers' markets is usually good for canning.

Allow apricots, peaches, pears and plums to ripen one or more days between harvest and canning for best results. If you must delay the canning of other fresh produce, keep it refrigerated until you are ready to can.

Chill and can fresh, home-slaughtered red meats and poultry without delay. Do not can meat from diseased animals. Immediately after catching fish, remove guts, put on ice, and can within two days.

### Quality for Keeps



### Keep your canned foods looking and tasting fresh

To make sure your canned foods keep the best possible color and flavor during processing and storage:

- Use only high-quality foods at their proper maturity, free from diseases and bruises.
- Use the hot-pack method, especially for acid foods to be processed in a boiling-water canner.
- Prevent darkening of fruits by holding them in an ascorbic acid (vitamin C) solution.
- Fill jars while food is still hot, and use the correct headspace specified in recipes.
- Tighten screw bands securely, but not as tightly as possible. Process and cool jars.

- Store the jars in a cool, dark place (50 degrees F to 70 degrees F).
- Can no more food than you will use within a year.

### A fresh look is easy

Ascorbic acid helps prevent the discoloration of apples, apricots, peaches, pears, mushrooms and potatoes, and stem-end darkening of cherries and grapes. You can find ascorbic acid in several forms.

- Pure powdered ascorbic acid is available among canners' supplies in supermarkets during the canning season. One level teaspoon of pure powder weighs about three grams. Use one teaspoon per gallon of water as a treatment solution.
- Vitamin C tablets are economical and available year-round in many stores. Crush and dissolve six 500-milligram tablets in a gallon of water as a treatment solution.
- Commercially prepared mixtures of ascorbic and citric acid are available among canners' supplies in supermarkets. Follow the manufacturer's directions. Citric acid powder is often sold in supermarkets, but it is less effective in controlling darkening.

## Hot-pack for canned foods that sizzle with taste

Home-canned food retains quality longer when air is removed from the food before jars are sealed.

Hotpacking is the best way to remove air. It also “shrinks” food so that more will fit into each jar, helps keep the food from floating, increases vacuum in sealed jars and improves shelf life.

### How to hot-pack

Bring freshly prepared food to a boil and simmer two to five minutes.

Loosely fill jars with the boiled food.

Hot-packing is the preferred pack style for foods processed in a boiling-water canner. At first, the color of hot-packed foods may appear no better than that of raw-packed foods, but within a short storage period, both color and flavor of hot-packed foods will be superior.

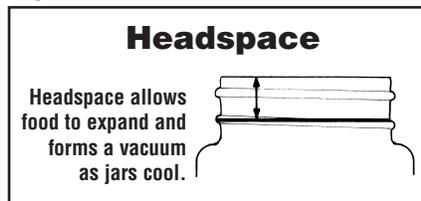
In raw-packing, jars are filled tightly with freshly prepared, unheated food. Some foods, especially fruit, will float in the jars. The trapped air may cause the fruit to discolor in as little as two to three months. Raw-packing is more suitable for vegetables processed in a pressure canner.

Whether food has been hot-packed or raw-packed, you should heat the juice, syrup or water added to the foods to boiling before adding it to the jars.

## Headspace gives food room to breathe

The unfilled space in a jar between the food and the lid is called headspace (see Figure 1). Leave one-fourth inch for jams and jellies, one-half inch for fruits and tomatoes to be processed in a boiling-water canner and from one inch to 1¼ inches in low-acid foods to be processed in a pressure canner. Headspace allows food to expand during processing and forms a vacuum as jars cool.

Figure 1.



## Use the right jars and lids

Regular and wide-mouth, Mason-type, threaded jars with self-sealing lids are the best choice for home canning (see Figure 2.). They are available in one-half pint, pint, 1½ pint, quart, and one-half gallon sizes. The regular jar mouth opening is about 2¾ inches. Wide-mouth jars have openings of about 3 inches, which makes them easier to fill and empty. Use half-gallon jars only for canning very acid juices. Jelly jars are available in eight-ounce and 12-ounce sizes.

