

Canning Pickles and Sauerkraut

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Provides recipes and methods for three kinds of dill pickles, including a reduced-sodium pickle, and a recipe for sauerkraut.

Safety is the top priority

The United States Department of Agriculture (USDA) home preservation guidelines used in this MontGuide are based on extensive research to prevent botulism, a potentially deadly foodborne illness caused by a toxin of the bacteria *Clostridium botulinum*, which produces one of the most deadly poisons. *C. botulinum* can grow and reproduce in improperly processed home-canned foods.

The guidelines presented here will also help prevent foodborne illnesses caused by other bacteria, molds and yeast, and will help prevent food spoilage in your home-processed foods.

This MontGuide is best suited for intermediate and advanced home food preservers. A list of resources for beginning food preservers is found on page 4.

A Question of Safety

Before beginning your home-canning task, ask yourself, 'What is my altitude?' In order to decrease your risk of foodborne illness and death, you must determine the correct home-canning processing times and pressure for your altitude. While water boils at 212°F at sea level, it boils at a much lower temperature at higher altitudes. Consequently, at higher altitudes, home-canned foods must be processed for longer times or at higher pressures.

The acidity level in a pickled product is another important safety consideration. To ensure safe levels of acidity, use only recipes following USDA recommendations as found in the resources on page 4. Do not alter vinegar, food or water proportions in these recipes. There must be a minimum uniform level of acid throughout the properly mixed product to prevent botulism.

Suitable jars, containers, covers and weights for fermenting and canning

Recommended jars for canning fermented and pickled vegetables are Mason-type, threaded, home-canning jars with self-sealing, 2-piece lids. Do not use commercial mayonnaise-type jars because they are not tempered for high heat and pressure and may result in seal failures and jar breakage.

The fermentation container and other equipment must be thoroughly washed in hot sudsy water and rinsed well with very hot water before use. For fermenting pickles and cabbage,

a 1-gallon container is needed for each five pounds of fresh cucumbers or cabbage. Therefore, a 5-gallon stone crock is an 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, non food-grade plastic containers may be used if lined inside with a clean food-grade plastic bag. Do not use aluminum, copper, brass, galvanized or iron containers for fermenting pickles or sauerkraut. **Be certain that foods contact only food-grade plastics. Do not use garbage bags or trash liners.**

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.

To keep the plate under the brine, weigh it down with 2 to 3 sealed quart jars filled with water or with a large, clean, plastic bag filled with 3 quarts of water containing 4½ tablespoons of salt (salt is necessary in case bags break). Cover the container opening with a clean, heavy bath towel to prevent contamination from insects and molds while the vegetables are fermenting.

Ingredients for Making Pickles

The combination of acid, spices and sugar with cucumbers creates the acidic food product known as pickles. A popular food, pickles are relatively easy to preserve. However, important steps must be followed to ensure safety and the desired quality of the final product.

Cucumbers

Quantity: An average of 14 pounds is needed per canner load of 7 quart jars; an average of nine pounds is needed per canner load of 9 pint jars.

Quality: Select firm, young cucumbers about 4 inches in size.

Types: Use pickling cucumbers. Bumpless and burpless cucumbers may not make an acceptable product. If you buy cucumbers, select unwaxed ones for pickling whole because the brine or pickling solutions cannot penetrate the wax.

For highest quality, plan to pickle within 24 hours after the cucumbers are picked. Wash well, especially around the stems. Soil trapped here can be a source of bacteria responsible for softening pickles. Cut thin slice off bottom/blossom end and discard to prevent softening by enzymes. Leave ¼ inch of stem attached.

Vinegars

Use commercial white or cider vinegar at the recommended 5 percent acidity (50 grain). This is the level of acidity in most commercially bottled vinegars. Cider vinegar has a good flavor and aroma, but may darken white or light-colored fruits and vegetables. Avoid vinegars of unknown acidity or homemade vinegars. **Never reduce the amount of vinegar in the recipe.**

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 during the boiling process and then remove the bag before packing in jars.

Salts (used in pickles and sauerkraut)

Use of canning or pickling salt is recommended. Do not alter the amount of salt called for in a recipe. Use of reduced sodium salt in pickle recipes is not recommended. Iodized or non-iodized table salt may safely be used, but the product quality may be unsatisfactory.

