



# PRESERVATION

## Canning Vegetables

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### Quick Facts...

Select fresh, young tender vegetables for canning.

Can only in a pressure canner at the pressure required to reach 240 degrees F at your altitude (10 lbs. psi plus 1/2 lb. per 1,000 ft.).

Vent all pressure canners 10 minutes before pressurizing to drive out trapped air.

Before tasting, boil all home-canned, low-acid vegetables 10 minutes plus one minute per 1,000 feet.

Vegetables are low in acid and must be processed in a steam pressure canner at the number of pounds needed to achieve 240 degrees F. The pressure required at sea level is 10 pounds. For higher elevations, add 1/2 pound of pressure for each 1,000 feet above sea level. For example, at 5,000 feet, 12.5 pounds of pressure is required to reach 240 degrees (see Table 1). This is necessary to supply enough heat to destroy bacteria that cause botulism. Do not take short cuts in recommended preparation or processing procedures. Failure to properly process low-acid foods in a pressure canner can result in botulism, which, if not treated, can be fatal.

### Prepare Equipment and Jars

**Pressure canner.** Make sure your pressure canner has a tight-fitting cover, clean exhaust vent (or petcock) and safety valve, and an accurate pressure gauge. There are two types of pressure gauges: weighted and dial gauges. Weighted gauges need only to be cleaned before using. Dial gauges need to be checked for accuracy. Check them each season before use, more frequently if used often. Ask your Colorado State University Cooperative Extension county office where to have your gauge checked.

Use a pressure canner that holds at least 4 quart jars. Smaller pressure canner-saucepans are not recommended for home canning as they heat up and cool down too quickly to ensure adequate heat penetration using the processing schedules specified in this fact sheet.

**Canning jars and lids.** Discard any jars and closures with cracks, chips, dents or rust. Defects prevent airtight seals. Use jars designed specifically for home canning. Commercial food jars (mayonnaise, coffee, etc.) break easily in pressure canners and may not seal. Use only the half-pint, pint and quart sizes. Wash jars in hot, soapy water and rinse well before using. Prepare metal lids as manufacturer directs. (See Figure 1.)

### Prepare Vegetables

Select only fresh, young, tender vegetables for canning. The sooner you can get them from the garden to the jar, the better. For ease of packing and even cooking, sort the vegetables for size and ripeness. Wash all vegetables thoroughly, whether or not they will be pared. Dirt contains some of the bacteria hardest to kill. Don't let vegetables soak; they may lose flavor and nutrients. Handle them gently to avoid bruising.

### Fill and Close Jars

The hot-pack method is recommended for all low-acid foods, including vegetables. Some vegetables may also be packed raw. See individual directions in Table 1 to determine which methods to use.

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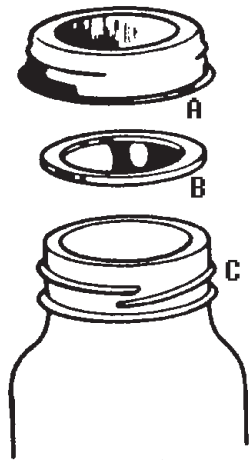


Figure 1: Canning jars and lids.  
 A. Narrow metal screw band.  
 B. Metal lid with sealing compound.  
 C. Seals here.

**Raw pack.** Put cold, raw vegetables into jars and cover with boiling water. Pack most raw vegetables (except for starchy ones) firmly into the jars. Loosely pack starchy vegetables such as corn, peas and lima beans, because they expand during processing.

**Hot pack.** Heat vegetables in water or steam before packing. Then cover with the boiling cooking liquid or water. Loosely pack the hot food.

**Either pack.** Use enough liquid to fill around and cover the food. Read the directions for each vegetable for the amount of space to leave between the top of the food and the top of the jar. This headspace is important to obtain a good seal.

Salt may be added to each jar, if desired. Salt is added only for seasoning and does not help preserve the food. If salt is used, canning salt is recommended to prevent the liquid from turning cloudy. Use 1/2 teaspoon salt per pint.

To remove any trapped air bubbles, insert a nonmetallic spatula between the food and the jar. Slowly turn the jar and move the spatula up and down to allow air bubbles to escape. Add more liquid if necessary to obtain the proper headspace. Wipe the jar rim with a clean damp paper towel to remove any food particles. Place pretreated lid on the jar. Screw on the band fingertip tight.

## Process in Pressure Canner

Read the manufacturer's instructions for your pressure canner. General directions for using steam pressure canners are as follows:

Put 2 to 3 inches of hot water in the canner. Place filled jars on the rack, using a jar lifter. Fasten canner lid securely. Leave weight off vent port or open petcock.

Maintaining a high heat setting, exhaust steam 10 minutes. Place weight on vent port or close petcock. The canner will pressurize in the next three to five minutes.

Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure for your altitude has been reached, or when the weighted gauge begins to jiggle or rock. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars. Weighted gauges should jiggle or rock slowly throughout the process.

When the timed process is completed, turn off the heat, remove the canner from the heat if possible, and let the canner depressurize. Do not force-cool the canner by pouring cold water over it. When the pressure registers zero, wait a minute or two, then slowly open the petcock or remove weighted gauge. Unfasten the cover and tilt the far side up so steam can escape away from you.

Carefully remove jars from canner and place on rack, dry towels or newspapers. Allow jars to cool untouched, away from drafts, for 12 to 24 hours before testing seals.

## Day-After Canning Jobs

Test the seals on the jar lids. Press flat metal lids at the center of the lid. Lids should be slightly concave and should not move. Remove screw bands. Label sealed jars with contents, canning method and date. Store in a clean, cool, dry, dark place.

Treat unsealed jars of food as fresh. The food can be eaten immediately, refrigerated, frozen or reprocessed. If you reprocess the food, repeat the entire process.

## On Guard Against Spoilage

Bulging lids or leaking jars are signs of spoilage. When you open the jar, look for other signs, such as spurting liquid, an off odor or mold.

Low-acid canned vegetables and meats can contain botulism toxin without showing signs of spoilage. As a safety precaution before tasting, boil all home-canned vegetables in a saucepan for 10 minutes, plus 1 minute for each 1,000 feet above sea level (15 minutes at 5,000 feet). Boil home-canned spinach or corn for 20 minutes. If the food looks spoiled, foams or has an off odor during heating, discard it.

Dispose of all spoiled home-canned food where it will not be eaten by people or pets. Boil all spoiled low-acid canned food for 30 minutes before disposing of it. This destroys any toxin present and prevents its spread.

## Reference

*The Complete Guide to Home Canning.* Home and Garden Bulletin, U.S. Department of Agriculture, 1994.

**Table 1: Preparation methods and processing times for canning in a pressure canner at 240 degrees F.**

Pressure required to reach 240 degrees F.					
Elevation (feet)	Pounds Pressure		Elevation (feet)	Pounds Pressure	
	Dial gauge	Weighted gauge		Dial gauge	Weighted gauge
Sea level	10	10			
1,000	10 1/2	15	6,000	13	15
2,000	11	15	7,000	13 1/2	15
3,000	11 1/2	15	8,000	14	15
4,000	12	15	9,000	14 1/2	15
5,000	12 1/2	15	10,000	15	15

Vegetable	Preparation and Pack	Processing Time (min.) 240 degrees F	
		Pints	Quarts
Asparagus, spears or pieces	Use tender, tight-tipped spears, 4-6 inches long. Wash and trim off tough scales. Break off tough stems and wash again. Cut in 1-inch pieces or can whole.		
	Raw Pack — Fill jars with raw asparagus. Pack as tightly as possible, without crushing, to 1 inch of jar tops. Add boiling water, leaving 1-inch headspace. Hot Pack — Cover asparagus with boiling water. Boil 2 or 3 minutes. Loosely fill jars with hot asparagus to 1 inch of jar tops. Add boiling water, leaving 1-inch headspace.	30	40
Beans or peas, dry (all varieties)	Sort and wash dry seeds. Cover with cold water and let stand 12-18 hours in cool place. Drain.		
	Hot Pack Only — Cover soaked beans with fresh water and boil 30 minutes. Fill jars with beans or peas and cooking water, leaving 1-inch headspace.	75	90
Beans, fresh lima, butter or shell beans	Can only young, tender beans. Shell beans and wash thoroughly.		
	Raw Pack — Pack raw beans loosely into jars. For small beans, fill 1 inch from top for pints and 1 1/2 inches for quarts. For large beans, fill 1 inch from top for pints and 1 1/4 inches for quarts. Do not press or shake down. Fill jars with boiling water, leaving 1-inch headspace. Hot Pack — Cover with boiling water, bring to a boil. Pack hot beans loosely in jars to 1 inch of jar tops. Cover with boiling water, leaving 1-inch headspace.	40	50
Beans, green, snap, wax, Italian; pieces	Wash; trim ends. Leave whole or cut or snap into 1-inch pieces.		
	Raw Pack — Pack beans tightly into jars to 1 inch of jar tops. Add boiling water, leaving 1-inch headspace. Hot Pack — Cover beans with boiling water; boil 5 minutes. Fill jars loosely to 1 inch of jar tops. Add boiling water, leaving 1-inch headspace.	20	25
Beets, whole, cubed or sliced	Sort for size. Cut off tops, leaving tap root and 1 inch of stem. Wash.		
	Hot Pack Only — Cover with boiling water. Boil until skins slip easily — 15-25 minutes, depending on size. Cool, remove skins, trim off stems and and roots. Can baby beets whole. Cut medium and large beets in 1/2-inch slices or cubes, or halve or quarter. Fill jars with hot beets and fresh hot water, leaving 1-inch headspace.	30	35

