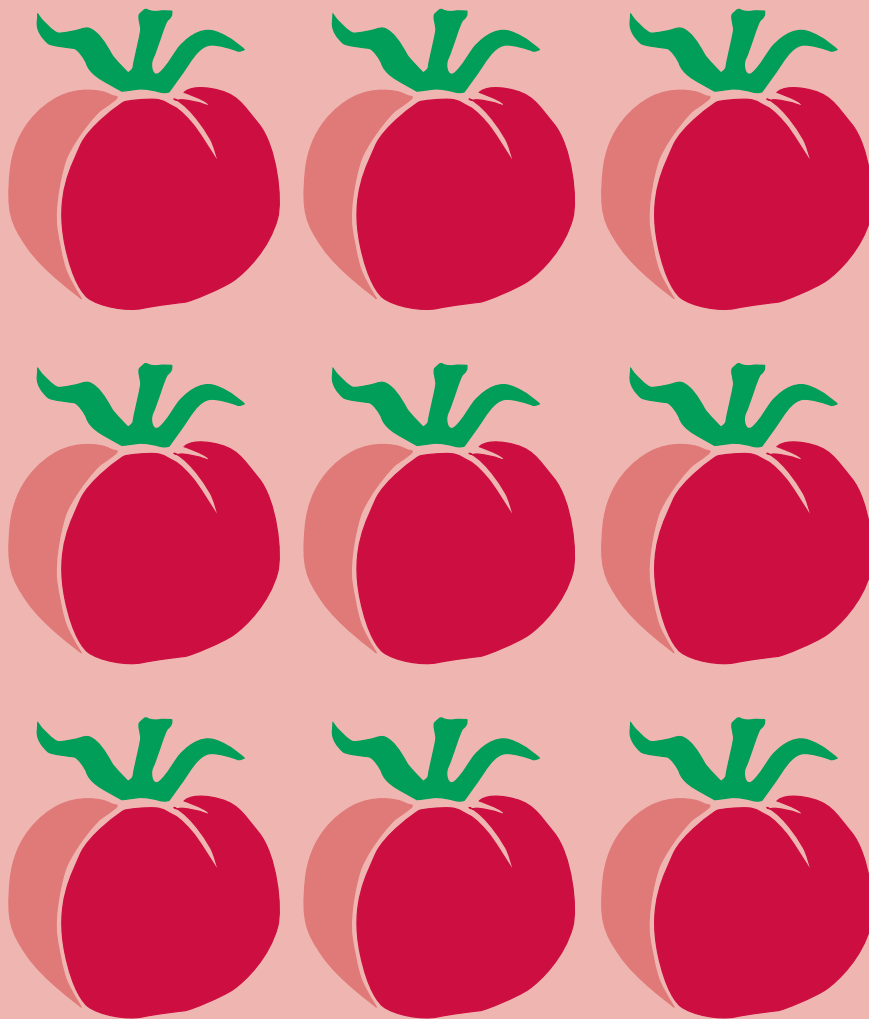




Canning Tomatoes and Tomato Products

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By Carolyn A. Raab, Extension foods and nutrition specialist, Oregon State University. The information in this bulletin is based on U.S. Department of Agriculture recommendations. The material was reviewed by Extension specialists in food and nutrition at Washington State University and the University of Idaho.

Canning Tomatoes and Tomato Products

Ripening tomatoes are a familiar sight in Pacific Northwest gardens and fields during the late summer months. Because storage life of fresh tomatoes is limited, many households preserve them for year-round enjoyment. Home canning is one of the most popular preservation methods.

When canning tomatoes and tomato products, safe procedures must be used. Microorganisms that cause spoilage (molds, yeast, bacteria) are destroyed by heat processing. Several factors influence the time and temperature required:

- Composition of tomatoes (acidity, solids content)
- Composition of other vegetables or meats added (acidity)
- Style of tomato preparation (crushed, whole, or halved)
- Type of liquid added to tomatoes (juice, water, none)
- Consistency of tomato product (thick, thin)
- Initial temperature (hot or raw pack)
- Type of jar (size, shape)

Processing times are scientifically determined. Therefore it is extremely important to follow a tested recipe for tomatoes and tomato products (such as salsa). Changing the amount or type of ingredients and method of preparation can influence the processing conditions needed to guarantee safety. For example, adding extra vegetables to a salsa recipe can change acidity, and overcooking can change consistency. *Products that are not prepared according to instructions should be frozen.*

Over the years, tomato canning recommendations have changed as a result of new research findings. In 1987, the U.S. Department of Agriculture completed extensive testing of tomato canning procedures. On the basis of this research, several changes have been made to ensure that home-canned tomatoes and tomato products will be safe to eat and can be stored on the shelf without spoiling. These procedures have been adopted nationwide.

