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# Making Fermented Pickles and Sauerkraut

Genuine dill pickles, half dills, sweet gherkins, and sauerkraut are fermented or brined pickle products. During fermentation, various micro-organisms break down complex organic compounds to simpler ones. This process produces substances that preserve the product and give it a characteristic taste and appearance. Conditions during the fermentation process must be controlled so that only desirable fermentations occur. For good quality fermented pickle products, be sure to follow the directions exactly. Fully fermented dill pickles, partially fermented or half dills, sweet gherkins pickles, and sauerkraut directions follow.

For information on quick pack, nonfermented pickles, see Food Science and Nutrition Fact Sheet 26, Making Fresh Pack Pickle Products.

## INGREDIENTS

### Vegetables

**Cucumbers**—Plant a variety of cucumbers intended for pickling. Do not expect good quality pickles if you use immature table-type or "slicing" cucumbers. If you purchase cucumbers for pickling, make sure they are a suitable variety, freshly harvested, and not waxed. If you buy a bushel of pickling cucumbers, be ready to start pickling immediately.

**Cabbage**—Use fresh, firm, mature heads for sauerkraut.

**Dill**—Use clean, fresh, insect-free heads of dill. Avoid over-mature, dry, brown dill.

### Vinegar

Use 4-6 percent acetic acid vinegar in pickle recipes calling for vinegar. This is the range of acidity of most high quality commercially bottled vinegar. Check the label to be sure the vinegar contains 4-6 percent acetic acid; 40-60 grains acetic acid means the same thing. Cider vinegar or white distilled vinegar may be used in pickle recipes. White distilled vinegar has a sharper taste than cider vinegar. White vinegar is not imitation or synthetic vinegar.

In some fermented pickle products like sauerkraut and half dills, no vinegar or acetic acid is used. Lactic acid is produced in these products during fermentation. In the following recipe for genuine dill pickles, some vinegar is added at the start and lactic acid is formed during the fermentation process.

### Salt

Use special canning salt. This salt does not contain any iodine and anti-caking agents which may cause darkening and cloudiness in pickles.

### Water

Use soft water if possible. Extremely hard water can cause discoloration of pickles particularly if it has a high iron content. Some types of hard water may be somewhat softened by the following method. Boil water for 5 minutes, skim off the scum, let the water rest 24 hours. When the sediment has settled to the bottom, pour off the water from the top and use.

### Sugar

White or brown sugar may be used in the following recipes which call for sugar. Brown sugar may darken the liquid slightly.

## EQUIPMENT

### For Measuring

**Measuring cups and spoons**—Accurate scales are needed when making sauerkraut to assure the proper proportions of cabbage and salt.

### For Fermentation

**Containers**—Genuine dill pickles and sauerkraut, traditionally fermented in stoneware crocks, can also be brined in large glass or unchipped enamelware containers or food-grade plastic pails. The latter can be purchased in home winemaking shops. Do not use galvanized, copper, or iron utensils. These metals may react with acids or salts and cause undesirable color and flavors, even toxic compounds, to form in the pickle mixture.

**Weights**—Fermenting pickles and cabbage must be kept submerged. Use a clean, heavy plate to cover pickles and weight down with a glass jar filled with water. Do not use stones or bricks because they may introduce impurities. A heavy plastic bag filled with water makes the best cover and weight for sauerkraut.

### For Packing the Pickles

Use standard canning jars free of chips, cracks, or nicks that may prevent an airtight seal. Widemouth jars are easiest for dill pickles. Do not use empty mayonnaise, peanut butter, or other packers' jars because they are not heat tempered and often break during heat processing. Have the jars clean and hot when packing them prior to heat processing. Thoroughly wash, scald, and keep the jars hot or if you have a dishwasher, put the jars through the complete cycle.

Two-piece, self-sealing lids are the most widely used type of sealing device. Have the 2-piece lids in boiling water prior to use. If you are using zinc lids, make sure you have new rubber rings.

### For Processing the Pickles

Genuine dill pickles, sweet gherkins, and sauerkraut should be heat processed in a boiling water bath canner to halt the fermentation and to destroy any micro-organisms or enzymes that could cause spoilage or the development of off-flavors. Fermentation in half dills is halted by refrigerating the pickles. USDA research has shown less change in the quality of heat-processed pickle products than in nonprocessed pickle products. Heat processing also insures a good seal on the jar.

## BRINED GENUINE DILL PICKLES

*Yield: 9 to 10 quarts*

20 pounds (about ½ bushel) in pickling cucumbers, 3-6 inches in length  
3/4 cup whole mixed pickling spice  
2-3 bunches dill plant

2 1/3 cups vinegar  
1 3/4 cups salt, canning  
2 1/2 gallons water

Wash the pickles. Make sure the blossom ends have been removed. Enzymes in the blossom can soften the pickles. Wash blossom and stem end carefully to remove soil.

Place half the pickle spices and a layer of dill in a 5-gallon crock or suitable pail. Fill the crock with cucumbers to within 3-4 inches of the top. Place a layer of dill and remaining spices over the cucumbers. (Garlic may be added, if desired.)

Thoroughly mix vinegar, salt, and water. Pour over the cucumbers. Weight down as previously described. During fermentation, keep the pickles at a temperature of about 65°-70°F. A typical basement temperature of 65°F is acceptable. Avoid hot room temperatures. Each day remove the surface scum. This yeast begins to form after a few days and interferes with the desired fermentation. If not removed, it causes soft pickles. Do not stir the pickles. Make sure they are kept covered with brine. If necessary, add more brine. Use original proportions specified in the recipe.

