



Preparing and Canning Fermented and Pickled Foods at Home¹

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Pickled and fermented food products are classified on the basis of ingredients used and the method of preparation. There are four general classifications.

Fermented pickles, often called brine pickles, are fermented and cured for about three weeks. Dill pickles and sauerkraut are examples of this group. Changes occur in the flavor and the color of the foods, and the acidity increases as the curing process takes place.

Fresh pack or quick process pickles are not brined or brined only for several hours, then drained and combined with vinegar and seasonings. These are quick and easy to prepare.

Fruit pickles are fruits heated in a spicy syrup acidified with vinegar or lemon juice.

Relishes are chopped fruits and/or vegetables seasoned and cooked with vinegar. Relishes often are hot and spicy since they are used to accent other, sometimes bland, food.

USE ONLY TESTED RECIPES

Pickled products can be satisfactory, tasty and safely prepared if top quality ingredients are used, a tested recipe is followed, and the proportions or measurements of the ingredients are strictly followed. The recipes in this booklet are a result of extensive research. They include the exact proportions of ingredients and the latest procedures. Always read through the complete recipe before starting. Then make sure that all necessary equipment and ingredients are on hand.

INGREDIENTS

Fruits and vegetables. Select only freshly harvested, tender but firm fruit or vegetables, free of any spoilage or bruises. Varieties of pickling cucumbers make better pickles than the slicing or salad kind. Wax-coated cucumbers should not be used in making pickles because the wax is almost impossible to remove and it prevents penetration of the brine.

Keep fruits or vegetables refrigerated or as cool as possible until ready to process to prevent deterioration. For best results, have just enough on hand to make one canner load. Process as soon as possible without interrupting the procedure.

Salt. There are various types of salt. Buy pure canning or pickling salt for top pickled products. Table salt and iodized salt contain anti-caking ingredients and may cause cloudiness or discoloration when used in pickling. Never reduce the amount of salt specified in any fermented pickle recipe.

Light salt or reduced-sodium salts should be used only in quick, fresh pack pickle recipes. The flavor and texture of pickles made with these salts is different and may not suit all tastes.

Vinegar. Use a high grade cider or white distilled vinegar of 5 percent acidity. As cider vinegar tends to darken light-colored fruits and vegetables, white distilled vinegar is often selected for a clear appearance. Never use homemade vinegar for making pickles because the percent of acidity is unknown, and acidity affects the safety and quality of the pickled product. For the same reason, do not reduce the amount of vinegar called for in a recipe.

Sugar. White granulated or brown sugar may be used in sweetening pickles. Brown sugar tends to give a tan color but may be preferred for its flavor. Corn syrup and honey may produce undesirable flavors and are not recommended in pickling.

Seasonings. Various herbs and spices often included in pickle and relish recipes give added taste. For superior flavors and aromas, buy fresh spices and herbs in small containers or amounts that will be used within a year. Old spices and herbs tend to become stale and powdery, often causing a cloudy, discolored liquid with poor flavor.

Water. Use clear, good-quality drinking water to make the pickling liquid and to wash fruits and vegetables. Very hard water causes pickles to shrivel. If water tends to be hard, distilled water can be used.

Utensils. Ingredients used in pickling solutions sometimes react with the metals in utensils and containers. Do not use iron, copper, brass or chipped enamelware utensils. Stainless

¹ This publication is intended for use by individuals who have a basic understanding of canning procedures. For more detailed information, consult the USDA Complete Guide to Home Canning, which is available through your local county Extension office.

steel, aluminum and Pyrex-type utensils are best for heating pickling liquid. Stone jars, glass jars, crock pots, large casseroles, glass bowls, or food-grade plastic containers may be used for brining. Use a glass or nonmetallic plate to cover and hold vegetables 1 to 2 inches under brine. A food-grade plastic freezer bag or glass jar filled with water placed on the plate make excellent weights to hold food below the surface.