- Processing times have been lengthened to ensure that tomato varieties with a high solids content will be adequately processed.
- Pressure-canner recommendations have been added as an alternative to boiling water processing.

- Recommended pressures now differ for dial and weighted gauges.
- Altitude corrections for both boiling water canners and pressure canners have been revised.

Failure to use these instructions could increase the chance of spoilage and food waste. If you have stored tomatoes that were canned using earlier recommendations, examine jars carefully before use. Discard those with signs of spoilage.

Selecting Equipment

You now have a choice of using either a boiling water canner or a pressure canner for processing many tomato products.

Boiling water canner. These canners made of aluminum or porcelain-covered steel have removable perforated racks and fitted lids. The canner must be deep enough so that at least 1 inch of briskly boiling water will cover the tops of jars during processing.

Pressure canner. Pressure canners are available in many sizes. A dial gauge or weight indicates pressure inside the canner. The gasket keeps steam from leaking out around the cover. A petcock, safety valve, or weight is used to control the escape of air or steam during processing. The pressure canner should have a rack to hold jars off the bottom. Pressure saucepans are no longer recommended for use in home canning.

Jars. Processing times are based on a standard size and shape of jar. Mason-type jars designed for home canning are the best choice. However, some commercial jars may be used for canning in the boiling water canner when new two-piece lids are used. Commercial jars are not recommended for use in the pressure canner. When using a commercial jar in a boiling water canner, be sure that dimensions are similar to standard jars and that screw bands fit snugly. Processing times may not be adequate for sizes and shapes other than those of standard canning jars.

Lids. Choose the size of closure that fits your jars (wide mouth or regular). To prevent sealing failures, do not reuse lids.

Preparing Equipment

Inspect jars for cracks and chips and discard damaged ones. Also inspect metal screw bands and discard any with dents or rust.

Wash jars, screw bands, and lids in hot, soapy water. Rinse. Place jars upside down on a clean, dry cloth or leave them in the dishwasher until needed.

Check manufacturer's directions for heating lids before use.

Before each use, inspect the pressure canner. See that the petcock and safety valve are not blocked. Clean them several times a year by drawing a string or pipe cleaner through the openings. Be sure the gasket around the cover fits tightly, and replace the gasket if it is loose. If you have a weighted pressure gauge, keep it clean. Check dial pressure gauges for accuracy once a year (more often if the canner is used frequently or is dropped). Your county Extension office can tell you where the gauge check can be made.

If the dial gauge reads high by more than 1 pound, buy a new one. Low readings may indicate that the accuracy of the gauge is unpredictable.

Preparing Tomatoes

Select firm, underripe-to-ripe tomatoes. Use of decayed or overripe tomatoes may result in spoilage of canned products. Do not can tomatoes from dead or frost-killed vines.

Wash the tomatoes in cool running water. To can crushed, whole, or halved tomatoes, remove the skins by dipping in boiling water for 30 to 60 seconds or until skins split. Dip in cold water, then slip off skins and remove cores.

Yields will vary. The amount generally needed per quart is:

<i>Type</i>	<i>Pounds Needed</i>
Crushed tomatoes	2 ³ / ₄
Whole or halved tomatoes	3
Tomato juice	3 ¹ / ₄
Tomato sauce	5 to 6 ¹ / ₂

Packing the Jars

Follow either hot pack or raw pack directions. In the hot pack method, food is packed in the jars while still very hot. Then the cooking liquid or boiling water is added. In the raw pack method, raw food is packed in the jars and covered with boiling water or juice.

The hot pack method has several advantages. Heated tomatoes are easier to pack into jars because they are softer. As a result, more can be put in each jar, fewer jars are needed, and tomatoes float less. However, raw-packed tomatoes will be firmer in texture.

Pack food and liquid to allow $\frac{1}{2}$ inch headspace unless otherwise specified. Headspace is the space between the food or liquid and the top of a jar. If the jars are too full, some of the contents could bubble out during heat processing and prevent sealing by sticking to the rim. Too much headspace may also prevent sealing if the processing time is too short to exhaust all air from the jar.

After packing, run a plastic spatula around the inside of the jar to remove air bubbles.

