

Let's Preserve: Fermented and Pickled Foods

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Pickles and relishes are very popular as a condiment to serve with meals. They are easy to make; however, the steps are very important to follow to ensure a safe product. Many vegetables can be pickled. Cucumbers and cabbage are the main vegetables that are pickled.

Two types of pickling methods can be used to make a variety of pickled products.

Fermented Pickles

Fermented pickles, including sauerkraut, are made from cucumbers or cabbage that are fermented for several weeks. Bacteria that are naturally present on these vegetables produce acid under the proper conditions. Then the proper amount of salt is added to inhibit spoilage and pathogenic bacteria. The amount of salt should never be altered when making pickles or sauerkraut by the fermentation process. A characteristic lactic acid flavor results when pickles are made by fermentation.

Fresh-Pack or Quick Pickles

Fresh-pack or quick process pickles are made with an acid (vinegar). Spices, salt, and sugar are added for flavor. These pickles do not require a fermentation peri-

od and they are usually made and processed within a day. The major flavor of a fresh-pack or quick pickle is due to the vinegar (acetic acid).



Photo courtesy of National Presto Industries, Inc.

Before you begin to pickle, consider what type of pickled product you would like to make. This publication provides procedures to safely process a variety of fermented and pickled foods. The publication *Let's Preserve: Canning Basics (EC434)* gives information on boiling-water canners, jar and lid selection, and preparation.

Cucumber Selection

Select fresh, firm cucumbers free from spoilage and of the appropriate size for the type of pickle to be made. For gherkins, select cucumbers about 1 1/2 inches in length and for dill pickles, use 4 inch cucumbers. For best results, use cucumber varieties intended for pickling.

Be sure to remove and discard a 1/16 inch slice from the blossom end of fresh cucumbers. Blossoms may contain enzymes which cause excessive softening of pickles. Wash and rinse cucumbers with cold water before use.

Approximately 14 pounds of cucumbers are needed for 7 quarts or 9 pounds of cucumbers for 9 pints. A bushel of cucumbers weighs 48 pounds and yields 16 to 24 quarts — an average of 2 pounds per quart. Measure

or weigh the amounts of food carefully because the proportion of fresh food to the other ingredients will affect flavor and safety of the final product.

Cabbage Selection

For the best sauerkraut, use firm heads of fresh cabbage. Freshly harvested cabbage is very crisp and fractures easily. Keep freshly harvested heads in a cool dry place for one to two days before shredding for kraut use.

Ingredients

Salt

Use of canning or pickling salt is recommended. Fermented and fresh-pack or quick pickles may be safely made using either iodized or noniodized table salt. However, noncaking materials added to table salt may make the brine cloudy. Flake salt varies in density and is not recommended for use.

Reduced-sodium salts, for example, “Lite Salt,” may be used in quick pickle recipes, as indicated in this guide. The pickles may, however, have a slightly different taste than expected. Caution: Use of reduced-sodium salt in fermented pickle recipes is not recommended.

Sugar

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

Vinegar

White distilled and cider vinegars of 5 percent acidity (50 grain) are recommended. Vinegar with unknown acidity should not be used. White vinegar is usually preferred when a light color is desirable, as in the case with fruits and cauliflower.

The level of acidity in a pickled or fermented product is as important to its safety as it is to taste and texture. Do not alter vinegar, food, or water proportions in a recipe. Use only recipes with tested proportions of ingredients.

There must be a minimum, uniform level of acid throughout the mixed product to prevent the growth of *Clostridium botulinum* bacteria.

Water

Use soft water, if possible. Extremely hard water can discolor pickles, especially if it has a high iron content. Sediment from hard water also may be a problem when extremely hard water is used to make pickles. Some types of hard water may be softened somewhat. Boil the water for 15 minutes, skim off the scum, and let the water rest for 24 hours. When the sediment has settled to the bottom, pour off the water from the top and use.

Firming Agents

Alum

Alum (a preservative available in the spice section of your grocery store) can be safely used to firm fermented pickles. It is not necessary and is not included in the recipes in this publication. Alum does not improve the firmness of quick process pickles.

Pickling Lime

The calcium in lime definitely improves pickle firmness. Food-grade or pickling lime may be used as a lime-water solution for soaking fresh cucumbers 12 to 24 hours before pickling them. 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 resoak the cucumbers in fresh water for one hour. Repeat the rinsing and soaking steps two more times.

Boiling Water Bath Processing

Pickled products may spoil from microorganisms, particularly yeasts and molds, as well as enzymes that may affect flavor, color, or texture. Processing the pickles in a boiling-water canner will prevent both of these problems. Processing times and procedures will vary with the food acidity and size of the food pieces. Follow the recommended processing procedures in this publication for successful results. Wait five minutes before removing jars from canner.

Low-temperature Pasteurization Treatment

A low-temperature pasteurization method to process pickles results in a firmer product. The treatment must be carefully managed to avoid possible spoilage.

Place jars in a canner filled halfway with warm (120° to 140°F) water. Then, add hot water to a level 1 inch above jars. Heat the water enough to maintain 180° to 185°F water temperature for 30 minutes. Check with a candy or jelly thermometer to be certain that the water temperature is at least 180°F during the entire 30 minutes. **Caution: Use the low temperature pasteurization treatment only when the recipe indicates.**

Determine Your Altitude

Water boils at 212°F at sea level. As the elevation increases, water boils at lower temperatures and foods take longer to cook. To ensure safely canned foods at altitudes above sea level, lengthen the processing time for boiling-water canning methods. *Figure 1* shows Nebraska altitudes. Find your area and check the tables for the correct processing time for your altitude.