Use a 1-gallon container for every 5 pounds of fresh vegetables or a 5-gallon container for 25 pounds. Never use garbage bags, trash liners or garbage cans for brining. These are not meant to hold food and are not food safe.

Utensils that facilitate home pickling include small, sharp paring and cutting knives; a vegetable peeler, colander, or wire basket; food chopper or grinder; cutting board; measuring cups and spoons; tongs; ladle; slotted spoon and wooden and/or stainless steel spoons.

GENERAL CANNING PROCEDURES

Use regular and wide-mouth Mason jars with self-sealing lids held in place by screw-on metal bands. The bands hold the lids in place during the processing and cooling periods.

Mason jars are made from tempered glass to resist high temperatures. Jars are available in 1/2 pint, pint, 1-1/2 pint, and quart sizes. Larger jars are not recommended for home canning.

Inspect jars carefully for cracks or chips and discard faulty ones. Wash jars in hot, soapy water and rinse thoroughly or in the dishwasher. Keep jars hot in the dishwasher, a sink of hot water or in a warm oven until they are filled.

Check metal screw bands for signs of rust or dents. Discard badly corroded or dented bands. Use only new lids and follow manufacturer's directions for preparing lids for canning.

Fill each jar with pickles and brine according to directions in the recipe. Remove any air bubbles trapped in the jar with a plastic or rubber spatula. Leave the recommended headspace to allow liquid to boil. Wipe the jar rim with a clean cloth moistened in hot water. Place a metal lid on the mouth of the jar and hold in place with a screw-on metal band tightened securely. Do not over tighten. Process in a boiling water canner.

Follow these steps for successful boiling-water canning:

1. Fill the canner halfway with water.
2. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods.
3. Load filled jars, fitted with lids, into the canner rack and use the handles to lower the rack into the water; or fill the canner, one jar at a time, with a jar lifter.
4. If necessary, add more boiling water so the water level is at least 1 inch above jar tops.
5. Turn heat to its highest position until water boils vigorously.
6. Set a timer for the minutes required for processing the food.
7. Cover with the canner lid and lower the heat setting to maintain a gentle boil throughout the process schedule.

8. If necessary, add more boiling water to keep the water level above the jars.
9. When jars have been boiled for the recommended time, turn off the heat and remove the canner lid.
10. Using a jar lifter, remove the jars and place them on a towel, leaving at least 1-inch spaces between the jars during cooling.

Low-temperature pasteurization treatment. The following treatment results in a better product texture but must be carefully managed to avoid possible spoilage. Place jars in a canner half-filled 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 assure that the water temperature is at least 180°F during the entire 30 minutes. Temperatures higher than 185°F may cause unnecessary softening of pickles. *Caution:* Use only when recipe indicates.

Test for jar seals. Remove screw bands when jars have cooled (12 to 24 hours) and test for vacuum seals by:

- Pressing the lid center with finger. If the lid springs up when released, it is not sealed.
- Tapping the lid with a teaspoon. A sealed jar lid will make a ringing sound.
- Holding the jar at eye level and looking across the lid. A sealed jar lid curves down slightly in the center.

Reprocessing unsealed jars. Remove lids from unsealed jars and discard. Check sealing surface of jar for tiny nicks or cracks. If the jar has defects, discard it and replace with another jar. If not, add a new lid and process for the same amount of time within 24 hours. Unsealed jars can be kept in the refrigerator and the food used within 3 to 4 days, or remove about an inch of the contents and freeze.

Storing canned food. Clean the outsides of sealed, cooled jars. Label with date and contents and store in a cool (50–70°), dark, dry place away from sun, light or dampness. Vegetable products are best if eaten within one year.

Accidental freezing. Freezing may cause food in jars to spoil if jars become unsealed. Freezing and thawing cause food to soften and lose eating quality. Protect jars from freezing by wrapping with layers of newspapers.