Adding Acid

As an extra measure to prevent spoilage, add acid to jars of whole, crushed, or juiced tomatoes before processing:

Bottled lemon juice: 1 Tbs. per pint; 2 Tbs. per quart

Citric acid USP: $\frac{1}{4}$ tsp. per pint; $\frac{1}{2}$ tsp. per quart

Sugar may be added to mask a sour flavor (1 tsp. per pint; 2 tsp. per quart).

Adding Salt

Salt is added to tomatoes for flavor, not to preserve them. Therefore, it may be omitted. If you use salt, add $\frac{1}{2}$ teaspoon to each pint jar, 1 teaspoon to each quart jar.

Closing the Jars

Wipe jar rims and threads with a clean, damp cloth to remove any bits of food that might prevent a seal. Follow manufacturer's directions for preheating lids. Put on lid and screw the metal band following manufacturer's directions for tightening.

Processing

Tomatoes and tomato products must be heat processed to destroy micro-organisms that cause spoilage. Either a pressure canner or a boiling water canner may be used.

Processing in a Boiling Water Canner

1. Half fill the canner with very hot water.
2. Arrange the jars on the rack. Add very hot water, if needed, to bring level up to 1 to 2 inches above jar tops. (Don't pour water directly on the jars.) Place a tight-fitting cover on canner. If a pressure canner is used for boiling water canning, leave the cover unfastened and the petcock open to prevent buildup of pressure.
3. Set a timer for recommended processing time (in chart) after water comes back to a rolling boil. At altitudes above 1,000 feet, times must be increased because temperatures will not reach 212°F. (See the chart on p. 8 for processing time adjustments.) Keep water boiling gently and steadily. Add boiling water if necessary to keep jars covered.
4. Remove jars from canner immediately when timer sounds. Contents could spoil if jars are left in hot water.

Processing in a Pressure Canner

1. Follow manufacturer's directions for use.
2. Have 2 to 3 inches of boiling water in the canner.
3. Arrange jars on a rack so steam can flow freely around each one.
4. Fasten canner lid securely so no steam escapes around the rim.
5. Watch for steam to escape steadily through the petcock. When steam has escaped for 10 minutes, close the petcock or place a weighted gauge on canner. This "exhausting" step is very important to remove all air from the canner. Air trapped in the canner will prevent jars from heating adequately. This step is needed even for those types of pressure canners labeled "self-exhausting."
6. When the correct pressure is reached, set a timer for the recommended processing time (see chart on p. 8). Also write down the time when processing will be completed as a double check on timer accuracy. At sea level, use 10 pounds pressure for a weighted gauge; 11 pounds for a dial gauge. (Research has shown that 10 pounds pressure with a weighted gauge is comparable to 11 pounds on a dial gauge.) At altitudes above 1,000 to 2,000

feet, it is necessary to increase pounds of pressure to compensate for decreased atmospheric pressure.

<i>Elevation</i>	<i>Pounds Pressure</i>
Weighted gauge canner	
sea level to 1,000 ft	10 lb
above 1,000 ft	15 lb
Dial gauge canner	
sea level to 2,000 ft	11 lb
2,001–4,000 ft	12 lb
4,001–6,000 ft	13 lb
6,001–8,000 ft	14 lb

7. Watch the canner continuously to be sure that pressure stays constant. If pressure fluctuates, regulate it immediately by adjusting the heat, not by opening the petcock or removing the weight. Fluctuating pressure may cause liquid to be drawn from the jars and cause some jars not to seal. Canners with a weighted gauge will either jiggle two or three times a minute or rock slowly throughout the process. Check the instruction manual.

8. When the timer sounds, remove the canner from heat. Do not cool the canner with water or cold towels. When pressure returns to zero, slowly open the petcock or remove the weighted gauge. After 2 minutes, unfasten the cover and tilt the far side up so that steam does not burn you. Immediately remove jars. Contents could spoil if jars are allowed to stand in the warm canner.

Cooling the Jars

Put the jars on a rack or cloth so air can circulate freely around them. There should not be a cold draft or fan blowing on the jars.

Testing the Seal

Test each jar for a seal within 12 to 24 hours. Jars with flat, metal lids are sealed if:

1. The lid has popped down in the center.
2. The lid does not move when pressed down.
3. The center of the lid gives a clear, ringing sound when tapped with a spoon. (This is not as reliable as the other methods.)

