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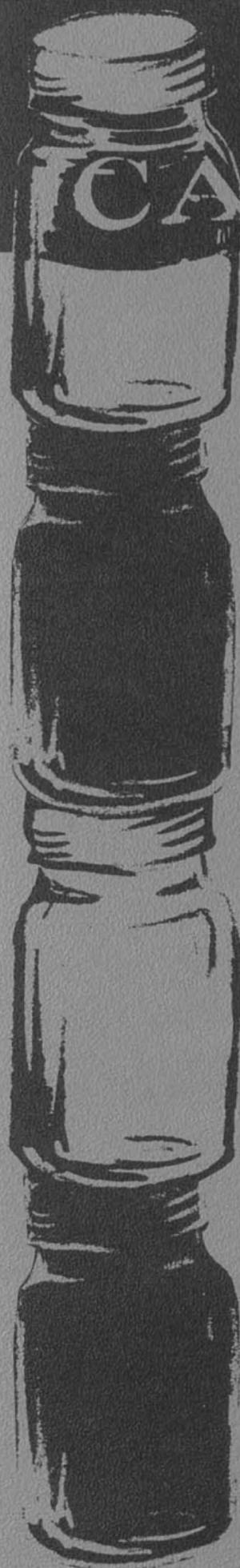
HOME CANNING

Fruits & Vegetables

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DOCUMENTS

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Successful home canning depends on:

- (1) heat destruction of food spoilage agents and
- (2) exclusion of air from the jar or can of food.

This may be accomplished by following the recommended heat treatment procedures for the food product being canned.

Four things cause spoilage in canned foods: (1) enzymes, (2) molds, (3) yeasts, and (4) bacteria. Enzymes, molds, yeasts, and some bacteria are inactivated by temperatures of 212°F. Certain heat-resistant bacteria and bacterial spores require higher temperatures of 240° F. for safe processing. All home canning recommendations are based upon conditions necessary to prevent growth of the dangerous heat-resistant bacteria, Clostridium botulinum. For a detailed discussion of C. botulinum and the deadly toxin it produces, see Minnesota Extension Bulletin 372, Botulism.

The degree of acidity in a food determines which kind of active food spoilage agents may be present. For home canning purposes, foods are divided into two main categories:

- (1) acid foods—all fruits and tomatoes, and
- (2) low acid foods—all vegetables except tomatoes, meats, poultry, and fish.

Acid foods—Fruits and tomatoes permit growth of yeasts, molds, and some heat sensitive bacteria, but they do not allow the growth of heat-resistant bacteria. The spoilage organisms likely to be present in fruits and tomatoes can be destroyed at temperatures reached in the boiling water bath (212°F.). Failure to process these acid foods in the boiling water bath may allow growth of yeasts, molds, or bacteria which cause food spoilage. Do not can these foods by the open kettle method.

Low acid foods—Foods in the low acid category will permit growth of yeasts, molds, and all bacteria including dangerous heat-resistant bacteria. C. botulinum bacteria **will not** be destroyed in low acid foods unless the food is heated to 240°F. Therefore, **all low acid vegetables must be heat processed at 240°F.** The boiling water bath canner reaches a temperature of only 212°F. and cannot be used for the safe processing of low acid foods. A temperature of 240°F. can be reached only with steam under 10 pounds pressure in a **pressure canner. All low acid vegetables must be processed in a pressure canner.**

Processing times for different foods vary because the rate of heat transfer in all vegetables and fruits is not the same. Recommended times are based upon the length of time needed to reach the slowest heating point in the container.

PRELIMINARY DETAILS

Plant or purchase varieties of produce recommended for canning.

Assemble and wash equipment and containers before gathering fruits and vegetables. Examine jars and discard those with nicks, cracks, rough edges, or other irregularities. Use new rubber jar rings or new metal lids and standard canning jars. Do not use empty mayonnaise, peanut butter, or other packers' jars. These jars are not heat tempered and often break during processing.

Gather products early, when they are at their peak of quality, and gather or purchase only as much as you can handle within 2 or 3 hours. Wash the product carefully, according to the directions in the chart. The cleaner the raw food, the more effective the canning process.

Prepare foods as you would for the table. Keep them cold until you are ready to begin the actual canning.

HOW TO PACK GLASS JARS

(When using tin, follow the manufacturer's instructions for filling and sealing. Follow time and pressure tables in this folder.)