If canned food spoils. Examine jars carefully before tasting fruit. Check lids for a vacuum seal. Never taste food from an unsealed jar.

Signs of food spoilage are streaks and dried food at the top of the jar, swollen lids, broken jar seals, rising air bubbles and any unnatural color. Other indicators include bad or unnatural odor; spurting liquid; white, blue, green or black mold; or foaming.

Dispose of any food you suspect of being spoiled. For safety, spoiled canned food and containers may need to be detoxified before disposal. Contact your county Extension office for detoxification instructions.

Altitude adjustments. All communities in New Mexico are above sea level, varying from 3,000 to 10,000 feet with differences even within a county.

Use Table 1 to determine the elevation of your community and then select safe processing times for canning your pickles. The boiling temperature of liquids is lower at higher elevations, therefore food must be processed longer at high altitudes.

Table 1. Elevation of towns in New Mexico.

City/Town	Elevation (ft)	City/Town	Elevation (ft)
Alamogordo	4,350	Los Alamos	7,400
Albuquerque	5,000	Los Ranchos de Albuquerque	4,950
Artesia	3,350	Lovington	3,900
Aztec	5,650	Magdalena	6,556
Bayard	5,800	Melrose	4,599
Belen	4,800	Mora	7,200
Bernalillo	5,050	Mosquero	5,550
Bosque Farms	4,864	Mountainair	6,500
Carlsbad	3,100	Portales	4,010
Carrizozo	5,450	Raton	6,650
Chama	7,900	Reserve	5,749
Cimarron	6,450	Rio Rancho	5,290
Clayton	5,050	Roswell	3,600
Cloudcroft	8,650	Roy	5,900
Clovis	4,300	Ruidoso	7,000
Columbus	4,020	San Jon	4,200
Corona	6,664	Santa Fe	7,000
Corrales	5,005	Santa Rita	6,300
Cuba	7,000	Santa Rosa	4,600
Deming	4,300	Silver City	5,900
Dexter	3,500	Socorro	4,600
Eagle Nest	8,250	Springer	5,800
Elida	4,345	Taos	7,000
Española	5,600	Texico	4,150
Estancia	6,100	Tierra Amarilla	7,460
Farmington	5,400	Truth or Consequences	4,250
Fort Sumner	4,050	Tucumcari	4,100
Gallup	6,500	Tularosa	4,500
Grants	6,450	Vaughn	5,950
Hobbs	3,650	Wagon Mound	6,200
Hurley	5,700		
Jemez Springs	6,200		
Las Cruces	3,900		
Las Vegas	6,450		
Logan	3,830		
Lordsburg	4,250		

FERMENTED RECIPES

Fermented Dill Pickles

Use the following quantities for each gallon capacity of your container.

- 4 lb 4-inch pickling cucumbers
- 2 Tbsp dill seed or 4–5 heads dill weed
- 1/2 cup canning or pickling salt
- 1/4 cup vinegar (5%)
- 8 cups water
- 2 cloves of garlic (optional)
- 2 dried red peppers (optional)
- 2 tsp mixed pickling spices (optional)

Wash cucumbers. Remove and discard 1/16-inch slice off blossom end but do not remove stem end. Place half of dill and spices at bottom of clean container. Add cucumbers and

remaining dill seed and spices. Dissolve salt in vinegar and water in another container and pour over cucumbers. Add cover and weight.

Store 3 to 4 weeks at 70°–75°F. Temperatures of 55°–65°F will take longer to develop full flavor. Higher temperatures (80°F or over) may cause softening of pickles. Check container often and remove any surface scum or mold.

Caution: Discard pickles if they become soft, slimy or develop a disagreeable odor.

To can: Pour brine into a pan and slowly heat to the boiling point. Simmer 5 minutes. Filter through coffee filters to reduce cloudiness. Fill jars with pickles and hot brine. Leave 1/2-inch headspace. Adjust lids and process (Table 2) in boiling-water canner or use low temperature pasteurization treatment.