**Table 1, continued: Preparation methods and processing times for canning in a pressure canner at 240 degrees.**

Vegetable	Preparation and Pack	Processing Time (min.) 240 degrees F	
		Pints	Quarts
Carrots, sliced or diced	Wash, peel and rewash. Baby carrots can be left whole. Slice or dice larger ones. Raw Pack — Pack carrots tightly into jars to 1 inch of jar tops. Add boiling water, leaving 1-inch headspace.	25	30
	Hot Pack — Cover carrots with boiling water. Simmer 5 minutes. Fill jars to 1 inch of jar tops. Add hot cooking liquid, leaving 1-inch headspace.	25	30
Corn, cream-style	Husk corn, remove silk and wash. Blanch ears 4 minutes in boiling water. Cool in ice water. Cut corn from cob at about the center of kernel. Scrape cob. Hot Pack — To each quart of corn and scrapings in saucepan, add 2 cups boiling water. Boil. Fill pint jars with hot corn mixture, leaving 1-inch headspace.	85	not recommended
Corn, whole-kernel	Husk corn, remove silk and wash. Blanch 3 minutes in boiling water. Cool in ice water. Cut from cob at about 3/4 depth of kernel. Do not scrape cob.		
	Raw Pack — Pack corn in jars, leaving 1-inch headspace. Do not shake or press down. Add fresh boiling water, leaving 1-inch headspace.	55	85
	Hot Pack — To each quart of kernels in saucepan, add 1 cup hot water. Heat to boil and simmer 5 minutes. Fill jars with corn and cooking liquid, leaving 1-inch headspace.	55	85
Greens, including spinach	Sort and wash thoroughly. Cut tough stems and midribs. Hot Pack Only — Steam greens, 1 lb. at a time, for 3-5 minutes or until wilted. Fill jars loosely with greens. Add fresh boiling water, leaving 1-inch headspace.	70	90
Mushrooms, whole or sliced	Select only high quality, small to medium-size domestic mushrooms with short stems. Do not can wild mushrooms. Trim stems and discolored parts. Soak in cold water for 10 minutes to remove dirt. Wash in clean water. Leave small mushrooms whole; cut large ones.		
	Hot Pack Only — Cover mushrooms with water in a saucepan and boil 5 minutes. Fill jars with hot mushrooms, leaving 1-inch headspace. Add 1/8 teaspoon of ascorbic acid powder or a 500-milligram tablet of vitamin C to each jar to prevent discoloration. Add fresh hot water, leaving 1-inch headspace.	45	not recommended
Peas, green or English; shelled	Select filled pods containing young, tender sweet seeds. Shell and wash peas.		
	Raw Pack — Fill jars with raw peas. Add boiling water, leaving 1-inch headspace. Hot Pack — Cover peas with boiling water, boil 2 minutes. Fill jars loosely with hot peas. Add cooking liquid, leaving 1-inch headspace.	40 40	40 40
Peppers, hot or sweet	Select firm yellow, green or red peppers. Wash and drain. Small peppers may be left whole. Large peppers may be quartered. Remove cores and seeds. Caution! Wear plastic gloves while handling hot peppers or wash hands thoroughly with soap and water before touching face. Hot Pack Only — Make 2 to 4 slits in each pepper. Blanch in boiling water or blister skins by placing peppers in hot oven (400 degrees F) or broiler for 6-8 minutes. Place blistered peppers in pan, cover with damp cloth. Let cool several minutes, then peel. Flatten whole peppers. Fill jars loosely with peppers to 1 inch of jar tops. Add boiling water, leaving 1-inch headspace.	35	not recommended
Potatoes, white; cubed or whole	Wash, pare. Leave whole if 1-2 inches in diameter or cut into 1/2-inch cubes. Dip potatoes into solution of 1/2 teaspoon ascorbic acid per quart of water to prevent darkening. Drain. Hot Pack Only — Place potatoes in saucepan and cover with boiling water. Boil cut potatoes for 2 minutes, whole for 10 minutes. Drain. Fill jars with hot potatoes and fresh hot water, leaving 1-inch headspace.	35	40
Pumpkin and winter squash, cubed	Wash; remove seeds and pare. Cut into 1-inch cubes. Hot Pack Only — Place in saucepan, cover with boiling water. Boil 2 minutes. Do not mash or puree. Fill jars with cubes and cooking liquid, leaving 1-inch headspace.	55	90
Sweet potatoes, pieces or whole	Choose small to medium-sized potatoes. Wash well. Hot Pack Only — Boil or steam until partially soft (15 to 20 minutes). Remove skins. Cut medium potatoes to uniform pieces. Do not mash or puree. Fill jars, leaving 1-inch headspace. Cover with fresh boiling water or syrup, leaving 1-inch headspace.	65	90

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