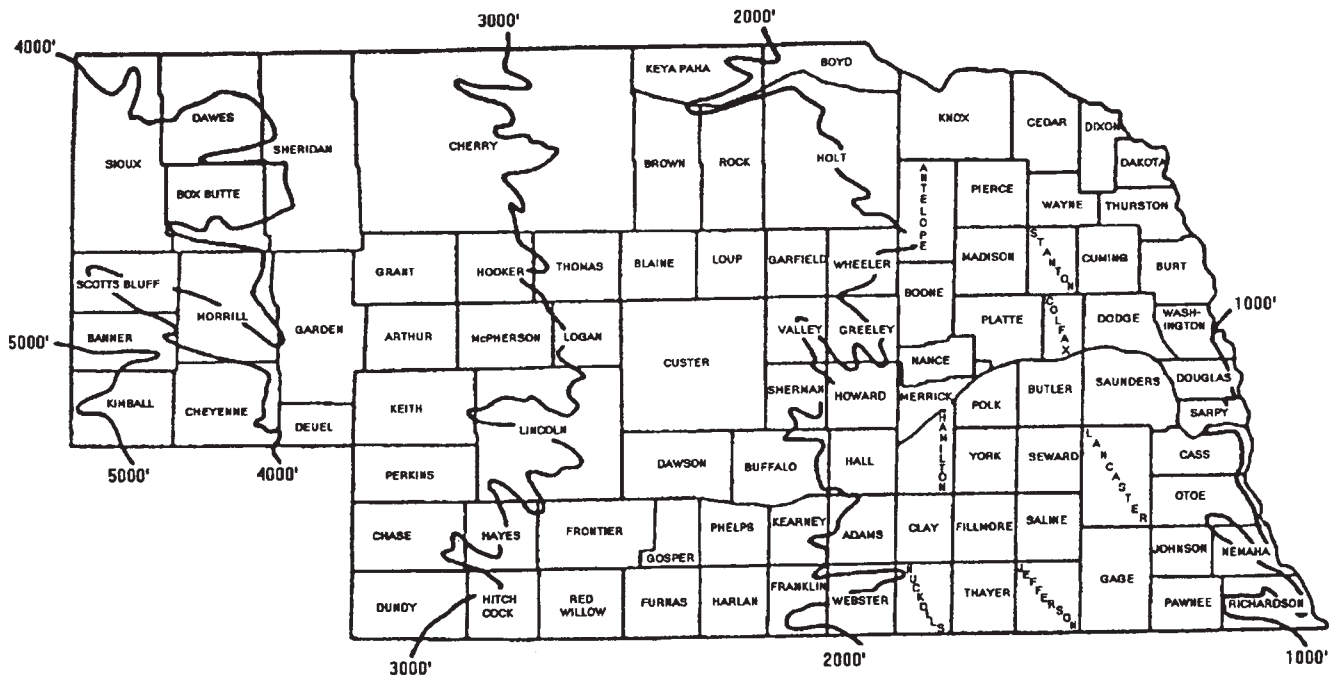


Figure 1. Altitude ranges in Nebraska.

Map was prepared by Les Howard, cartographer, UNL School of Natural Resources

Suitable Containers, Covers, and Weights for Fermenting Food

A 1-gallon container is needed for each 5 pounds of fresh vegetables. Therefore, a 5-gallon stone crock is of ideal size for fermenting about 25 pounds of fresh cabbage or cucumbers. Food-grade plastic and glass containers are excellent substitutes for stone crocks. Other 1- to 3-gallon nonfood grade plastic containers may be used if lined inside with a clean food-grade plastic bag. **Caution: Be certain that foods contact only food-grade plastics. Do not use garbage bags or trash liners.** Fermenting sauerkraut in quart and half-gallon Mason jars is an acceptable practice, but may result in more spoilage losses.

Cabbage and cucumbers must be kept 1 to 2 inches under brine while fermenting. After adding prepared vegetables and brine, insert a suitably sized dinner plate

or glass pie plate inside the fermentation container. The plate must be slightly smaller than the container opening, yet large enough to cover most of the shredded cabbage or cucumbers. To keep the plate under the brine, weight it down with 2 to 3 sealed quart jars filled with water. Covering the container opening with a clean, heavy bath towel helps to prevent contamination from insects and molds while the vegetables are fermenting. Fine quality fermented vegetables also are obtained when the plate is weighted down with a very large clean, plastic bag filled with 3 quarts of water containing 4 1/2 tablespoons of salt. Be sure to seal the plastic bag. Freezer bags sold for packaging turkeys are suitable for use with 5-gallon containers.

The fermentation container, plate and jars must be washed in hot sudsy water and rinsed well with very hot water before use.

RECIPES

Dill Pickles

- For each gallon capacity of your container use:
- 4 lb of 4-inch pickling cucumbers
 - 2 tbsp dill seed or 4 to 5 heads fresh or dry dill weed
 - 1/2 cup (canning or pickling) salt
 - 1/4 cup vinegar (5%)
 - 8 cups water and one or more of the following:
 - 2 cloves garlic (optional)
 - 2 dried red peppers (optional)
 - 2 tsp whole mixed pickling spices (optional)

Wash cucumbers. Cut 1/16 inch slice off blossom end and discard. Leave 1/4 inch of stem attached. Place half of dill and spices on bottom of a clean, suitable container (see Page 2). Add cucumbers, remaining dill, and spices. Dissolve salt in vinegar and water and pour over cucumbers. Add suitable cover and weight.

Store where temperature is between 70° and 75°F for about three to four weeks while fermenting. Temperatures of 55° to 65°F are acceptable, but the fermentation will take five to six weeks. Avoid temperatures above 80°F or pickles will become too soft during fermentation. Fermenting pickles cure slowly. Check the container several times a week and promptly remove surface scum or mold. Caution: If the pickles become soft, slimy or develop a disagreeable odor, discard them.

Fully fermented pickles may be stored in the original container for about four to six months, provided they are refrigerated and surface scum and molds are removed regularly. Canning fully fermented pickles is a better way to store them. To can them, pour the brine into a pan, heat slowly to a boil, and simmer five minutes. Filter brine through a paper coffee filter to reduce cloudiness, if desired. Fill jar with pickles and hot brine, leaving 1/2 inch headspace. Adjust lids and process as below or use the low-temperature pasteurization treatment described on Page 2. Wait five minutes before removing jars from canner.