Note: Fully fermented pickles may be stored in original fermenting container up to 4 to 6 months, but container must be refrigerated. Remove surface scum and molds regularly.

Table 2. Processing times for fermented dill pickles.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Raw	pints	15	20
Raw	quarts	20	25

Sauerkraut

(Yield: about 9 quarts)

25 lb cabbage, finely shredded
3/4 cup canning or pickling salt

Prepare a 5-gallon fermentation container, plate and weight. Select firm cabbage heads, harvested within 24 to 48 hours. Work with about 5 pounds of cabbage at a time. Discard outer leaves and rinse under cold running water. Drain. Cut into quarters and remove cores. Shred cabbage very fine, about 1/8 to 1/16 inch. Mix 3 tablespoons of salt with every 5 pounds of shredded cabbage and pack firmly. Continue shredding, salting and packing until all cabbage is in container. The salt draws out the cabbage's juices to form enough brine to cover the cabbage. If enough juice is not produced, add brine made by boiling 1-1/2 tablespoons of salt to 1 quart of water. Cool and add to shredded cabbage.

Add plate and weights. Cover container with clean towel. Store at 70–75°F while fermenting for 3 to 4 weeks. Maintain this temperature for best results.

If using a brine-filled bag to weigh cabbage down, allow fermentation to complete (bubbles cease) before disturbing the sauerkraut. If using water-filled jars as weights, check the kraut two or three times each week. Remove scum as it forms.

Store sauerkraut in the refrigerator in tightly covered jars for several months. Sauerkraut also can be canned.

Hot pack: Slowly bring kraut and liquid to a boil in a pot. Stir frequently. Remove from heat and fill jars tightly with kraut and juices. Leave 1/2-inch headspace.

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

Adjust lids and process in a boiling-water canner (Table 3).

Table 3. Processing time for sauerkraut.

Pack	Jar size	Process Time (in minutes) at		
		1,000–3,000 ft	3,001–6,000 ft	Above 6,000 ft
Hot	pints	15	15	20
Hot	quarts	20	20	25
Raw	pints	25	30	35
Raw	quarts	30	35	40

FRESH-PACK RECIPES

Quick Fresh-Pack Dill Pickles *(Yield: 7 to 9 pints)*

8 lb of 3- to 5-inch pickling cucumbers
 2 gal water
 1-1/4 cup canning or pickling salt (divided)
 1-1/2 qt vinegar (5%)
 1/4 cups sugar
 2 qt water
 2 Tbsp whole mixed pickling spice
 about 3 Tbsp whole mustard seed (1 tsp per pint jar)
 about 14 heads of fresh dill (1-1/2 heads per pint jar),
 or 4-1/2 Tbsp dill seed (1-1/2 tsp per pint jar)

Wash cucumbers. Cut 1/16-inch slice off blossom end and discard, but leave 1/4-inch 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 cucumbers. Add 1 teaspoon mustard seed and 1-1/2 heads fresh dill per pint. Cover with boiling pickling solution, leaving 1/2-inch headspace. Adjust lids and process (Table 4) or use the low-temperature pasteurization treatment described previously.

Table 4. Processing time for quick fresh-pack dill pickles.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Raw	pints	15	20
Raw	quarts	20	25

Quick Sweet Pickles *(Yield: about 7 to 9 pints)*

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 below to make firmer pickles)

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 3 to 4 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 jars, leaving 1/2-inch headspace.

Raw pack: Fill jars, leaving 1/2-inch headspace. Add hot pickling syrup, leaving 1/2-inch headspace. Adjust lids and process as below or use the low-temperature pasteurization treatment.

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 1 hour in fresh cold water. Repeat the rinsing and resoaking two more times. Handle carefully because slices or strips will be brittle. Drain well.

