

Sauerkraut

Sauerkraut is naturally fermented cabbage. Natural fermentation is one of the oldest ways of preserving food. When salt is added to shredded cabbage, it causes juice to be extracted from the shredded cabbage. This juice contains fermentable sugars. Bacteria such as *Lactobacillus brevis* and *Lactobacillus plantarum* naturally present on the cabbage leaves will, in the absence of oxygen, use these sugars to produce lactic acid. The acid will preserve the cabbage and the bacteria become healthy probiotics.

*It is very important to use the correct amount of salt so that fermentation can take place. Sauerkraut is a salty food. People who must restrict their sodium intake need to take into account the high salt content of sauerkraut when planning their meals. **Do not try to lower the sodium content of sauerkraut by adding less salt to the fermentation mixture.** The cabbage will spoil rather than ferment. Instead, try rinsing the fermented kraut in cold water before eating it to remove some of the salt. Rinsing will also reduce the probiotics, but will not eliminate them.*

Although sauerkraut is traditionally made from regular green cabbage, you can make good kraut from red cabbage, too. The red cabbage may be a blue/purple color at the beginning of the process, but the pigments will change to red/purple as the fermentation progresses and acid is formed.

If you want to make sauerkraut from Alaska's giant cabbages, you can, but it may take some extra work to get this cabbage shredded evenly. The leaves, especially the outer ones, may be tough

on these very large cabbages. It is difficult to shred tough leaves to produce pieces that are of uniform size.

Uneven-size pieces could result in uneven fermentation. If the leaves are tough,



try removing the veins and cutting the more tender, veinless leaf pieces with a knife. (If you cut them into small pieces, those tough veins can be used to make a good coleslaw.)

Making Sauerkraut

Large Amount of Cabbage

(Yield: about 9 quart jars)

25 pounds cabbage
15 tablespoons canning salt (non-iodized)

- ... Discard outer leaves. Rinse cabbage heads under cold water and drain. Cut heads in quarters and remove cores.
- ... Shred or slice to a thickness of a 25-cent coin or thinner. A meat slicer works well, if you have one. You may also use a food processor or food grinder. The shredded product will look a little different, but that will not affect its ability to ferment. (Not all food processors/grinders will give an even shred. You may have to shop around to find one that works well for cabbage.)
- ... Weigh cabbage. Put 5 pounds of shredded cabbage into a large mixing bowl or pan. Sprinkle 3 tablespoons canning salt over the cabbage. Let salted cabbage stand 5 to 10 minutes to wilt slightly and help to draw the juices out. Then mix well with clean hands.
- ... Transfer the salted cabbage to a suitable fermentation container. Press cabbage firmly with a wooden tamper, spoon or clean hands until enough juices are drawn out to entirely cover the cabbage.
- ... Weigh another 5 pounds of cabbage and repeat the procedure, placing the second batch of salted, wilted cabbage on top of the first. Continue layering 5-pound batches, pounding or pressing each layer to draw out juices, until fermentation

What Is a Suitable Fermentation Container?

Glass jars and heavy food-grade plastic containers are considered to be the safest fermenting vessels. Metal and non-food-grade plastic containers are not recommended. The acid in the kraut could extract metals or chemicals from these containers that could produce off-flavors and toxic products in the kraut.

Old ceramic crocks may contain lead and other toxic metals; the acid in the kraut could cause the lead to leach from the crock into the kraut, especially if the ceramic is cracked or chipped. New ceramic crocks may be expected to be low-lead or lead-free, and, if so, make excellent fermenting containers. However, since new ceramic crocks may be expensive, it is a good idea to ask about the lead content before investing in a ceramic crock. You may be able to purchase food grade plastic containers from local restaurants. A 5-gallon container will hold about 25 pounds of prepared cabbage.

container is filled to the desired depth. If you have less than 5 pounds of cabbage in the last batch, adjust the salt accordingly — just keep the proportion of 3 tablespoons salt to 5 pounds of shredded cabbage.

... Leave about 4 or 5 inches of space between the cabbage and the top of the fermentation container. Cabbage should be covered with 1 to 2 inches of its own juice. If juice does not cover cabbage, add boiled and cooled brine (1½ tablespoons salt per quart of water).