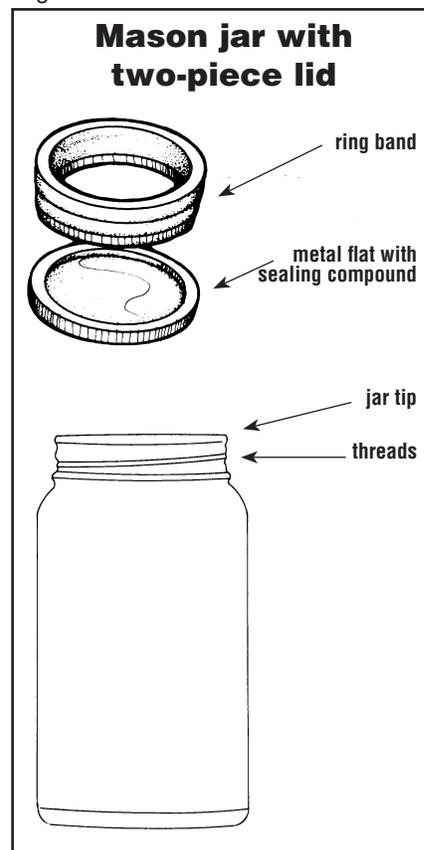
With careful handling, Mason jars and screw bands may be reused many times. You will need to use new lids (flats) each time, however. After jars have cooled, remove screw bands. Wash and dry bands and store in a dry area. If left on stored jars, they become hard to remove and often rust, which makes them unsuitable for further use.

When you use jars and lids properly, the results are excellent seals and vacuums and little or no jar breakage.

## Show off canned foods with sparkling jars

Before every use, wash empty jars in hot water and detergent and rinse well by hand. Or, wash in a dishwasher. Unrinsed detergent may cause unnatural flavors and colors in home-canned food. Remove scale or hard-water film on jars by soaking jars several hours in a solution containing one cup of vinegar (5 percent acidity) per gallon of water. These washing methods do not sterilize jars.

Figure 2.