Table 5. Processing time for quick sweet pickles.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints	10	15
Hot	quarts	10	15
Raw	pints	15	20
Raw	quarts	20	25

Storage: After processing (Table 5) and cooling, jars should be stored 4 to 5 weeks to develop ideal flavor.

Variation: Add 2 slices of raw whole onion to each jar before filling with cucumbers.

Pickled Dill Beans *(Yield: about 8 pints)*

4 lb fresh, tender green or yellow beans (5–6 inches long)
 8–16 heads of 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)

Wash and trim ends from beans and cut to 4-inch length. Place 1 or 2 heads of dill and 1 clove of garlic in each pint jar. Place beans upright in jars, leaving 1/2-inch headspace. Trim beans to ensure proper fit. Combine salt, vinegar, water and pepper flakes in a pan and heat to boiling. Add vinegar solution to beans. Leave 1/2-inch headspace. Adjust lids on jars and process (Table 6) in a boiling-water canner.

Table 6. Processing time for pickled dill beans.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Raw	pints	10	15

Bread and Butter Pickles *(Yield: 8 pints or 4 quarts)*

6 lb 4- to 5-inch pickling cucumbers
 8 cups thinly sliced onions (about 3 lb)
 1/2 cup canning or pickling salt
 2 trays or 2 qt of crushed ice or ice cubes
 4 cups vinegar (5%)
 4-1/2 cups sugar
 1 Tbsp tumeric
 1-1/2 Tbsp celery seed
 2 Tbsp mustard seed

Wash cucumbers with a vegetable brush. Trim 1/16-inch off blossom end and discard. Slice unpeeled cucumbers in 3/16-inch slices. Combine cucumbers and onions in a large bowl. Add salt. Cover with 2 inches of ice. Refrigerate 3–4 hours. Add ice as needed. Drain thoroughly.

Combine vinegar, sugar, and spices in a large pot. Boil 10 minutes. Add cucumbers and onions and slowly reheat to boiling. Fill jars with cucumbers, onions and syrup. Leave 1/2-inch headspace. Adjust lids and process (Table 7) in a boiling-water canner or use low-temperature pasteurization treatment.

Table 7. Processing time for bread and butter pickles.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints or quarts	15	20

Pickled Beets *(Yield: about 8 pints)*

7 lb 2- to 2-1/2-inch diameter beets
 4 cup vinegar (5%)
 1-1/2 tsp canning or pickling salt
 2 cups sugar
 2 cups water
 2 cinnamon sticks (in cheesecloth bag)
 12 whole cloves (in cheesecloth bag)
 4–6 onions 2- to 2-1/2 inch diameter (optional)

Trim beet tops, but leave 1-inch stems and roots to prevent color bleeding. Wash thoroughly. Sort by similar size. Place in a pan, cover with boiling water and cook until tender, about 25 to 30 minutes. Drain and cool. Trim roots, stem and remove skins. Slice into 1/4-inch thick slices. Peel and thinly slice onions. Combine vinegar, salt, sugar and fresh water in a pan. Add cheesecloth bag with spices to vinegar mixture and heat to boiling. Add beets and onions. Simmer 5 minutes. Remove spice bag and discard. Fill jars with beets and onions leaving 1/2-inch headspace. Add hot vinegar solution to cover beets, allowing 1/2-inch headspace. Adjust lids and process (Table 8) in a boiling-water canner.

Table 8. Processing time for pickled beets.

Pack	Jar size	Process Time (in minutes) at		
		1,000–3,000 ft	3,001–6,000 ft	Above 6,000 ft
Hot	pints or quarts	35	40	45

Pickled Cauliflower or Brussel Sprouts*(Yield: 9 half-pints)*

12 cups 1- to 2-inch cauliflower florets or small brussels sprouts
 4 cups white vinegar (5%)
 2 cups sugar
 2 cups thinly sliced onion
 1 cup diced red bell pepper
 2 Tbsp mustard seed
 1 Tbsp celery seed
 1 tsp tumeric
 1 tsp hot red pepper flakes

