



UCCE Master Food Preservers of El Dorado County

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Preserve Today, Relish Tomorrow

Fresh-pack Pickling Fundamentals

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 safe food is served.

Preventing Foodborne Illnesses

1. Clean
2. Cook
3. Separate
4. Chill

1. Clean

- Wash hands frequently and after: using toilet, changing 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 Happy Birthday song twice.
- Bandage any cuts or burns on hands before handling food.
- Use disposable latex gloves to protect food.
- Run sponges and dish scrapers through the dishwasher often.
- Change dish cloths daily.
- Use paper towels to mop up spilled juices from meat, fish or poultry.
- Use a disinfecting solution consisting of 1 tablespoon regular, unscented chlorine bleach to 1 quart of water. Use a spray bottle to disinfect countertops, cutting surfaces, etc.
 - The disinfecting solution has very specific instructions for mixing. Once bleach is mixed with water its disinfecting properties start to diminish after 24 hrs. When you are cleaning up after things that are highly likely to spread bacteria (like raw meat), you would want to use a freshly mixed solution.



2. Cook

Internal Temperatures & Rest Times:

- All poultry products including ground poultry and stuffing (cooked alone or in bird) 165°F.
- Ground meat (beef, pork, veal and lamb), sausages, and bacon: 160°F.
- Steaks, chops and roast (beef, pork, lamb and veal): 145°F & allow to rest for at least 3 minutes before carving.
- Fish and shellfish: 145°F (Cook shellfish until the shells open).
- Eggs: 160°F internal temperature.
- Casseroles: 165°F.
- Reheat leftovers to 165°F.
- Use a thermometer.



3. Separate

Avoid cross contamination

- Ice is food! Use clean ice to avoid contaminating food.
- **ALWAYS** wash your hands, knives, cutting boards, and food preparation surfaces well with soapy water before and after any contact with raw meat, fish, or poultry. Using a separate cutting board for meat and poultry is recommended.
- Rinse all fresh fruits and vegetables well under running water before preparing or eating them.
- When grilling or barbecuing, always use a clean plate to put the cooked meat on.
- 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.
- Use a separate cutting board for fresh produce, raw meat, and cooked meat.

4. 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. Reheat just before serving.
- Divide leftover hot food into shallow containers to accelerate cooling; 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).

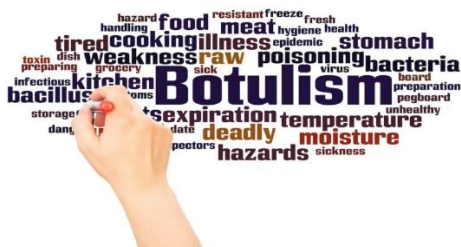
General cleaning tips

- Run sponges and pot scrubbers through the dishwasher frequently.
- Change dish cloths daily.
- Mop up spilled juices from meat, fish or poultry immediately using a disposable paper towel.
- Wipe food preparation surfaces with soap and water then disinfect.
- Use a disinfecting solution consisting of 1 ½ teaspoon of chlorine bleach to 1 pint of water. Dispense with a spray bottle to disinfect countertops, cutting surfaces, etc. Make a new solution every week.
- 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, fish, or poultry.
- Rinse all fresh fruits and vegetables well under running water before preparing or eating them. Do not soak.

When In Doubt - Throw It Out

DANGER - 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.



Boiling Water Canner Processing

1. Place jars in a canner with a rack.
2. Water should be 140° for raw pack jars and 180° for hot pack jars. Add enough water to cover the tops of the jar by at least 1" to 2". Cover with 2" of water if processing time is more than 30 minutes.
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.
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 Chart	
Altitude in feet	Increase processing time
1000 - 3000	5 minutes
3001 - 6000	10 minutes
6001 - 8000	15 minutes
8001 - 10000	20 minutes

7. Remove lid and let sit for 5 minutes, then remove jars from the canner. When you take the jars from the canner after processing, hold upright; do not disturb the seal. Do not retighten the rings. 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.
8. Leave the ring bands on the jars until they have cooled (approximately 24 hours). Do not try to dump the water off the lids.
9. **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.
10. After the jars have 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.
11. Wash and dry bands. Store rings for future use. Storing jars with rings attached is not recommended. Clean the jars with a damp cloth. 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.

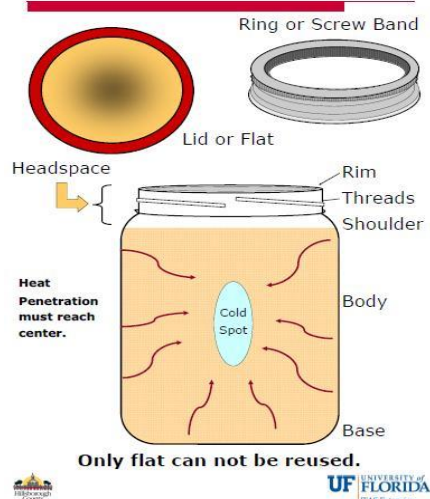


Atmospheric Steam Canner Processing

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 (4-6 inches) appears from the vent hole(s) in the canner lid. Jars must be processed in pure steam environment.
7. 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. If using a canner with a temperature sensor, use the temperature gauge only as a guide.
 - The processing time should begin only after a full column of steam (approximately 6 -8 inches) appears through the canner vent holes at the bottom of the cover. Some canners come with built-in temperature sensors, which can be used to monitor the temperature. A full column of steam should be present throughout the process time. If there is an interruption in the steam, the product should be reprocessed for the full processing time.
 - The temperature gauges on steam canners cannot be tested, therefore it is not recommended that they be relied upon to know when to start the processing time.
9. Set the timer for the total minutes required for processing the food, adjusting for altitude. 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.
10. 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.
11. At the end of the processing time, turn off the heat, wait 5 minutes then remove the lid, lifting the lid away from you.
12. 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.