◆ Scald the washed jars and keep them hot. This may be done in a dishwasher. It is not necessary to sterilize jars that are to be processed in a boiling water bath or pressure canner. They will be sterilized during the processing.

◆ If you wish to add salt be sure to add it before the vegetable. Salt, in small amounts, adds flavor but does not help in the preservation process. Salt can easily be added when the vegetable is reheated for serving.

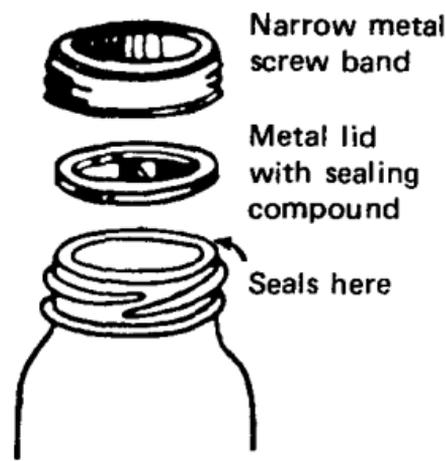
◆ Use one of two methods for packing fruits or vegetables: hot pack or raw pack. More food can be packed into one jar when hot pack is used and this method is best for foods that tend to discolor during canning. Packing products such as green beans raw helps to retain flavor and food value. Try both ways and make your own choice.

Before applying lids, wipe off the rims of your jars with a piece of muslin dipped in hot water. Any foreign matter on the rim of the jar may prevent an air-tight seal from forming. If the seal does not form, the food may be contaminated by substances carried by the entering air.

Keep jars hot after filling them by placing them in either a boiling-water-bath canner or a steam-pressure canner. Process, following time-tables one and two of this pamphlet.

COMMON TYPES OF CLOSURES

Self-seal closure (fits any standard mason jar): a metal disk or lid is held on the jar with a narrow



screwband. Pick up the lid with tongs and dip in boiling water—unless the manufacturer's directions state otherwise. Place lid on filled jar, center it carefully, and hold in place with finger. Then screw the band down **firmly**. Do not use great force. As the jar cools after processing, a vacuum will

form and this creates the air tight seal. Do not turn screwband after processing or you may break the seal and contaminate the contents of the jar. After the jar is cold, remove the screwband. Bands are unnecessary once the jars are sealed, and may rust if left on the jars. Screwbands may be used over and over but the metal lid may be used only once.

Zinc cap with porcelain lining and removable jar ring (fits any standard mason jar): place wet



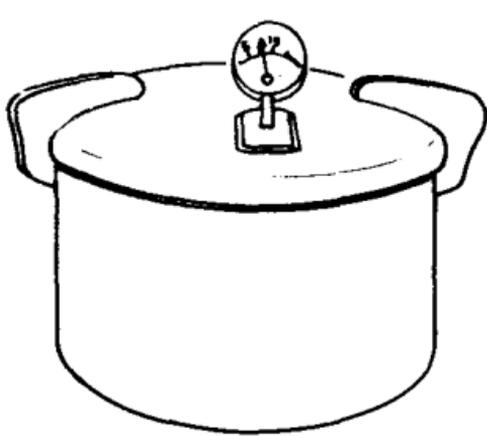
jar ring on shoulder of jar. Make it lay flat by pressing with side of knife blade. Screw cap down tightly, and turn it back 1/4 inch. When processing is complete, tighten the cap again as soon as jar is taken from the canner. The rubber rings should not be used again.

PROCESSING METHODS

Pressure Canner Method

Get your pressure canner in good condition before the canning season starts. Have pressure gauge and safety valve tested, all parts cleaned, and broken or missing parts replaced.

The Minnesota Department of Agriculture will test gauges and safety valves throughout the year as



a service to Minnesotans. Allow 2 weeks for this service. The Department's equipment can be used only for testing dial gauges. Weighted gauges cannot be tested; they need only

be thoroughly cleaned. When sending parts for testing, remove the pressure gauge and safety valve from the cover, place in a small sturdy box, and wrap carefully. Be sure to send the gauge in a box. The box you send it in will be used to return it to you. **Insure the package.** In an attached envelope, enclose a minimum of 70¢ in **stamps** for return postage and insurance. Write your name and address plainly. Please remember that the laboratory cannot accept currency or checks for postage and insurance. Stamps must be enclosed to insure prompt return of your gauge. Send the package to Minnesota Department of Agriculture, Division of Laboratory Services, Room 510, State Office Building, St. Paul, Minnesota 55155.

