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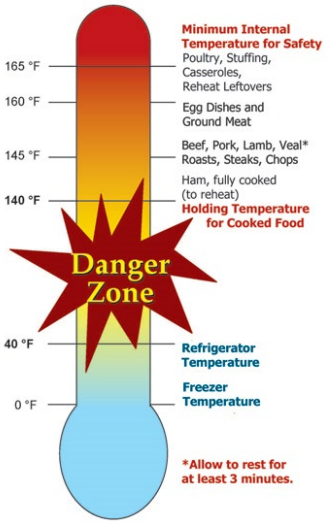
Boiling Water and Steam Canning Basics: Pickling

The quality of food is judged by wholesomeness, its nutritional value, and our expectations of its color, flavor, odor, and texture. The quality of preserved food varies greatly and depends mostly on the quality of the fresh food and preservation methods. High quality preserved foods are free from microbial spoilage and toxins, are pleasing to eat, and are reasonably nutritious.

The Bottom Line: If you prepare or serve food, you are responsible for making sure it's safe food.

Factors That Affect Growth of Microorganisms



1. **Temperature:** Foodborne pathogens grow best under the same conditions that allow people to thrive. Most foodborne bacteria grow fastest at temperatures from 90° to 110° F. However, foodborne bacteria will grow in the temperature range known as the ***Danger Zone***, 40° to 140°F; some grow at temperatures below this range.

2. **Acidity or alkalinity (pH):** Most organisms grow best under conditions that are not highly acid or alkaline; that is, a neutral pH. (Very few foods are highly alkaline.) High acid foods generally do not support bacterial growth.

3. **Moisture:** Microorganisms require moisture for growth. Dehydration preserves foods by removing moisture.

4. **Oxygen:** Most microorganisms require oxygen to grow; a few pathogens do not, or may require limited oxygen. However, controlling oxygen content is not useful for controlling bacterial growth for home food preservers.

5. **Time:** It takes time for microorganisms to grow or multiply in foods. The time required is affected by temperature, acidity, moisture and oxygen levels. Under ideal conditions bacteria can double in number every 10 to 20 minutes.

6. **Food:** Bacteria require nutrients to reproduce. Foods provide proteins and carbohydrates for growth.

7. **Inhibitors:** Some natural compounds/food additives are bacterial inhibitors (sugar, acid).

Preventing Foodborne Illnesses

Clean

- Wash hands frequently and after using the toilet, changing a baby's soiled diaper, sneezing or coughing, touching animals, handling raw meat, fish and poultry and before handling food.
- 20-second rule: wash hands for 20-seconds or sing the Happy Birthday song twice.
- Bandage any cuts or burns on hands before handling food; use disposable gloves to protect food.
- Run sponges and dish scrapers through the dishwasher often. Change dishcloths daily.
- Use paper towels to mop up spilled juices from meat, fish or poultry.
- Use a disinfecting solution consisting of 1 tsp unscented chlorine bleach to 1 quart of water. Use a spray bottle to disinfect countertops, cutting surfaces, etc. Make a new solution every week.

Separate

- Avoid cross contamination. **ALWAYS** wash your hands, knives, cutting boards, and food preparation surfaces well with soapy water before and after any contact with raw meat or fish.
- Use a separate cutting board for fresh produce, raw meat and cooked meat.
- Rinse all fresh fruits and vegetables well under running water before preparing or eating them.
- When grilling or barbecuing, always use a clean plate for the cooked meat.
- Ice is food! Use clean ice to avoid contaminating food.
- Store raw meat, fish and poultry on the bottom shelf in the refrigerator or on a plate to prevent juices from dripping onto other food items.

Cook

- Must reach and maintain an internal temperature high enough to kill pathogens.
- Use a thermometer on meats; follow a reputable recipe when canning.

Chill

- Keep your refrigerator set at 40°F or below and refrigerate all perishable foods.
- Thaw frozen perishable foods in a refrigerator overnight, in a microwave oven, or under cold running water. Do not thaw frozen food on your counter.
- Do not prepare food more than 2 hours before serving without plans for proper storage in a refrigerator then reheating just before serving.
- Divide leftover hot food into shallow containers to accelerate cooling and refrigerate within 2 hours after preparation.
- Foods can spoil in as little as 1 hour in the hot sun. Discard any perishable foods from a picnic or potluck that have not been kept adequately chilled (40°F or below) or kept hot (140°F or above).