Anatomy of a Jar



Pickling

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 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.

Raw (Cold) Pack Or Hot-Pack

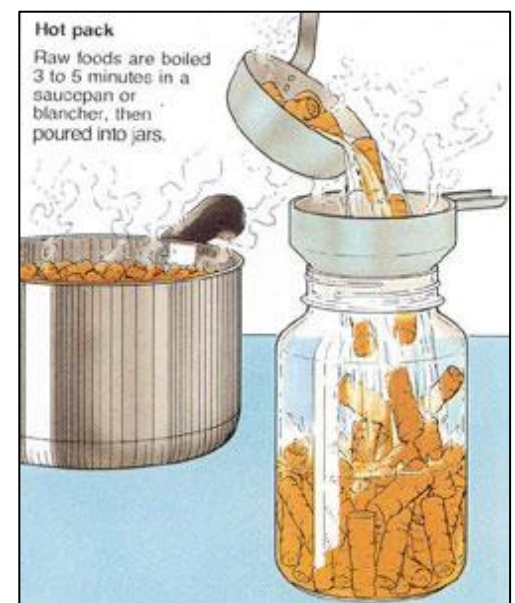
The raw, or cold-pack, method means packing the cold or raw food into a hot jar, then adding boiling liquid brine. The jars are then processed in a boiling-water canner. Fruits such as apricots, berries, cherries, grapes, plums, rhubarb and tomatoes are best if packed raw. Most vegetables can be packed raw (cold-packed) if processed in the pressure canner.

The hot-pack method requires a short pre-cooking period (boiling or heating in some manner). Then the boiling-hot product is packed into clean, hot jars and processed immediately. The hot-pack method is more satisfactory for some vegetables and fruits and it is recommended for peaches, pears and pineapple. Benefits include a tighter pack and, because food expels air when heated, less float.

Use the method suggested in your tested recipe for best flavor and texture.

Salt

- Use canning or pickling salt. Table salt contains anti-caking ingredients which can cloud the brine.
- 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.



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 acidity should be listed 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 sit for 24 hours. Skim off scum and use water from the top of the container without disturbing the sediment.

Pickles with reduced salt content

Any fresh-pack pickle recipe that calls for as much or more vinegar than water and provides a finished product with at least 1/4 cup of 5 percent acid vinegar per pint jar of pickled products can be safely made without salt. Sweet pickles generally taste better without salt than dill pickles. If salt is omitted from fresh-pack dill pickles, try adding hot peppers, herbs and garlic instead. Dill pickles taste better if as little as 0.5 percent salt by weight of entire contents is added. This is the equivalent of 1/2 to 3/4 teaspoon of salt per pint jar of pickles.

However, the salt used in making fermented sauerkraut and brined pickles not only provides characteristic flavor but is also vital to safety and texture. In fermented foods, salt favors the growth of desirable bacteria while inhibiting the growth of others. **Caution: Do not attempt to make sauerkraut or fermented pickles by cutting back on the salt required.**

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 good quality ingredients are used in pickling and up-to-date methods are followed, 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 fresh-pack pickles. However, since it is unnecessary, it is not included in these recipes.

- Soaking cucumber in ice water for 4 to 5 hours prior to pickling is a safe method for making 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!!! According to San Joaquin County extension, "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. 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 ...

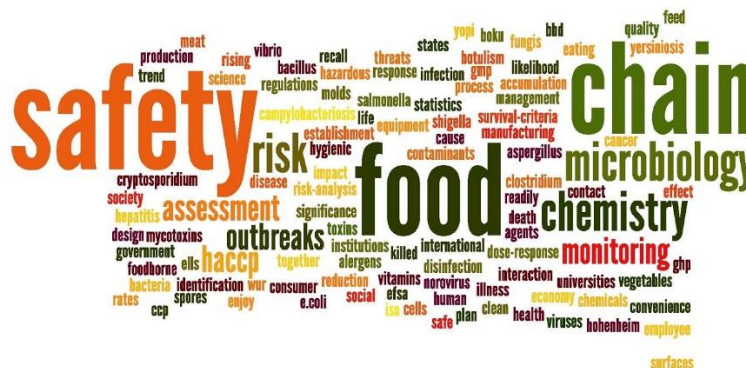
- Marinate refrigerator pickles in the refrigerator for at least two weeks before serving and use within 3 months.
- Store fresh-pack/quick pickles for 4-6 weeks in a cool, dry, dark place to allow the flavors to mellow and blend.

