



## What You Need to Know

Nearly all food requires some type of preservation treatment to maintain its quality and safety, so that it may be enjoyed long after harvesting or purchasing. Home canning, also referred to as processing, preserving, and jarring, allows you to store many perishable foods on your pantry shelf for up to one year. Understanding how home canning prevents the natural occurrence of food deterioration caused by microorganisms is the basis to achieving a successful outcome, so that you can proudly share the foods you preserve with your friends and family.

Simple techniques used for everyday meal preparation are some of the same techniques used to minimize deterioration of food quality when home canning. For example, washing an apple is helpful in removing some surface spoilage microorganisms. Peeling the apple reduces even greater numbers of the spoilage microorganisms. However, once the protective peel is removed from the apple, the flesh begins to darken due to enzyme activity. If left untreated, the apple becomes brown and undesirable. This is Mother Nature's way of ensuring that you don't eat food that could potentially be harmful to your health. Another technique frequently used in meal preparation, which is also used to prepare food for home canning, is blanching. Blanching food helps control enzymes long enough for you to complete recipe preparation and fill the jars before processing.

You may then wonder—what does home canning contribute to extending the seasonal quality of food?

The normal cycle of food decay is interrupted when food is home canned according to the tested recipes, processing methods, and specific processing times in this book. Heating food in a sealed jar to a specific temperature for a precise length of time destroys the normal levels of heat-resistant microorganisms present in food and forces air from the jar. The vacuum seal that forms prevents new microorganisms from entering the jar and contaminating its contents. Storing processed, sealed jars at the correct room temperature, 50° to 70°F, is the last essential step to ensure flavorful, nutritious, safe foods are at hand when you're ready to serve them.

Now that you know the basic principles behind home canning, it's also helpful for you to understand how acidity and temperature affects molds, yeasts, bacteria, and enzymes—the *spoilers*.

### Molds and Yeasts

Molds are fungi that grow as silken threads in food. A portion of the mold cannot be seen, while part may appear as fuzz on top of food. Certain molds can produce mycotoxins that are harmful to eat. Yeasts are also fungi that cause food to ferment, thus making it unfit to consume. Fortunately, the acid in food protects against the growth of bacteria; however, molds and yeasts are ever-present and continue to grow if left untreated. Molds and yeasts are easily destroyed at temperatures between 140° and 190°F. Processing high-acid foods according to a tested recipe in a boiling-water canner heats foods to 212°F, which is adequate to destroy the molds and yeasts without destroying the quality of food (see figure 1).

