

Canning Foods at Home

Canning is an important, safe method of food preservation if practiced properly. The canning process involves placing foods in jars and heating them to a temperature that destroys microorganisms that could be a health hazard or cause the food to spoil. Canning also inactivates enzymes that could cause the food to spoil. Air is driven from the jar during heating, and as it cools, a vacuum seal is formed. The vacuum seal prevents air from getting back into the product bringing with it microorganisms to recontaminate the food.

The *Clostridium botulinum* microorganism is the main reason why pressure canning is necessary. Though the bacterial cells are killed at boiling temperatures, they can form spores that can withstand these temperatures. The spores grow well in low acid foods, in the absence of air, such as in canned low acid foods (vegetables and meats). When the spores begin to grow, they produce the deadly botulinum toxins (poisons).

These spores can be destroyed by canning the food at a temperature of 240 °F or above for the correct length of time. This temperature is above the boiling point of water so it can only be reached in a pressure canner.

SAFE CANNING METHODS

There are two safe ways of canning, depending on the type of food being canned. These are the boiling water bath method and the pressure canner method.

Boiling Water Bath Method: The boiling water bath method is safe for fruits, tomatoes and pickles as well as jam, jellies and other preserves. In this method, jars of food are heated by being completely covered with boiling water (212 °F at sea level).

High-acid foods contain enough acid (ph of 4.6 or less) so that the *Clostridium botulinum* spores can't grow and produce their deadly toxin. High-acid foods include fruits and properly pickled vegetables. These foods can be safely canned at boiling temperatures in a boiling water bath.

Tomatoes and figs have ph values close to 4.6. To can these in a boiling water bath, acid in the form of lemon juice or citric acid must be added to them.

Pressure Canning Methods: Pressure canning is the only safe method of canning low-acid foods (those with a ph of more than 4.6). These include all vegetables, meats, poultry and seafood. Because of the danger of botulism, these foods must be canned in a pressure canner. Jars of food are placed in 2 to 3 inches of water in a pressure canner and then heated to a temperature of at least 240 °F. This temperature can only be reached in a pressure canner.

GETTING READY

Assemble and wash equipment and containers before gathering fruits and vegetables. Gather products early when they are at their peak of quality. Do not use over-ripe products. Gather or purchase only as much as you can handle within 2 or 3 hours.

Wash the product carefully, handling small amounts at a time. Lift the food out of the water, drain the water and continue rinsing until the water is clear and free of dirt. Dirt contains some of the bacteria that are hardest to kill. Don't let the food soak; it will lose flavor and nutrients. The cleaner the raw foods, the more effective the canning process. Do not can decayed or damaged food items.

Preparing the Jars and Lids: Examine jars and discard those with nicks, cracks and rough edges. These defects will not permit an airtight seal on the jar, and food spoilage will result. All canning jars should be washed in soapy water, rinsed well and then kept hot. This could be done in the dishwasher or by placing the jars in the water that is heating in your canner. The jars need to be kept hot to prevent breakage when they're filled with a hot product and placed in the canner for processing.

Jars that will be filled with food and processed for less than 10 minutes in a boiling water bath canner need to be sterilized by boiling them for 10 minutes. NOTE: If you are at an altitude of 1000 feet or more, boil an additional minute for each 1000 feet of additional altitude. Jars processed in a boiling water bath canner for 10 minutes or more or in a pressure canner will be sterilized during processing.

Be sure to use new two-piece lids. Follow the manufacturer's instructions for treating them. Some need to be brought almost to a boil and then left in hot water, while others need to be boiled for a period of time.

METHODS OF PACK

Fruits and vegetables may be packed raw or they may be preheated and then packed into canning jars. The hot pack yields better color and flavor, especially when foods are processed in a boiling water bath.

For both raw pack and hot pack, there should be enough syrup, water or juice to fill in around the solid food in the jar and to cover the food. If not covered by liquid, food at the top tends to darken and develop unnatural flavors. It takes from ½ to 1½ cups of liquid for a quart jar.

