

# Home Canning of Vegetables

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COOPERATIVE EXTENSION WORK  
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# HOME CANNING OF VEGETABLES

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A pantry well stocked with home canned food is an economic asset as well as a health protection measure. Vegetables should be conspicuous on the pantry shelves for both quantity and variety because they make such a definite contribution to the diet, particularly in minerals and vitamins.

The surest way for farm families to have adequate amounts of vegetables throughout the year is to produce and preserve them while they are in season. There are four general methods for preserving vegetables—canning, freezing, dehydration and brining. Furthermore, certain vegetables such as potatoes, turnips, onions and others are conserved by storage. This circular is concerned only with canning methods.

The first objective in the process of canning is to preserve foods against spoilage. The second purpose is the preservation of food nutrients, and a third purpose is to retain natural food flavors and texture so far as is possible. A careful following of the points emphasized in the procedure given below is essential for accomplishing these purposes.

“Speed” throughout the process is the watchword for success.

## Steps Necessary for Prevention of Spoilage and for the Preservation of Food Nutrients

### *Equipment*

1. Be sure that your canner is in good working condition and ready for use.
2. Inspect containers for cracks, nicks and other flaws. Discard faulty containers and lids.
3. Wash jars, glass lids and zinc mason lids thoroughly in clean, soapy water. Rinse well and sterilize by boiling, steaming or heating in a moderate oven for 15-20 minutes.
4. Either fill each jar as removed from the hot water or steam, or invert on a clean cloth.

*The Vegetables*

1. Selection—Choose vegetables that have made a quick growth and that are of proper maturity—young, and tender.

2. Freshly harvested—Freshness aids in reducing spoilage and makes for a higher vitamin content.

3. Condition—Should be fresh, sound, and free from spots and bruises.

4. Grade and sort for age, color and size.

5. Washing—To be done thoroughly before shelling, cutting, paring, or peeling, to remove some of the bacteria. After shelling or cutting wash again. Do not allow foods to stand in water because nutrients may be lost.

6. Preparation for processing—Follow “how to prepare” in the processing chart.

7. Preheating—(Sometimes called blanching or precooking). Checks the action of enzymes, shrinks the food, exhausts air from the food, aids in preserving flavor, and relaxes the product which makes for ease in packing. Preheating with steam may be used if facilities are available. Preheat only enough vegetables for a canner load at a time.

8. Packing—*Immediate* packing of hot food is important. Fill only as many jars at a time as the canner will hold.

Pack most foods reasonably tight next to the walls of container, leaving it somewhat loose in the center for complete heat penetration to the center.

Such foods as corn, greens, English peas and green shelled beans should always be loosely packed, allowing for plenty of liquid. Pack to within ½ inch of top of jar, except corn, peas and shelled beans. Allow about one inch head space for them. Liquid should cover the food.

9. Right proportion of food and liquid—Plenty of liquid is essential for thorough heat penetration to center of jar and for thorough sterilization of the food. The food should be well surrounded and saturated with liquid. This is very important especially with such foods as corn, greens, English peas and shelled beans and peas.

10. Seasoning—Salt is the usual seasoning (1 t. per quart). It may be added or omitted.

11. Exhaust air from filled containers by leaving the seal open while the food is being processed. This is usually taken care of if the lids are properly adjusted.

### *Adjustment of Closures and Processing*

1. Adjustment of closures (lids)—Proper adjustment of lids is very important for a perfect seal. Remove all food particles from mouth of jar with a clean damp cloth. A seed or sticky bit may prevent a seal. Adjust all closures according to manufacturer's *latest* instructions for the particular type of container being used.

2. Processing—Process (cooking the food in jar) *immediately* after packing. Place each container as filled in the canner, which has been placed over heat to keep the food hot until canner is filled. This is very important. Process required time for method used, as given in the chart.

3. Venting Pressure Canner—Pressure canners should be well vented (at least 10 minutes for average size canner) before closing the petcock for running up pressure. The pressure will be more accurate if this is done.

4. Cooling—Remove from canner and tighten all closures except when using *two-piece metal* caps. Place jars right side up, leaving space between for quick cooling. Avoid drafts and never set hot jars on a cold surface. Never remove lids to replace lost liquid.

5. Storage—Should always be cool, dry, and dark.

### *Canning in Tin*

When canning in tin the same methods are used as for glass with exceptions of exhausting, amount of head space, and the method of cooling.

In tin the air must always be completely exhausted before sealing containers. In home canning this is done by filling the can with hot preheated food and hot liquid. The head space allowed is  $\frac{1}{4}$  inch. Tin cans are cooled by immersing in cold water immediately after processing.