Wash cauliflower florets or brussels sprouts. Remove stems and blemished outer leaves. Combine 4 teaspoons of pickling salt to 1 gallon of water in large pot and heat to boiling. Add cauliflower florets and boil 3 minutes (4 minutes for brussels sprouts). Drain and cool. Combine vinegar, sugar, onion, red pepper and spices in a large saucepan. Heat to boiling and simmer 5 minutes. Fill jars with cauliflower or brussels sprouts. Leave 1/2-inch headspace. Distribute onion and diced peppers equally among jars and fill with pickling solution. Leave 1/2-inch headspace. Adjust lids and process (Table 9) in boiling-water canner.

Table 9. Processing time for pickled cauliflower or brussels sprouts.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	half-pints or pints	15	20

Marinated Whole Mushrooms *(Yield: 9 half-pints)*

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 Tbsp canning or pickling salt
 1/2 cup finely chopped onion
 1/4 cup diced pimento
 2 cloves of garlic, cut in quarters
 25 black pepper corns

Select fresh, small, unopened mushrooms with caps less than 1-1/4-inch in diameter. Wash. Cut stems, leaving about 1/4-inch attached to cap. Add lemon juice and water to cover.

Heat to boiling and simmer 5 minutes. Drain. Mix olive oil, vinegar, oregano, basil and salt in a saucepan. Stir in onions and pimento. Heat to boiling. Place 1/4 garlic clove and 2–3 peppercorns in each half-pint jar. Fill jars with mushrooms and hot, well-mixed vinegar and oil solution. Leave 1/2-inch headspace. Adjust lids and process (Table 10) in boiling-water canner.

Table 10. Processing time for marinated whole mushrooms.

Pack	Jar size	Process Time (in minutes) at		
		1,000–3,000 ft	3,001–6,000 ft	Above 6,000 ft
Hot	half-pints	25	30	35

Pickled Dill Okra *(Yield: 8–9 pints)*

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

Wash and trim okra. Place 1 garlic clove in each jar. Pack jars firmly with okra leaving 1/2-inch headspace. Combine salt, peppers, dill seed, water and vinegar in a saucepan and boil. Pour the hot pickling solution over the okra, leaving 1/2-inch headspace. Adjust lids and process (Table 11) in boiling-water canner.

Table 11. Processing time for pickled dill okra.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints	15	20

FRUIT PICKLE RECIPES

Spiced Crab Apples *(Yield: 9 pints)*

- 5 lb crab apples
- 4-1/2 cups cider vinegar (5%)
- 3-3/4 cups water
- 7-1/2 cups sugar
- 4 tsp whole cloves
- 4 sticks of cinnamon
- 6 (six) 1/2-inch cubes of fresh ginger root

Remove leaves or blossom petals carefully, but do not remove stems. Wash apples. Puncture skin of apples four or five times with a toothpick. Tie spices in a sturdy, porous cloth. Mix vinegar, water, sugar and spice bag in a large pot and bring to a boil. Place 1/3 of the apples at a time in a wire basket or sieve and dip for 2 minutes in the boiling solution. Place cooked apples and spice bag in 2-gallon crock. Pour hot syrup over apples. Cover and let stand overnight. Remove

spice bag and discard; drain syrup into saucepan and heat to boiling. Fill jars with apples, leaving 1/2-inch headspace. Pour hot syrup over apples, leaving 1/2-inch headspace. Adjust lids and process (Table 12) in boiling-water canner.

Table 12. Processing time for spiced crab apples.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints	30	35

Spiced Apple Rings *(Yield: 8 to 9 pints)*

- 12 lb firm, tart apples (maximum diameter, 2-1/2 inches)
- 12 cups sugar
- 6 cups water
- 1-1/4 cup white vinegar (5%)
- 3 Tbsp whole cloves
- 3/4 cup red cinnamon candies, *or*
8 cinnamon sticks and 1 tsp of red food coloring

Wash, peel and slice one apple at a time to prevent discoloration. Cut crosswise into 1/2-inch slices. Remove core and immerse slices in ascorbic acid solution (1 teaspoon ascorbic acid per 1 gallon of cold water).