Recommended Process Time for Dill Pickles in a Boiling-water Canner				
Style of Pack	Jar Size	Process Time at Altitudes of		
		0-1,000 ft	1,001-6,000 ft	Above 6,000 ft
Raw	Pints	10 min	15 min	20 min
	Quarts	15 min	20 min	25 min

Sauerkraut

- 25 lb cabbage
- 3/4 cup canning or pickling salt

Yield: About 9 quarts

Work with about 5 pounds of cabbage at a time. Discard outer leaves. Rinse heads under cold running water and drain. Cut heads in quarters and remove cores. Shred or slice to the thickness of a quarter. Put cabbage in a suitable fermentation container (see Page 2), and add 3 tbsp of salt. Mix thoroughly, using clean hands or use gloves. Pack firmly until salt draws juices from cabbage. Repeat shredding, salting, and packing until all cabbage is in the container. Be sure it is deep enough so that its rim is at least 4 or 5 inches above the cabbage. If juice does not cover cabbage, add boiled and cooled brine (1 1/2 tbsp of salt per quart of water). Add plate and weights; cover container with a clean bath towel. Store at 70° to 75°F while fermenting. At temperatures between 70° and 75°F, kraut will be fully fermented in about three to four weeks; at 60° to 65°F, fermentation may take five to six weeks. At temperatures below 60°F, kraut may not ferment. Above 75°F, kraut may become soft.

If you weigh the cabbage down with a brine-filled bag, do not disturb the crock until normal fermentation is completed (when bubbling ceases). If you use jars as weight, you will have to check the kraut two to three times each week and remove scum if it forms. Fully fermented kraut may be kept tightly covered in the refrigerator for several months or it may be canned as follows:

Hot pack — Bring kraut and liquid slowly to a boil in a large kettle, stirring frequently. Remove from heat and fill jars rather firmly with kraut and juices, leaving 1/2-inch headspace.

Raw pack — Fill jars with kraut and cover with juices, leaving 1/2-inch headspace.

Recommended Process Time for Sauerkraut in a Boiling-water Canner				
Style of Pack	Jar Size	Process Time at Altitudes of		
		0-1,000 ft	1,001-6,000 ft	Above 6,000 ft
Hot	Pints	10 min	15 min	15 min
	Quarts	15 min	20 min	20 min
Raw	Pints	20 min	25 min	30 min
	Quarts	25	30	35 min

RECIPES

Fresh-Pack or Quick Pickled Foods

Pickled Asparagus

For six wide-mouth pint jars	For seven 12-ounce jars
10 pounds asparagus	7 pounds asparagus
6 large garlic cloves	7 large garlic cloves
4 1/2 cups water	3 cups water
1/2 cup white distilled vinegar (5%)	3 cups white distilled vinegar (5%)
6 small hot peppers (optional)	7 small hot peppers (optional)
1/2 cup canning salt	1/3 cup canning salt
3 tsp dill seed	2 tsp dill seed

Wash asparagus well, but 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. 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.

In an 8-quart Dutch oven or saucepot, combine water, vinegar, hot peppers (optional), salt, and dill seed. Bring to a boil. Place one hot pepper (if used) 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 needed. Wipe rims of jars with a dampened, clean paper towel; apply two-piece metal canning lids.

Process in a boiling water canner according to the recommendations on Page 11. Wait five minutes before removing jars from canner. Let cool, undisturbed, for 12 to 24 hours and check for seals.

Allow pickled asparagus to sit in processed jars for three to five days before consumption for best flavor development.

Pickled Baby Carrots

8 1/2 cups peeled baby carrots
5 1/2 cups white distilled vinegar (5%)
1 cup water
2 cups sugar
2 tsp canning salt
8 tsp mustard seed
4 tsp celery seed

Yield: About 4 pint jars

Wash carrots well and peel, if necessary. Wash again after peeling.

Combine vinegar, water, sugar, and canning salt in an 8-quart Dutch oven or stockpot. Bring to a boil and

boil gently three minutes. Add carrots and bring back to a boil. Then reduce heat to a simmer and heat until the carrots are half-cooked (about 10 minutes).

Meanwhile, place 2 tsp mustard seed and 1 tsp celery seed in the bottom of each clean, hot pint jar.

Fill hot jars with the hot carrots, leaving 1-inch headspace. Cover with hot pickling liquid, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened, clean paper towel; adjust two-piece metal canning lids.

Process in a boiling-water canner, as recommended on Page 11. Wait five minutes before removing jars from canner. Let cool, undisturbed, 12 to 24 hours and check for seals.

Allow carrots to sit in processed jars for three to five days before consuming for best flavor development.

Pickled Dilled Beans

4 lb fresh tender green or yellow beans (5 to 6 inches long)
8 to 16 heads fresh dill
8 cloves garlic (optional)
1/2 cup canning or pickling salt
4 cups white vinegar (5%)
4 cups water
1 tsp hot red pepper flakes (optional)

Yield: About 8 pints

Wash and trim end from beans and cut to 4-inch lengths. In each sterile pint jar, place one to two dill heads and, if desired, one clove of garlic. Place whole beans upright in jars, leaving 1/2-inch headspace. Trim beans to ensure proper fit, if necessary. Combine salt, vinegar, water, and pepper flakes (if desired). Bring to a boil. Add hot solution to beans, leaving 1/2 inch headspace. Process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Three-Bean Salad

1 1/2 cups cut and blanched green or yellow beans (prepared as below)
1 1/2 cups canned, drained, red kidney beans
1 cup canned, drained garbanzo beans
1/2 cup peeled and thinly sliced onion (about 1 medium onion)
1/2 cup trimmed and thinly sliced celery (1 1/2 medium stalks)
1/2 cup sliced green peppers (1/2 medium pepper)
1/2 cup white vinegar (5%)

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1/4 cup bottled lemon juice
3/4 cup sugar
1/4 cup oil
1/2 tsp canning or pickling salt
1 1/4 cups water