### Bacteria

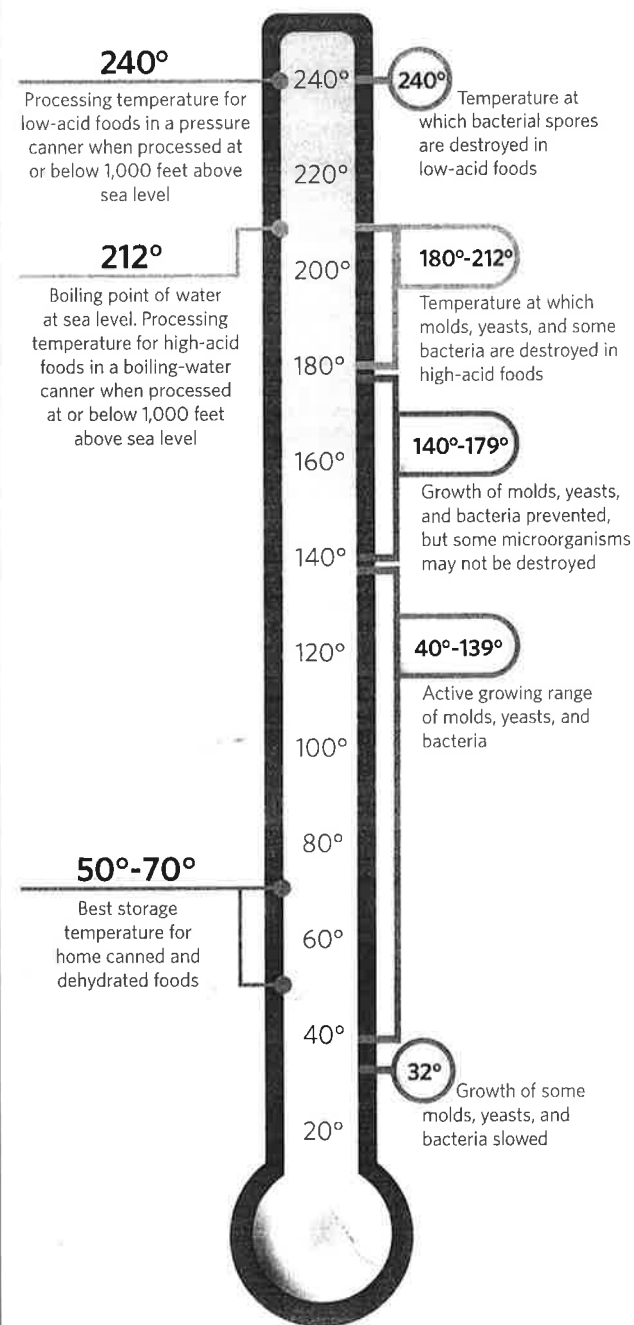
Bacteria are not easily destroyed by heat. In fact, certain bacteria actually thrive at the temperatures that destroy molds and yeasts. Salmonella is destroyed when held at 140°F. Staphylococcus aureus, or "staph," is destroyed if food is kept above 140°F. However, staph bacteria produce a toxin that must be destroyed by heating food in a sealed jar to 240°F, for the time specified by a tested home canning recipe (see figure 1).

The bacterium Clostridium botulinum is also readily destroyed by boiling; however, its toxin-producing spores cannot be destroyed at 212°F. Furthermore, this botulism-causing bacterium thrives on low-acid foods in the absence of air within a moist environment—exactly the conditions inside a sealed jar of canned vegetables, meats, or other types of low-acid foods. Due to bacterial spores and the toxin they produce, low-acid foods must be processed at 240°F (see figure 1). This high temperature can only be reached using a pressure canner, since the steam it creates can achieve temperatures hotter than boiling water.

### Enzymes

Enzymes are present in all living things. They promote the normal organic changes necessary to the life cycle of food. Their action can cause food to change color, flavor, and texture, making it unappetizing. Enzymes are easily inactivated by heat beginning at 140°F. Like molds and yeasts, enzymes are easily inactivated using the boiling-water process.

Figure 1 | Growth and Destruction of Microorganisms  
Temperature Degrees (°F)