Water

When brining pickles, use soft water because hard water interferes with the pickling process by reducing the formation of acid. If soft water is unavailable, hard water can be softened. Simply boil for 15 minutes and let set for 24 hours, covered. Remove any scum that appears. Slowly pour the water from the container so the sediment will not be disturbed. Discard sediment. Distilled water can also be used in making pickles although it is relatively expensive.

Firming Agents

Firming agents (alum, food-grade lime, calcium chloride) for crisp pickles are not needed if high quality ingredients and the most current preservation methods are used. The safest way for making crisper pickles is soaking cucumbers in ice water for 4 to 5 hours prior to pickling.

Low-temperature pasteurization treatment

Use low-temperature pasteurization treatment only when the recipe indicates. The Quick Fresh-Pack Dill Pickles and Fermented Dill Pickles recipes in this publication are suitable for low-temperature pasteurization treatment. The following treatment results in a more desirable texture but must be carefully managed to avoid 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. Temperatures higher than 185°F may cause unnecessary softening of pickles.

Ingredients for Making Sauerkraut

Sauerkraut has a distinctive sour flavor which results from the acid that forms when sugars in the cabbage are fermented. Use firm heads of cabbage within 24 to 48 hours of harvesting. Use only canning or pickling salts. (See Salts under Ingredients for Making Pickles.)

FERMENTED DILL PICKLES

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

4 lbs. of 4-inch pickling cucumbers
2 Tbsp. dill seed or 4 to 5 heads fresh or dry dill weed
½ cup salt
¼ cup vinegar (5%, white or dark)

8 cups water and one or more of the following optional ingredients:
2 cloves garlic
2 dried red peppers
2 tsp. whole mixed pickling spices

Procedure: Wash cucumbers. Be sure to cut ¼ inch slice off blossom end. Leave ¼ inch of stem attached. Place half of dill and spices in bottom of a clean, suitable container (see page 1). 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 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. Check the container several times a week and promptly remove surface scum or mold.

Canning fully fermented pickles is the best 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 paper coffee filters to reduce cloudiness, if desired. Fill jar with pickles

and hot brine, leaving ½ inch headspace. Adjust lids and process according to the times listed for your altitude, or use the low-temperature pasteurization treatment described above. Turn off heat and remove water bath canner lid after required processing time. Wait 5 minutes before removing jars.

Caution: If the pickles become soft, slimy or develop a disagreeable odor, discard them. If you do not choose to process in a boiling water canner, you may store fully fermented pickles in the original container for four to six months, provided they are refrigerated and surface scum and molds are removed regularly.

Recommended processing time for dill pickles in a boiling-water canner

Style of Pack	Jar Size	Processing 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.

QUICK FRESH-PACK DILL PICKLES

8 lbs. of 3 to 5 inch pickling cucumbers
 2 gals. water
 1¼ cups canning or pickling salt (divided)
 1½ qts. vinegar (5%, white or dark)
 ¼ cup sugar
 2 qts. water
 2 Tbsp. whole mixed pickling spice
 3 Tbsp. whole mustard seed (1 tsp per pint jar)
 14 heads of fresh dill (1½ heads per pint jar) OR
 4½ Tbsp. dill seed (1½ tsp per pint jar)

Yield: 7 to 9 pints

Procedure: Wash cucumbers. Be sure to cut ¼ inch slice off blossom end. You can leave ¼ inch stems attached. Dissolve ¾ cup salt in two gallons water. Place cucumbers in a suitable container (see page 1). Pour brine over cucumbers and let stand 12 hours. Drain. Combine vinegar, ½ 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 one teaspoon mustard seed and 1½ heads fresh dill per pint. Cover with boiling pickling solution, leaving ½ inch headspace. Adjust lids and process according to times listed for your altitude or use the low-temperature pasteurization treatment described on page 2. Turn off heat and remove water bath canner lid after required processing time. Wait 5 minutes before removing jars.

Recommended processing time for quick fresh-pack dill pickles in a boiling-water canner

Style of Pack	Jar Size	Processing 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.

REDUCED-SODIUM SLICED DILL PICKLES

4 lbs. of 3 to 5 inch pickling cucumbers
 6 cups vinegar (5%, white or dark)
 6 cups sugar
 2 Tbsp. canning or pickling salt
 1½ tsp. celery seed
 1½ tsp. mustard seed
 2 large onions, thinly sliced
 8 heads fresh dill

Yield: About 8 pints

Procedure: Wash cucumbers. Be sure to cut ¼ inch slice off blossom end. Cut cucumbers in ¼ inch slices. Combine vinegar, sugar, salt, celery and mustard seeds in large saucepan. Heat to boiling. Place two slices of onion and ½ dill head in bottom of each pint jar. Fill jars with cucumber slices, leaving ½ inch headspace. Add one slice of onion and ½ dill head on top. Pour hot pickling solution over cucumbers, leaving ¼ inch headspace. Adjust lids and process according to times listed for your altitude. Turn off heat and remove water bath canner lid after required processing time. Wait 5 minutes before removing jars.