When In Doubt - Throw It Out! Never taste food that looks or smells strange to see if it can still be used. **Just discard it.** Generally foods that contain bacteria will look, smell, and taste normal. Generally speaking most bacteria that cause foodborne illness are odorless, colorless and tasteless.

How Canning Preserves Food Safely

- With proper canning practices, air is forced from the jars, leaving a vacuum. Heat destroys most heat-resistant microorganisms capable of growing in food stored at room temperature.
- Molds and some yeasts are unable to grow in a vacuum. However, there is a very healthy growth environment for anaerobic bacteria in sealed, home-canned foods. Such foods must be heat processed until a commercially sterile product is achieved, or they must have salts, sugars, acids or other preservatives added.
- Yeasts and molds are destroyed when food temperatures reach about 190°F, whereas most bacterial vegetative cells are destroyed in foods heated to a boiling temperature. Bacterial spores are able to survive for a long period at the temperature of boiling water.
- Pressure enables the processing of low-acid canned foods at temperatures higher than boiling water, where kill rates are greatly increased. Pressure canning is required to safely process foods that may support the growth of bacterial spores, leading to the production of toxins.

Sweetening and Acidifying Jellies & Jams

- Adds sugar and acids that tie up free water and lower the pH.

Pickling and Fermenting

- Use either naturally produced or added acids to inhibit or prevent the growth of *Clostridium botulinum* as well as molds and other pathogens.
- Fermenting uses bacteria to produce lactic acid and lower the pH in products such as fermented pickles and sauerkraut.

Canning Processes

- Use an **atmospheric steam canner** or a **boiling water canner** for high acid foods: fruits, pickled and fermented products, jams and jellies.
- Use a **pressure canner** for low acid foods: meats, vegetables, and seafood.

Why two different processes? Low acid foods must be pressure canned because *Clostridium botulinum*, the bacteria that causes botulism, is a spore former. When conditions are not favorable for the organism to grow (high heat, dryness, etc.), the bacterial cell forms a protective structure called a spore. It takes a higher temperature than boiling to destroy the spores: 240° - 250°F. If you do not destroy the spores in low acid foods they will germinate and produce fatal toxins in the food when it is stored on the shelf. High acid foods have enough acidity to prevent *Clostridium botulinum* from growing.

The USDA <u>does not</u> recommend the open kettle method of canning because it does not prevent all risks of spoilage. *(Open kettle canning is ladling hot foods into hot jars, applying the lids and letting them seal without processing them in a canner.)*

Pickles

A pickle is any fruit or vegetable preserved in vinegar or brine.

- **Brine pickles** are products fermented in salt brine. Regular dill pickles and sauerkraut are fermented and cured for about 3 weeks. They may be canned or stored in the refrigerator for 4-6 months.
- **Refrigerator dills** are not heat processed and must be stored in the refrigerator for 4-6 months.
- **Fresh-pack or quick-process pickles** are not fermented; some are brined several hours or overnight, then drained and covered with vinegar and seasonings.
- **Fruit pickles** are fruits that are pickled in spicy, sweet-sour syrup.
- **Relishes** are prepared using chopped products and cooked in a spicy vinegar solution.

Be sure to remove and discard a 1/16-inch slice from the blossom end of fresh cucumbers. Blossoms may contain an enzyme which causes excessive softening of pickles.

Salt

- Salts are not interchangeable.
- Use canning or pickling salt. Table salt contains anti-caking ingredients, which can cloud the brine. Kosher salt may also contain anti-caking ingredients so check the label.
- Since flake salt varies in density (grain size), it is not recommended for making pickled and fermented foods. (If you must substitute Kosher salt, it is lighter than canning salt so you need to use the same amount of salt by weight, not volume.
- In our class experiment, **1/2 cup pickling salt = 1 cup plus 2 Tablespoons Kosher salt**.)

Vinegar

The level of acidity in a pickled product is as important to its safety as it is to taste and texture. When pickling, always use high-quality commercial vinegars with 5% acidity or higher (also listed as 50-grain). The label should list the acidity on the label; if not, assume it is not 5%.

- Do not alter vinegar, food, or water proportions in a recipe or use a vinegar with unknown acidity. Doing so may alter its preservative effect and undermine the safety of the product.
- Use only recipes with tested proportions of ingredients.
- White distilled and cider vinegars of 5% acidity are recommended. White vinegar is usually preferred when light color is desirable.
- Do not use homemade vinegar as the acidity is unknown.