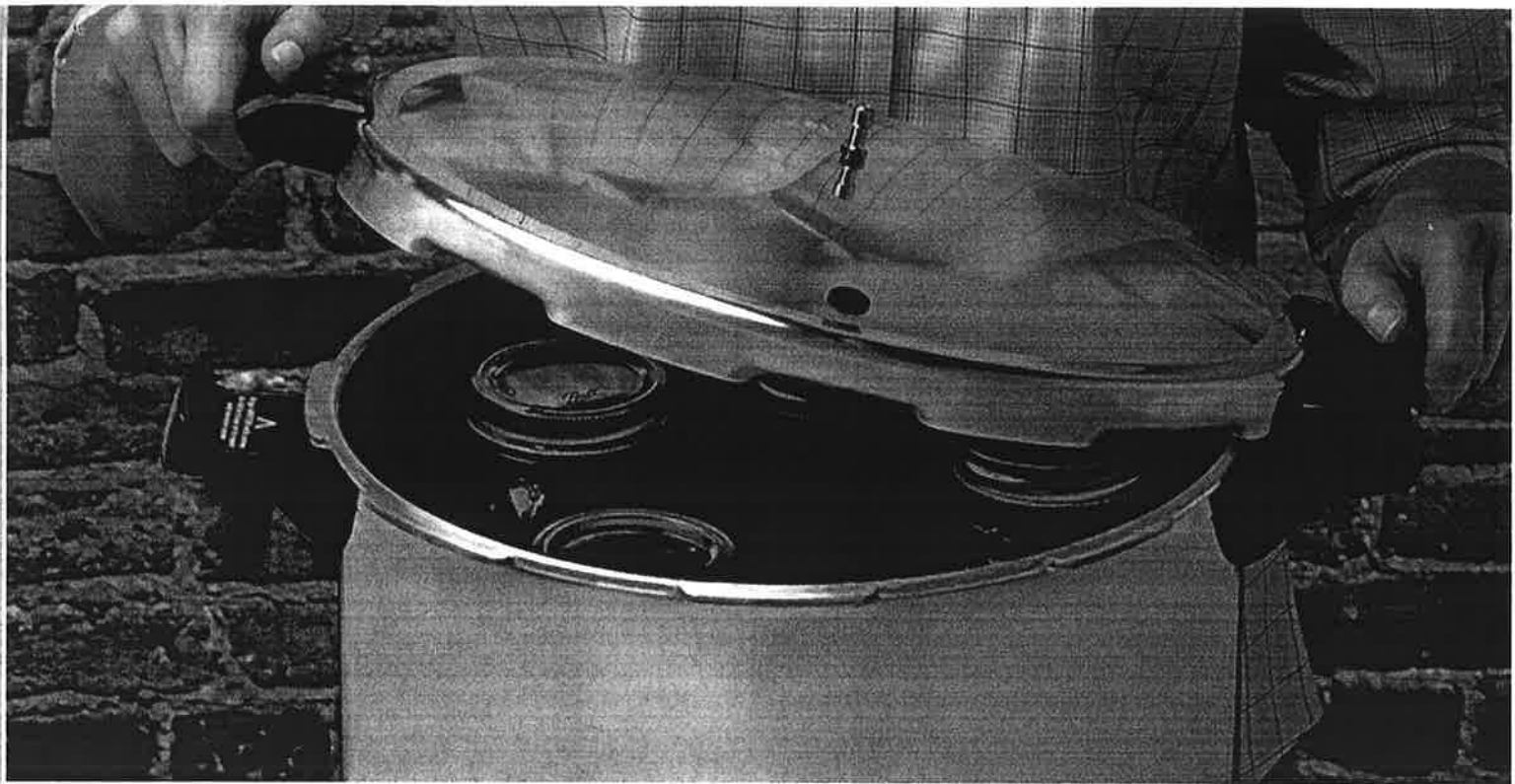
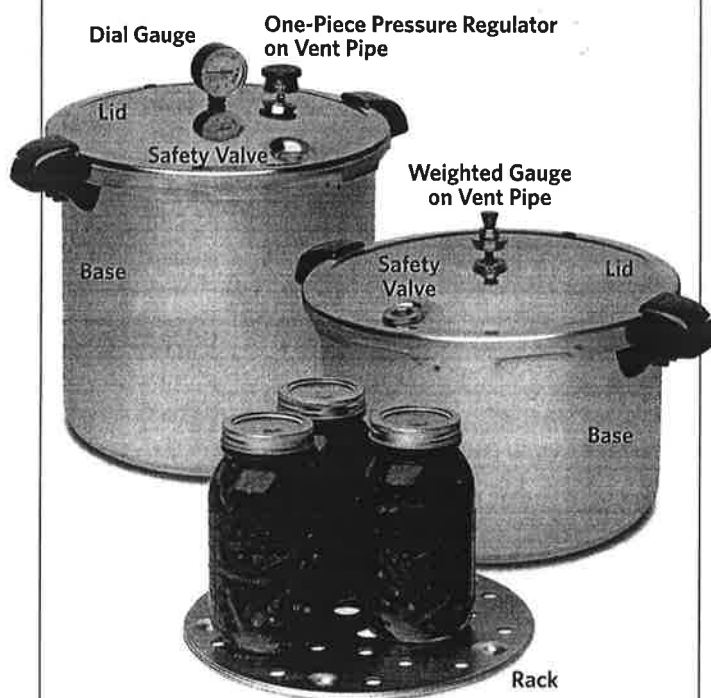


Figure 4 | Pressure Canner Features



**Lid**—Locks or clamps securely onto the base and may be fitted with a gasket, vent pipe, and safety valve.

**Gauge**—Measures the pressure in the canner. The gauge may be either a three-piece or one-piece weighted gauge or a dial gauge.