Combine sugar, water, vinegar, cloves, cinnamon sticks and food coloring or candy in 6-quart saucepan to make syrup and stir. Heat to boil and simmer 3 minutes. Drain apple rings from ascorbic acid and add to hot syrup. Cook 5 minutes. Fill jars with the apple rings and flavored syrup, leaving 1/2-inch headspace. Adjust lids and process (Table 13) in boiling-water canner.

Table 13. Processing time for spiced apple rings.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints	15	20

RELISH RECIPES

Pickled Corn Relish *(Yield: about 9 pints)*

- 10 cups fresh, whole kernel corn (16 to 20 medium size ears *or* 6 10-ounce packages frozen corn)
- 2-1/2 cups diced, sweet red pepper
- 2-1/2 cups diced, sweet green pepper
- 2-1/2 cups chopped celery
- 1-1/4 cups diced onion
- 1-3/4 cups sugar
- 5 cups vinegar (5%)
- 2-1/2 tsp canning or pickling salt
- 2-1/2 tsp celery seed
- 2-1/2 tsp dry mustard
- 1-1/4 tsp tumeric

Boil ears of corn for 5 minutes in a large pot, dip in cold water and drain. Cut kernels off cob or use frozen corn. Combine all ingredients, except corn, mustard and tumeric in a saucepan. Heat to boiling and simmer 5 minutes. Mix mustard and tumeric in 1/2 cup of the simmered mixture. Add this mixture and corn to the hot mixture. Simmer 5 minutes more. Fill jars with hot mixture, leaving 1/2-inch headspace. Adjust lids and process (Table 14) in boiling-water canner.

Table 14. Processing time for pickled corn relish.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	half-pints or pints	20	25

Pickled Green Tomato Relish *(Yield: 7 to 9 pints)*

- 10 lb small, hard green tomatoes
- 1-1/2 lb red bell peppers
- 1-1/2 lb green bell peppers
- 2 lbs onion
- 1/2 cup canning or pickling salt
- 1 qt water
- 4 cups sugar
- 1 qt vinegar (5%)
- 1/3 cup prepared yellow mustard
- 2 Tbsp cornstarch

Wash and fine chop tomatoes, peppers and onion. Place in a large kettle. Dissolve pickling salt in water and pour over vegetables. Heat vegetables and salt solution to boiling and simmer 5 minutes. Drain in colander. Return vegetables to kettle. Add sugar, vinegar, mustard and cornstarch and mix. Heat to boiling and simmer 5 minutes. Fill sterile pint jars with hot relish leaving 1/2-inch headspace. Adjust lids and process (Table 15) in boiling-water canner.

Table 15. Processing time for pickled green tomato relish.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints	10	15

Pickled Hot Peppers *(Yield: about 9 pints)*

- (Hungarian, banana, chile, jalapeño)
- 4 lb hot, long, red/green/yellow peppers
- 3 lb sweet, mixed red and green peppers
- 5 cups vinegar (5%)
- 1 cup water
- 4 tsp canning/pickling salt
- 2 Tbsp sugar
- 2 cloves of garlic

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

Wash peppers. If peppers are small, leave whole. Cut two slits in each. Blanch in boiling water or blister in order to peel. Cool and peel off skin. Flatten small peppers, quarter larger peppers. Fill jars, leaving 1/2-inch headspace. Combine and heat vinegar, water, salt, sugar and garlic to boiling and simmer 10 minutes. Remove garlic. Pour hot pickling solution over peppers, leaving 1/2-inch headspace. Adjust lids and process (Table 16) in boiling-water canner.