Yield: About 5 to 6 half-pints

Wash and snap off ends of fresh green or yellow beans. Cut or snap into 1- to 2-inch pieces. Blanch two minutes and cool immediately. Rinse kidney beans with tap water and drain again. Prepare and measure all other vegetables. Combine vinegar, lemon juice, sugar, and water and bring to a boil. Remove from heat. Add oil and salt and mix well. Add beans, onions, celery, and green pepper to solution and bring to a simmer. Marinate 12 to 14 hours in refrigerator, then heat entire mixture to a boil. Fill clean jars with solids. Add hot liquid, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Beets

7 lb of 2- to 2 1/2-inch diameter beets
4 cups vinegar (5%)
1 1/2 tsp canning or pickling salt
2 cups sugar
2 cups water
2 cinnamon sticks
12 whole cloves
4 to 6 onions (2- to 2 1/2-inch diameter), if desired

Yield: About 8 pints

Trim off beet tops, leaving 1 inch of stem and roots to prevent bleeding of color. Wash thoroughly. Sort for size. Cover similar sizes together with boiling water and cook until tender (about 25 to 30 minutes). Caution: Drain and discard liquid. Cool beets. Trim off roots and stems and slip off skins. Slice into 1/4-inch slices. Peel and thinly slice onions. Combine vinegar, salt, sugar, and fresh water. Put spices in cheesecloth bag and add to vinegar mixture. Bring to a boil. Add beets and onions. Simmer five minutes. Remove spice bag. Fill jars with beets and onions, leaving 1/2-inch headspace. Add hot vinegar solution, allowing 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Variation: *Pickled whole baby beets.* Follow above directions but use beets that are 1- to 1-1/2 inches in diameter. Pack whole; do not slice. Onions may be omitted.

Pickled Cauliflower or Brussels Sprouts

12 cups of 1- to 2-inch cauliflower florets or small Brussels sprouts
4 cups white vinegar (5%)
2 cups water
2 cups thinly sliced onions
1 cup diced sweet red peppers
2 tbsp mustard seed
1 tbsp celery seed
1 tsp turmeric
1 tsp hot red pepper flakes

Yield: About 9 half-pints

Wash cauliflower florets or Brussels sprouts (remove stems and blemished outer leaves) and boil in salt water (4 tsp canning salt per gallon of water) for three minutes for cauliflower and four minutes for Brussels sprouts. Drain and cool. Combine vinegar, sugar, onion, diced red pepper, and spices in large saucepan. Bring to a boil and simmer five minutes. Distribute onion and diced pepper among jars. Fill jars with pieces and pickling solution, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Corn Relish

10 cups fresh whole kernel corn (16 to 20 medium-size ears), or
six 10-ounce packages of frozen corn
2 1/2 cups diced sweet red peppers
2 1/2 cups diced sweet green peppers
2 1/2 cups chopped celery
1 1/4 cups diced onions
1 3/4 cups sugar
5 cups vinegar (5%)
2 1/2 tbsp canning or pickling salt
2 1/2 tsp celery seed
2 1/2 tsp dry mustard
1 1/4 tsp turmeric

Yield: About 9 pints

Boil ears of corn 5 minutes. Dip in cold water. Cut whole kernels from cob or use six 10-ounce frozen packages of corn. Combine peppers, celery, onions, sugar, vinegar, salt, and celery seed in a saucepan. Bring to boil and simmer five minutes, stirring occasionally. Mix mustard and turmeric in 1/2 cup of the simmered mixture. Add this mixture and corn to the hot mixture. Simmer

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another five minutes. If desired, thicken mixture with flour paste (1/4 cup flour blended in 1/4 cup water) and stir frequently. Fill jars with hot mixture, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Horseradish Sauce

2 cups (3/4 lb) freshly grated horseradish
1 cup white vinegar (5%)
1/2 tsp canning or pickling salt
1/4 tsp powdered ascorbic acid

Yield: About 2 half-pints

The pungency of fresh horseradish fades within one to two months, even when refrigerated. Therefore, make only small quantities at a time. Wash horseradish roots thoroughly and peel off brown outer skin. The peeled roots may be grated in a food processor or cut into small cubes and put through a food grinder. Combine ingredients and fill into sterile jars, leaving 1/4-inch headspace. Seal jars tightly and store in a refrigerator.

Marinated Whole Mushrooms

7 lb small whole mushrooms
1/2 cup bottled lemon juice
2 cups olive or salad oil
2 1/2 cups white vinegar (5%)
1 tbsp oregano leaves
1 tbsp dried basil leaves
1 tsp canning or pickling salt
1/2 cup finely chopped onions
1/4 cup diced pimento
2 cloves garlic, cut in quarters
25 black peppercorns

Yield: About 9 half-pints

Select very fresh unopened mushrooms with caps less than 1-1/4 inch in diameter. Wash. Cut stems, leaving 1/4-inch attached to cap. Add lemon juice and water to cover. Bring to boil. Simmer five minutes. Drain mushrooms. Mix olive oil, vinegar, oregano, basil, and salt in a saucepan. Stir in onions and pimento and heat to boiling. Place 1/4 garlic clove and two to three peppercorns in a half-pint jar. Fill jars with mushrooms and hot, well-mixed oil/vinegar solution, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Dilled Okra

7 lb small okra pods
6 small hot peppers
4 tsp dill seed
8 to 9 garlic cloves
2/3 cup canning or pickling salt
6 cups water
6 cups vinegar (5%)

Yield: 8 to 9 pints

Wash and trim okra. Fill jars firmly with whole okra, leaving 1/2-inch headspace. Place 1 garlic clove in each jar. Combine salt, hot peppers, dill seed, water and vinegar in large saucepan and bring to a boil. Pour hot pickling solution over okra, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Marinated Peppers

Bell, Hungarian, banana, or jalapeno
4 lb firm pepper*
1 cup bottled lemon juice
2 cups white vinegar (5%)
1 tbsp oregano leaves
1 cup olive or salad oil
1/2 cup chopped onions
2 cloves garlic, quartered (optional)
2 tbsp prepared horseradish (optional)

*Note: It is possible to adjust the intensity of pickled jalapeno peppers by using all hot jalapeno peppers (hot style) or blending with sweet and mild peppers (medium or mild style).