Water

- Soft water makes the best brine for pickles
- Hard water may cause cloudiness in the brine and discolor pickles. If only hard water is available, boil and let site for 24 hours. Skim off scum and use water from the top of the container without disturbing the sediment.

Pickles with reduced salt content

- When making fresh-pack pickles, cucumbers are acidified quickly with vinegar. Use only tested recipes formulated to produce the proper acidity. While these pickles may be prepared safely with reduced or no salt, their quality may be noticeably lower. Both texture and flavor may be slightly, but noticeably, different than expected.
- You may wish to make small quantities first to determine if you like them.

Sugars
White granulated and brown sugars are most often used. Corn syrup and honey, unless called for in reliable recipes, may produce undesirable flavors.

Spices
Use fresh whole spices for the best quality and flavor in pickles. Powdered spices may cause the product to darken and become cloudy. Pickles will darken less if you tie whole spices loosely in a clean white cloth or cheesecloth bag and then remove the bag from the product before packing the jars.

Firming Agents
If you use good quality ingredients in pickling and follow up-to-date methods, lime and alum are not needed for crisp pickles. If you choose to use firming agents, alum may be safely used to firm *fermented* cucumbers. Alum does not have an effect on quick-processes pickles.

- When pickling cucumbers, cut 1/16-inch slice off the blossom end and discard because enzymes in the blossom end causes soft pickles?
- Soaking cucumber in **ice** water for 4-5 hours before pickling is a safe method to make crisp pickles.
- The calcium in pickling lime does improve pickle firmness. Food-grade lime may be used as a lime-water solution for soaking fresh cucumbers 12 to 24 hours before pickling them. However, EXCESS LIME ABSORBED BY THE CUCUMBERS MUST BE REMOVED TO MAKE SAFE PICKLES. To remove excess lime, drain the lime-water solution, rinse and then re-soak the cucumbers in fresh water for 1 hour. Repeat the rinsing and soaking steps two more times.
- Calcium chloride for pickling is often sold where you buy canning supplies. It is usually added directly to the jars of pickles. Follow the instructions on the package.

Other considerations:

- ***Yellow crystals on pickled asparagus:*** Sometimes pickled asparagus will form yellow crystals. Do not panic!!! When asparagus is heated with acid (such as vinegar), rutin is drawn out of the asparagus plant. It then becomes insoluble in the vinegar and crystallizes on the exterior of the asparagus stems. It is safe to it; it is only a cosmetic concern. In commercially canned asparagus, a small amount of tin salts are added to the pickling solution, which prevents the rutin from crystallizing.
- ***Blue garlic***: Garlic contains anthocyanins, water- soluble pigments that can turn blue or purple in acidic environments like vinegar or pickling brine - the garlic is still safe to eat. Garlic should be fresh and at the peak of maturity. Immature or sprouting garlic can turn blue in the jar.

For Best Results …

- Store fresh-pack/quick pickles for 4-6 weeks in a cool, dry, dark place to allow the flavors to mellow and blend.
- Marinate **refrigerator** pickles (they aren't processed in heat) in the refrigerator for at least two weeks before serving and use within 3 months.

Preventing Spoilage
Pickle products are subject to spoilage from microorganisms, particularly yeasts and molds, as well as enzymes that may affect flavor, color, and texture. Processing the pickles in a boiling-water or steam canner will prevent these problems. Standard canning jars and self-sealing lids are recommended. Processing times and procedures will vary according to food acidity and the size of food pieces.

Canning Basics

Get Ready … Be Prepared!

- Read the recipe thoroughly before you begin.
- Measure out all ingredients.
- Have all of your utensils at hand.
- Wash jars, lids and rings in hot soapy water and rinse well. Check jars for imperfections.
- Place clean jars into the boiling water canner to heat.
- Prepare lids and rings according to the directions on the lid and ring packages. (Newer boxes of lids don't require pre-heating, older ones do. You may still pre-heat newer lids.)
- Do a "dry run" of the recipe to make sure you have all of your materials and understand the process.