When parts have been returned to you, replace them carefully so that you will not strip threads.

Order new parts from manufacturer or hardware dealer. Gauges, safety valves, and petcocks are usually interchangeable among different makes of pressure cookers, but make sure before you buy.

Follow the manufacturer's instructions for opening and closing the pressure cooker. Follow pressure and timetables given in this folder.

Have 2 to 3 inches of boiling water in pressure canner. Stand the jars on a rack so they are not touching each other or sides of the canner. Fasten lid to pressure canner and open the petcock.

Turn heat on until steam flows from petcock in a steady stream (10 minutes or more after it first appears). At first a mixture of steam and air will be released as a white vapor or cloud. When air is all driven out, the steam will become nearly invisible for 1 to 2 inches from the petcock. It is then time to close the petcock. All air must be exhausted from the canner to make certain the internal temperature of the pressure canner reaches 240°F.

Raise pressure rapidly to 2 pounds less than required, reduce heat, and bring up the last 2 pounds slowly to avoid overpressure. Fluctuating pressure is one cause of liquid loss, so hold the pressure at 10 pounds.

When processing time is up, remove canner from heat and allow the pressure to return to zero. Do **not** attempt to cool the pressure canner with cold water.

When the pressure registers zero, wait 1 or 2 minutes, then slowly open the petcock. Unfasten the cover and tilt the far side up so that steam escapes away from you. Remove each jar with jar tongs or lift them out in the wire basket.

If the petcock is not opened a few minutes after the pressure has dropped to zero, a vacuum

