

# Home Canning Basics

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## Introduction

People choose to can foods at home for many reasons: to preserve the harvest from their gardens or local farmers markets for year-round enjoyment; to gain more control over what is in their food by limiting or avoiding salt, sugar or preservatives; to save money; to get better-tasting canned foods; to follow family traditions; or just for the sense of satisfaction that home canning provides.

Home canning has changed over the last 200 years. Scientists have found ways to produce safer, higher quality products, including the design of better home canning equipment and supplies. Because many microorganisms live and multiply quickly on the surfaces of fresh fruits and vegetables, methods of home canning should always follow research-based recommendations. The advantages of home canning are lost when you start with poor quality fresh foods; when jars fail to seal properly; when food spoils; or when color, texture, flavors and nutrients deteriorate during prolonged storage. Following the correct procedures can ensure safely canned foods that are of top quality and may be stored for up to two years.

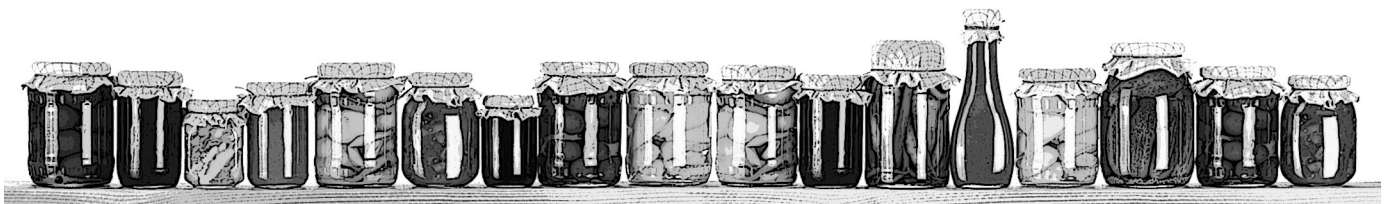
## Jars and Equipment

Home canning requires the use of specialized jars that have been designed to be reused under home canning methods. The USDA recommends Mason-

type jars with two-piece screw-on caps. Jars come in a variety of sizes for efficient use of your home-canned products. There are numerous manufacturers of canning jars. It is important that you purchase jars and lids that were manufactured and advertised as canning jars. Canning jars go through a tempering process during manufacturing and are less susceptible to breakage. Commercial single-use jars from mayonnaise, peanut butter, etc., should not be used because they are more prone to breaking during the canning process.

Jars advertised as storage jars should not be used for canning. Likewise you should not use glass mason jars purchased in the crafting section of certain stores. Storage jars and crafting jars cannot withstand the repeated heating and cooling associated with the canning process and are more susceptible to breakage. In addition, the necks of the jar and sealing edges are often different than canning jars so lids and bands do not apply correctly.

Before use, all empty jars should be washed with soap and hot water and rinsed, with a dishwasher if desired. Hard water films may be removed easily with a soak in a solution containing 1 cup of vinegar per gallon of water. All jars to be processed less than 10 minutes should be sterilized for 10 minutes. They can be boiled in the boiling water canner before using it for processing. Jars that



will be processed 10 minutes or longer should be washed and rinsed but do not need to be boiled.

A canning funnel, flexible spatula, jar lifter, and lid wand will make home canning easier. These items are usually available from any local grocery store that carries home canning supplies.

## Filling

You must correctly fill jars and adjust the two-piece caps for successful home canning. There are two methods of packing food into the jars: raw pack and hot pack.

The raw pack method is used for delicate foods that are usually easier to handle raw. There may be shrinkage during processing, causing some foods to float to the top of the jar or expand into the headspace.

The hot pack method involves preheating the food for a specified length of time before placing it into the hot jars. Heating the food first allows for a tighter pack that requires fewer jars and removes more air from the food. In the boiling water canner, hot packed food also requires less time for the canner to reach boiling because the food and jars are already hot. Hot packed home canned foods maintain color and flavor better than raw packed foods.

Headspace is the space between the top of the jar and the top of the food. The less air in this space, the higher the quality of the canned product. As a general rule, juices, jams, and jellies require a quarter inch of headspace; high-acid foods, fruits, tomatoes, pickles, and relishes require a half inch; and low-acid foods, vegetables, and meats require a headspace of one inch or more. A USDA-recommended recipe will specify the correct headspace to use.