**Base**—Holds jars for processing without obstructing the lid.

**Rack**—Elevates the jars off the bottom of the canner to allow the steam to circulate around the jars.

## Pressure Method

The pressure method is necessary to safely can vegetables, meats, poultry, seafoods, and recipes containing a combination of low-acid and high-acid foods, like meat sauce and beef stew. Foods such as these having a pH higher than 4.6 must be processed at a temperature of 240°F and held there for the time specified by a tested recipe. This high temperature is necessary to destroy all bacteria, their spores, and the toxins they produce, and is achieved only when using a pressure canner.

A pressure canner creates a controlled steam environment that is hotter than the boiling point of water. At 10 pounds pressure, a weighted gauge canner reaches 240°F at 1,000 feet above sea level or lower. Processing times in this book are based on using a weighted gauge pressure canner and processing at an elevation of 1,000 feet above sea level or lower. Pressure must be increased if you are located at a higher elevation or using a dial gauge pressure canner; refer to the Altitude chart (see figure 5).

## Are you wondering how pressure processing works?

1. Filled home canning jars fitted with two-piece vacuum caps are placed in the pressure canner, which contains about 2 quarts (about 2 inches) of simmering water.
2. The canner lid is adjusted to the locked position. Heat is increased to medium-high and steam is allowed to escape through the vent pipe for 10 minutes.
3. The weighted gauge is then placed onto the vent pipe. When the gauge indicates the canner is pressurized to 10 pounds (psi), steam circulating inside the canner has reached 240°F, where it is held for the entire processing period. Heat transfers through the food by conduction.
4. The correct combination of temperature and tested processing time destroys molds, yeasts, and bacteria and their toxin-producing spores. It also inactivates enzymes that cause deterioration and spoilage of food.

For information about using your specific pressure canner model, refer to the owner's manual.

**Here is what to look for when selecting a pressure canner:**

Pressure canners are typically made of heavy-gauge aluminum. The standard size (about 22-quart liquid capacity) typically holds five to seven home canning quart jars. Pressure canners come equipped with a locking lid, lid gasket (for some models), dial or weighted pressure gauge, pressure regulator (for some models), and rack.

**Dial Gauge**—must be tested for accuracy once each year. If the gauge is inaccurate by 1 pound (psi) or more at 5, 10, or 15 pounds pressure, it must be replaced with a new, accurate gauge. Dial gauge pressure canners are fitted with a one-piece pressure regulator to help maintain temperature. Visually monitor the dial gauge throughout the entire processing period to ensure accurate temperature is maintained. Refer to the owner's manual for dial gauge testing information.

**Weighted Gauge**—available in adjustable 5, 10, and 15 pounds (psi) and non-adjustable 15 pounds (psi) styles. A weighted gauge does not require testing for accuracy. Slow movement of the weighted gauge during the entire processing period indicates accurate temperature is maintained. When using a non-adjustable gauge, process at 15 pounds (psi) for the same length of time as indicated for 10 pounds (psi). Do not shorten processing time.

**Know Your Altitude for Canning**

Barometric pressure is reduced at high altitudes, affecting the temperature at which water boils. This means boiling-water and pressure processing methods must be adjusted to ensure the safety of home canned food. Additional processing time must be added when using the boiling water method. Increased temperature is required when using the pressure method. The Altitude Chart gives adjustments for both methods at various elevations (see figure 5).

Processing times and temperatures for recipes in this book are based on canning at an elevation of 1,000 feet above sea level or lower. If you are processing at a higher elevation or using a dial gauge canner, refer to the Altitude Chart for adjustments (see figure 5).

Contact your Natural Resources Conservation Service, Cooperative Extension Service, or Public Library Service for the altitude in your area.