Alternative Low-Temperature Pasteurization Process

- Low-temperature pasteurization can produce a better pickle texture, but must be done very carefully to avoid spoilage and is only acceptable for certain recipes. Fill jars with room temperature pickles. Pour 165° to 180° F liquid over the product, leaving the appropriate headspace. Remove bubbles with a rubber spatula. Wipe the jars clean and adjust lids. Process at 180°F for 30 minutes. Be sure to use a thermometer.
- **Caution: Use this process only when a recipe indicates and only for cucumbers and zucchini.**

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.



Sweet & Sour Relish

Yield: about seven 8 oz. jars

- 4 cups finely chopped seeded green bell pepper
- 3 cups chopped, cored peeled tart apples
- 2 cups chopped cabbage
- 1 cup finely chopped seeded sweet banana peppers
- 2 Tbsp salt
- 3 cups cider vinegar
- 3 cups granulated sugar
- 1 tsp mustard seeds
- 1 red chili pepper, finely chopped (optional)

In a large glass or stainless steel bowl, combine green peppers, apples, cabbage, banana peppers and salt. Cover and let stand in a cool place (70° to 75°) for 2 hours.

Transfer to a colander placed over a sink and drain. Rinse with cool water and drain thoroughly. Using your hands, squeeze out excess liquid. Set aside.

In a large stainless-steel saucepan, combine vinegar, sugar, mustard seeds and red chili pepper, if using. Bring a boil over medium-high heat, stirring to dissolve sugar. Reduce heat to medium-low, add drained pepper mixture and boil gently, stirring frequently, until vegetables are heated through, about 10 minutes.

Ladle hot relish into hot jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot relish. Wipe rim, center lid on jar and screw band (ring) down until resistance is met, then increase to fingertip tight.

Place jars in canner, ensuring they are completely covered with water. Process in a boiling water canner or atmospheric steam canner for 10 minutes 0-1000 ft., 15 minutes 1001-6000 ft., 20 minutes above 6000 ft. Remove canner lid, wait 5 minutes, then remove jars, cool, label and store.

Source: Ball Complete Book of Home Food Preservation

Cook's note: You can make this relish mild or hot depending on the peppers you choose to use. You can substitute hot peppers for all or part of the recipe. Just make sure the final amount of peppers is the same as what is called for in the recipe.

Make sure you use apple cider vinegar not apple cider "flavored" vinegar. The real thing makes a big difference in the flavor of your product. Also, for safety, make sure your vinegar is 5% acidity. The acidity is printed on the label of the vinegar container.



Dixie Relish

This is an old fashioned, traditional relish. It is an ideal gift for those who love sweet-and-sour food. We decided to stick with tradition and use the old-fashioned method for soaking the vegetables in a salt-water brine, which was in the original recipe, instead of sprinkling salt over the vegetables, as more contemporary recipes do. Just be aware that this relish may be slightly saltier than those you are accustomed to, as tastes have changed over the years, but it's delicious nonetheless.

Yield: about 6-8 half-pint jars

- 1 quart chopped cabbage
- 2 cups chopped onion
- 2 cups chopped seeded red bell pepper
- 2 cups chopped seeded green bell pepper
- ½ cup canning salt
- 2 cups cold water
- 3 Tbsp. mustard seeds
- 2 Tbsp. celery seeds
- 1 quart vinegar
- ¼ cup sugar

In a large glass or stainless-steel bowl, combine cabbage, onions, and bell peppers. Dissolve salt in water and pour over vegetables. Cover and let stand in a cool place (70° to 75°) for 1 hour. Drain. If too salty, rinse and drain again.

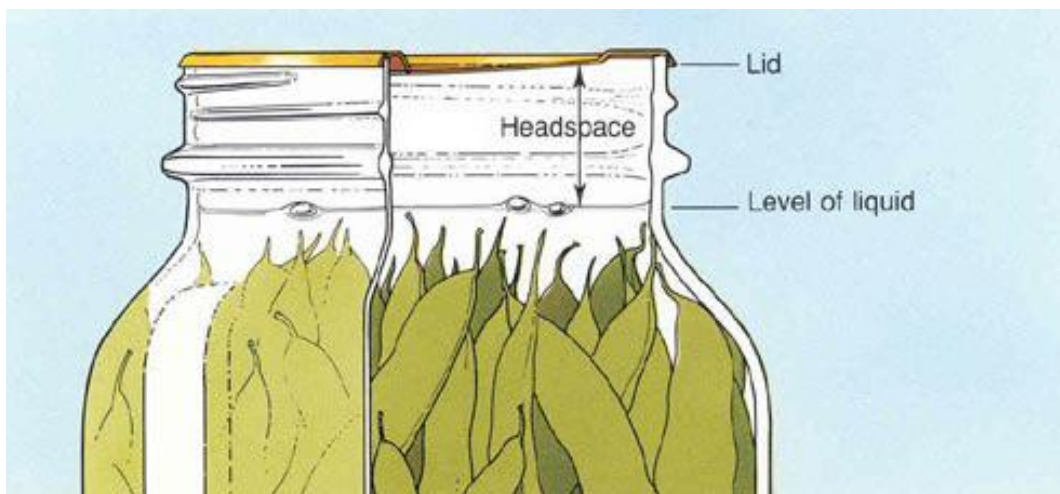
In a large stainless-steel saucepan, combine drained cabbage mixture, vinegar, sugar, and spices. Cover and bring to a boil over medium-high heat. Uncover, reduce heat, and boil gently, stirring frequently, for 20 minutes.