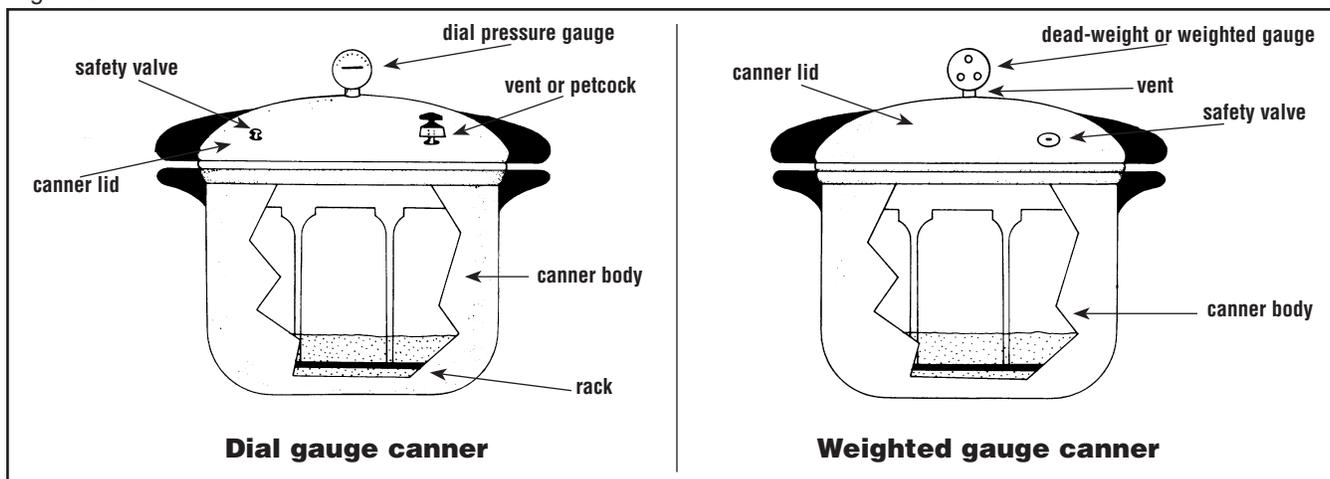


## Sterilizing jars

Sterilize jars to be used for jams, jellies and pickled products processed less than 10 minutes. Place empty jars right-side-up on the rack in a boiling-water canner. Fill the canner and jars with hot (not boiling) water to one inch above the tops of the jars. Boil 10 minutes at altitudes of less than 1,000 feet. If you live above 1,000 feet, add one minute for each 1,000 feet above sea level. Remove hot, sterilized jars one at a time and drain. Save the hot water for processing filled jars. Fill jars with food, adjust lids and process as directed.

Jars used for vegetables, meats and fruits to be processed in a pressure canner do not need to be sterilized. It is also unnecessary to sterilize jars for fruits, tomatoes and pickled or fermented foods that will be processed 10 minutes or longer in a boiling water canner.

Figure 3.



### Top it off with the right lid

The two-piece, self-sealing lid is recommended for home canning. It consists of a flat, metal lid held in place during processing by a metal screw band. The flat lid is crimped around the bottom edge to form a trough, which is filled with a colored gasket compound. When jars are processed, the lid gasket softens and flows slightly to cover the jar-sealing surface, yet allows air to escape from the jar. The gasket then forms an airtight seal as the jar cools.

Buy only the quantity of lids you will use in a year. To ensure a good seal, carefully follow the manufacturer's directions in preparing lids for use. Examine all metal lids carefully. Do not use old, dented or deformed lids, or lids with gaps or other defects in the sealing gasket.

After filling jars with food, release air bubbles by inserting a flat, plastic spatula between the food and the jar. (Don't use a metal spatula or knife.) Slowly turn the jar and move the spatula up and down to allow air bubbles to escape. Adjust the head-space and clean the jar rim (sealing surface) with a clean, damp paper towel.

Place the lid, gasket down, onto the cleaned jar rim. Uncleaned jar-sealing surfaces may cause seal failures. Then

fit the metal screw band over the flat lid. Follow the lid manufacturer's guidelines for tightening the jar lids properly.

Do not retighten lids after processing jars. As jars cool, the contents in the jar contract, pulling the self-sealing lid firmly against the jar to form a high vacuum. If screw bands are too loose, liquid may escape from jars during processing, and seals may fail. If screw bands are too tight, air cannot vent during processing, and food will discolor during storage. Overtightening may also cause lids to buckle and jars to break, especially with raw-packed, pressure-processed food.

### Canners put the pressure on

There are two main types of canners for home canning: **boiling-water canners** and **pressure canners**. Most hold seven quart jars or eight to nine pint jars. Small pressure canners hold four quart jars; some large pressure canners hold 18 pint jars in two layers, but only seven quart jars. Never use pressure saucepans with smaller-volume capacities for canning.

You must process low-acid foods, like vegetables, meat, poultry and fish, in a pressure canner to prevent botulism, an often fatal type of foodborne illness. Although pressure canners may also be used for processing some acid foods, such as fruits, boiling water

canners are recommended for this purpose because they are faster.

Please refer to MU publication GH1451, *Before You Start To Can, Learn The Basics*, for more information on safe home canning.

### Boiling-water canners

Boiling-water canners are made of aluminum or porcelain-covered steel. They have removable, perforated racks and fitted lids. The canner must be deep enough so that at least one inch of briskly boiling water will cover the tops of jars during processing. Boiling-water canners with ridged bottoms can be used only on a gas range. Boiling-water canners with flat bottoms can be used on either a gas or electric range. To ensure uniform processing of all jars with an electric range, the canner should be no more than four inches wider than the burner (meaning that when centered over the burner, the canner would overhang the burner by two inches all the way around).