**Gather Your Canning Equipment**

Improvements in canning equipment, small appliances, and kitchen utensils help to make home canning a simple, safe, and efficient method of preserving food at home. Most equipment used for home canning is readily available in a well-equipped kitchen. A little pre-planning to check that all equipment and ingredients are on hand in advance of the intended canning day will allow you time to acquire any items you may need.

Figure 5 | Altitude Chart

**Boiling-Water Method**

The processing times given in this book for high-acid foods are based on canning at or below 1,000 feet above sea level using the boiling water method. When processing at altitudes higher than 1,000 feet above sea level, adjust the processing time according to this boiling-water canner chart.

Boiling-Water Canner Altitude Adjustments	
Altitude In Feet	Increase Processing Time
1,001 to 3,000	5 Minutes
3,001 to 6,000	10 Minutes
6,001 to 8,000	15 Minutes
8,001 to 10,000	20 Minutes

**Pressure Method**

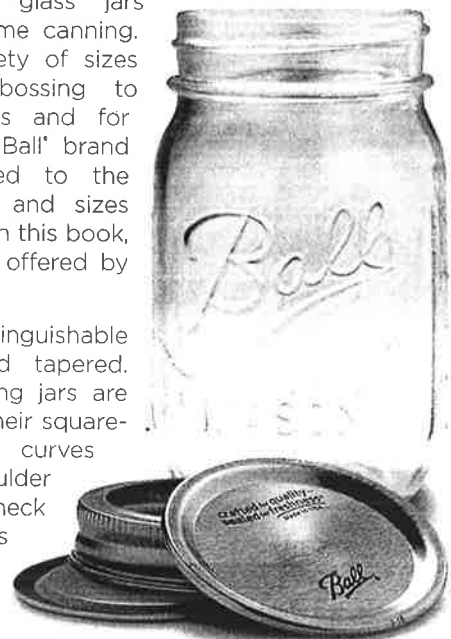
The pressure method is used for low-acid foods. The pounds pressure given for low-acid foods in this book are based on using a weighted gauge canner and processing at or below 1,000 feet above sea level. When using a dial gauge canner or processing at altitudes higher than 1,000 feet above sea level, adjust pounds pressure according to this pressure canner chart.

Pressure Canner Altitude Adjustments		
Altitude in Feet	Weighted Gauge	Dial Gauge
0 to 1,000	10	11
1,001 to 2,000	15	11
2,001 to 4,000	15	12
4,001 to 6,000	15	13
6,001 to 8,000	15	14
8,001 to 10,000	15	15

**Glass Home Canning Jars**

Home canning jars, sometimes referred to as Mason jars, are the only glass jars recommended for home canning. They come in a variety of sizes with decorative embossing to meet everyday needs and for gift-giving occasions. Ball® brand jars are manufactured to the correct specifications and sizes for the tested recipes in this book, as well as for recipes offered by the USDA.

Ball® jars have two distinguishable shapes: standard and tapered. Standard home canning jars are easily recognized by their square-round side wall that curves slightly to form a shoulder as it connects to the neck of the jar where threads begin to form. Standard jars come in regular and wide



mouth openings. They are typically available in 8-ounce, 16-ounce, 32-ounce, and 64-ounce sizes.

Tapered home canning jars are designed with a straight side wall and have a smaller circumference at the bottom than at the opening. The straight side wall connects to the neck of the jar where threads begin to form. It is this tapered shape that makes these jars uniquely suited for the dual functions of home canning and home freezing. Tapered jars are designed with regular and wide mouth openings. You can find them in 4-ounce, 8-ounce, 12-ounce, 16-ounce, and 24-ounce sizes.

The glass used to manufacture Ball jars can withstand both the high temperature of pressure canning and the sub-zero temperature of freezing—but only tapered jars are suitable for freezer storage.

### Metal Lids and Bands

Home canning two-piece vacuum caps come in regular or wide mouth sizes. The set consists of a flat metal lid and a threaded band. The lid has a lacquer finish to help prevent the natural corrosive reaction that occurs when high-acid foods come in contact with metal. It also has a flanged edge sized to the width of the jar rim and lined with sealing compound. Lids are needed to help form a vacuum seal and to ensure microorganisms do not enter the jar and contaminate the food after heat processing. Lids may be used only one time for home canning.