Raw Pack: For this method put raw, unheated food directly in jars. Pour boiling hot water, juice or syrup over the food to obtain proper headspace.

Fruits and most vegetables packed raw should be packed tightly because they will shrink during processing; however, corn, lima beans, potatoes and peas should be packed loosely because they expand during canning.

Hot Pack: For this method, heat the food to boiling (or cook it for specified time) and then pack the hot food and boiling hot liquid in jars. Foods packed hot should be packed fairly loosely, as shrinkage has already taken place.

STEPS FOR BOILING WATER BATH METHOD

- Fill the canner about halfway with hot water. Turn on the burner and heat the water.
- For raw-packed jars, have the water in the canner hot but not boiling to prevent breakage of the jars when they're placed in the canner. For hot-packed jars, use hot or gently boiling water.
- Fill the jars as described above in "Methods of Pack."
- Allow the proper headspace according to processing directions for specific foods. This is necessary so that all the extra air will be removed during processing, and a tight vacuum seal will be formed.
- To make sure that air bubbles have not been trapped inside the jar, run a bubble freer or any plastic or rubber-like utensil around the edges of the jar, gently shifting the food, so that any trapped air is released. After the air bubbles have been removed, more liquid may need to be added to the jar to ensure proper headspace.
- Wipe off the rims of the jars with a clean, damp cloth.
- Screw on the lids, but not too tightly — air needs to escape during processing.
- Put filled glass jars on the rack in the canner. Add more boiling water or take out some as needed so that the water is at least 1 inch over the tops of the jars. (If you add more water, pour it between the jars, not directly on them, to prevent breakage.) Put the lid on the canner.
- When the water in the canner reaches a rolling boil, begin counting the correct processing time. Boil gently and steadily for the recommended time, adjusting the heat and adding more boiling water as necessary.
- Use a jar lifter to carefully remove the jars as soon as the processing time is up. Place the hot jars right side up on a rack, dry towels, boards or newspapers to prevent the jars from breaking on contact with a cold

surface. Leave at least 1 inch of space between jars.

- Do not tighten the lids.
- Allow the jars to cool untouched for 12 to 14 hours.

STEPS FOR PRESSURE CANNER

METHOD

- Be sure to read your manufacturer's instructions on the use of your pressure canner.
- Place 2 to 3 inches of water in the canner. It should be hot but not boiling when canning raw-packed food; hot or gently boiling for hot-packed foods.
- Fill the jars as described above in "Methods of Pack."
- Allow proper headspace, remove air bubbles, wipe jar rims and put on lids. (See detailed instructions above in "Steps for Boiling Water Bath Methods).")
- Process according to instructions below.

Processing Instructions: Set the jars of food on the rack in the canner so steam can flow around each jar. Fasten the canner lid so that no steam begins to escape except through the vent. Turn heat to high and watch until steam begins to escape from the vent. Let the steam escape steadily for 10 minutes.

Close the vent, using a weight, valve or screw, depending on the type of canner. If you have a weighted-gauge canner that has a weight of varying pressures, be sure you are using the correct pressure.

For a dial-gauge canner, let the pressure rise quickly to 8 pounds of pressure. Adjust the burner temperature down slightly and let the pressure continue to rise to the correct pressure. (If the burner were left on high, the pressure would be hard to regulate when the correct pressure is reached.) Start counting the processing time as soon as the pressure is reached.

For weighted-gauge canners, let the canner heat quickly at first and then adjust the heat down slightly until the weight begins to rock gently or

"jiggle" two to three times per minute, depending on the type of canner you have. Start counting the processing time as soon as the weight does either of these.

Keep the pressure constant by regulating the heat under the canner. Do not lower the pressure by opening the vent or lifting the weight. Keep drafts from blowing on the canner. Fluctuating pressure causes loss of liquid from jars and underprocessing.