... Next, cover the cabbage to exclude air. **This step is critical because fermentation will take place only in the absence of oxygen.**

How To Exclude Air (Oxygen)

Either of the following methods may be used to keep oxygen from the cabbage/salt mixture so that cabbage will ferment properly. You may have less trouble with spoilage if you use method 1.

Method 1

One of the easiest and best ways to keep air out of the fermenting cabbage is to place a brine-filled food-grade plastic bag on top of the cabbage. This will also cover and weigh down the cabbage. To make brine, use 6 tablespoons salt/1 gallon water (1½ tablespoons/1 quart water.)

Use a heavy-weight, watertight plastic bag that is intended for use with food and that is not colored. Do not use plastic garbage/trash bags. For extra protection against leakage, the brine-filled bag may be placed inside another plastic bag. Add enough brine to the bag to give just enough pressure to keep the fermenting cabbage covered with its own juice — 3 to 4 inches is usually about right — then close the bag securely.

Method 2

An alternate method is to cover the cabbage with a clean plate or other nonmetallic disk. Fit this cover smoothly against the sides of the container, so that all cabbage pieces are covered, to the container sides.

Put a weight on top of the cover to hold the cover and the cabbage below the juice by 1 to 2 inches. A glass jar filled with water makes a good weight.

Store container with cabbage at 70°F to 75°F for fermenting. For best quality, select a location in which temperature will remain fairly constant.

At temperatures between 70°F and 75°F, 25 pounds of kraut will be fully fermented in about three to four weeks; at 60°F 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 and spoil before fully fermenting.

Regardless of which air exclusion method you use, you will need to check the kraut two to three times each week (or even every day) and remove any white film if it forms. Some people like to examine the kraut as it ferments and choose the container and air exclusion method that allows them to most easily view the kraut's progress. After checking the kraut and removing any white film from the kraut or container surfaces, re-cover the brine with the brine-filled bag (cleaned of any white film, if needed) and re-cover the container with clean plastic or cloth.



Illustration from USDA Complete Guide to Home Canning, Agriculture Information Bulletin No. 539. 9-94.

Look for these indicators to help recognize when fermentation is complete and the sauerkraut is ready.

- ... Cabbage changes from opaque, green-white to translucent, golden color.
- ... Product smells like sauerkraut.
- ... Product has a sauerkraut taste that you enjoy.

If you are new to making sauerkraut, the smells associated with fermentation may seem unpleasant until full fermentation is reached (and sometimes even then). For this reason, tasting your kraut periodically when it is fermenting is the best way to determine when it's done. It is perfectly fine to taste-test your kraut throughout fermentation. It will start out very salty and slowly become more acidic. With experience, you and your family will get used to the smell of fermentation and you will be able to better gauge when your sauerkraut is done without having to taste it as often.

Small Amount of Cabbage

If you would rather work with only one or a few heads of cabbage at a time, the guidelines that follow will help you to make small amounts of sauerkraut successfully.

Glass Jar Method

Use any 1- or 2-quart standard canning jar that is free from nicks, chips or cracks. Food-grade plastic containers also work well if they are tall (like juice pitchers, for example). Containers with wide mouths are easiest to use. Sterilize glass jars, lid and other utensils to be used in packing the kraut by placing them in boiling water for 10 minutes. If using a plastic

container, wash it very well. Remove the sterilized equipment from the hot water as it is needed. Allow it to cool before coming in contact with the cabbage.

- ... Prepare cabbage as described for making a large amount of kraut.
- ... Shred cabbage into a well-cleaned pan or bowl. If you use a kraut grater, you will get uniform cabbage slices and increase your chances for success with this method.
- ... Weigh the grated cabbage and combine with non-iodized salt, using 3 tablespoons salt for every 5 pounds of shredded cabbage.
- ... After thoroughly mixing cabbage with salt, allow it to stand for 10 to 30 minutes to wilt. This step is important. It will help to draw juices from the cabbage.
- ... Pack the cabbage firmly into the jar, filling jar to the top. Press down firmly on the cabbage until juice is squeezed out of the cabbage. For best results, try to press enough juice from the cabbage to cover it completely. If you cannot press out enough juice to cover cabbage, try adding boiled and cooled brine (1½ tablespoons salt/quart of water) until cabbage is completely covered.