Timetable I—Processing Low-acid Vegetables

PRODUCT	Work rapidly. Raw pack or hot pack foods following directions, adding if desired ½ teaspoon salt for pints and 1 teaspoon for quarts. Place jars on rack in pressure cooker containing 2 to 3 inches of boiling water. Fasten canner cover securely. Let steam escape 10 minutes or more before closing petcock.	USE 10-POUND PRESSURE				
		PRESSURE CANNER				PRESSURE SAUCEPAN
		Glass jars		Tin cans		Glass jars
		Pints	Quarts	# 2	# 2½	Pints
Asparagus	Raw Pack Wash asparagus; trim off scales and tough ends and wash again. Cut in 1-inch pieces. Pack asparagus tightly as possible without crushing to ½ inch of top. Cover with boiling water leaving ½ inch at top.	min.	min.	min.	min.	min.
	Hot Pack Prepare as for raw pack; then cover with boiling water. Boil 2 or 3 minutes. Pack asparagus loosely to ½ inch of top. Cover with boiling water leaving ½ inch at top.	25	30	20*	20*	45
Beans, dry with tomato or molasses sauce	Hot Pack Sort and wash dry beans. Cover with boiling water; boil 2 minutes, remove from heat and let soak 1 hour. Heat to boiling and drain, saving liquid for sauce. Fill jars ¾ full with hot beans. Add small piece of salt pork, ham, or bacon. Fill to ½ inch of top with hot tomato or molasses sauce. (Recipes in folder)	65	75	65*	75*	85
	Raw Pack Shell and wash beans. Pack loosely small type to 1 inch of top of jar for pints and 1½ inches for quarts; for large beans fill to ¾ inch of top for pints and 1¼ inches for quarts. Fill jars to top with boiling water.	40	50	40*	40*	60
Beans, fresh lima	Hot Pack Shell the beans, then cover with boiling water, and bring to boil. Pack beans loosely in jar to 1 inch of top. Cover with boiling water, leaving 1 inch at top.	40	50	40*	40*	60
	Raw Pack Wash beans. Trim ends and cut into 1 inch pieces. Pack tightly in jars to ½ inch of top. Cover with boiling water, leaving ½ inch at top.	20	25	25*	30*	40
Beans, snap	Hot Pack Prepare as for raw pack beans. Then cover with boiling water and boil 5 minutes. Pack beans in jars loosely to ½ inch of top. Cover with boiling-hot cooking liquid and water, leaving ½ inch at top.	20	25	25*	30*	40
	Hot Pack Sort beets for size. Cut off tops, leaving 1 inch stem, also root; and wash. Boil until skins slip easily. Skin, trim, cut, and pack into jars to ½ inch of top. Cover with boiling water, leaving ½ inch at top.	30	35	30‡	30‡	50
Carrots	Raw Pack Wash and scrape carrots. Slice, dice, or leave whole. Pack tightly in jars to 1 inch of top. Fill to top with boiling water.	25	30	25*	30*	45
	Hot Pack Prepare as for raw pack, then cover with boiling water and bring to boil. Pack carrots in jars to ½ inch of top. Cover with boiling-hot cooking liquid and water, leaving ½ inch at top.	25	30	20*	25*	45
Corn—cream style	Raw Pack Husk corn and remove silk. Wash. Cut corn from cob at about center of kernel and scrape cobs. Pack corn loosely in pint jars to 1 inch of top. Fill to top with boiling water.	95		105†		115
	Hot Pack Prepare as for raw pack. Add 1 pint boiling water to each quart of corn. Heat to boiling. Pack hot corn to 1 inch of top.	85		105†		105
Corn—whole kernel	Raw Pack Husk corn and remove silk. Wash. Cut from cob at about ¾ the depth of kernel. Pack corn loosely to 1 inch of top and fill to top with boiling water.	55	85§	60†	60†	75
	Hot Pack Prepare as for raw pack. To each quart of corn add 1 pint of boiling water. Heat to boiling. Pack loosely to 1 inch of top with mixture of corn and liquid.	55	85§	60†	60†	75
Peas, green	Raw Pack Shell and wash peas. Pack peas loosely in jars to 1 inch of top. Cover with boiling water, leaving 1 inch at top.	40	40	30*	35*	60
	Hot Pack Prepare as for raw pack. Cover with boiling water and bring to boil. Pack peas loosely in jars to 1 inch of top. Cover with boiling water, leaving 1 inch at top.	40	40	30*	35*	60
Pumpkin or Winter Squash cubed	Hot Pack Wash pumpkin or winter squash, remove seeds, and pare. Cut into 1 inch cubes. Add just enough water to cover. Bring to boil. Pack cubes in jars to ½ inch of top. Cover with hot cooking liquid and water, leaving ½ inch at top.	55	90	50‡	75‡	75
Pumpkin or Winter Squash strained	Hot Pack Wash pumpkin or winter squash, remove seeds, and pare. Cut into 1 inch cubes. Steam until tender (about 25 minutes). Put through food mill or strainer. Simmer until heated. Pack hot in jars to ½ inch of top.	65	80	75‡	90‡	85
Spinach and other greens	Hot Pack Pick over and wash thoroughly. Cut out tough stems and midribs. Place about 2½ pounds of spinach in cheesecloth bag and steam about 10 minutes or until well wilted. Pack loosely to ½ inch of top. Cover with boiling water, leaving ½ inch at top.	70	90	65*	75*	90

* Use plain tin.

† Use C enamel cans.

‡ Use R or sanitary enamel.

§ The State Department of Agriculture recommends all corn be canned in pints rather than quarts since processing time required for quarts tends to darken it.

Timetable 2—Processing Fruits, Tomatoes, Pickled Vegetables in Boiling-water Bath