Ladle hot relish into hot jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot relish. Wipe rim, center lid on jar and screw band (ring) down until resistance is met, then increase to fingertip tight.

Place jars in canner, ensuring they are completely covered with water. Process in a boiling water canner or atmospheric steam canner for 10 minutes 0-1000 ft., 15 minutes 1001-6000 ft., 20 minutes above 6000 ft.

Remove canner lid, wait 5 minutes, then remove jars, cool, label and store.

Source: *Ball Blue Book Guide To Preserving*, 2009



Spiced Red Cabbage

This eastern European pickle has many uses. It is great as a side dish, warmed, and served with sausages, maybe some German potato salad, too. Can you say Rueben sandwich? Picture this with pastrami or corned beef on good rye bread. Don't forget your homemade mustard! Add it

Yield: about 5 quart jars

- 12 lbs. red cabbage (about 3 large heads), cored and shredded
- ½ cup pickling or canning salt
- ¼ cup whole cloves
- ¼ cup whole allspice
- ¼ cup whole black peppercorns
- ¼ cup celery seeds
- 2 cinnamon sticks (each about 4 ") broken into pieces
- 8 cups red wine vinegar
- 1 cup lightly packed brown sugar
- ½ cup mustard seeds
- ¼ cup ground mace or nutmeg

Day 1: In a large clean crock, jar or stainless-steel bowl, layer cabbage and salt. Cover and let stand in a cool place for 24 hours.

Day 2: Transfer cabbage to a colander placed over a sink and drain. Rinse with cool running water. Drain thoroughly on trays lined with paper towels, about 6 hours.

Tie cloves, allspice, peppercorns, celery seeds and cinnamon stick pieces in a square of cheesecloth, creating a spice bag.

In a large stainless-steel saucepan, combine vinegar, brown sugar, mustard seeds, mace and spice bag. Bring to a boil over medium-high heat, stirring to dissolve sugar. Reduce heat and boil gently for 5 minutes, until spices have infused the liquid. Discard spice bag.

Pack hot cabbage into hot jars to within a generous ½-inch of top of jar. Ladle hot pickling liquid into jar to cover cabbage, leaving ½-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot liquid. Wipe rim, center lid on jar and screw band down until resistance is met, then increase to fingertip tight.

Process in a boiling water canner or atmospheric steam canner for 20 minutes 0-1000 ft., 25 minutes 1001-6000 ft., 30 minutes above 6000 ft. Remove canner lid, wait 5 minutes, then remove jars, cool, label and store.

Cooks Tip: This recipe can be safely halved.

Source: Ball Complete Book of Home Preservation



Chow-Chow Relish

Yield: makes approximately seven 8-oz jars

- 2 cups diced English cucumber
- 1 ½ cups diced seeded red bell peppers
- 1 ½ cups diced green cabbage
- 1 ½ cups diced onions
- 1 ½ cups diced green tomatoes, unpeeled
- 9 cups water, divided
- 1 cup salt pickling or canning salt
- 3 cups white vinegar
- 2 ½ cups granulated sugar
- 3 Tbsp mustard seeds
- 2 Tbsp celery seeds
- 1 Tbsp turmeric
- 1 ½ cups diced green beans, blanched
- 1 ½ cups diced carrots, blanched

Day 1

In a large bowl, combine cucumber, peppers, cabbage, onions, and green tomatoes.

Add 8 cups water and the salt. Cover and let stand overnight. Drain in a colander, rinse, and drain again. Allow to sit for several minutes to remove as much water as possible. You may need to squeeze it a little to remove more water.

Day 2

Prepare green beans and carrots. Blanch for 30 seconds. Drain and set aside.

In a large nonreactive pot, combine 1 cup water, vinegars, sugar, mustard seeds, celery seeds, and turmeric. Bring to a boil. Add cabbage mixture, green beans and carrots and simmer about 40 minutes until thick. Much of the liquid will evaporate, and it will be a little thinner than a typical store-bought relish.

Ladle hot relish into hot jars to within a generous ½-inch of top of jar. Ladle hot pickling liquid into jar to cover the relish, leaving ½-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot liquid. Wipe rim, center lid on jar and screw band down until resistance is met, then increase to fingertip tight.

Process in a boiling water canner or atmospheric steam canner for 20 minutes 0-1000 ft., 25 minutes 1001-6000 ft., 30 minutes above 6000 ft. Remove canner lid, wait 5 minutes, then remove jars, cool, label and store.