Metal bands, in regular or wide mouth sizes, complete the cap set. Bands are threaded to adjust evenly onto home canning jars. Adjust bands to fingertip tightness so they fit comfortably onto jars without being forced. The sole purpose of the band is to hold the lid in place during processing. After jars are processed and a vacuum seal is formed, bands are no longer needed. They may be removed before storing jars. If maintained in good condition, bands can be reused multiple times.

### Canning Utensils

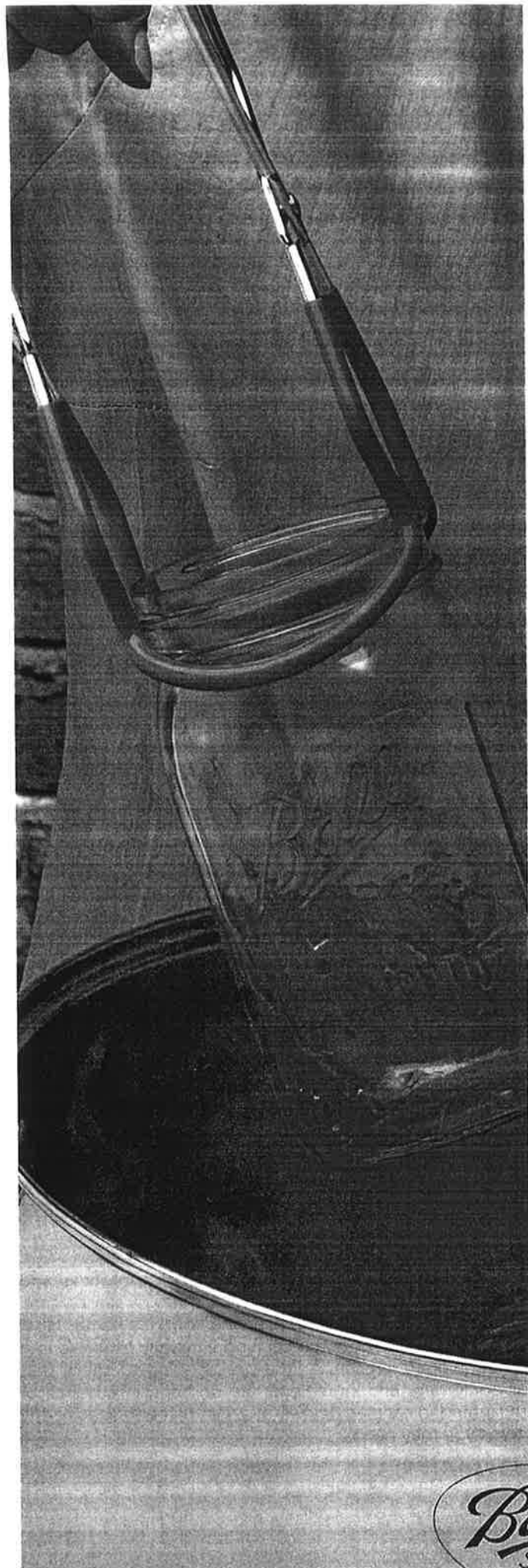
Specially-designed utensils help make home canning easier and safer. Most pieces may be purchased where home canning supplies are sold. You will find these canning utensils to be very helpful.



Jar Funnel

Jar Lifter

Bubble Remover  
& Headspace Tool



**Meats**

The flavor and texture of canned meats depends largely upon the breed of animal and the manner of handling the meat at the time of slaughter. If you slaughter your own meat, contact your County Cooperative Extension service for complete information on slaughtering, chilling, and aging the meat.

To prepare meat for processing, trim away gristle, bruised spots, and fat. Too much fat is likely to cause the meat to develop a strong flavor and could also contribute to seal failure.

Cut meat into pieces suitable for cooking or canning. Slice across the grain about 1 inch thick. Then cut with the grain into jar-sized pieces. Cut stew meat into uniform cubes. Meat for soups or other entrees may be cut into smaller uniform pieces, ground, or shredded according to recipe instructions.