Once the jars are packed with food, any air bubbles should be removed. A plastic knife or spatula can be pressed from the side of the jar into the food to release trapped air. Do not use metal

utensils as this may result in glass chipping or breakage. After removing air bubbles, adjust the headspace if necessary by adding more product.

The research-recommended two-piece metal cap consists of a screw band and a flat lid. The lid has a sealing compound inside the edge, designed to allow air to escape as the food in the jar is heated during processing and then to adhere to the glass rim as the jar cools and a vacuum is formed. Lids are designed to be used only once, but bands may be reused if they are without rust or nicks. Before use, wash lids and bands in hot soapy water and rinse well. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids. The jar rim should be wiped clean before adding the lid. The band should be tightened only fingertip tight to prevent disturbing the seal when you remove the band for storage. Over tightening may also cause the metal lid to buckle during processing.

## Processing

Presently, only two research-based methods are acceptable for the home canning of safe and quality products: the boiling water method or the pressure canner method. The method used to process home canned products depends on the type of raw product and whether or not the recipe has the addition of an acid. To ensure that the finished product is safe, it is crucial not to change or modify the recipe, processing method or processing time. There are no USDA-approved conversions between boiling water canner and pressure canner processing times available to home canners. Inspect your equipment and supplies for proper working condition before you begin to process food.

**Note:** Currently, open-kettle canning, oven canning, and the use of small pressure cookers are *not* recommended for home canning.

Pressure cookers are sometimes advertised as canners but should not be used for pressure canning.

Research by the National Center for Home Food Preservation (NCHFP) has found atmospheric steam canners safe for processing high acid foods or acidified foods with a pH of 4.6 or below. Examples include peaches, pears, apples, salsa or pickles. USDA research-based recipes and process times and methods, along with other guidelines are recommended to produce a safe and good tasting product. Atmospheric steam canners are not appropriate or safe to pressure can low acid foods, such as vegetables. For more information on safely using an atmospheric steam canner for home food preservation, contact your local Extension Office or [http://nchfp.uga.edu/publications/nchfp/factsheets/steam\\_canners.html](http://nchfp.uga.edu/publications/nchfp/factsheets/steam_canners.html).

## *The Boiling Water Method*

High-acid foods can be processed in a boiling water canner. Fruits are considered naturally high-acid foods. With the addition of lemon juice, citric acid, or vinegar in the right proportion, tomatoes, pickles, and relishes also become high-acid foods. When high-acid foods are processed at a boiling water temperature (212°F) for the time specified in the recipe, the process is adequate to inactivate enzymes and destroy molds, yeast, and some bacteria. (Tomatoes are usually considered a high-acid food, but some varieties are not high acid; thus, it is recommended to add an acid to safely process tomatoes in a boiling water canner.)

### **Steps for successful boiling water canning**

1. Assemble all equipment and utensils. Rinse ingredients as needed.
2. Fill the canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. If you have a canner rack, position it in the canner. Begin preparing the recipe while the water is preheating. In about 20 to 30 minutes the water will begin to boil.
3. Prepare the recipe, fill the jars to the appropriate headspace, and remove any air bubbles. After adjusting the two-piece caps, load the jars into the canner one at a time. (A jar lifter will make this activity safer and more efficient.) Keep the jars upright at all times to prevent food from spilling into the sealing area and interfering with the final seal.
4. Add more boiling water if needed so that the water level is at least one inch above the jar tops.
5. Turn up the heat so that the water boils vigorously. Place the lid on the canner. When the water begins to boil, begin timing the process, as indicated in the recipe. The heat setting may be lowered as long as a gentle but complete boil is maintained for the entire processing time.
6. Set a timer for the total number of minutes indicated in the recipe.  
**Note:** If the water stops boiling at any time during the process, increase the heat to return to a complete boil and start the timing of the process all over again.
7. When the jars have been processed in boiling water for the recommended time, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
8. Using a jar lifter, remove the jars one at a time, keeping them upright. Carefully place them on a towel, leaving a one-inch space between the jars for proper cooling.
9. Leave the jars undisturbed for at least 12 hours. (As the jars cool, the vacuum seal forms.)
10. After 12 to 24 hours, test seals and remove bands. Wash outside of jars and lid surfaces. Date and label jars and store in a cool, dry place for up to two years.

The boiling water method should not be used for processing low-acid foods such as meats, poultry, seafood, milk, and fresh vegetables, since it does not reach high enough temperatures to destroy certain bacterial spores and toxins that cause botulism. All low-acid foods should be processed in a pressure canner following research-recommended instructions.