Source: *Ball Complete Book of Home Preservation*



Red Root Relish

- 4 cups prepared beets, about 6 medium
- 4 cups finely chopped cabbage, 1 small head
- 3 cups white vinegar
- 1 1/2 cups granulated sugar
- 1 cup finely chopped onion
- 1 cup finely chopped red pepper
- 1 Tbsp. prepared horseradish
- 1 Tbsp. salt

Trim all but 2 inches of beet stems. Cook beets in boiling water, until tender, about 35 to 45 minutes. Remove from water and allow to cool slightly. Remove skins by easily slipping off beets. Dice beets and measure 4 cups.

Place beets, cabbage, vinegar, sugar, onion, pepper, horseradish and salt in a large stainless-steel saucepan. Bring to a boil; boil gently 10 minutes.

Ladle hot relish into hot jars to within a generous ½-inch of top of jar. Ladle hot pickling liquid into jar to cover the relish, leaving ½-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot liquid. Wipe rim, center lid on jar and screw band down until resistance is met, then increase to fingertip tight.

Process in a boiling water canner or atmospheric steam canner for:
15 minutes 0-1000 ft., 20 minutes 1001-6000 ft., 25 minutes above 6000 ft.
Remove canner lid, wait 5 minutes, then remove jars, cool, label and store.

Source: *Ball Complete Book of Home Preservation*, 2006-2012

Resources

National Center for Home Food Preservation: <http://nchfp.uga.edu/>

Complete Guide to Home Canning. 2009. http://nchfp.uga.edu/publications/publications_usda.html

Also available in paper copy from Purdue Extension (online store is located at

https://mdc.itap.purdue.edu/item.asp?item_number=AIG-539)

Canning Vegetables, 2012. Publication 8072. University of California Ag & Natural Resources, <http://anrcatalog.ucanr.edu>.

So Easy to Preserve, Sixth Edition. 2016. Bulletin 989. Cooperative Extension/University of Georgia, Athens

Ball Blue Book Guide to Preserving. 2014. Jarden Corporation.

Ball Complete Book of Home Preserving, 2006. Jarden Corporation.



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Sauerkraut

Intro to Sauerkraut

Sauerkraut is a naturally fermented cabbage. Natural fermentation is one of the oldest means of food preservation, and reduces the risk of foodborne illness and food spoilage. When salt is added to shredded cabbage, it causes juice to be extracted from the cabbage. This juice contains fermentable sugars. Microorganisms naturally present on the cabbage leaves will, in the absence of oxygen, use these sugars to produce lactic acid. The lactic acid preserves the cabbage.

Sauerkraut is a low-calorie food – only 42 calories per cup – and a good source of vitamin C (30 mg per cup). However, because of the salt necessary to regulate the fermentation, sauerkraut is a high-sodium food, containing about 1.5 grams (1,500 mg) sodium per cup. For that reason, people trying to moderate sodium intake should consider the sodium content of sauerkraut before including kraut in their menu. *Note:* Do not try to lower the sodium content of sauerkraut by using less salt to the cabbage, as the cabbage will spoil rather than ferment. It is very important to use the correct amount of salt so that fermentation can take place. You can reduce the sodium content – as well as the tartness – by rinsing sauerkraut in cold water before using.



SAUERKRAUT.

Ingredients

Cabbage. Use firm, sweet, fresh heads of cabbage, preferably within 24-48 hours of harvest. Kraut is typically made from regular green cabbage, but red cabbage may be used as well. Mid- to late-season harvest crops generally make the best kraut.

One medium head of cabbage weighs approximately 1¼ to 1½ pounds. One pound of cabbage will yield about 3½ to 4½ cups of shredded cabbage.

Canning/Pickling Salt. For best results, use a salt made for canning or pickling. Iodine and other additives, such as anti-caking agents, may inhibit fermentation. Flake salt is not recommended, as it varies in density and may result in an incorrect ratio of salt to cabbage (unless you weigh the salt).

When making sauerkraut, the ratio of salt to cabbage is 2.25 to 2.50 percent salt by weight (see *Procedures* below for exact recipe). Using too little salt not only softens the cabbage tissue, but also yields a product lacking in flavor. Too much salt delays the natural fermentation and, depending on the degree of over-salting, may cause an acrid flavor, darken the color or allow pink pigment-producing yeasts to grow.

Equipment

Slicer/Shredder. Use a large sharp knife, mandolin, kraut shredder or food processor.

Mixing bowl or tub. A large bowl or plastic tub is needed to mix the prepared cabbage and salt.

Kitchen scale. A scale is necessary for weighing the shredded cabbage, as the correct proportions of salt to cabbage are important for ensuring proper fermentation.

Fermenting Container. Glass jar, lead-free ceramic crock, or food-grade plastic pail.

Note: Check crocks carefully; if cracks or chips are found, or if using an old, potentially lead-glazed crock, line it with a with a clean, heavy food-grade plastic bag.

Procedures

Step 1. Discard outer cabbage leaves, reserving one or two large, unblemished leaves, if desired, for covering the cabbage (see Step 5). Rinse heads and reserved leaves under cold running cold water and drain.

Step 2. Cut heads into halves or quarters and core. Slice or shred the cabbage to about the thickness of a quarter.