Strong-flavored game should be soaked in salt water before canning. Soak game 1 hour in salt brine made of 1 tablespoon salt for each quart of water. Prepare, pack, and process according to the tested recipes in this book. Do not allow meat to soak in water longer than the recommended time stated in the recipe.

**Poultry**

Poultry that is one or two years old is best for canning. Wash poultry under cold running water; drain. Begin separating poultry into parts by cutting the skin between legs and body. Bend legs until hip joints snap; cut through connecting tissue as needed. Separate thighs from legs by cutting through the joint. Slip knife under the ends of shoulder blades and cut up to the wings. Cut back and breast apart. Wash under cold running water. Drain and dry. Do not salt. Chill poultry pieces in refrigerator 6 to 12 hours before canning.

**Seafoods**

Prepare freshly caught fish as for cooking. Leave backbone in small fish. Debone large fish. Soak fish in salt water before canning (refer to recipe for instructions). Process seafoods in half-pint or pint jars only to ensure there is sufficient heat penetration throughout the jar. This is particularly important since seafoods have little natural acid to inhibit the growth of bacteria and bacterial spores that produce toxins.

**Combination Recipes**

Recipes that combine some low-acid and some high-acid ingredients with a pH higher than 4.6 must be processed as low-acid foods using a pressure canner. Refer to the Pressure Method (see page 8). The length of processing time for combination recipes must safely preserve the ingredient requiring the longest processing time. Follow individual recipe for ingredient preparation, jar size, and processing time.

**Vegetables**

Vegetables are low in natural acid and thus require the high temperature achieved by a pressure canner to destroy molds, yeasts, enzymes, and bacterial spores that produce toxins. Some vegetables may be canned using either the RAW PACK or HOT PACK method, while other vegetables must only be packed into the jars while hot. Not all vegetables withstand the high temperature or processing time required to safely preserve them in a jar; therefore, for best results, freezing is the recommended preservation method.

*Meats*

**Broth for Canning Meat**

Remove meat from cooking pan. Drain juice from pan; reserving liquid. Allow fat to separate to the top of juice. Remove fat and measure. Measure the juice. Combine 1 to 2 tablespoons fat to 1 cup juice in a large saucepan. Water or broth may be added as needed for the amount of meat to be canned. Boil broth for canning 2 to 3 minutes.

*Note:* Do not add a thickening agent such as flour or cornstarch before processing.

**Chopped Meat**

Beef, Lamb, Mutton, Pork, Veal, Venison

Preserve in pint or quart jars

Meat Salt (optional)

Water, Broth for Canning  
Meat (see this page),  
or tomato juice

**PREP** Grind fresh meat using an electric or manual food grinder. Measure ground meat.

**COOK** Sear meat in a hot skillet. Add 1 to 1½ cups water, broth, or tomato juice for each quart of chopped meat. Bring mixture to a boil. Reduce heat to a simmer (180°F); simmer 5 minutes.

**FILL** Pack hot meat and liquid into a hot jar, leaving 1-inch headspace. Add ½ teaspoon salt to each pint jar; 1 teaspoon salt to each quart jar, if desired. Remove air bubbles. Clean jar rim. Center lid on jar and adjust band to fingertip-tight. Place jar on the rack in pressure canner containing 2 inches of simmering water (180°F). Repeat until all jars are filled.

**PROCESS** Place lid on canner and turn to locked position. Adjust heat to medium-high. Vent steam for 10 minutes. Put weighted gauge on vent; bring pressure to 10 pounds (psi). Process pint jars 1 hour and 15 minutes or quart jars 1 hour and 30 minutes. Turn off heat; cool canner to zero pressure. After 5 minutes, remove lid. Let jars cool 10 minutes. Remove jars from canner; do not retighten bands if loose. Cool 12 hours. Check seals. Label and store jars.



You can create 101 meals at a moment's notice when you have a variety of canned meats at your fingertips. Here are a few suggestions: tamales, stuffed peppers or stuffed cabbage, Sloppy Joes, shepherd's pie, taco salad, moussaka, and pasta with meat sauce, just to name a few.