To eliminate air so cabbage can ferment use either of the following methods:

1. Put a sterilized lid on the jar just tightly enough to keep out air.
 2. Weigh down with a brine-filled plastic bag as described in the section on fermenting large amounts of cabbage.
- ... Set the jar on a tray or in a pan to collect juice that may leak out during fermentation. Do not pour the juice that bubbles out back into the jar.
 - ... Store container with cabbage at 70°F to 75°F for fermenting. Cabbage will ferment more quickly in the smaller containers, usually between one and three weeks, depending on container size.

Look for the same of completion as described for making large batches of kraut.

Storing Sauerkraut

Fully fermented kraut may be kept tightly covered in the refrigerator for several months, or it may be canned or frozen to maintain quality and to save space in your refrigerator. If you plan to store some kraut in the refrigerator, check the kraut after fermenting to see that there still is enough liquid to cover it. If not, replace the juice that has bubbled out with a weak brine — 1 tablespoon salt/quart of water. Then, cover the container and refrigerate.

Canning

If you fermented the cabbage in **1-quart or smaller size jars**, just place the open kraut-filled jars in water that comes up to the shoulders of the jars. Bring water to a boil and boil 10 minutes. Remove jars. Pack kraut firmly into clean 1-quart or smaller jars, to ½ inch head space. If needed, add boiling hot brine to fill jars to ½ inch from the top. Wipe jar rims and attach lids according to manufacturer's directions. Process as recommended for **hot pack**.

It is important to transfer kraut to clean jars because it may be difficult to clean the rims of the jars used for fermenting well enough to achieve a good seal when processing. If you used two-part jar lids to keep out air while fermenting, be certain to use **NEW jar lids** and **clean rings** for processing.

If you fermented the cabbage in a 2-quart jar or larger container, follow recommendations below.

Hot Pack: Pour kraut and liquid into a large pot and bring slowly to a boil, stirring frequently. Remove from heat and fill jars firmly with kraut and liquid, leaving ½ inch headspace. Wipe jar rims. Adjust lids.

Process in boiling water canner.

pints: 10 minutes

quarts: 15 minutes

Raw Pack: Fill jars firmly with unheated kraut and liquid, leaving ½ inch headspace. Wipe jar rims. Adjust lids.

Process in boiling water canner.

pints: 20 minutes

quarts: 25 minutes

Note: If you live at an altitude greater than 1,000 feet above sea level, these processing times may be insufficient. Consult your local Extension agent for recommended times.

Freezing

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

Spoilage Problems

Spoilage in sauerkraut causes undesirable color, off-odors, soft texture and unpleasant flavor. Spoilage of sauerkraut could result in a product that is unsafe to eat.

The primary safety concern with kraut is that if the cabbage is not fermented with an adequate amount of salt, it will not ferment properly and may not form sufficient acid to be safely preserved by canning. If insufficient acid is formed, harmful microorganisms may grow if the sauerkraut is canned for shelf-stable storage.

Some spoilage may occur on the surface of kraut that is stored in the refrigerator. You may be able to remove this spoiled kraut and use the rest. However, molds that grow on the surface of kraut during fermentation can change the acidity of the kraut, making it susceptible to spoilage by harmful microorganisms if canned for shelf-stable storage. Molds grow best when they can get some air. Try to keep the kraut container airtight in the refrigerator and check kraut for mold often and quickly remove any mold that you see.

Some kinds of spoilage, other than mold, that may occur when making sauerkraut are listed below.

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

You could get some softness in kraut if you start out with cabbage that is not crisp.

Pink color in kraut is caused by the growth of certain types of yeasts on the surface of the kraut. These may

grow if there is too much salt, an uneven distribution of salt or if the kraut is insufficiently covered during fermentation. *These yeasts are not considered harmful. Pink color may also result from pigments in the cabbage. The pigments are not harmful.*

Rotten 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. *Some darkening may occur during storage of canned kraut. This probably is not a safety concern, since it is likely caused by a chemical change that occurs naturally over time.*

If you have any doubts about the safety of your kraut, throw it out.