- For hot style: Use 4 lb jalapeno peppers
- For medium style: Use 2 lb jalapeno peppers and 2 lb sweet and mild peppers.
- For mild style: Use 1 lb jalapeno peppers and 3 lb sweet and mild peppers.

Yield: About 9 half-pints

Select your favorite pepper. Caution: If you select hot peppers, wear rubber or plastic gloves while handling them or wash hands thoroughly with soap and water before touching your face or eyes. Peppers may be left whole or large peppers may be quartered. Wash, slash two to four slits in each pepper, and blanch in boiling water or blister in order to peel tough-skinned hot peppers.

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Blistering. Peppers may be blistered using one of the following methods:

Oven or broiler method — Place peppers in a hot oven (400°F) or broiler for 6-8 minutes or until skins blister.

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

Allow peppers to cool. Place in pan and cover with a damp cloth. This will make peeling the peppers easier. After several minutes of cooling, peel each pepper. Flatten whole peppers. Mix all remaining ingredients in a saucepan and heat to boiling. Place 1/4 garlic clove (optional) and 1/4 teaspoon salt in each half pint or 1/2 tsp salt per pint. Fill jars with peppers, add hot, well-mixed oil/pickling solution over peppers, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Bell Peppers

7 lb firm bell peppers
3 1/2 cups sugar
3 cups vinegar (5%)
3 cups water
9 cloves garlic
4 1/2 tsp canning or pickling salt

Yield: About 9 pints

Wash peppers, cut into quarters, remove cores and seeds, and cut away any blemishes. Slice peppers in strips. Boil sugar, vinegar, and water for 1 minute. Add peppers and bring to a boil. Place 1/2 clove of garlic and 1/4 teaspoon salt in each sterile half-pint jar; double the amounts for pint jars. Add pepper strips and cover with hot vinegar mixture, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Hot Peppers

Hungarian, banana, chili, jalapeno
4 lb hot long red, green, or yellow peppers
3 lb sweet red and green peppers, mixed
5 cups vinegar (5%)
1 cup water
4 tsp canning or pickling salt
2 tbsp sugar
2 cloves garlic

Yield: About 9 pints

Caution: Wear rubber gloves when handling hot peppers or wash hands thoroughly with soap and water before touching your face.

Wash peppers. If small peppers are left whole, slash two to four slits in each. Quarter large peppers. Blanch in boiling water or blister in order to peel (see instructions for blistering in column one). Cool and peel off skin. Flatten small peppers. Fill jars, leaving 1/2-inch headspace. Combine and heat other ingredients to boiling and simmer 10 minutes. Remove garlic. Add hot pickling solution over peppers, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Pepper-Onion Relish

6 cups finely chopped onions
3 cups finely chopped sweet red peppers
3 cups finely chopped green peppers
1 1/2 cups sugar
6 cups vinegar (5%), preferably white distilled
2 tbsp canning or pickling salt

Yield: 9 half-pints

Wash and chop vegetables. Combine all ingredients and boil gently until mixture thickens and volume is reduced by one-half (about 30 minutes). Fill sterile jars with hot relish, leaving 1/2-inch headspace, and seal tightly. Store in refrigerator and use within one month. **Caution:** If extended storage is desired, this product must be processed according to the table on Page 11. Wait five minutes before removing jars from canner.

Piccaililli

6 cups chopped green tomatoes
1 1/2 cups chopped sweet red peppers
1 1/2 cups chopped green peppers
2 1/4 cups chopped onions
7 1/2 cups chopped cabbage
1/2 cup canning or pickling salt
3 tbsp whole mixed pickling spice
4 1/2 cups vinegar (5%)
3 cups brown sugar

Yield: 9 half-pints

Wash, chop, and combine vegetables with 1/2 cup salt. Cover with hot water and let stand 12 hours. Drain and press in a clean white cloth to remove all possible

RECIPES

liquid. Tie spices loosely in a spice bag and add to combined vinegar and brown sugar and heat to boil in saucepan. Add vegetables and boil gently 30 minutes or until the volume of the mixture is reduced by one-half. Remove spice bag. Fill hot sterile jars with hot mixture, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Bread-and-Butter Pickles

6 lb of 4- to 5-inch pickling cucumbers
8 cups thinly sliced onions (about 3 pounds)
1/2 cup canning or pickling salt
4 cups vinegar (5%)
4 1/2 cups sugar
2 tbsp mustard seed
1 1/2 tbsp celery seed
1 tbsp ground turmeric
1 cup pickling lime (optional — for use in variation for making firmer pickles)

Yield: About 8 pints

Wash cucumbers. Cut 1/16-inch off blossom end and discard. Cut into 3/16-inch slices. Combine cucumbers and onions in a large bowl. Add salt. Cover with 2 inches crushed or cubed ice. Refrigerate three to four hours, adding more ice as needed.

Combine remaining ingredients in a large pot. Boil 10 minutes. Drain and add cucumbers and onions and slowly reheat to boiling. Fill pint jars with slices and cooking syrup, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11 or use low-temperature pasteurization treatment described on Page 2. Wait five minutes before removing jars from canner.

Variation for firmer pickles: Wash cucumbers. Cut 1/16-inch off blossom end and discard. Cut into 3/16-inch slices. Mix 1 cup pickling lime and 1/2 cup salt to 1 gallon water in a 2- to 3-gallon crock or enamelware container. Avoid inhaling lime dust while mixing the lime-water solution. Soak cucumber slices in lime water for 12 to 24 hours, stirring occasionally. Remove from lime solution, rinse, and resoak one hour in fresh cold water. Repeat the rinsing and soaking steps two more times. Handle carefully, as slices will be brittle. Drain well.

Storage: After processing and cooling, jars should be stored four to five weeks to develop ideal flavor.

Variation: *Squash bread-and-butter pickles.* Substitute slender (1- to 1 1/2-inch diameter) zucchini or yellow summer squash for cucumbers.