Step 3. Weigh cabbage. Working with no more than 5 pounds at a time, place it in a mixing bowl or tub and sprinkle with the correct amount of canning/pickling salt (see table below for the correct ratio of salt to cabbage). Mix well with clean hands, gently massaging the shredded cabbage, to distribute the salt uniformly. Allow the salted cabbage to stand for about 5-15 minutes, until it wilts slightly and juice begins to be drawn out.

YIELD	CONTAINER SIZE	CABBAGE	SALT
1 Quart	Quart Jar	2 lbs.	3 ½ tsp.
2 Quarts	Half Gallon Jar	4 lbs.	7 tsp.
3-4 Quarts	Gallon Jar or Crock	5 lbs.	3 tbsp.
6-9 Quarts	5-Gallon Crock or Bucket	25 lbs.	¾ cup

Step 4. Transfer a layer of cabbage into the fermenting container, pressing firmly with a wooden spoon, tamper, or your hand until enough juices are drawn out to cover the cabbage. Repeat until the container is filled to the desired depth and the cabbage is completely covered with 1-2" of juice. If using glass jars, fill to the shoulder, leaving room for 1-2" of juice. If using crocks, leave at least 4-5" of headspace between the cabbage and the top of the container. If the juice does not cover the cabbage, add brine (boil 1 quart of water and 1½ tablespoons of salt; allow to cool).

Step 5. Cover the shredded cabbage with the reserved leaves, if using, ensuring that the leaves are covered with 1-2" of juice. Weight down the cabbage so it remains under the juice and cover the fermenting vessel. This step is essential, since the fermentation process requires anaerobic conditions (without oxygen). If using a large crock or bucket, a brine-filled plastic bag is one of the easiest ways to both cover and weight down the cabbage. Be sure to use a clear, heavy-duty, watertight plastic bag intended for food use. Clear freezer bags sold for packaging turkeys are suitable for use on 5-gallon containers. Fill the bag with salted water (6 tablespoons salt in 1 gallon water) to a depth of 3-4", allowing the bag to completely cover the cabbage. An alternate method is to cover the cabbage with a clean cloth or clear plastic, fitting the covering snugly against the container sides. Then put a plate or other nonmetallic disk that just fits inside the container so that the cabbage is not exposed to air. Put a weight on top of the cover so the juice comes to the cover but not over it. A jar filled with water or brine makes a good weight.

If working with glass jars, put a sterilized lid on the jar just tightly enough to keep out air, or use an airlock. A brine-filled bag as described above can also be used.

Step 6. Place the container on a tray or in a pan to collect juice that may leak out during active fermentation.

Note: Do not pour any juice that bubbles out back into the container. Set the container in a well-ventilated place with a relatively constant temperature. If kept at room temperature (70° to 75°F), large batches of kraut should be ready in 3 to 4 weeks; small batches should be ready in about 2 to 3 weeks.

At higher temperatures, fermentation will proceed more rapidly and the kraut will be ready sooner, but the kraut may become soft. If kept at temperatures lower than 70°F, fermentation will be slow, and it may be incomplete if the temperature drops to below 60°F. It is desirable to provide 70° to 75°F temperatures during the first several days to begin production of the acid that will preserve the cabbage. Then, if you want a slower fermentation, the container could be stored in a cooler area such as a basement or unheated garage. If the temperature drops below freezing, fermentation will stop, but will start again when the temperature rises into a favorable range.

Step 7. Check the kraut 2-3 times per week (or even daily) and remove any scum if it forms. If any discoloration appears within the top inch of kraut, remove it. If you are using a cloth covering, rinse or replace it each time you remove scum or spoiled cabbage. Fermentation is complete when the cabbage turns from opaque green-white to a translucent golden color, and the product smells like sauerkraut. The absence of bubbles may also be an indicator that the kraut is ready.

Storage

There are four alternatives for storing sauerkraut after fermentation is complete. For shorter-term storage, kraut may be refrigerated or left in the crock. For longer-term storage, freezing and canning will maintain high quality.

Refrigerating

Place the kraut in tightly closed jars or sealed freezer bags and stored in the refrigerator for as long as several months. Check the kraut after fermenting to ensure that there is still enough juice covering it. If more liquid is needed, add a weak brine (boil 1 tablespoon of salt in 1 quart of water and cool).

Leaving in the Crock

If you have a cool basement (65-75°F), garage or other storage area, the sauerkraut may be kept in the crock indefinitely as long as the surface is not exposed to air, which may cause spoilage. No refrigeration is required. After removing portions, cover and weight down. A small amount of spoilage may appear after each opening, but you can remove it the next time you open the crock.

Freezing

Pack sauerkraut and juice in rigid plastic moisture- or vapor-proof freezer containers, in glass freezer jars (leaving 1½ inches headspace), or in heavy, tightly sealed plastic freezer bags. Freeze.

Canning

- **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 firmly with kraut and cover with juices, leaving 1/2-inch headspace.

- If there is not enough sauerkraut juice to cover all the kraut in the jars, use a boiling hot, weak brine (2 tablespoons salt for each quart of water).
- Adjust lids and process in a boiling-water or atmospheric steam canner per the recommendations below.