Sauerkraut References

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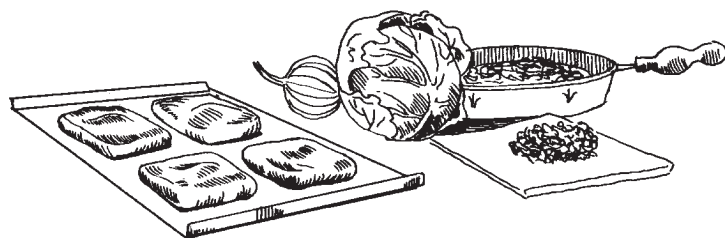
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Sauerkraut Recipes



Bierocks

Deanna Morris

A prize-winning recipe at the Tanana Valley Fair!

- 1 pound (approximately) potatoes, peeled and cut in chunks
- 1 package (2¾ teaspoon) dry yeast
- ⅔ cup sugar
- 1½ teaspoons salt
- 2 eggs, well beaten (plus additional egg yolk to brush on top of bierocks)
- ⅔ cup cooking oil
- 7–7½ cups flour

Boil potatoes. Save 1½ cups water. Mash potatoes. You will need 1 cup of the mashed potatoes for the bierock dough. Dissolve yeast in lukewarm potato water. Add sugar and salt. Let stand until sugar dissolves (about 5 minutes); add lukewarm mashed potatoes and mix well. Add eggs and oil. Mix well. Add flour until dough is easy to handle. Let stand 10 minutes, then knead until smooth. Cover and refrigerate up to 24 hours (rises in refrigerator). Let stand at room temperature 1 hour. Divide into three parts. Roll each part on well-floured board to ¼ inch thick. Cut into 4-inch squares. Place 1 tablespoon filling in center of each. Bring up and pinch edges together. Place pinched side down on greased baking sheet. Let rise in warm place 15 to 20 minutes. Brush top with egg yolks beaten with 1 tablespoon water. Bake in 375°F oven 30 minutes or until golden brown. Makes 3 dozen. When cooled, bierocks may be wrapped in foil and frozen. Reheat by making slit opening in foil and heating in 300°F preheated oven for 25 minutes.

Filling for Bierocks

- 1½ pounds ground chuck
- 16 ounces sauerkraut (rinsed and thoroughly drained)
- 1 1-ounce package onion soup mix
- ½ cup sweet pickle relish (optional)
- cayenne pepper to taste

Cook meat. Drain fat and add remaining ingredients. Cool before enclosing in dough. Recipe makes 36.

Per serving: calories, 421; fat 15 g; cholesterol, 47 mg; iron, 19% of Daily Value; vitamin C 12% of Daily Value. (Values are for a serving of 2 bierocks.)

42% of the calories come from the flour in the potato pastry; 54% of the fat comes from the oil in the pastry. Enjoy these delicious bierocks only every once in a while as a special treat.

Sauerkraut Salad I

- 2 cups sauerkraut, drained
- 1 cup celery, chopped
- 1 cup green pepper, chopped
- ¼ cup onion, chopped
- ½ cup vegetable oil
- ⅔ cup sugar
- 1 cup vinegar
- ½ teaspoon salt (optional)

Combine vegetables with oil and seasonings. Cover and chill overnight. Approximately eight ½-cup servings.

Per serving: calories, 202; fat, 14 g; cholesterol, 0; vitamin C, 30% of Daily Value.

59% of the calories and 99% of the fat come from the oil; 29% of the calories come from the sugar. If you drain the salad before serving or use a slotted serving spoon, you will decrease the amount of oil and dissolved sugar in the salad.

Sauerkraut Salad II

- ⅔ cup vinegar
- ⅓ cup water
- ½ cup vegetable oil
- 1 cup sugar
- 2–3 cups sauerkraut, drained
- 1 green pepper, chopped
- 1 2-ounce jar pimento, chopped
- 1 cup celery, diced
- 1 large onion, sliced in rings

Blend the first four ingredients well and mix with sauerkraut. Then add the remaining ingredients and mix. Refrigerate overnight in a container with a tight-fitting lid. Stores 2 to 3 weeks. Approximately 10 ½-cup servings.