## TIME TABLE

KIND OF FOOD	HOW TO PREPARE	Time to Process in Pressure Canner at 10 lbs. (240° F.)
		Pints and Quarts
Asparagus . . . .	Wash thoroughly. If sandy, remove ears, cut into desired lengths—several inches. Cover with boiling water, boil 2 minutes. Pack hot; cover with hot cooking liquid.	Minutes 30
Beans . . . . .	<b>Snap</b> —Wash thoroughly. Leave whole or cut into 2 to 3 inch lengths. Cover with boiling water and boil 3-5 minutes until bright green. Pack hot; cover with fresh boiling water.	35
	<b>Fresh Lima</b> —Can only young tender beans. Wash pods before shelling; drain, shell. Cover with boiling water; boil 2 or 3 minutes; pack hot and loosely; cover with hot cooking liquid.	50
	<b>Green Soybeans</b> —Use only young tender beans. Scald, drain immediately; shell. Cover shelled beans with boiling water and boil 3 or 4 minutes. Pack hot and loosely; cover with boiling water.	70
	<b>Baked Beans</b> —Prepare favorite baked bean recipe. Shorten precooking period 30-40 minutes. Pack loosely while hot. <b>If Meat is Included in Baked Bean Recipe—</b>	50 65
Beets . . . . .	Before washing, trim off tops, leaving taproot and 1 inch of stem. Boil until skins slip easily—baby beets take about 15 minutes; older beets longer. Skin and trim. Cut older water.  If preferred, beets may be washed thoroughly, pared raw, covered with boiling water and boiled 3 to 4 minutes. Pack hot; cover with hot cooking liquid.	35
Broccoli . . . .	Use only young tender and fresh heads. Remove imperfect and tough parts. Wash thoroughly. Cut into desirable serving pieces. Cover with boiling water; boil until bright green color. Drain. Pack hot; cover with fresh boiling water.	35
Brussels Sprouts . . . .	Same as broccoli.	35
Cabbage . . . . .	Same as broccoli.	35

## Time Table (Continued)

KIND OF FOOD	HOW TO PREPARE	Time to Process in Pressure Canner at 10 lbs. (240° F.)
		Pints and Quarts
Carrots . . . . .	Wash thoroughly, scrape. Leave whole if small; cut lengthwise if larger. Cover with boiling water; boil 5 minutes. Pack hot; cover with hot cooking liquid.	Minutes 30
Cauliflower . .	Same as broccoli, except boil for 3 minutes before packing.	35
Corn . . . . .	<b>Whole Grain</b> —Use only young tender corn. Husk, silk, and wash. Cut corn from cob so as to get most of kernel but do not scrape. Cover corn with boiling water and boil about 3 minutes. Pack hot and loosely. If too thick add boiling water. Leave 1 inch head space.	65
	<b>Cream Style</b> —Prepare as for whole grain except cut only $\frac{3}{4}$ depth of kernel. Scrape once only.	90
Eggplant . . .	Wash, pare, drop immediately into salted water (to prevent discoloration). Drain. Cover with boiling water. Boil 3 to 5 minutes. Pack hot; cover with hot cooking liquid.	40
Greens . . . . .	Discard imperfect leaves and tough stems; wash in several waters, lifting greens each time to free from dirt. Heat in small amount of boiling water or steam until thoroughly wilted and bright green in color. Pack hot and not too solidly. Cover with boiling water.	65
Okra . . . . .	Can only tender pods. Wash thoroughly. Cover with boiling water and bring back to boil. Pack hot; cover with fresh boiling water.	40
	Okra and tomatoes.	35
	Okra, corn, and tomatoes.	70
Peas . . . . .	<b>English Peas</b> —Can only young, tender peas. Wash pods before shelling, drain, shell. Cover with boiling water; boil until bright green. Pack hot and loosely; cover with hot cooking liquid.	45
	<b>Blackeyed or other field peas</b> —same as Lima Beans.	50