		Process Time at Altitudes of			
Style of Pack	Jar Size	0 - 1,000 ft.	1,001 - 3,000 ft.	3,001 - 6,000 ft.	Above 6,000 ft.
Hot	Pints	10 min	15 min	15 min	20 min
	Quarts	15	20 min	20 min	25 min
Raw	Pints	20	25 min	30min	35 min
	Quarts	25	30 min	35min	40 min

Spoilage Problems

Spoilage in sauerkraut causes undesirable color, off-odors, soft texture and unpleasant flavor.

Softness may result from insufficient salt, high temperatures during fermentation, uneven salt distribution or air pockets caused by improper packing.

Pink color in kraut is caused by the growth of certain types of yeasts on the kraut surface. These may grow if there is too much salt or unevenly distributed salt, or if the kraut is insufficiently covered during fermentation.

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

Darkness in kraut may be caused by unwashed and improperly trimmed cabbage, insufficient juice to cover the cabbage during fermentation, uneven salt distribution, exposure to air, high temperatures during fermentation, processing or storage, or by a long storage period.



Cooking with Kraut

For full flavor, just heat sauerkraut through. But to make it more interesting and mellow, add a little brown sugar, chopped apple and onion, and simmer slowly. Rinsing kraut with water before using it will produce a milder flavor and remove some of the salt.

Sauerkraut can be used in appetizers, dips, soups, relishes, salads, entrées and even desserts. It is also a good vegetable companion for corned beef, spareribs, frankfurters, sausages, pork hocks, poultry or game.

A newer way to use kraut is as a sauce, dip or potato topping. Puréed sauerkraut, called kolé, is mixed in equal amounts with plain yogurt or with mayonnaise. To make a flavorful topping for baked potatoes or a dip for chips and vegetables, add herbs, chili sauce, hot taco or pepper sauce, chopped meats or seafood such as clams. If the flavor seems too acidic, smooth it out with a pinch of baking soda. Yogurt kolé is a low-calorie taste treat.

Slow Cooker Reuben Dip

"A wonderful, easy, creamy hot dip that even sauerkraut haters love."

- 1 (16 ounce) jar sauerkraut, drained
- 1 (8 ounce) package cream cheese, softened
- 2 cups shredded Swiss cheese
- 2 cups shredded cooked corned beef
- 1/4 cup thousand island dressing

In a slow cooker, combine the sauerkraut, cream cheese, Swiss cheese, corned beef and thousand island dressing. Cover, and cook on high for 45 minutes if you're in a hurry, low for longer if you're not, or just until hot and cheese is melted. Stir occasionally while cooking. Serve with cocktail rye or crackers.

Source: <https://allinrecipes.com/slow-cooker-reuben-dip/>

Sauerkraut Salad

"Great-Grandma Maida Dixon made this salad for family gatherings. I think of her every time I make. It's sooo good. It needs to be placed in the refrigerator to allow the flavors to meld. It really is worth the wait."

- 1 quart sauerkraut, drained
- 1 onion, chopped
- 2 stalks celery, chopped
- 1 green bell pepper, chopped
- 1 large carrots, chopped
- 1 (4 ounce) jar diced pimento peppers, drained
- 1 teaspoon mustard seed
- 1 ½ cups white sugar
- 1 cup vegetable oil
- ½ cup cider vinegar

In a large bowl, mix together sauerkraut, onion, celery, green bell pepper, carrot, pimientos, and mustard seed. Set aside this mixture.

In a small saucepan, mix together sugar, oil, and vinegar. Bring to a boil. Remove from heat.

Pour sugar mixture over salad, cover, and leave it in the refrigerator for 2 days before serving.

Sauerkraut Soup

- 2 pounds Italian sausage, removed from casing and crumbled
- 2 to 3 large onions or leeks, diced
- 3 pounds cooked northern (navy) beans
- 1 quart sauerkraut, homemade preferred
- Thinly sliced celery or carrots (optional)
- Salt, pepper and paprika to taste

Brown 2 pounds Italian sausage, until well browned.

Add 2-3 large onions and cook until transparent.

Add thinly sliced celery/carrots with onions, if you like.

Add 3 pounds cooked beans, 1 quart of sauerkraut, salt, pepper and paprika.

Heat thoroughly.

This is best made with homemade sauerkraut and sausages, if available.

If the soup seems too thick add 1 or 2 cans of chicken broth.

I usually use additional seasonings, for example, I like to use Herbs Provence but the choice is yours.

Bacon, Sausage and Sauerkraut Pie

- Dough for one 9-inch piecrust
- 6 slices thick bacon, cut into ½-inch pieces
- 1 large onion, halved and thinly sliced
- 1 pound sauerkraut, drained and squeezed dry
- ¼ tsp caraway seeds, optional
- 3 large eggs
- 1 ⅓ cups sour cream
- ⅓ cup whole milk or half and half
- 1 Tbsp. Dijon mustard
- 2 tsp flour
- ¾ tsp salt
- Black pepper to taste
- 1 ½ cups grated Swiss cheese
- 6 oz cooked bratwurst or kielbasa, cut into bite-size pieces

On a lightly floured sheet of wax paper, roll dough into a 13-inch circle. Flip into a 9-inch pie pan; peel off paper. Gently tuck pastry into pan without stretching it, fluting the edges. Refrigerate for 1 hour.