### Boiling-water canning step-by-step

1. Fill the canner halfway with water.
2. Preheat water to 140 degrees F for raw-packed foods and to 180 degrees F for hot-packed foods.
3. Load filled jars, fitted with lids, into the canner rack and use the han-

- dles to lower the rack into the water; or fill the canner, one jar at a time, with a jar lifter.
4. Add more boiling water, if needed, so the water level is at least one inch above jar tops. Do not pour directly on jar tops.
  5. Turn heat to its highest position until water boils vigorously.
  6. Set a timer for the minutes required for processing the food. Be sure to use correct time for your altitude.
  7. Cover the canner and lower the heat setting to maintain a gentle boil throughout the process schedule.
  8. Add more boiling water, if needed, to keep the water level at least one inch above the jars.
  9. When jars have been processed for the recommended time, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
  10. Use a jar lifter to remove the jars, and place them on a towel. Leave at least one inch of space between the jars during cooling. Let the jars sit undisturbed for 12 to 24 hours.

## Pressure canners

Pressure canners for use in the home have been extensively redesigned in recent years. Models made before the 1970s were heavy-walled kettles with clamp-on or turn-on lids. They were fitted with a dial gauge, a vent port in the form of a petcock or counterweight and a safety fuse.

Modern pressure canners are lightweight, thin-walled kettles; most have turn-on lids. They have a jar rack, gasket, dial or weighted gauge, an automatic vent/cover lock, a vent port (steam vent) to be closed with a counterweight or weighted gauge, and a safety valve (see Figure 3).

To be absolutely certain you are getting a true reading of the temperature inside your pressure canner you must:

1. Operate the canner at the pressure and time specified in the map of altitudes in Missouri found in MU publication GH1451, *Before You Start To Can, Learn The Basics*. Temperatures inside pressure canners are lower at higher altitudes.
2. Get rid of air trapped inside the pressure canner by venting. Air trapped inside the canner lowers the temperature obtained at 5 pounds, 10 pounds and 15 pounds of pressure and results in underprocessing.

**No matter what the manufacturer's directions say, to be safe, you should vent all types of pressure canners 10 minutes before pressurizing.**

To vent a canner, leave the vent port uncovered on newer models or manually open petcocks on some older models. Then, heat the filled canner with its lid locked into place until the water boils and generates a funnel of steam that escapes through the petcock or vent port. Start the timing process once you see the funnel.

After venting 10 minutes, close the petcock, or place the counterweight or weighted gauge over the vent port to pressurize the canner.

Weighted-gauge models exhaust tiny amounts of air and steam each time their gauge rocks or jiggles during processing. They control pressure precisely and do not need watching during processing.

The sound of the weight rocking or jiggling indicates that the canner is maintaining the recommended pressure. Weighted gauges do not have to be checked for accuracy.

The single disadvantage of weighted-gauge canners is that they cannot correct precisely for higher altitudes. At altitudes above 1,000 feet, they must be operated at canner pressures of 10 PSI instead of 5 PSI, or 15 PSI instead of 10 PSI.

Check dial gauges for accuracy

before use each year, and replace them if they read high by more than 2 pounds at 5 pounds, 10 pounds or 15 pounds of pressure.

Low readings cause over-processing and also indicate that the gauge should be replaced. Gauges may be checked at many local University of Missouri Extension centers.

Handle canner lid gaskets carefully, and clean them according to the manufacturer's directions. Nicked or dried gaskets will allow steam leaks during pressurization of canners. Keep gaskets clean between uses.

Gaskets on older-model canners may require a light coat of vegetable oil once each year. Gaskets on newer-model canners are prelubricated and do not need oiling. To find out if your canner gasket has been prelubricated, check your instruction manual.

Lid safety valves are thin metal inserts or rubber plugs that relieve excess pressure in the canner. Do not pick at or scratch valves while cleaning lids. Use only canners that have the Underwriter's Laboratory (UL) approval for safety.

Replacement gauges and other parts for canners are often available at stores that sell canning equipment or from canner manufacturers. When ordering parts, be sure to give your canner model number and describe the parts needed.