Per serving: calories, 117; fat, 11 g, cholesterol, 0; vitamin C, 33% of Daily Value.

82% of the calories and 98% of the fat come from the oil. If you drain the salad or use a slotted serving spoon you will remove some of the oil.

Easy Baked Sauerkraut

- 2 tablespoons butter
- ½ cup onion, sliced
- 4 cups sauerkraut, drained
- 1 apple, peeled and sliced
- 1 teaspoon caraway seed

Melt butter in large skillet; sauté onions; add sauerkraut and apple; add caraway seed. Barely cover with water and bake 30 minutes at 375°F. Approximately eight ½-cup servings.

Per serving: calories, 59; fat, 3 g; cholesterol, 4 mg; dietary fiber, 3.3 g, 13% of Daily Value; vitamin C, 30% of Daily Value.

44% of the calories and 93% of the fat come from the butter.

Research on food preservation is an ongoing process. The United States Department of Agriculture and Alaska Cooperative Extension continuously apply new research findings to their recommendations for food preservation techniques. The guidelines in this publication may be revised any time new knowledge is gained that may increase the safety or improve the quality of home-preserved products. Please consult your local Cooperative Extension Service annually, wherever you live, for updated information.

Chocolate Sauerkraut Cake

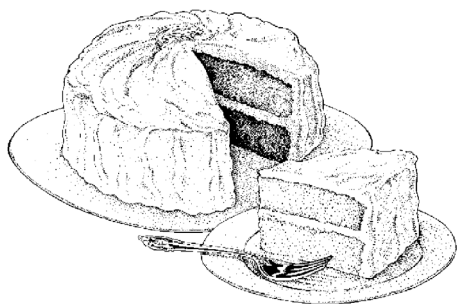
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- 1½ cups sugar
- ⅔ cup butter or shortening
- 3 eggs, well beaten
- 1 teaspoon vanilla
- 2¼ cups sifted flour
- ¼ teaspoon salt
- ½ cup cocoa, unsweetened
- 1 teaspoon baking soda
- 1 teaspoon baking powder
- 1 cup cold water
- ⅔ cup sauerkraut, drained and chopped

(If kraut is salty, pour water over and wash; drain well.) Blend the butter or shortening and sugar until creamy. Add well-beaten eggs and vanilla. Mix with shortening and sugar until fluffy. Mix dry ingredients together with a fork. Add the dry mixture alternately with the water to the creamed mixture. Stir in the sauerkraut. Bake at 350°F in layer pans for 25 to 30 minutes or in a 9x13-inch pan for 35 to 40 minutes. Approximately 16 servings.

Per serving: (cake only) calories, 233; fat, 10 g; cholesterol, 40 g.

90% of the calories come from the shortening, sugar and flour (about 30% from each); 85% of the fat comes from the shortening.



Frosting for Sauerkraut Cake

Here are two frosting recipes for the chocolate sauerkraut cake. Frosting I has slightly fewer calories and a little less cholesterol than frosting II. Frosting I resembles whipped cream in texture and appearance.

Frosting I

- 1 cup milk
- 2 tablespoons cornstarch
- ½–¾ cup vegetable shortening
- ¼ cup sugar
- 1 teaspoon vanilla

Combine milk and cornstarch in saucepan and cook over medium heat, stirring constantly until thick; cool mixture. Combine shortening and sugar in a bowl and cream well. Add cooled mixture to the creamed mixture. Add vanilla and beat until smooth and spread on cake. Approximately 16 servings.

Per serving: calories, 80; fat, 7 g; cholesterol, 1 mg.

Frosting II

- 1 3-ounce package cream cheese
- 6 tablespoons butter
- 1 teaspoon vanilla
- 2 cups powdered sugar
- 1 tablespoon milk

Soften cheese and butter. Combine all ingredients and beat until smooth. Add more milk if necessary to make frosting spread easily. Approximately 16 servings.

Per serving: calories, 108; fat, 6 g; cholesterol, 12 mg.

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