General Canning Supplies

- Standard canning jars, rings, self-sealing one-time use lids; no paraffin wax as a sealing agent
- Funnel
- Headspace measurer
- De-bubbler
- Jar lifter
- Tray/towel for hot jars
- Canning pot with bottom rack and a lid
- Reputable recipe that follows the USDA recommended canning procedures

Raw-Pack vs. Hot-Pack Methods

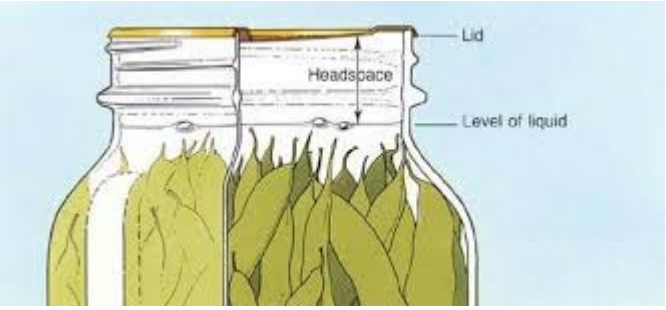
Filling jars with raw, unheated food prior to heat processing is called the raw-pack method. The preferred method, filling jars with preheated, hot food prior to heat processing, is called the hot-pack method. Benefits include a tighter pack and, because food expels air when heated, less float.

Jars

Check jars, lids and bands for high quality. Wash jars, lids and bands in hot, soapy water. Rinse well. Heat home canning jars in hot water, not boiling, until ready for use. Fill a large saucepan or stockpot half-way with water. You may also place them in your canner. Place jars in water (filling jars with water from the saucepan will prevent flotation). Bring to a simmer over medium heat. Keep jars hot until ready for use. You may also use a dishwasher to wash and heat jars. Keeping jars hot prevents them from breaking when hot food is added. Leave lids and bands at room temperature for easy handling.

Headspace

Headspace is the completely empty space left in the jar underneath the lid and above the food. Headspace allows for food to expand during canning without being forced out from under the lid during processing. Too much headspace and a vacuum may not form. Too little and the product may boil onto the rim and prevent a good seal.



Boiling Water Canner Processing

1. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods. Food preparation can begin while this water is preheating. Do not have the water boiling when you add the jars.
2. Place jars on the rack in the canner. Add enough boiling water to cover the tops of the jar by at least 1" to 2".
3. Place lid on canner. Bring the water to a rolling boil, then reduce heat to a gentle boil.
4. Begin to count processing time when the water comes to a boil.
5. Process for the time indicated in the recipe, maintaining a constant boil.
6. All recipes are developed using sea level as the criteria for processing time. If you are at a higher altitude, adjust the processing times according to the following chart:

Altitude in feet	Increase processing time
1000 - 3000	5 minutes
3001 - 6000	10 minutes
6001 - 8000	15 minutes
8001 - 10000	20 minutes

Note: these altitude adjustments are for non-jam & jelly recipes. Process jams & jellies for 5+ minutes in sterile jars as recommended on page 3.

7. When the jars have boiled for the recommended time, turn off the heat and remove the canner lid. Wait no more than 5 minutes before removing jars
8. Keep the jars upright when you remove them from the canner.
9. Place the hot jars on a rack or folded towel away from drafts or cool surfaces. Keep the jars separated so they will cool evenly. Do not disturb the seal. Do not retighten the rings.
10. Leave the ring bands on the jars until they have cooled (approximately 24 hours).
11. Do NOT invert jars: Some canning books still recommend inverting the jars after removing them from the boiling water canner. The USDA does not recommend this method.
12. After the jars cooled, remove the ring bands. Look at the top of each jar. If the lid is slightly concave, it indicates a seal. Test the seal by pressing on the lid with your finger; the lid should not give. If you are not sure a jar is sealed, carefully lift the jar by the lid after removing the ring band. If not properly sealed, the lid will come off.

13. Wash and dry bands. Clean the jars with a damp cloth. The ring bands may be replaced on the jars if desired. The ring bands must be thoroughly dry.
14. Label and date the jars, and store in a cool, dark, dry area.

Reprocessing - If a jar did not seal, refrigerate and use within a few days, or reprocess it within 24 hours using a new lid. Check the jar for flaws. Process by the method originally advised and for the full length of time.