Table 16. Processing time for pickled hot peppers.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Raw	half-pints or pints	15	20

Pickle Relish *(Yield: 9 pints)*

- 3 qt chopped cucumbers
- 3 cups chopped sweet green peppers
- 3 cups chopped sweet red peppers
- 1 cup chopped onion
- 3/4 cup canning or pickling salt
- 4 cups ice
- 8 cups water
- 2 cups sugar
- 4 tsp each: mustard seed, tumeric, whole allspice and whole clove
- 6 cups white vinegar (5%)

Add cucumbers, peppers, onions, salt and ice to water and let stand 4 hours. Drain and cover vegetables with fresh ice water for 1 hour. Drain again. Combine spices in a spice or cheesecloth bag. Add spices to sugar and vinegar. Heat to boiling and pour mixture over vegetables. Cover and refrigerate 24 hours. Heat mixture to boiling and pour hot into clean jars, leaving 1/2-inch headspace. Adjust lids and process (Table 17) in boiling-water canner.

Table 17. Processing time for pickle relish.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	half-pints or pints	15	20

Pickled Bread and Butter Zucchini *(Yield: 8–9 pints)*

- 16 cups sliced fresh zucchini
- 4 cups onions, finely sliced
- 1/2 cup canning/pickling salt
- 4 cups vinegar (5%)
- 2 cups sugar
- 4 Tbsp mustard seed
- 2 tsp tumeric
- 2 Tbsp celery seed

Cover zucchini and onion slices with 1 inch water and salt in a pan. Let stand 2 hours. Drain thoroughly. Combine vin-

egar, sugar and spices. Bring to boil and add zucchini and onions. Simmer 5 minutes and fill jar with mixture and pickling solution. Leave 1/2-inch headspace. Adjust lids and process (Table 18) in boiling-water canner or use low-temperature pasteurization treatment.

Table 18. Processing time for pickled bread and butter zucchini.

Pack	Jar size	Process Time (in minutes) at	
		1,000–6,000 ft	Above 6,000 ft
Hot	pints or quarts	15	20

CAUSES OF POOR-QUALITY PICKLES

Shriveled pickles can be the result of using too strong a vinegar, sugar or salt solution at the start of the pickling process and/or overcooking or over-processing.

Hollow pickles are usually caused by:

- Poorly developed cucumbers.
- Holding cucumbers too long before pickling.
- Too rapid fermentation.
- Too strong or too weak a brine during fermentation.

Soft or slippery pickles result from microbial activity caused by:

- Too little salt or acid.
- Cucumbers not covered with brine during fermentation.
- Scum not removed from brine during fermentation.
- Insufficient heat treatment.
- A seal that is not airtight.
- Moldy garlic or spices.
- Blossom ends not entirely removed from the cucumbers.

Dark pickles may be caused by:

- Use of ground spices.
- Too much spice.
- Old spices.
- Iodized salt.
- Overcooking.
- Iron or other minerals in water.
- Use of iron utensils.

CAUSES OF SPOILAGE IN SAUERKRAUT

Spoilage of sauerkraut is indicated by undesirable color, off-flavor, off-odor and soft texture.

Soft kraut may be the result of:

- Insufficient salt.
- High temperatures during fermentation.
- Uneven salt distribution.
- Air pockets caused by improper packing.

Pink kraut is caused by the growth of certain types of yeast on kraut. These grow if there is:

- Too much salt.
- Uneven distribution of salt.
- Improper covering or weighting during fermentation.

Dark kraut may be caused by:

- Unwashed and improperly trimmed cabbage.
- Insufficient juice to cover fermenting cabbage.
- Uneven salt distribution.
- Exposure to air.
- High temperatures during fermentation, processing and storage.
- Long storage period.

Rotted kraut is usually found on the surface where the cabbage has not been sufficiently covered to exclude air during fermentation.

This publication was originally written by Priscilla Grijalva, Food & Nutrition Specialist. It was later revised by Alice Jane Hendley, Food & Nutrition Specialist.