## Pressure canning step-by-step

1. Put 2 inches to 3 inches of hot water in the canner. Place filled jars on the rack using a jar lifter. Fasten canner lid securely.
2. Leave weight off vent port or open petcock. Heat at the highest setting until steam flows freely from the petcock or vent port.
3. Maintain high heat setting, let steam vent 10 minutes and then place weight on vent port or close petcock. The canner will pressurize

- during the next three to five minutes.
4. Start timing the process when the pressure reading on the dial indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock.
  5. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure changes during processing may cause jars to lose liquid. Weighted gauges on Mirro canners should jiggle about two or three times per minute. On Presto canners, they should rock slowly throughout the process.
  6. When the timing process is completed, remove the canner from heat and let the canner depressurize. Do not force-cool the canner. Forced cooling may result in food spoilage. Cooling the canner with cold running water or opening the vent port before the canner is fully depressurized will cause liquid to escape from jars and may cause seal failures. Force-cooling may also warp the canner lid on older-model canners causing steam leaks. Time the depressurization of older models. Standard-size, heavy-walled canners require about 30 minutes when loaded with pints and 45 minutes with quarts. Newer, thin-walled canners cool more rapidly. They are equipped with vent locks that drop to a normal position allowing the canner to be opened when the canner is depressurized.
  7. After the canner is depressurized, remove the weight from the vent port or open the petcock. Wait 10 minutes, unfasten the lid and remove it carefully tilting it away from you so the steam does not burn your face.

8. Use a jar lifter to remove the jars and place them on a towel. Leave at least one inch of space between the jars during cooling.

### **Allow time for a slow cool-down**

When removing hot jars from a canner, do not retighten their lids. Retightening of hot lids may cut through the gasket and cause seal failures. Cool the jars at room temperature for 12 hours to 24 hours on towels or racks. The food level and liquid volume of raw-packed jars will be noticeably lower after cooling. Air is exhausted during processing and food shrinks. If a jar loses excessive liquid during processing, do not open it to add more liquid.

### **Testing jar seals**

After cooling jars for 12 hours to 24 hours, remove the screw bands and test seals using one of these methods:

- Press the middle of the lid. If it springs up when released, the lid is not sealed.
- Tap the lid with the bottom of a teaspoon. If the jar is sealed correctly, it will make a ringing, high-pitched sound. A dull sound means the lid is not sealed. Food touching the underside of the lid, however, will also cause a dull sound. Test seal by another method to make sure it is sealed.
- Hold the jar at eye level, and look across the lid. The lid should be concave (curved down slightly in the center). If the center of the lid is either flat or bulging, it may not be sealed.

### **Reprocessing unsealed jars**

If a lid fails to seal, you must reprocess within 24 hours. Remove the lid, and check the jar-sealing surface for tiny nicks. If necessary, change the jar. Always use a new, properly prepared lid, and reprocess using the same processing time. The quality of reprocessed food is poor.

Instead of reprocessing, unsealed jars of food can also be frozen if headspace is adjusted to 1½ inches and food is in a freezer-safe container. Single, unsealed jars can be refrigerated and used within several days.

### **Storing canned foods**

Tightly sealed, cooled jars are ready to be stored. Remove screw bands, wash the lid and jar to remove food residue, rinse and dry jars. Label and date jars, and store them in a clean, cool, dark, dry place — 50 degrees F to 70 degrees F is ideal. Do not store jars above 95 degrees F, or near hot pipes, a range, a furnace, in an uninsulated attic or in direct sunlight. Under conditions such as these, food will lose quality in a few weeks or months and may spoil. Dampness may corrode metal lids, break seals and allow recontamination and spoilage.

Freezing of canned foods will not cause spoilage unless jars become unsealed and recontaminated. Freezing and thawing will soften food, however. If you must store jars where they may freeze, wrap them in newspapers, place them in heavy cartons and cover with more newspapers and blankets.

*Adapted from Complete Guide to Home Canning, USDA, Agriculture Information Bulletin, No. 539.*

For more information, visit MU Extension:

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