In about 3 weeks the cucumbers become an olive green color and should have a desirable flavor.

The original brine is usually cloudy due to yeast development during the fermentation period. If this cloudiness is objectionable, you can use fresh brine to cover pickles when packing them in jars. To make fresh brine, use 1/2 cup salt and 4 cups vinegar to 1 gallon water. The cloudy fermentation brine is generally preferred for its added flavor; strain it before boiling.

Pack pickles together with some dill into clean, hot quart jars; add garlic, if desired. Avoid too tight a pack. Cover with boiling brine to within 1/2 inch of the jar top. Adjust jar lids.

Process in simmering water 200°-205°F for 10 minutes (start counting the processing time as soon as the boiling water returns to a simmer).

Set jars upright, several inches apart, on a wire rack to cool.

#### HALF DILLS (partly fermented pickles) Yield: 9 to 10 quarts

1/2 bushel small, pickling cucumbers  
1/2 bunch dill  
3 gallons water  
1 pound pickling salt  
5 garlic cloves, sliced  
3/4 cup mixed, pickling spices

Wash cucumbers carefully as described in genuine dill pickles. Place in large stone crocks. Distribute the dill heads evenly. Make a brine of the remaining items, add to cucumbers and weight down as previously described.

Store at moderate room temperature 70°-75°F. Pickles may be eaten after third day but well-done pickles need a 1-week fermentation. After 1 week, pack the pickles into clean jars and refrigerate to halt the fermentation. These pickles must be kept in the refrigerator until used.

#### SWEET GHERKINS (slightly fermented, sweetened pickles) Yield: 7 to 8 pints

5 quarts (about 7 pounds) cucumbers, 1 1/2 to 3 inches in length  
1/2 cup salt, pickling  
8 cups (2 quarts) sugar  
6 cups (1 1/2 quarts) vinegar  
3/4 teaspoon tumeric  
2 teaspoons celery seed  
2 teaspoons whole mixing pickling spice  
8, one-inch pieces stick cinnamon  
1/2 teaspoon fennel (if desired)

#### First Day

*Morning.* Wash cucumbers thoroughly; scrub with vegetable brush; stem ends may be left on if desired. Drain cucumbers, place in large container and cover with boiling water. *Afternoon* (6 to 8 hours later). Drain; cover with fresh boiling water.

#### Second Day

*Morning.* Drain; cover with fresh boiling water. *Afternoon.* Drain; add salt; cover with fresh boiling water.

#### Third Day

*Morning.* Drain; prick cucumbers in several places with table fork. Make syrup of 3 cups of the sugar and 3 cups of the vinegar; add tumeric and spices. Heat to boiling and pour over cucumbers. (Cucumbers will be partially covered at this point.) *Afternoon.* Drain syrup into pan; add 2 cups of the sugar and 2 cups of the vinegar to syrup. Heat to boiling and pour over pickles.

#### Fourth Day

*Morning.* Drain syrup into pan; add 2 cups of the sugar and 1 cup of the vinegar to syrup. Heat to boiling and pour over pickles. *Afternoon.* Drain syrup into pan; add remaining 1 cup sugar to syrup; heat to boiling. Pack pickles into clean hot pint jars and cover with boiling syrup to within 1/2 inch of top of jar. Adjust jar lids.

Process for 5 minutes in simmering water 200°-205°F. Remove jars and complete seals if necessary. Set jars upright, several inches apart, on a wire rack to cool.

#### SAUERKRAUT

50 pounds fresh cabbage      1 pound salt, pure, granulated

Remove outer leaves from cabbage. Remove core, wash, and drain. This washing removes undesirable micro-organisms which can spoil fermentation. Use a shredder or sharp knife to cut the cabbage into thin shreds.

In a large container, thoroughly mix 3 tablespoons salt and 5 pounds shredded cabbage. Let the salted cabbage stand for several minutes to wilt slightly.

Pack the salted cabbage firmly, but gently, into a large clean crock or other container. Using a wooden spoon or your hands, press down firmly until the juice comes to the surface. Repeat the shredding, salting, and packing of cabbage until the crock is filled to within 3 or 4 inches of the top. Don't leave any air pocket in the crock or pail. The desirable fermentation bacteria grow best when there isn't any air and spoilage bacteria can thrive in air pockets.

The top surface of the fermentating kraut must also be kept from contact with air. Cover with a large, heavyweight, upright plastic bag filled with water. For extra protection, use two plastic bags. The amount of water in the plastic bag can be adjusted to give just enough pressure to keep the fermenting cabbage covered with brine. If top surfaces are not covered, mold will grow on kraut.

Formation of gas bubbles indicates fermentation is taking place. A room temperature of 68°-72°F is best for fermenting cabbage. A basement temperature of 65°F is acceptable. Fermentation is usually completed in 5-6 weeks.

When fermentation is complete, heat sauerkraut to 190°-195°F. Do not boil. Pack into clean, hot jars and heat process in boiling water bath canner at simmering temperature of 200°-205°F for 15 minutes.

Sauerkraut may also be frozen to halt fermentation. Frozen sauerkraut may be stored about a year.

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