Quick Fresh-Pack Dill Pickles

8 lb of 3- to 5-inch pickling cucumbers
2 gallons water
1 1/4 cups canning or pickling salt
1 1/2 quarts vinegar (5%)
1/4 cup sugar
2 quarts water
2 tbsp whole mixed pickling spice
5 tbsp whole mustard seed (2 tsp per quart jar)
21 heads of fresh dill (3 heads per quart jar) or
7 tbsp dill seed (1 tbsp per quart jar)

Yield: 7 to 9 pints

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard, but leave 1/4 inch of stem attached. Dissolve 3/4 cup salt in 2 gallons water. Pour over cucumbers and let stand 12 hours. Drain. Combine vinegar, 1/2 cup salt, sugar, and 2 quarts water. Add mixed pickling spices tied in a clean white cloth. Heat to boiling. Fill jars with pickles. Add 2 tsp mustard seed and three heads fresh dill per quart. Cover with boiling pickling solution, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11 or use low temperature pasteurization treatment described on Page 2. Wait five minutes before removing jars from canner.

Pickle Relish

3 quarts chopped cucumbers
3 cups each of chopped sweet garden and red peppers
1 cup chopped onions
3/4 cup canning or pickling salt
4 cups ice
8 cups water
2 cups sugar
4 tsp each of mustard seed, turmeric, whole allspice, and whole cloves
6 cups white vinegar (5%)

Yield: About 9 pints

Add cucumbers, peppers, onions, salt, and ice to water and let stand four hours. Drain and re-cover vegetables with fresh ice water for another hour. Drain again. Combine spices in a spice or cheesecloth bag. Add spices

RECIPES

to sugar and vinegar. Heat to boiling and pour mixture over vegetables. Cover and refrigerate 24 hours. Heat mixture to boiling and fill hot into clean jars, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Mixed Vegetables

- 4 lb of 4- to 5-inch pickling cucumbers, washed, cut into 1-inch slices (cut off 1/16 inch from blossom end and discard)
- 2 lb peeled and quartered small onions
- 4 cups cut celery (1-inch pieces)
- 2 cups peeled and cut carrots (1/2-inch pieces)
- 2 cups cut sweet red peppers (1/2-inch pieces)
- 2 cups cauliflower flowerets
- 5 cups white vinegar (5%)
- 1/4 cup prepared mustard
- 1/2 cup canning or pickling salt
- 3 1/2 cups sugar
- 3 tbsp celery seed
- 2 tbsp mustard seed
- 1/2 tsp whole cloves
- 1/2 tsp ground turmeric

Yield: About 10 pints

Combine vegetables, cover with 2 inches of cubed or crushed ice, and refrigerate three to four hours. In 8-quart kettle, combine vinegar and mustard and mix well. Add salt, sugar, celery seed, cloves, and turmeric. Bring to boil. Drain vegetables and add to hot pickling solution. Fill vegetables in sterile pint jars or clean quarts, leaving 1/2-inch headspace. Add pickling solution, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11. Wait five minutes before removing jars from canner.

Pickled Bread-and-Butter Zucchini

- 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 tbsp mustard seed
- 2 tbsp celery seed
- 2 tsp ground turmeric

Yield: About 8 to 9 pints

Cover zucchini and onion slices with 1 inch of water and salt. Let stand two hours and drain thoroughly. Combine vinegar, sugar, and spices. Bring to boil and add zucchini and onions. Simmer five minutes and fill jars with mixture and pickling solution, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 11 or use low-temperature pasteurization treatment described on Page 2. Wait five minutes before removing jars from canner.

Recommended Process Times for Nonfermented Pickles in a Boiling-water Canner

Product	Style of Pack	Jar Size	Process Times at Altitudes of		
			0- 1,000 ft	1,001- 3,000 ft	3,001- 6,000 ft
Pickled Asparagus	Raw	12-ounce or Pints	10 min	15 min	
Pickled Baby Carrots	Hot	Pints	15 min	20 min	
Pickled Dilled Beans	Raw	Pints	5 min	10 min	10 min
Three-Bean Salad	Hot	Half-pints or Pints	15 min	20 min	20 min
Pickled Beets	Hot	Pints or Quarts	30 min	35 min	40 min
Pickled Cauliflower or Brussels Sprouts	Hot	Half-pints or Pints	10 min	15 min	15 min
Pickled Corn Relish	Hot	Half-pints or Pints	15 min	20 min	20 min
Marinated Whole Mushrooms	Hot	Half-pints	20 min	25 min	30 min
Pickled Dilled Okra	Hot	Pints	10 min	15 min	15 min
Marinated Peppers	Raw	Half-pints or Pints	15 min	20 min	20 min
Pickled Bell Peppers	Hot	Half-pints or Pints	5 min	10 min	10 min
Pickled Hot Peppers	Raw	Half-pints or Pints	10 min	15 min	15 min
Pickled Pepper- Onion Relish	Hot	Half-pints or Pints	5 min	10 min	10 min
Piccalilli	Hot	Pints	5 min	10 min	10 min
Bread-and-Butter Pickles	Hot	Pints or Quarts	10 min	15 min	15 min
Quick Fresh- Pack Dill Pickles	Raw	Pints Quarts	10 min 15 min	15 min 20 min	15 min 20 min
Pickle Relish	Hot	Half-pints or Pints	10 min	15 min	15 min
Pickled Mixed Vegetables	Hot	Pints Quarts	5 min 10 min	10 min 15 min	10 min 15 min
Pickled Bread-and-Butter Zucchini	Hot	Pints or Quarts	10 min	15 min	15 min

RECIPES

Reduced Sodium Pickles

Fresh-pack pickles can be made with a reduced salt (sodium) content. Fresh-pack pickles are made by acidifying cucumbers with vinegar. The proper acid content (5% vinegar) is necessary to ensure a safe product. Use only tested recipes formulated with the proper amount of vinegar and reduced salt content. While reduced sodium pickles may be prepared safely with reduced salt content, their quality may be noticeably lower. The texture and flavor may be slightly different than expected. Try small quantities first to determine if you like these pickles. Salt substitutes are not recommended for use in home-preserved pickles.