The boiling water canner is generally made of aluminum or porcelain-covered steel. It usually includes a removable rack for ease of loading and unloading jars and a fitted lid to keep the heat in while the water is boiling during processing. The canner must be deep enough to cover the tops of the jars by at least one inch with briskly boiling water during processing. Any pan that meets these specifications will work as a boiling water canner.

If you have an electric range, you will need a boiling water canner that has a flat bottom. A boiling water canner that has either a flat or ridged bottom may be used on a gas range. A loaded canner is heavy. If you have a flat-top electric range, you will need to lift the canner straight up, without sliding it, to prevent scratching the flat top.

## *The Pressure Canner Method*

Low-acid foods have a pH higher than 4.6. Meats, seafood, poultry, milk, and all fresh vegetables are considered low-acid foods. These foods must be processed in a pressure canner, where temperatures of 240° to 250°F can be attained at 10 to 15 pounds of pressure. Maintaining this high temperature for the amount of time specified in the recipe destroys spores that can cause botulism. The specified time depends on the kind of food being canned, the way it is packed into the jar, and the size of the jar.

Buying a pressure canner at a yard sale is probably not a good idea, as replacement parts and manufacturer's instructions may no longer be available.

Many people are intimidated by the thought of using a pressure canner. With a little information and the correct process, you'll be pressure canning like a pro. Pressure canners made after 1997 have been redesigned with more safety features, and they are lighter in weight. The newer lids usually have a sealing ring that fits into a groove in the lid, preventing steam from escaping between the lid and the canner rim. Choose a pressure canner that has been approved by Underwriter's Laboratory (UL) to ensure that it meets current safety guidelines. Follow the manufacturer's instructions regarding care and maintenance of the canner. Pressure canners only need one to two inches of water in the bottom of the canner. Read the manufacturer's instructions to find this information.

Two types of gauges are available to regulate pressure: the dial gauge and the weighted gauge. A dial gauge is easy to read because it indicates the pounds of pressure on the dial. A counterweight or pressure regulator will cover the vent to allow pressure to build up within the pressure canner. A dial gauge should be checked for accuracy annually. Your local county Extension office has equipment to perform this test. If the gauge reads high or low by more than two pounds at 10 pounds of pressure, replace it. A weighted gauge is round with different-sized holes around the edge. Each hole indicates the amount of pressure that will build up inside the pressure canner. A weighted gauge will usually jiggle several times a minute or rock gently when the correct pres-

### **Older canner models may take up to one hour to cool when fully loaded with quart jars.**

Newer canner models cool more rapidly and are usually fitted with vent locks that open when the pressure is at zero. These canners are depressurized when the piston in the vent lock drops to a normal position. If the lid will not open, there may be a hidden lock in the canner handles.



## Steps for successful pressure canning

1. Assemble all equipment and utensils. Rinse ingredients as needed.
2. Prepare the recipe, fill the jars to the appropriate headspace, remove air bubbles, and adjust the two-piece caps.
3. Depending on your manufacturer's instructions, place one to two inches of hot water in the canner. Place filled jars on the rack using a jar lifter. Keep jars upright at all times to prevent food from spilling into the sealing area and interfering with the final seal. Fasten the canner lid securely. Leave the weight off the vent port or open the petcock.
4. Heat the canner on high until the water boils and generates steam that can be seen escaping through the open vent port or petcock. When a funnel shape of steam begins to continuously escape the canner, set a timer for 10 minutes.
5. After 10 minutes of continuous steam, you can close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner. The canner should pressurize within three to ten minutes.
6. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or for canners without dial gauges, when the weighted gauge begins to jiggle or rock as the manufacturer describes.
7. Regulate the heat under the canner to maintain a steady pressure at, or slightly above, the correct gauge pressure. Loss of pressure at any time can result in underprocessing or unsafe food. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars.  
**Note:** If the pressure drops below the recommended pounds, increase the heat to bring the canner back up to pressure and start the timing of the process all over again.
8. When the timed process is finished, it is best to remove the canner from the stove and allow it to cool naturally to return to zero pressure. Forced cooling before the canner is fully depressurized will cause a loss of liquid from jars and failed seals. Forced cooling may also warp the canner lid.
9. After the canner is completely depressurized, remove the weight from the vent port or open the petcock. At this point, the canner and contents will still be hot. Wait 10 minutes; then unfasten the lid and remove it carefully. Lift the lid with the underside away from you so that the steam coming out of the canner does not burn your face.
10. Using a jar lifter, remove the jars one at a time, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
11. Leave the jars undisturbed for at least 12 hours. (As the jars cool, the vacuum seal forms.)
12. After 12 to 24 hours, test seals and remove bands. Wash outside of jars and lid surfaces. Date and label jars and store in a cool, dry place for up to two years.