PRODUCT	Raw pack or hot pack foods following directions. Put filled glass jars into canner containing hot or boiling water: For raw pack have water in canner hot but not boiling; for all other packs have water boiling. Add boiling water to bring water 1 inch or two over tops of jars but don't pour boiling water directly on glass jars. Put on cover of canner. Count processing time when water in canner comes to a rolling boil.	GLASS JARS		TIN CANS	
		Pints	Quarts	# 2	# 2½
Apples	Hot Pack 1. Pare, core, cut into pieces. To keep from darkening, place in water containing 2 tablespoons each of salt and vinegar per gallon. Drain, then boil 5 minutes in thin sirup or water. Pack apples in jars to ½ inch of top. Cover with hot sirup or water, leaving ½ inch at top.	min. 15	min. 20	min. 10*	min. 10*
	2. Make apple sauce, sweetened or unsweetened; pack hot to ¼ inch of top.	10	10	10*	10*
Beets, pickled	Hot Pack Cut off beet tops, leaving 1 inch of stem and root. Wash beets, cover with boiling water and cook until tender. Remove skins and slice. For pickling sirup use 2 cups vinegar to 2 cups sugar. Heat to boiling. Pack beets in jars to ½ inch of top. Add ½ teaspoon salt to pints, 1 teaspoon to quarts. Cover with boiling sirup, leaving ½ inch at top.	30	30		
Berries, except strawberries	Raw Pack Wash berries and drain. Fill jars to ½ inch of top, shaking berries down gently. Cover with boiling sirup (thin or medium recommended) leaving ½ inch at top.	10	15	15†	20†
	Hot Pack Wash berries and drain well. Add ½ cup sugar to each quart fruit. Cover pan and bring to boil. Pack berries to ½ inch of top.	10	15	15†	20†
Cherries	Raw Pack Wash; remove pits if desired. Fill jars to ½ inch of top, shaking cherries down gently. Cover with boiling sirup (thin or medium) leaving ½ inch at top.	20	25	20†	25†
	Hot Pack Wash; remove pits if desired. Add ½ cup sugar to each quart of fruit. Add a little water to unpitted cherries. Cover pan and bring to boil. Pack hot to ½ inch of top.	10	15	15†	20†
Fruit juices	Hot Pack Wash; remove pits if desired and crush fruit. Heat to simmering. Strain through cloth bag. Add sugar if desired—about 1 cup to 1 gallon juice. Reheat to simmering and fill jars to top.	10	10	10†	10†
Fruit puree	Hot Pack Use sound, ripe fruit. Wash; remove pits if desired. Cut large fruit in pieces. Simmer until soft, add a little water if needed. Put through strainer or food mill. Add sugar to taste. Heat to simmering and pack to ¼ inch of top.	10	10	10†	10†
Peaches or Apricots	Raw Pack Wash peaches or apricots and remove skins. Remove pits. To keep from darkening place in solution (same as apples). Drain, pack fruit in jars to ½ inch of top. Cover with boiling sirup (light or medium) leaving ½ inch at top.	25	30	30*	35*
	Hot Pack Prepare fruit as for raw pack. Heat fruit through in hot sirup. If fruit is very juicy you may heat it with ½ cup of sugar to 1 quart of raw fruit adding no liquid. Pack fruit to ½ inch of top.	20	25	25*	30*
Pears	Peel, cut in halves, and core. Follow directions for peaches either raw pack or hot pack using same timetables.				
Plums	Raw Pack Wash. To can whole, prick skins. Freestone varieties may be halved and pitted. Pack fruit in jars to ½ inch of top. Cover with boiling sirup, leaving ½ inch space at top.	20	25	15†	20†
	Hot Pack Prepare as for raw pack. Heat to boiling in sirup or juice. If fruit is very juicy, you may heat it with sugar, adding no liquid. Pack hot fruit to ½ inch of top. Cover with boiling sirup, leaving ½ inch at top.	20	25	15†	20†
Rhubarb	Hot Pack Wash and cut into ½ inch pieces. Add ½ cup sugar to each quart rhubarb and let stand to draw out juice. Bring to boiling. Pack hot to ½ inch of top.	10	10	10†	10†
Sauerkraut	Hot Pack Heat well-fermented sauerkraut to simmering (185°-210° F.). Pack hot kraut to ½ inch of top. Cover with hot juice, leaving ½ inch at top.	15	20	20*	25*
Tomatoes	Raw Pack Use only perfect, ripe tomatoes. Scald just long enough to loosen skins; plunge into cold water. Drain, peel, and core. Leave tomatoes whole or cut in halves or quarters. Pack tomatoes to ½ inch of top, pressing gently to fill spaces. Add ½ teaspoon salt to pints and 1 teaspoon to quarts.	40	50	55*	55*
	Hot Pack Quarter peeled tomatoes. Bring to boil and pack to ½ inch of top. Add salt as for raw packed tomatoes.	35	45	45*	45*
Tomato juice	Hot Pack Use ripe, juicy tomatoes. Wash, remove stem ends, cut into pieces. Simmer until softened and put through strainer. Add 1 teaspoon salt to each quart juice. Reheat to just boiling. Fill jars with juice to ¼ inch of top.	35	35	40*	40*

* Use plain tin for apples, apricots, peaches, pears, sauerkraut, and tomatoes.

† Use R enamel cans for berries, cherries, plums, rhubarb.

may form inside the cooker. This may draw liquid from jars and seal the lid to the canner.

Cooling the jars

Place jars upright on a perfectly dry, non-metallic surface (towel, board, or newspapers may be used) spaced for free air circulation.