Recommended processing time for reduced sodium sliced dill pickles in a boiling-water canner

Style of Pack	Jar Size	Processing Time at Altitudes of		
		0-1,000 ft.	1,001-6,000 ft.	Above 6,000 ft.
Raw	Pints	15 min.	20 min.	25 min.

Altitudes* of County Seats in Montana

County Seat	Altitude	County Seat	Altitude	County Seat	Altitude	County Seat	Altitude
Anaconda	5239	Cut Bank	3793	Hysham	2618	Ryegate	3775
Baker	2968	Deer Lodge	4609	Jordan	2640	Scobey	2461
Big Timber	4199	Dillon	5118	Kalispell	2984	Shelby	3300
Billings	3153	Ekalaka	3494	Lewistown	3936	Sidney	1967
Boulder	4938	Forsyth	2510	Libby	2198	Stanford	4288
Bozeman	4806	Fort Benton	2698	Livingston	4557	Superior	2813
Broadus	3091	Glasgow	2088	Malta	2275	Terry	2228
Butte	5539	Glendive	2053	Miles City	2362	Thompson Falls	2519
Chester	3162	Great Falls	3398	Missoula	3232	Townsend	3869
Chinook	2411	Hamilton	3625	Phillipsburg	5357	Virginia City	5804
Choteau	3799	Hardin	2903	Plentywood	2068	W. Sulphur Sp.	5091
Circle	2500	Harlowton	4185	Polson	2930	Wibaux	2650
Columbus	3599	Havre	2493	Red Lodge	5562	Winnett	2975
Conrad	3523	Helena	4068	Roundup	3198	Wolf Point	2043

*accessed January 22, 2009, <http://nris.mt.gov/montanafacts/townelev.html>

SAUERKRAUT

25 lbs. cabbage
 ¾ cup canning or pickling salt

Quality: Use firm heads of fresh cabbage harvested with 24 to 48 hours.

Yield: About 9 quarts

Procedure: 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 a thickness of a quarter.

Put cabbage in a suitable fermentation container (see page 1), and add 3 tablespoons of salt. Mix thoroughly, using clean hands. 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 four or five inches above the cabbage. If juice does not cover cabbage, add boiled and cooled brine (1½ tablespoons 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 lower than 60°F, kraut may not ferment. Above 75°F, kraut may become soft. Fermentation is complete when bubbling stops.

If you weight the cabbage down with a brine- or water-filled filled double-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 ½ inch headspace.

Raw pack – Fill jars firmly with kraut and cover with juices, leaving ½ inch headspace.

For either pack, adjust lids and process according to times listed for your altitude. Turn off heat and remove water bath canner lid after required processing time. Wait 5 minutes before removing jars.

Recommended processing time for sauerkraut in a boiling-water canner	Style of Pack	Jar Size	Processing Time at Altitudes of			
			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.

Additional Resources

This MontGuide is best suited for intermediate and advanced home food preservers. The following resources provide a wide variety of tested recipes and information, based on USDA recommendations, especially important for the beginning food preserver.

National Center for Home Food Preservation (NCHFP), USDA sponsored Web site is the most current source for publications, video clips, tutorials for the beginning home food preserver, frequently asked questions, and seasonal tips: <http://www.uga.edu/nchfp/>



To order additional publications, please contact your county or reservation MSU Extension office, visit our online catalog at www.msueextension.org/store or e-mail orderpubs@montana.edu

USDA *Complete Guide to Home Canning, 2006*. Available on NCHFP Web site, above, click on 'publications'

So Easy to Preserve, 5th edition only, MSU Extension does not recommend earlier editions. <http://www.soeasytopreserve.com>

The following publications are available at local stores or online at <http://www.kitchenkrafts.com>: *New Ball Blue Book of Preserving*, 2009 edition only; *Ball Complete Book of Home Preserving*, 2006 edition only; *Ball Blue Book of Preserving*, 2006 edition only.

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