**Altitude affects processing times and pressures.** If you live at an altitude greater than 1,000 feet, please consult the website for the National Center for Home Food Preservation located at <http://nchfp.uga.edu/>.

sure is being maintained. Always read the manufacturer's directions to know how a particular weighted gauge should rock or jiggle. A weighted gauge should maintain its accuracy as long as you don't drop it or plug the vent.

Once the lid is firmly in place on the canner, usually secured with a twist, the air trapped inside the canner must be removed. This process is known as venting or exhausting the canner. To vent a canner, leave the vent port uncovered (or manually open the petcock on some older models). Heat the canner on high until the one to two inches of water boils and generates steam that can be seen escaping through the open vent port or petcock. When a funnel shape of steam begins to continuously escape the canner, set a timer for 10 minutes. After 10 minutes of continuous steam, the canner is vented. You can close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner.

## Reprocessing Unsealed Jars

After cooling, the metal lids on properly sealed jars will be concave (curved down slightly in the center). If any jars fail to seal, remove the lids and check the jar edges for nicks. If necessary, change the jars. If the jars are sound, wipe the rims, add new (properly prepared) lids, and reprocess within 24 hours. Use the processing time specified in the recipe.

As an alternative to reprocessing, the jar contents may be frozen for storage. Adjust the headspace to one and a half inches and apply a clean lid before freezing. The food in single unsealed jars may be refrigerated and eaten within several days.

## Signs of Spoilage in Canned Foods

Before using stored canned foods, check each jar for signs of spoilage. Do not use any that have come unsealed or show any of the following signs: dried

food on the outside of the jar, indicating seepage; rising air bubbles; cloudiness; unnatural color; spurting liquid when opened; disagreeable odor; or mold growth on the food surface or underside of the lid. Spoiled food should be disposed of safely. If the suspect jars are still sealed but exhibiting signs of spoilage (swollen lid, rising air bubbles, streaks of dried food, yeast or mold growth, unnatural color), place the jars in a heavy garbage bag. Close the bag and place in a regular trash container or dispose in a landfill. If the suspect jars are unsealed, open or leaking, they should be detoxified before disposal. To detoxify canned food start by wearing disposable rubber or heavy plastic gloves. Gently place the suspect jars and lids on their sides in an 8-quart or larger stock pan or boiling water canner. Wash your gloved hands thoroughly. Add water to the pot and be careful not to splash the water. The water should cover the jars with a minimum of 1-inch level above the jars. Place a lid on the pot and heat to boiling. Boil for 30 minutes to ensure detoxifying the food and all jar components. Cool the jars, lids and food before throwing away or dispose in a landfill. Use a fresh bleach solution made from 1 part unscented liquid bleach (5%-6% sodium hypochlorite) to 5 parts clean water to sanitize work surfaces, equipment, or other items that may have come in contact with the suspect jars or food. Spray or dampen all contaminated surfaces with the bleach solution and let stand for 30 minutes. Wearing gloves, clean up any spills with paper towels. Place the paper towels and gloves in a plastic bag before putting them in the trash. The same sanitizing procedure above should be used on surfaces where spills were cleaned. NOTE: Bleach is an irritant. The vapors should not be inhaled and the liquid should not come in contact with the skin.

## References

- Address, E. L., and J.A. Harrison (2011). So Easy to Preserve (5th ed.). Athens, GA: University of Georgia.
- Jarden Home Brands (2012). Ball Blue Book Guide to Preserving. Daleville, IN: Hearthmark.
- National Center for Home Food Preservation (n.d.). How Do I?...Can. Retrieved February 18, 2013 from [http://nchfp.uga.edu/how/can\\_home.html](http://nchfp.uga.edu/how/can_home.html).
- United States Department of Agriculture (2009). USDA Complete Guide to Home Canning (Agriculture Information Bulletin No. 539). Retrieved February 18, 2013, from [http://nchfp.uga.edu/publications/publications\\_usda.html](http://nchfp.uga.edu/publications/publications_usda.html).