## Time Table (Continued)

KIND OF FOOD	HOW TO PREPARE	Time to Process in Pressure Canner at 10 lbs. (240° F.)	
		Pints and Quarts	Minutes
Pumpkin . . .	Wash, cut into sections; scrape or peel and cut into 1-inch cubes. Add a little water and bring to boil or steam. Pack hot; cover with hot cooking liquid or pack without liquid. <b>If Precooked until tender, Reduce Processing Time 15 minutes.</b>		95
Sauerkraut . .	Pack well fermented kraut into sterilized containers unless kraut was made in glass jars. Cover with kraut juice or fresh brine (2 T. salt to a quart water) to within ¼ inch of top. Process 15-25 minutes at simmering temperature.		
Squash . . . .	<b>Summer</b> —Do not peel. Prepare as for pumpkin except quarter or leave whole if small. <b>Winter</b> —Same as pumpkin.	45	95
Sweet Potatoes . . .	Wash. Boil or steam until skin slips easily. Cut into pieces or leave whole if small. Skin Pack hot; pack dry or with water.		95
Tomatoes . . .	<b>Cold Pack</b> —Scald and peel; remove core, pack raw, whole or in pieces, making a solid pack. Use only good quality tomatoes for this pack. Process 45 minutes in a hot water canner. Keep the water boiling throughout the processing period.  or Scald and peel; remove core end and bad spots. Quarter or leave whole, heat to boiling for a few minutes. Pack hot and add 1 teaspoon salt to each quart. Process 25 minutes in a hot water canner.		
Tomato Juice . . . . .	Remove stems and all green and bad spots. Cut into pieces. Simmer only until softened. Put through a fine sieve immediately. Add 1 teaspoon salt to each quart. Reheat at once just to boiling. Fill into hot jars immediately. Leave ¼-inch head space. Process 15 minutes in a hot water canner.		
Vegetable Soup Mixture . . . . .	Use 2 or more of these: Tomato pulp, corn, lima beans, peas, okra, carrots, turnips, celery, onion. Cut vegetables into small pieces or cubes. Add water as needed. Preheat separately or together to boiling and pack hot; cover with hot cooking liquid. Season to taste with salt and small amount of sugar if desired.	60	

## Miscellaneous Problems

**Kraut:** Select only mature, sound heads of cabbage. After removing all decayed or dirty leaves, wash and quarter the heads, then slice off the core portion. Weigh and shred. Use one-fourth pound of salt ( $\frac{1}{2}$  cup) to each 10 pounds of cabbage. Use pure salt—meat or dairy salt. Mix salt and shredded cabbage together in an enamel pan before packing.

### Method 1

Pack firmly but not too tightly in sterilized quart or half-gallon jars up to the shoulder of jars or even above. If the cabbage seems to be lacking in moisture, add cold water to cover—soft water or hard water that has been boiled and settled. Leave lids loose enough to allow escape of gas released by fermentation. Place jars in a pan to catch liquid that may overflow. Remove lids occasionally, remove scum if any, push the cabbage down and add new brine if needed. (2 T. salt to 1 quart water). Keep cabbage covered with brine at all times. When fermentation is complete, examine, add extra brine if needed and process according to time table. Keep at room temperature and not more than 86° F. throughout fermentation period.

### Method 2

Pack firmly but not too tightly in a sterilized stone crock or jar. When full of cabbage cover with a clean cheesecloth, plate and weight. Keep at room temperature and not more than 86° F. Remove scum as it forms (frequently); *important*. Scald the cloth often to keep free from scum.

Fermentation will probably be complete in 10-15 days in summer. Pack into jars and process.

### Pecans and other nuts:

Put nut meats into dry sterilized jars—adjust lids. Process in oven. Use lowest possible heat 225° (quite warm to hand) for 40 minutes for any size jar. If no thermometer is used, process for 30 minutes. Or process in a pressure canner at 5 lbs. pressure for 15 to 20 minutes. Release steam suddenly from pressure canner for exhaust of air.

### Peanut Butter:

4 quarts Virginia nuts, 8 tablespoons salt, 2 quarts Spanish nuts.

Roast peanuts uniformly brown. Cool, remove red skins and "eyes," add salt and grind 2 or 3 times. Use finest blade of food chopper for the grinding. Pack loosely into jars, filling to within 1 inch of top. Process 60 minutes in hot water bath at simmering temperature.



Virginia and Spanish nuts mixed prevent too much oil in butter. If there is not enough oil, add a little salad oil.

Make butter often rather than several months' supply at one time.

**Lye Hominy:**

For each quart of shelled corn dissolve 2 T. of concentrated lye in one gallon of boiling water. Boil the corn in this solution until hulls loosen or about 30 minutes. Rinse the corn thoroughly, changing the water several times to remove lye. Rub vigorously to remove hulls and tips. Soak for 2 or 3 hours in fresh water changing 3 or 4 times. Drain and cover with boiling water, adding 1 t. salt to each quart of water. Cook until almost tender. Pour into hot sterilized quart jars and process 60 minutes at 10 pounds pressure.

Refer to Farmers' Bulletin No. 1236 "Corn and Its Uses" page 17 for method of making hominy by cold water process.

**Horseradish:**

Wash, scrape, and grate horseradish roots and measure. Add an equal amount or a little less of vinegar. White vinegar is preferred because of its absence of color. Pour into sterilized containers, seal and store away from the light.

**Pepper Sauce:**

Wash small cherry or chili peppers (red and green). Prick with a needle. Pack into bottles. Cover with good cider vinegar and cork. It will be ready for use within a few days. As the sauce is used, more vinegar may be added to the peppers.