The salt used in making fermented pickles is necessary for a safe product. The salt also provides the characteristic flavor and texture of fermented pickles. In fermented pickles, the salt favors the growth of desirable microorganisms while inhibiting the growth of spoilage microorganisms. These microorganisms produce the acid needed to maintain a safe product. Do not reduce the amount of salt when making sauerkraut or fermented pickles.

Reduced Sodium Sliced Dill Pickles

- 4 lb (3- to 5-inch) pickling cucumbers
- 6 cups vinegar (5%)
- 6 cups sugar
- 2 tbsp canning or pickling salt
- 1 1/2 tsp celery seed
- 1 1/2 tsp mustard seed
- 2 large onions, thinly sliced
- 8 heads fresh dill

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard. Cut cucumbers in 1/4-inch slices. Combine vinegar, sugar, salt, celery, and mustard seeds in large saucepan. Bring mixture to boiling. Place two slices of onion and 1/2 dill head on bottom of each pint jar. Fill jars with cucumber slices, leaving 1/2-inch headspace. Add one slice of onion and 1/2 dill head on top. Pour hot pickling solution over cucumbers, leaving 1/4-inch headspace. Adjust lids and process according to table on Page 12.

Reduced Sodium Sliced Sweet Pickles

4 lb (3- to 4-inch) pickling cucumbers

Brining solution:

- 1 quart distilled white vinegar (5%)
- 1 tbsp canning or pickling salt
- 1 tbsp mustard seed
- 1/2 cup sugar

Canning syrup:

- 1 2/3 cups distilled white vinegar (5%)
- 3 cups sugar
- 1 tbsp whole allspice
- 2 1/4 tsp celery seed

Yield: About 4 to 5 pints

Wash cucumbers and cut 1/16 inch off blossom end, and discard. Cut cucumbers into 1/4-inch slices. Combine all ingredients for canning syrup in a saucepan and bring to boiling. Keep syrup hot until used. In a large kettle, mix the ingredients for the brining solution. Add the cut cucumbers, cover, and simmer until the cucumbers change color from bright to dull green (about five to seven minutes). Drain the cucumber slices. Fill jars, and cover with hot canning syrup, leaving 1/2-inch headspace. Adjust lids and process according to the following table.

Recommended Process Time for Reduced Sodium Pickles in a Boiling-water Canner				
Product	Style of Pack	Jar Size	Process Time at Altitudes of	
			0-1,000 ft	1,001-6,000 ft
Reduced-Sodium Sliced Dill Pickles	Raw	Pints	15 min	20 min
Reduced-Sodium Sliced Sweet Pickles	Hot	Pints	10 min	15 min

RECIPES

SWEET PICKLES

14-Day Sweet Pickles

Can be canned whole, in strips, or in slices

- 4 lb of 2- to 5-inch pickling cucumbers
(If packed whole, use cucumbers of uniform size)
- 3/4 cup canning or pickling salt
(Separated — 1/4 cup on each of the 1st, 3rd, and 5th days)
- 2 tsp celery seed
- 2 tbsp mixed pickling spices
- 5 1/2 cups sugar
- 4 cups vinegar (5%)

Yield: About 5 to 9 pints

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard, but leave 1/4-inch of stem attached. Place whole cucumbers in suitable 1-gallon container (see Page 2). Add 1/4 cup canning or pickling salt to 2 quarts water and bring to a boil. Pour over cucumbers. Add suitable cover and weight. Place clean towel over container and keep the temperature at about 70°F.

On the third and fifth days, drain salt water and discard. Rinse cucumbers, rescald cover, and weight. Return cucumbers to container. Add 1/4 cup salt to 2 quarts fresh water and boil. Pour over cucumbers. Replace cover and weight, and recover with clean towel.

On the seventh day, drain salt water and discard. Rinse cucumbers and rescald containers, cover and weight. Slice or strip cucumbers, if desired, and return to container. Place celery seed and pickling spices in small cheesecloth bag. Combine 2 cups sugar and 4 cups vinegar in a saucepan. Add spice bag, bring to a boil, and pour pickling solution over cucumbers. Add cover and weight, and recover with clean towel.

On each of the next six days, drain syrup and spice bag and save. Add 1/2 cup sugar each day and bring to a boil in a saucepan. Remove cucumbers and rinse. Scald container, cover and weight daily. Return cucumbers to container, add boiled syrup, cover, weight, and recover with towel.

On the 14th day, drain syrup into saucepan. Fill sterile pint jars or clean quart jars, leaving 1/2-inch headspace. Add 1/2 cup sugar to syrup and bring to boil. Remove spice bag. Pour hot syrup over cucumbers, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 14 or use low-temperature pasteurization treatment described on Page 2.

Quick Sweet Pickles

May be canned as either strips or slices.

- 8 lb of 3- to 4-inch pickling cucumbers
- 1/3 cup canning or pickling salt
- 4 1/2 cups sugar
- 3 1/2 cups vinegar (5%)
- 2 tsp celery seed
- 1 tbsp whole allspice
- 2 tbsp mustard seed
- 1 cup pickling lime (optional — for use in variation for making firmer pickles)

Yield: About 7 to 9 pints

Wash cucumbers. Cut 1/16 inch off blossom end and discard, but leave 1/4 inch of stem attached. Slice or cut in strips, if desired. Place in bowl and sprinkle with 1/3 cup salt. Cover with 2 inches of crushed or cubed ice. Refrigerate three to four hours. Add more ice as needed. Drain well.

Combine sugar, vinegar, celery seed, allspice, and mustard seed in 6-quart kettle. Heat to boiling.

Hot pack — Add cucumbers and heat slowly until vinegar solution returns to boil. Stir occasionally to make sure mixture heats evenly. Fill sterile jars, leaving 1/2-inch headspace.

Raw pack — Fill jars, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 14 or use the low temperature pasteurization treatment described on Page 2.