Atmospheric Steam Canner Processing

1. Use a research tested recipe and processing time developed for a **boiling water** canner when using an atmospheric steam canner. An atmospheric steam canner may be used with recipes approved for half-pint, pint, or quart jars.
2. Add enough water to the base of the canner to cover the rack. (Follow manufacturer recommendations.)
3. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods. Food preparation can begin while this water is preheating. Do not have the water boiling when you add the jars.
4. Heat jars prior to filling with hot liquid (raw or hot pack). Do not allow the jars to cool before filling.
5. Load filled jars, fitted with lids, onto the canner rack and place the lid on the canner base.
6. Turn heat to its highest position to boil the water until a steady column of steam (6-8 inches) appears from the vent hole(s) in the canner lid. Jars must be processed in pure steam environment.
7. If using a canner with a temperature sensor, begin processing time when the temperature marker is in the green zone for your altitude. If using a canner without a temperature sensor, begin processing time when a steady stream of steam is visible from the vent hole(s).

8. Set the timer for the total minutes required for processing the food, adjusting for altitude (see chart on page 5). Processing time must be limited to **45 minutes or less, including any modification for elevation**. The processing time is limited by the amount of water in the canner base. When processing food, **do not** open the canner to add water.
9. Monitor the temperature sensor and/or steady stream of steam throughout the entire timed process. Regulate heat so that the canner maintains a temperature of 212°F. A canner that is boiling too vigorously can boil dry within 20 minutes. If a canner boils dry, the food is considered under-processed and therefore potentially unsafe.
10. At the end of the processing time, turn off the heat, wait 2-3 minutes and remove the lid, lifting the lid away from you.
11. Using a jar lifter, remove the jars without tipping and place them on a towel, leaving at least 1 inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.

Recipes: Pickled Vegetables

Pickled Garlic *Yield: 5 half-pint jars*

2 1/2 cups white vinegar
1 cup dry white wine
1 tbsp pickling or canning salt
1 tbsp granulated sugar
1 tbsp dried oregano
12 large heads of garlic, separated and peeled
5 dried chili peppers, such as cayenne, chile de arbol or Japanese dried chili (optional)

1. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
2. In a large stainless-steel saucepan, combine vinegar, wine, salt, sugar, and oregano. Bring to a boil over medium-high heat and boil gently for 1 minute. Add garlic and cook for 1 minute.
3. Pack garlic and 1 chili pepper, if using, into hot jars to within a generous ½ inch of top of jar. Ladle hot picking liquid into jar to cover garlic, leaving ½ inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot pickling liquid. Wipe rime, Center lid on jar. Screw band down until resistance is met, then increase to fingertip tight.
4. Process in a boiling water or steam canner for 10 minutes at 0-1,000 feet elevation, 15 minutes at 1,001-6,000 feet, 20 minutes above 6,000 feet.
5. If using a boiling water canner, remove lid and wait 5 minutes. If using a steam canner, wait 3 minutes before removing lid.
6. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Remove rings, clean and label jars. Store sealed jars in a cool, dry, dark location.

Source: Ball Complete Book of Home Preserving 2006 & nchfp.uga.edu 2020

Bread and Butter Zucchini *Yield: 8-9 pint jars*

16 cups fresh zucchini, sliced
4 cups onions, thinly sliced
1/2 cup canning or pickling salt
4 cups white vinegar (5%)
2 cups sugar
4 tablespoons mustard seed
2 tablespoons celery seed
2 teaspoons ground turmeric

1. Cover zucchini and onion slices with 1 inch of water and salt. Let stand 2 hours and drain thoroughly.
2. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
3. Combine vinegar, sugar, and spices. Bring to a boil and add zucchini and onions. Simmer 5 minutes.
4. Fill jars with mixture and pickling solution, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace if necessary. Wipe rims with a dampened clean paper towel; adjust two-piece metal canning lids.
5. Process in a boiling water or atmospheric steam canner for 10 minutes between 0-1,000 feet, 15 minutes between 1,001 – 6,000 feet, 20 minutes above 6,000 feet.
6. If using a boiling water canner, remove lid and wait 5 minutes. If using a steam canner, wait 3 minutes before removing lid.
7. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Remove rings, clean and label jars. Store sealed jars in a cool, dry, dark location.