Test seals when jars are thoroughly cool. Wash, dry, and label. Store jars where it is dry and cool but never subject them to freezing. Test jars with flat metal lid by tapping the center of the lid with a spoon. A clear, ringing sound means a good seal. A dull note does not always mean a poor seal; if there is no leakage, store the jar and watch for signs of spoilage.

Boiling-Water-Bath Method

(Use only for acid products such as fruits, tomatoes, and pickled vegetables.)

For boiling-water-bath, use a utensil that has a close-fitting cover and is deep enough to allow jars standing on rack to be covered with at least 1 inch of briskly boiling water.

1. Use same method as for pressure canner in packing jars and adjusting jar lids.

2. Have the water-bath ready. Lower the jars quickly. If water evaporates, add boiling water to keep the level an inch or more over the jar tops. Count time when water begins to boil; keep at rolling boil.

3. When processing time is completed, remove jars. Don't disturb lids on self-seal jars, but tighten closures at once on all others.

4. Set the jars right side up on a dry surface, spacing them for free air circulation.

5. When cold, test for seal, remove screwbands (if self-seal closure), label, and store where it is cool and dry.

Use of pressure canner for processing fruit

Your pressure canner may be used as a boiling



water bath canner if it is deep enough to allow the jars on the rack to be covered by 1 inch of briskly boiling water. Put the cover on the canner but **DO NOT fasten or lock the lid into place**. Leave the petcock wide open so that steam es-

capescapes and pressure does not build up inside the canner.

Pressure saucepan

The pressure saucepan is made for cooking food and is not intended for food preservation. Newer model pressure saucepans do not have gauges which accurately record the pressure and temperature in the saucepan. Greater fluctuation of temperature and pressure inside the pressure saucepan, as compared to the pressure canner, result in (1) uncertainty as to whether the food has been properly processed, and (2) loss of liquid from the jars of food. It is not advisable to can foods in the pressure saucepan.

SYRUPS TO USE IN CANNING FRUIT

Most fruits have better color, flavor, and texture when canned with sugar or syrup, but will keep when canned without sugar.

To prepare syrups, add sugar to water or to water mixed with juice extracted from fruit. Then bring to a boil and boil for 5 minutes. Skim if necessary.

Type of syrup	Sugar	Water or juice	Yield of syrup
Thin	2 cups	4 cups	5 cups
Medium	3 cups	4 cups	5½ cups
Heavy	4¾ cups	4 cups	6½ cups

SAUCES USED IN CANNING BEANS

Tomato sauce—Mix 1 quart tomato juice; 3 tablespoons sugar; 2 teaspoons salt; 1 tablespoon chopped onion; and ¼ teaspoon mixture of ground cloves, all-spice, mace, and cayenne. Heat to boiling.

Or mix 1 cup of tomato catsup with 3 cups of water or soaking liquid from beans and heat to boiling.

Molasses sauce—Mix 1 quart water or soaking liquid from beans, 3 tablespoons dark molasses, 1 tablespoon vinegar, 2 teaspoons salt, and ¾ teaspoon powdered dry mustard. Heat to boiling.

Be on Guard Against Spoilage

Don't use canned food that shows any sign of spoilage. Examine containers before opening them. Bulging can ends and jar lids or a leak may indicate that food has spoiled. When you open containers look for other signs—an off-odor, spurting liquid, or mold.

It's possible for canned vegetables to contain the botulinus toxin, which causes acute food poisoning, without showing signs of spoilage. To avoid any risk of botulism, boil home canned vegetables before tasting. Bring vegetables to a rolling boil;

then cover and boil for at least 10 minutes. Boil corn and spinach for 20 minutes. If the food looks spoiled, foams, or has an off-odor during heating, destroy it.

Burn spoiled vegetables or dispose of the food so that it will not be eaten by humans or animals.

Fruits and tomatoes need not be reheated but should be discarded if mold or fermentation appears.

IMPORTANT TIPS

1. **DO NOT process or can food in the oven.** Jars may explode. The temperature of the food in the oven is not high enough to destroy spoilage bacteria in vegetables.

2. Aspirin and boric acid should **never** be used in canning of food. These compounds are drugs and not preservatives.

3. Use ascorbic acid compounds to prevent the darkening of fruits such as apples and peaches. Purchase preparations intended for use in home food preservation and follow the manufacturer's directions.

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