Variation for firmer pickles: Wash cucumbers. Cut 1/16-inch off blossom end and discard, but leave 1/4-inch of stem attached. Slice or strip cucumbers. Mix 1 cup pickling lime and 1/2 cup salt to 1 gallon water in a 2- to 3-gallon crock or enamelware container. Caution: Avoid inhaling lime dust while mixing the lime-water solution. Soak cucumber slices or strips in lime water solution for 12 to 24 hours, stirring occasionally. Remove from lime solution and rinse and resoak one hour in fresh water. Repeat the rinsing and resoaking two more times. Handle carefully because slices or strips will be brittle. Drain well.

Storage: After processing and cooling, jars should be stored four to five weeks to develop ideal flavor.

Variation: Add two slices of raw whole onion to each jar before filling with cucumbers.

RECIPES

Sweet Gherkin Pickles

- 7 lb cucumbers (1 1/2 inch or less)
- 1/2 cup canning or pickling salt
- 8 cups sugar
- 6 cups vinegar (5%)
- 3/4 tsp turmeric
- 2 tsp celery seeds
- 2 tsp whole mixed pickling spice
- 2 cinnamon sticks
- 1/2 tsp fennel (optional)
- 2 tsp vanilla (optional)

Yield: 6 to 7 pints

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard, but leave 1/4-inch of stem attached. Place cucumbers in large container and cover with boiling water. Six to eight hours later, and on the second day, drain and cover with 6 quarts of fresh boiling water containing 1/4 cup salt. On the third day, drain and prick cucumbers with a table fork. Combine and bring to boil 3 cups vinegar, 3 cups sugar, turmeric, and spices. Pour over cucumbers. Six to eight hours later drain and save the pickling syrup. Add another 2 cups each of sugar and vinegar and reheat to boil. Pour over pickles. On the fourth day, drain and save syrup. Add another 2 cups sugar and 1 cup vinegar. Heat to boiling and pour over pickles. Six to eight hours later drain and save pickling syrup. Add 1 cup sugar and 2 tsp vanilla and heat to boiling. Fill sterile pint jars with pickles and cover with hot syrup, leaving 1/2-inch headspace. Adjust lids and process according to table on Page 14 or use the low-temperature pasteurization treatment described on Page 2.

Recommended Process Time for Sweet Pickles in a Boiling-water Canner

Product	Style of Pack	Jar Size	Process Time at Altitudes of	
			0-1,000 ft	1,001-6,000 ft
14-Day Sweet Pickles	Raw	Pints	5 min	10 min
		Quarts	10 min	15 min
Quick Sweet Pickles	Hot	Pints or Quarts	5 min	10 min
		Raw	10 min	15 min
		Quarts	15 min	20 min
Sweet Gherkin Pickles	Raw	Pints	5 min	10 min

SUGARLESS RECIPES

No Sugar Added Sweet Cucumber Slices

- 3 1/2 lb of pickling cucumbers
- Boiling water to cover sliced cucumbers
- 4 cups cider vinegar (5%)
- 3 cups Splenda®
- 1 tbsp canning salt
- 1 cup water
- 1 tbsp mustard seed
- 1 tbsp whole allspice
- 1 tbsp celery seed
- 4 1-inch cinnamon sticks

Yield: About 4 or 5 pint jars.

Wash cucumbers. Slice 1/16th-inch off the blossom ends and discard. Slice cucumbers into 1/4-inch thick slices. Pour boiling water over the cucumber slices and let stand 5 to 10 minutes. Drain off the hot water and pour cold water over the cucumbers. Let cold water run continuously over the cucumber slices, or change water frequently until cucumbers are cooled. Drain slices well.

Mix vinegar, 1 cup water, Splenda®, and all spices in a 10-quart Dutch oven or stockpot. Bring to a boil. Add drained cucumber slices carefully to the boiling liquid. Return to a boil.

Place one cinnamon stick in each jar, if desired. With a slotted spoon, fill hot pickle slices into clean, hot pint jars, leaving 1/2-inch headspace. Cover with boiling hot pickling brine, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel; apply two-piece metal canning lids.

Process in a boiling water canner according to the recommendations below. Let cool, undisturbed, 12 to 24 hours and check for seals.

No Sugar Added Pickled Beets

- 7 lb of 2- to 2 1/2-inch diameter beets
- 4 to 6 onions (2- to 2 1/2-inch diameter), if desired
- 6 cups vinegar (5%)
- 1 1/2 teaspoons canning or pickling salt
- 2 cups Splenda®
- 3 cups water
- 2 cinnamon sticks
- 12 whole cloves

Yield: About 8 pints

RECIPES

Trim off beet tops, leaving 1 inch of stem and roots to prevent bleeding of color. Wash thoroughly. Sort for size. Cover similar sizes together with boiling water and cook until tender (about 25 to 30 minutes). **Caution: Drain and discard liquid.**

Cool beets. Trim off roots and stems and slip off skins. Slice into 1/4-inch slices. Peel, wash, and thinly slice onions.

Combine vinegar, salt, Splenda®, and fresh water in large Dutch oven. Tie cinnamon sticks and cloves in cheesecloth bag and add to vinegar mixture. Bring to a boil. Add beets and onions. Simmer five minutes. Remove spice bag.

With a slotted spoon, fill hot beets and onion slices into clean, hot pint jars, leaving 1/2-inch headspace. Cover with boiling hot vinegar solution, leaving 1/2-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel; apply two-piece metal canning lids.

Process in a boiling water canner according to the recommendations below. Let cool, undisturbed, 12 to 24 hours and check for seals.

Variation: *Pickled whole baby beets* — Follow the directions above but use beets that are no more than 1 to 1 1/2 inches in diameter. Pack whole after cooking, trimming, and peeling; do not slice.

Recommended Process Time for No Sugar Added Pickles in a Boiling-water Canner

Style of Pack	Jar Size	Process Time at Altitudes of		
		0- 1,000 ft	1,001- 3,000 ft	3,001- 6,000 ft
No Sugar Added Sweet Cucumber Pickle Slice	Hot Pints	10 min	15 min	15 min
No Sugar Added Pickled Beets	Hot Pints	30 min	35 min	40 min

Reference

Complete Guide to Home Canning. Agriculture Information Bulletin 539, 2009. http://www.uga.edu/nchpf/publications/publications_usda.html.

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