## Processing Methods

1. *Pressure-canner method*—The steam pressure canner correctly used is recommended for processing of all low-acid vegetables and for such products as meat, poultry, and fish.
2. *Boiling-water-bath method of canning*—In the boiling-water-bath method the jars are completely covered with boiling water throughout the processing time. This method is recommended for home canning of tomatoes, tomato juice, rhubarb, fruits and fruit juices. It is not recommended for vegetables other than tomatoes, nor for fish, meat, and poultry products, because of danger of spoilage and possible food poisoning.
3. *Steam bath canning method*—In the steam bath method, jars may or may not be partly immersed in water, but the uncovered portions must be surrounded by flowing steam.

A steam bath canner, properly used, may serve the same purpose as the water bath canner, but the processing time should be increased by one-fourth above water bath method since the temperature attained is usually slightly less than that attained by the boiling water bath method.

4. *Open kettle method of canning*—This method is recommended only for such products as relishes, preserves, jams and jellies.
5. *Oven method of canning*—Warning should be given against oven canning because of danger from explosions and danger of underprocessing due to the slow rate of heat transfer and uneven heat distribution in the oven. When dry heat is used, heat penetration to center of container is not as certain as when steam or water is used.

## Causes of Spoilage

Foods spoil from two causes: first, is the action of enzymes on foods. Enzymes in foods bring about the normal ripening of fruits and vegetables, and unless checked, the final decay of the food. Enzymes may be rendered inactive and even destroyed at boiling temperature and even below the boiling point.

The second cause of food spoilage is the action of micro-organisms on food including yeasts, molds and bacteria.

Yeasts and molds may be destroyed by heating food for a short time at boiling temperature. Bacteria are the chief trouble makers since some of them are very resistant to heat. Research workers are about to prove that 10 hours or more of straight vigorous boiling are required to replace pressure canner processing times, should certain heat resisting bacteria be present. This is the reason back of the recommendation by the National and State Food Preservation Committees for the pressure canner method for all non-acid vegetables. It is the surest method for a complete "kill" of all bacteria within a container of food.

Therefore, the causes of spoilage in canned foods that the homemaker will be most concerned with may be listed under two principal reasons:

1. *Imperfect Sterilization of Food*—(Failure to destroy all living organisms or bacteria within containers of food.) Some probable causes of imperfect sterilization may be:

- a. Containers not thoroughly washed and sterilized.
- b. Over maturity of the product.

- c. Delay in canning after harvesting.
  - d. Imperfect condition of the foods such as bruises, decay, and insect injuries.
  - e. Foods not thoroughly washed.
  - f. Packing the food too tightly—not enough liquid in proportion to the amount of food.
  - g. Too short a processing period.
  - h. Water not covering jars in hot water bath.
  - i. Failure to keep water boiling the *entire processing period* in a water bath.
  - j. Inaccurate pressure canner gauge.
  - k. Failure to exhaust pressure canner long enough before closing it to run up pressure.
2. *Imperfect Sealing of Containers*—Some probable causes may be:
- a. Imperfections in jar or closure.
  - b. Use of nonstandard jars or closures.
  - c. Top edge of jar not clean when lid is put in place.
  - d. Jar ring or lid not placed in proper position.
  - e. Not using right size band with the self-seal lid or the 3-piece glass lid. These bands are not interchangeable.
  - f. Failure to adjust closures properly before processing. Be sure that you know how to properly adjust the closure of the particular closure you are using.
  - g. Not tightening lids as removed from canner. Tightening lids after jars have cooled may break seals. (Exception-h, below).
  - h. By screwing bands of vacuum seal lids tighter after jars are removed from cooker. Will break the seal.
  - i. Failure to screw vacuum seal (2-piece metal disc lids) firmly tight *before* processing.

## Detection and Treatment of Spoilage

1. *Before opening containers*—
  - a. *In tin*—Both ends of can should be flat or curved slightly in. Neither end should bulge or snap back when pressed.
  - b. *In glass*—The cover if metal should be firm and flat or curved slightly inward. There should be no sign of leakage around lid or elsewhere. The contents should appear sound, with no unusual cloudiness of liquid.

*2. When Containers are Opened*

- a. When opened there should not be any sudden out-rush of air or spurting of liquid. Indicates spoilage. (Do not confuse with air being sucked in which indicates a good seal). Smell contents. The odor should be characteristic of the product. "Sour" or "off" odors probably indicate spoilage. Neither should there be any extreme change in color.
3. Since practically no spoilage may be indicated when the toxin from botulinus spoilage is present all non-acid vegetables should be boiled for 10-15 minutes in an open kettle before tasting or using. Corn and spinach should be boiled for 20 minutes. Move the food about in the kettle so that all will be well heated.
4. Canned foods showing signs of spoilage should always be destroyed. If buried, should be so deep that it cannot be eaten by chickens, pigs, or dogs.

### Canning Compounds and Powders

It is recommended that so-called canning compounds, canning powders or chemical preservatives, not be used in place of sterilization by heat, since such compounds usually are not efficient preservatives and may be injurious to health.