If you discover that a jar has not sealed within 24 hours of the initial processing, refrigerate or freeze the contents or reprocess. To reprocess, start by

removing the lid. Check and clean the sealing surfaces of the jar. Use a new lid and process again for the full time. The quality of the food will not be as good after reprocessing.

If more than 24 hours have passed when you discover an unsealed jar, examine it for spoilage. **Do not taste the food.** If the food appears to be edible, boil for 10 minutes and freeze or refrigerate. It is not safe to reprocess at this point.

Note: If jars unseal during storage, safety must be evaluated.

Storing

Wipe the jars and label them with the date and contents. Remove the screw bands so the liquid under them will not cause rusting.

Store jars in a cool, dark, dry place. For best eating quality and nutritive value, use them within 1 year. Exposure to heat, freezing temperatures, or light decreases the quality and shelf life of canned food .

Before Using

Before opening each jar, look for bulging lids, leaks, and any unusual appearance of the food. After opening, check for off-odor, mold, foam, or spurting liquid. **Never taste questionable foods.** If there is any sign of spoilage, destroy the food.

To avoid the risk of botulism, tomato–vegetable mixtures not canned according to the recommendations in this publication or according to other USDA-endorsed recommendations should be boiled even if you detect no signs of spoilage. Boil foods for 10 minutes at altitudes below 1,000 feet. Add 1 minute more of boiling time for each additional 1,000 feet of elevation.

Styles of Home-canned Tomatoes

We have scientifically tested processing recommendations for several styles of home-canned tomatoes. Use the charts on the following pages to find the instructions that you'll need. Make these decisions:

1. Do you want to can crushed tomatoes, whole or halved tomatoes, tomato sauce, or tomato juice?
2. If tomatoes are whole or halved, what type of liquid will you add (water, juice, none)?
3. Will you use a boiling water canner or a pressure canner?

Preparing and Processing Tomatoes and Tomato Products

Type of Product	Preparation
Crushed Packed hot without added liquid	Prepare tomatoes as directed (p. 5). Trim off any bruised or discolored portions and cut into quarters. Heat one-sixth of a canner load quickly in a large pot, crushing them with a wooden spoon as they are added to press out juice. (Continue heating to boiling, stirring to prevent burning.) Gradually add remaining quartered tomatoes, stirring constantly. (Crushing is not necessary for these.) Boil gently 5 minutes after adding all tomatoes. Fill jars immediately with hot tomatoes, leaving ½ inch headspace. Add acid (p. 6) and, if desired, salt (p. 6). Adjust lids and process in a boiling water canner or pressure canner.
Whole or halved Packed in water	Prepare tomatoes as directed (p. 5) Leave whole, or halve them. <i>Raw pack.</i> Fill jars with raw, peeled tomatoes. Cover with hot water, leaving ½ inch headspace. <i>Hot pack.</i> Add enough water to cover tomatoes in a large pan and boil gently for 5 minutes. Fill jars with hot tomatoes and cover with hot cooking liquid, leaving ½ inch headspace. Add acid (p. 6) to jars of both hot and raw pack products. If desired, salt (p. 6). Adjust lids and process in a boiling water canner or pressure canner.
Whole or halved Packed in tomato juice	Prepare tomatoes (p. 5) and tomato juice (below) as directed. <i>Raw pack.</i> Heat tomato juice in a saucepan. Fill jars with raw tomatoes and cover with hot tomato juice, leaving ½ inch headspace. <i>Hot pack.</i> Completely cover tomatoes with tomato juice in large pan. Boil gently for 5 minutes. Fill jars with hot tomatoes and cover with hot tomato juice, leaving ½ inch headspace. Add acid (p. 6) to jars of both hot and raw pack products. If desired, salt (p. 6). Adjust lids and process in a boiling water canner or pressure canner.
Whole or halved Packed raw without added liquid	Prepare tomatoes as directed (p. 5). Leave whole or halved. Loosely fill jars with raw tomatoes, pressing until spaces fill with juice. Leave ½ inch headspace. Add acid (p. 6) and, if desired, salt (p. 6). Adjust lids and process in a boiling water canner or pressure canner.

*See chart on p. 8 for altitude adjustment.