Source: "Complete Guide to Home Canning," Agriculture Information Bulletin No. 539, USDA, 2015

Pickled Asparagus *Yield: about 3 wide-mouth pints*

5 pounds asparagus
3 large garlic cloves
2-1/4 cups water
2-1/4 cups white distilled vinegar (5%)
3 small hot peppers (optional)
1/4 cup canning salt
1-1/2 teaspoons dill seed

1. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
2. Wash asparagus gently under running water. Cut stems from the bottom to leave spears with tips that fit into the canning jar with a little less than 1/2-inch headspace.
3. Peel and wash garlic cloves. Place a garlic clove at the bottom of each jar, and tightly pack asparagus into jars with the blunt ends down.
4. In a 6-8 quart pot, combine water, vinegar, hot peppers (optional), salt and dill seed. Bring to a boil.
5. If using, place one hot pepper in each jar over asparagus spears. Pour boiling hot pickling brine over spears, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace if necessary, by adding hot solution. Wipe rims with a dampened clean paper towel; adjust two-piece metal canning lids.
6. Process in a boiling water or steam canner for 10 minutes at 0-1,000 feet elevation, 15 minutes at 1,001-6,000 feet, 20 minutes above 6,000 feet.
7. If using a boiling water canner, remove lid and wait 5 minutes. If using a steam canner, wait 3 minutes before removing lid.
8. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Remove rings, clean and label jars. Store sealed jars in a cool, dry, dark location.
9. Allow pickled asparagus to sit in processed jars for 3 to 5 days before consumption for best flavor development.

Source: USDA Complete Guide to Home Canning, 2015

Bread and Butter Pickles *Yield: about 5 pints*

10 cups sliced trimmed pickling cucumbers
4 medium onions, thinly sliced
1/2 cup pickling or canning salt
3 cups cider vinegar (5%)
2 cups brown sugar
2 tablespoons mustard seeds
1 teaspoon celery seeds
1 teaspoon ground turmeric
1 teaspoon ground ginger

1. In a glass or stainless steel bowl, combine cucumbers, onions and salt. Mix well, cover with cold water and let stand at room temperature for 2 hours. Transfer to a colander placed over a sink, rinse with cool running water and drain thoroughly.
2. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
3. In a large stainless steel pan, combine vinegar, brown sugar, mustard seeds, celery seeds, turmeric, and ground ginger. Bring to a boil over medium-high heat, stirring to dissolve sugar. Stir in vegetables and return to a boil.

4. Pack vegetables into hot jars to within a generous 1/2-inch of top of jar. Ladle hot pickling liquid into jar to cover vegetables, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot pickling liquid. Wipe rims with a dampened clean paper towel; adjust two-piece metal canning lids.
5. Process in a boiling water or atmospheric steam canner for 10 minutes between 0-1,000 feet, 15 minutes between 1,001 – 3,000 feet, 20 minutes between 3,001 – 6,000 feet, 25 minutes between 6,001 – 8,000 feet, and 30 minutes between 8,001 – 10,000 feet.
6. If using a boiling water canner, remove lid and wait 5 minutes. If using a steam canner, wait 3 minutes before removing lid.
7. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Remove rings, clean and label jars. Store sealed jars in a cool, dry, dark location.

Source: Ball Blue Book Guide to Preserving, 2012

Bread and Butter Jicama *Yield: about 3 pints*

7 cups cubed jicama
1-1/2 cups thinly sliced onion
1/2 cup chopped red bell pepper
2 cups distilled white vinegar (5%)
2-1/4 cups sugar
1 tablespoon mustard seed
1/2 tablespoon celery seed
1/2 teaspoon ground turmeric

1. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
2. Combine vinegar, sugar and spices in a large saucepot. Stir and bring to a boil.
3. Stir in prepared jicama, onion slices, and red bell pepper. Return to a boil, reduce heat and simmer 5 minutes. Stir occasionally.
4. Fill hot solids into clean, hot pint jars, leaving 1/2-inch headspace. Cover with boiling hot cooking liquid, leaving 1/2-inch headspace.
5. Remove air bubbles and adjust headspace if needed. Wipe rims with a dampened clean paper towel; adjust two-piece metal canning lids.
6. Process in a boiling water or atmospheric steam canner for 15 minutes between 0-1,000 feet, 20 minutes between 1,001 – 6,000 feet, and 25 minutes above 6,000 feet.
7. If using a boiling water canner, remove lid and wait 5 minutes. If using a steam canner, wait 3 minutes before removing lid.
8. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Remove rings, clean and label jars. Store sealed jars in a cool, dry, dark location.