Preheat oven to 375°. Position rack in center of oven.

Prick bottom of chilled pie shell with a fork 8-10 times. Fit a 16-inch long piece of foil snugly into the shell. Fill with dried beans. Bake 25 minutes. Remove foil and beans. Bake 5-7 minutes or until bottom is dry and pale golden. Put onto wire rack to cool.

While shell prebakes, heat a large skillet over medium heat. Add bacon; cook 8 minutes or until crisp. Remove bacon to paper-towel-lined plate, reserving 3 tbsp fat in. Add onion to pan; cook 12 minutes or until light golden, stirring occasionally. Stir in sauerkraut and caraway, if using; remove from heat.

In a large bowl, whisk eggs until blended. Whisk in sour cream, milk, mustard, flour, salt and pepper. Spread sausage in bottom of prebaked shell. Top with sauerkraut mixture. Pour egg mixture over sauerkraut mixture, smoothing top with a spoon.

Crumble bacon over top.

Bake 40-45 minutes or until set. Transfer to wire rack, cool at least 30 minutes before serving.

Serves 8

Chocolate Sauerkraut Cake

The sauerkraut cannot be tasted; you think you're eating coconut!

- ½ cup butter
- 1 ½ cups white sugar
- 3 eggs
- 1 tsp. vanilla extract
- ½ cup unsweetened cocoa powder
- 2 ¼ cups sifted all-purpose flour
- 1 tsp. baking powder
- ¾ tsp. baking soda
- ¼ tsp. salt
- 1 ¼ cups water
- ¾ cup drained and chopped sauerkraut

Preheat oven to 350 degrees F (175 degrees C).

Grease and flour two 8-inch square or round pans.

Cream together the butter and sugar. Beat in eggs and vanilla.

Sift together cocoa, flour, baking powder, soda, and salt, and add alternately with water to egg mixture. Stir in the sauerkraut. Pour batter into prepared pans.

Bake at 350 degrees F (175 degrees C) for 30 minutes or until a wooden pick comes out clean.

Use your favorite chocolate or white frosting.

Resources

- *Adapted from: Make Your Own Sauerkraut, Mary E. Mennes, University of Wisconsin-Extension, Cooperative Extension, B2087 (Revised 1994), and Sauerkraut, University of Alaska Fairbanks Cooperative Extension Service, FNH-00170. Additional Sources: USDA Complete Guide to Home Canning, Agriculture Information Bulletin No. 539, and Using, Storing and Preserving Cabbage, Michigan State University Extension Bulletin HNI09.*
- National Center for Home Food Preservation [Internet]. University of Georgia [cited 2014 September 4]. Available from: <http://nchfp.uga.edu/>
- **Make Your Own Sauerkraut.** Mary E. Mennes. University of Wisconsin-Extension, Cooperative Extension. B2087 (Revised 1994).
- Penn State Extension, <http://extension.psu.edu/food/preservation/safe-methods/sauerkraut>

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04/05/2022

Sauerkraut

Quality: For the best sauerkraut, use firm heads of fresh cabbage.

Yield: About 9 quarts: 25 lbs cabbage 3/4 cup canning or pickling salt
Yield: About 5 pints: 5 lbs cabbage 3 tablespoons canning or pickling salt
Yield: About 1 quart: 2 lbs cabbage 4 teaspoons canning or pickling salt

1. Discard outer leaves. Rinse heads under cold running water and drain. Cut heads in quarters and remove cores. Shred or slice to a thickness of a quarter.
2. Put 2 or 5 pounds of cabbage in a suitable fermentation container, and add corresponding amount of salt. Mix thoroughly, using clean hands. Pack firmly until salt draws juices from cabbage.
3. Repeat shredding, salting, and packing until all cabbage is in the container. Be sure container is deep enough so that its rim is at least 4 or 5 inches above the cabbage.
4. If juice does not cover cabbage, add boiled and cooled brine (**1-1/2 tablespoons of salt per quart of water**).
5. Add plate and weights; cover container with a clean towel.
6. Store at 70° to 75°F while fermenting. At temperatures between 70° and 75°F, kraut will be fully fermented in about 3 to 4 weeks; at 60° to 65°F, fermentation may take 5 to 6 weeks. At temperatures lower than 60°F, kraut may not ferment. Above 75°F, kraut may become soft.
7. 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 2 to 3 times each week and remove scum if it forms.
8. 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 firmly with kraut and cover with juices, leaving 1/2-inch headspace.
9. Adjust lids and process in a boiling-water or steam canner according to the recommendations below.

Style of Pack	Jar Size	0 - 1,000 ft	1,001 - 3,000 ft	3,001 - 6,000 ft	Above 6,000 ft
Hot	Pints	10 min	15 min	15 min	20 min
	Quarts	15 min	20 min	20 min	25 min
Raw	Pints	20 min	25 min	30 min	35 min
	Quarts	25 min	30 min	35 min	40 min

Adapted from the USDA "Complete Guide to Home Canning," revised 2009 and So Easy to Preserve



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