Pressure Canner Processing time (in minutes) at 240°F (10 lb pres- sure for weighted gauge; 11 lb for dial gauge)		Boiling Water Canner Processing time (in minutes) with altitude adjustment for various elevations (in feet)			
Size of Jars		0–1,000	1,001–3,000	3,001–6,000	6,001–8,000
Pint	15*	35	40	45	50
Quart	15*	45	50	55	60
Pint	10*	40	45	50	55
Quart	10*	45	50	55	60
Pint	25*	85	90	95	100
Quart	25*	85	90	95	100
Pint	25*	85	90	95	100
Quart	25*	85	90	95	100

Preparing and Processing Tomatoes and Tomato Products (continued)

Type of Product	Preparation
Tomato juice	<p>Wash, remove stems, and trim off bruised or discolored portions. To prevent juice from separating into water and pulp layers, quickly cut about 1 pound of tomatoes into quarters and heat immediately to boiling in a sauce pan while crushing. Continue to slowly add and crush freshly cut tomato quarters to the boiling mixture. (Make sure the mixture boils constantly and vigorously while you add the remaining tomatoes.) Simmer 5 minutes after adding all pieces.</p> <p>If you are not concerned about juice separation, simply slice or quarter tomatoes into a large saucepan. Crush, heat, and simmer for 5 minutes before juicing. Press both types of heated crushed tomatoes through a sieve or food mill to remove skins and seeds. Heat juice again to boiling. Fill jars with hot juice, leaving ½ inch headspace.</p> <p>Add acid (p. 6) and, if desired, salt (p. 6). Adjust lids and process in a boiling water canner or pressure canner.</p>
Tomato–vegetable juice blend	<p>Prepare, crush and simmer tomatoes as for making tomato juice. An average of 22 pounds of tomatoes is needed per canner load of 7 quarts. Add no more than 3 cups of any combination of finely chopped celery, onions, carrots, and peppers to each 22 pounds of tomatoes. Simmer mixture 20 minutes. Press hot cooked tomatoes and vegetables through a sieve or food mill to remove skins and seeds. Bring tomato–vegetable juice blend to boiling and fill jars immediately, leaving ½ inch headspace. Add acid (p. 6) and, if desired, salt (p. 6). Adjust lids and process in a boiling water canner or pressure canner.</p>
Tomato sauce	<p>Wash tomatoes, remove stems, and trim off bruised or discolored portions. Heat and press as for making tomato juice. Simmer in large-diameter pan until sauce reaches desired consistency. (Volume should be reduced by about one-third for thin sauce, or by about one-half for thick sauce.) Fill jars, leaving ½ inch headspace. Add acid (p. 6) and, if desired, salt (p. 6). Adjust lids and process in boiling water canner or pressure canner.</p>

*See chart on p. 8 for altitude adjustment.

Size of Jars	Pressure Canner Processing time (in minutes) at 240°F (10 lb pres- sure for weighted gauge; 11 lb for dial gauge)	Boiling Water Canner Processing time (in minutes) with altitude adjustment for various elevations (in feet)			
		0-1,000	1,001-3,000	3,001-6,000	6,001-8,000
Pint	15*	35	40	45	50
Quart	15*	40	45	50	55
Pint	15*	35	40	45	50
Quart	15*	40	45	50	55
Pint	15*	35	40	45	50
Quart	15*	40	45	50	55

Tomato–Vegetable Combinations

Approximate One-pound Equivalents

1 lb = 3–4 small tomatoes
1 lb = 10 large chile peppers
1 lb = 2½ cups chopped onions
1 lb = 6½ cups sliced mushrooms

Mexican Tomato Sauce

2½ to 3 lb chile peppers, chopped
18 lb tomatoes
3 cups onions, chopped
1 Tbs. salt
1 Tbs. oregano
½ cup vinegar (5% strength)

Yield: About 9 pints

Procedure: Wash and dry chiles. (Caution: Wear rubber gloves while handling chiles or wash hands thoroughly with soap and water before touching your face.) Slit each pepper along the side to allow steam to escape. Peel using one of the following methods:

Oven or broiler method: Place chiles in oven (400°F) or under a broiler for 6 to 8 minutes until skins blister.

Range top method: Cover hot burner, either gas or electric, with heavy wire mesh. Place chiles on burner for several minutes until skins blister.

Place peppers in a pan and cover with a damp cloth. (This will make peeling the peppers easier.) After several minutes of cooling, slip off skins. Discard seeds and chop. Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water, slip off skins, and remove cores. Coarsely chop tomatoes and combine chopped peppers and remaining ingredients in large saucepan. Bring to a boil. Cover and simmer 60 minutes. Fill jars, leaving 1 inch headspace. Adjust lids and process in a pressure canner at 240°F: 20 minutes for pints, 25 minutes for quarts (10 pounds pressure with a weighted gauge, 11 pounds pressure with a dial gauge). Adjust pressure for altitude (p. 8).