When the processing is completed, carefully remove the canner from the heat. If the canner is too heavy, simply turn it off.

Let the pressure in the canner drop to zero. This will take 30 to 45 minutes in a standard heavy-walled canner and nearly an hour for a larger 22-quart canner. Newer thin-walled canners depressurize more quickly. Do not rush the cooling by setting the canner in water or by running cold water over the canner. Never lift the weight or open the vent to hasten the reduction in pressure.

Older canners are depressurized when the gauge on a dial-gauge canner registers zero or when a gentle nudge to the weight on a weighted gauge canner does not produce steam or resistance. New canners are equipped with a safety lock. These canners are depressurized when the safety lock drops to normal position. When a canner is depressurized, open the vent or remove the weight. Wait two minutes and then open the canner.

Note: Sometimes safety locks that are located in the handle of a canner will stick. If a nudge to a canner weight shows that it is depressurized, remove the weight, wait two minutes and then run a knife blade between the handles to release the lock.

Unfasten the lid, and tilt the far side up, so the steam escapes away from you. Do not leave the canner unopened, or the food inside could begin to spoil. Use a jar lifter to carefully remove the jars from the canner. Place the hot jars on a rack, dry towels, boards or newspaper, right side up to prevent the jars from breaking on contact with a cold surface. Leave at least 1 inch of space between the jars. Do not tighten the lids. Allow the jars to cool, untouched for 12 to 24 hours.

SAFE HANDLING OF PROCESSED JARS

Test the Lid for a Proper Seal: Most two-piece lids will seal with a “pop” sound while they’re cooling. When it is completely cool, test the lid. It should be curved downward and should not move when pressed with a finger. If a jar is not sealed, refrigerate it and use the unspoiled food within two to three days, reprocess the food within 24 hours or freeze it.

If liquid has been lost from sealed jars do not open them to replace it, simply plan to use these first. The food may discolor, but if sealed, the food is safe.

Label and Store Jars: The screw bands should be removed from the sealed jars to prevent them from rusting on. The screw bands should then be washed, dried and stored for later use.

Wash food residue from the jars and rinse. Label, showing contents, date and lot number (if you canned more than one canner full that day). It’s important to write down the lot number so that if one jar spoils, you can identify the others from that canner load.

Store in a clean, cool, dark, dry place. The best temperature is between 50 and 70 °F. Avoid storing canned foods in a warm place near hot pipes, a range or a furnace, or in direct sunlight. They lose quality in a few weeks or months, depending on the temperature and may even spoil. Keep canned goods dry. Dampness may corrode metal lids and cause leakage so food will spoil. For best quality, use canned foods within one year.

TO REPROCESS FOOD FROM UNSEALED JARS

If you decide to reprocess food from jars that did not seal, do so within 24 hours. To do this, remove the lid and check the jar-sealing surface for tiny nicks. Change the jar if necessary, add a new treated lid and reprocess using the same processing time.

Label food that has been recanned and use these foods first. It will be softer in texture and lower in nutritional value than food processed only once.

ON GUARD AGAINST SPOILAGE

Don’t taste or use canned food that shows any sign of spoilage! Look closely at all jars before opening them. A bulging lid or leaking jar is a sign of spoilage. When you open the jar, look for other signs such as spurting liquid and off-odor or mold.

Spoiled canned foods should be discarded in a place where they will not be eaten by humans or pets.

For more information on canning foods at home, request HGIC 3020, *Home Canning Equipment* or HGIC 3000, *Preserving Foods*.

SOURCE: Reynolds, Susan and Paulette Williams. *So Easy to Preserve*. Cooperative Extension Service, University of Georgia. Revised 1993 by Judy Harrison.

This information has been reviewed and adapted for use in South Carolina by P.H. Schmutz, HGIC Information Specialist, and E.H. Hoyle, Extension Food Safety Specialist, Clemson University.

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