Source: So Easy to Preserve, 2014

Recipes: Pickled Fruit

Apple Rings, Spiced *Yield: about 4-5 pints*

6 pounds firm tart apples (max diameter 2-1/2 inches)
6 cups sugar
3 cups water
3/4 cups white vinegar (5%)
1-1/2 tablespoons whole cloves
4 cinnamon sticks

1. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
2. Wash apples. Prepare enough ascorbic acid solution to hold sliced apples.
3. To prevent discoloration, peel and slice one apple at a time. Immediately cut crosswise into 1/2-inch slices, remove core area with a melon baller and immerse in ascorbic acid solution.
4. To make flavored syrup, combine sugar, water, vinegar, cloves and cinnamon sticks in a 6-qt saucepan. Stir, heat to boil, and simmer 3 minutes.
5. Drain apples, add to hot syrup, and cook 5 minutes.
6. Fill jars (preferably wide-mouth) with apple rings and hot flavored syrup, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace, if needed. Wipe rims with a dampened clean paper towel; adjust two-piece metal canning lids.
7. Process half-pint and pint jars in either a boiling water or steam canner for 10 minutes between 0-1,000 feet elevation, 15 minutes between 1,001-6,000 feet, and 20 minutes above 6,000 feet.
8. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Clean and label jars. Store sealed jars in a cool, dry, dark location.

Source: USDA Complete Guide to Home Canning, 2015

Strawberry Vinaigrette Dressing *Yield: about 6 half pints*

5 quarts (25 cups) whole strawberries, washed and stemmed
1 quart (4 cups) white distilled vinegar
Sugar

1. Place strawberries in a large stainless steel sauce-pot or plastic container. Add vinegar. Cover container tightly with plastic wrap and let stand overnight in a dark, cool place (70°F to 75°F).
2. Strain liquid from strawberries. Liquid should be red and clear (no pulp). Measure liquid.
3. Place strawberry vinegar in a clean, large stainless steel saucepan. Add an equal amount of sugar, stirring to combine. Bring mixture just to a boil. Remove from heat and skim foam if necessary.
4. Ladle hot vinaigrette into hot jars leaving 1/4-inch headspace. Wipe rim and apply two-piece metal canning lids.
5. Process in a steam or boiling water canner for 10 minutes at 0-1000', 15 minutes at 1,001 -3,000', 20 minutes at 3,001 – 6,000', 25 minutes above 6,000' elevation.

Strawberry Flavored Shrub
8 oz strawberry vinaigrette
24 oz sparkling water

Mix strawberry vinaigrette with sparkling water. Taste and add more syrup, if desired. Use shrub syrups as cocktail mixes, in salad dressings, and more.

Source: Ball Complete Book of Home Preserving, 2012

Watermelon Rinds, Pickled *Yield: about 4 or 5 pints*

3 quarts (about 6 pounds) watermelon rind
3/4 cup salt
3 quarts water
2 quarts (2 trays) ice cubes
9 cups sugar
3 cups white vinegar (5%)
3 cups water
1 tablespoon (about 48) whole cloves
6 cinnamon sticks, 1-inch pieces
1 lemon, thinly sliced, with seeds removed

1. Trim the pink flesh and outer green skin from thick watermelon rind. Cut into 1-inch squares. Cover with brine made by mixing the salt with 3 quarts cold water. Add ice cubes. Let stand 3 to 4 hours.
2. Drain, rinse, cover with cold water, cook until fork tender (10 minutes - do not overcook). Drain.
3. Combine sugar, vinegar, water, and spices (tied in a clean, thin, white cloth). Boil 5 minutes and pour over the watermelon; add lemon slices. Let stand overnight in the refrigerator.
4. The next day, heat watermelon in syrup to boiling and cook slowly 1 hour.
5. Wash and rinse canning jars; keep hot until ready to use. Prepare lids and bands according to manufacturer's directions.
6. Pack hot pickles loosely into clean, hot pint jars. To each jar add 1 piece of stick cinnamon from spice bag; cover with boiling syrup, leaving 1/2-inch headspace.
7. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel; adjust two-piece metal canning lids.
8. Process pint jars in either a boiling water or steam canner for 10 minutes between 0-1,000 feet elevation, 15 minutes between 1,001-6,000 feet, and 20 minutes above 6,000 feet.
9. Remove jars from canner. Let cool, undisturbed, 12-24 hours and check for seals. Clean and label jars. Store sealed jars in a cool, dry, dark location.

Source: USDA Complete Guide to Home Canning, 2015

Resources: National Center for Home Food Preservation, http://nchfp.uga.edu