Chile Salsa (Hot Tomato–Pepper Sauce)

2 lb chile peppers, chopped
5 lb tomatoes
1 lb onion, chopped
1 cup vinegar (5% strength)
1 Tbs. salt
½ tsp. pepper

Yield: 6 to 8 pints

Procedure: Prepare chiles as directed in *Mexican Tomato Sauce*. Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water, slip off skins, and remove cores. Coarsely chop tomatoes and combine onions, peppers, and remaining ingredients in a large saucepan. Heat to boiling and simmer 10 minutes. Fill pint jars, leaving ½ inch headspace. Adjust lids and process in a boiling water canner: 15 minutes for 0–1,000 feet altitude; 20 minutes for 1,001–6,000 feet; or 25 minutes at 6,001–8,000 feet.

Spaghetti Sauce Without Meat

30 lb tomatoes
1 cup onions, chopped*
5 cloves garlic, minced
1 cup celery or green pepper, chopped*
1 lb mushrooms, sliced* (optional)
¼ cup vegetable oil
2 Tbs. salt or to taste
2 tsp. black pepper
2 Tbsp. oregano
¼ cup parsley, minced
¼ cup brown sugar

*It is not safe to increase the proportion of onions, peppers/celery, or mushrooms.

Yield: About 9 pints

Procedure: Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water and slip off skins. Remove cores and quarter tomatoes. Boil 20 minutes, uncovered, in large saucepan. Put through food mill or sieve. Sauté onions, garlic, celery or peppers, and mushrooms (if used) in vegetable oil until tender. Combine sautéed vegetables and tomatoes and add salt, pepper, herbs, and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. (The volume will have been reduced by nearly half.) Stir frequently to avoid burning. Fill jars, leaving 1 inch headspace. Adjust lids and process in a pressure canner at 240°F: 20 minutes for pints, 25 minutes for quarts (10 pounds pressure with a weighted gauge, 11 pounds with a dial gauge). Adjust pressure for altitude (p. 8).

Spaghetti Sauce With Meat

30 lb tomatoes
2½ lb ground beef or sausage
5 cloves garlic, minced
1 cup onion, chopped
1 cup celery or green peppers, chopped
1 lb mushrooms, sliced (optional)
2 Tbs. salt or to taste
2 tsp. black pepper
2 Tbs. oregano
¼ cup parsley, minced
¼ cup brown sugar

Yield: About 9 pints

Procedure: To prepare tomatoes, follow directions for *Spaghetti Sauce Without Meat*. Sauté beef or sausage until brown. Drain off fat. Add garlic, onion, celery or green pepper, and mushrooms (if used). Cook until vegetables are tender. Combine with tomato pulp in a large saucepan. Add salt, pepper, herbs, and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. (Volume will have been reduced by nearly half.) Stir frequently to avoid burning. Fill jars, leaving 1 inch headspace. Adjust lids and process in a pressure canner at 240°F: 60 minutes for pints, 70 minutes for quarts (10 pounds pressure with a weighted gauge, 11 pounds pressure with a dial gauge). Adjust pressure for altitudes (p. 8).

Tomatoes with Zucchini

Quantity: An average of 12 pounds of tomatoes and 4 pounds of zucchini is needed per canner load of 7 quarts. An average of 7 pounds of tomatoes and 2½ pounds of zucchini is needed per canner load of 9 pints.

Procedure: Wash tomatoes and zucchini. Dip tomatoes in boiling water 30 to 60 seconds or until skins split. Then dip in cold water, slip off skins and remove cores and quarter. Slice or cube zucchini. Bring tomatoes to a boil and simmer 10 minutes. Add zucchini and boil gently 5 minutes. Fill jars with mixture, leaving 1 inch headspace. Add 1 teaspoon of salt per quart, if desired. Adjust lids and process in a pressure canner at 240°F: 30 minutes for pints, 35 minutes for quarts (10 pounds pressure with a weighted gauge, 11 pounds with a dial gauge). Adjust pressure for altitude (p. 8).

Safety Checklist

- Select firm, ripe tomatoes. Do not can tomatoes from dead or frost-killed vines.
- Use the amount and type of ingredients specified.
- Prepare ingredients as directed.
- Acidify tomatoes with lemon juice or citric acid.
- Process in a boiling water canner or pressure canner for the time specified.
- Examine jars for spoilage before use.

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