Virginia Cooperative Extension Service

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Food Preservation
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Lesson 5
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Pickling

Pickling is not as simple as adding vinegar to a fruit or vegetable to make it so acid that spoilage organisms will become inactive. Fresh fruits and vegetables placed in a pickling liquid (vinegar) would soften in 24 hours and begin to both ferment and decay. Fermentation is desirable in many pickled vegetable products, but decay is not. How can we eliminate decay while promoting fermentation?

Brining

Naturally occurring lactic-acid forming bacteria cause fermentation in pickle products. These lactic-acid forming bacteria will grow in a brine which is strong enough to stop the growth of most spoilage organisms. A weak brine (1/4 to 1/2 cups salt per quart of water) allows rapid fermentation and formation of the maximum amount of lactic acid in a comparatively short time. A medium brine (3/4 cup salt per quart of water) is used to "cure" cucumbers for later processing. The medium brine prevents growth of spoilage organisms but allows the slow production of lactic acid. From 6 to 12 months may be allowed for the "curing." A strong brine (one cup of salt per quart of water) prevents the production of lactic acid as well as the growth of spoilage organisms. Cured pickles might be held in a strong brine for several months before being pickled.

The formation of lactic acid is most efficient at temperatures between 70° and 75° F. At temperatures above 80° F or below 60°, abnormal flavor or other undesirable characteristics may develop.

Salt may be added to the food either dry or as a brine. If dry salt is used, liquid (juice) is drawn out of the food and a brine forms. The carbohydrate in the liquid serves as food for the lactic-acid forming bacteria. Too much salt may cause the pickle to shrivel because of an excessive loss of moisture.

The loss of liquid from the fruit or vegetable leaves it firmer. The color of cucumbers changes from bright green to an olive or yellow-green. The tissue becomes translucent in the curing process.

Fresh-pack or quick process pickles are brined for several hours or overnight, then drained and covered with a boiling-hot pickling liquid.

Brined or fermented pickles go through a 2- to 3-week curing process before pickling.

Whether fresh-packed or brined, the fruit or vegetable should be of good quality, firm in texture, and free from bruises, decay, or mold. Overmature fruits and vegetables will shrivel during the pickling procedure. Use fruits and vegetables as soon after picking as possible. Refrigerate if there is more than a 2-hour delay. Cucumbers lose quality very quickly. Wax on cucumbers pickled whole will keep the brine from penetrating.

Wash the fruit or vegetable carefully. Be sure to remove all blossoms from cucumbers as they contain an enzyme which can cause softening. It is possible to overwash and remove too many of the lactic-acid producing bacteria needed for fermentation.

Although cucumbers are the vegetable most frequently pickled using fermentation by lactic acid producing bacteria, summer squash, cauliflower, and broccoli can be treated in the same way. There's no need to look for a special recipe using these foods.

Canning salt contains no additives that may cloud pickle brine or affect the taste, color, or texture of canned foods. Iodine in salt may cause pickles to darken. Since flake salt varies in density, it is not recommended for pickling.

Vinegar serves two purposes in pickle making, that of preserving the product and modifying its taste. Vinegar of 5% acidity (50 grain) should be used. The acidity of homemade vinegar is too variable to be recommended for use in pickling.

Cider vinegar has a more mellow acid taste than white distilled vinegar but it may darken white or light-colored fruits and vegetables. White distilled vinegar has a sharp, pungent, acetic acid taste and is desirable when light color is important.

Do not reduce the amount of vinegar in a recipe or dilute with water. If a less sour product is desired, find a new recipe or add sugar to offset the sourness.

Either white granulated sugar or brown sugar may be used. White sugar gives a product with a lighter color.

Use fresh spices for best flavor.

Soft water is best for pickling. The lime in very hard water may interfere with lactic acid formation. Iron

in the water or from utensils may cause darkening of the pickles.

Equipment

Use pans of unchipped enamelware, stainless steel, aluminum, or glass for heating pickling liquids. Do not use copper, brass, galvanized, or iron utensils.

Use a crock or stone jar, unchipped enamelware, or large glass jar for brining. Cover with a glass plate and weight to keep vegetable under the brine. Or use a plastic bag filled with water as a cover. If you use plastic, be sure it was meant to be used with food.

Heat Treatment

While it is true that pickle products when properly prepared are too acid for the production of botulism toxin, a short heat treatment is recommended. This short heat treatment in a boiling water bath will destroy other microorganisms including enzymes which can cause changes in flavor, color, and texture.

If you are using an old recipe which does not have processing times, find a similar product on the list below and use that processing time.

Time Table

	Min.		Min.	
Pickles--Dill				
Fermented (whole)	Pints	10	Quarts	15
Unfermented (whole)	Pints	10	Quarts	15
Sauerkraut, hot pack	Pints	10	Quarts	15
Pickles and Relishes				
Bread and Butter	Pints	10		
Chutney	Pints	10		
Cross Cut Slices	Pints	5		
Dill Green Beans	Pints	5		
Sweet Gherkins	Pints	5		
Piccalilli	Pints	5		
Pepper-Onion Relish	Pints	5		
Corn Relish	Pints	15		
Watermelon	Pints	5		
Fruit Pickles				
Peaches	Pints	20	Quarts	20
Pears	Pints	20	Quarts	20

Other Pickle Products

Fruit pickles are usually prepared from whole fruits and simmered in a spicy, sweet-sour syrup. They should be bright in color, of uniform size, and tender and firm without being watery.

Relishes are prepared from fruits and vegetables which are chopped, seasoned, and then cooked to desired consistency. Clear, bright color and uniformity in size of pieces make an attractive product. Relishes accent the flavor of other foods. Some are quite hot and spicy.

Sauerkraut is a brined cabbage product. Good sauerkraut has a pleasant tart and tangy flavor and is free from any off-flavors or off-odors. It is crisp and firm in texture and has a bright, creamy-white color. The shreds are uniformly cut and are free from large coarse pieces.

Evaluation of Pickles

Container	- Appropriate, clean, and neatly labeled.	10
Appearance	- Clear, bright, characteristic of fruit or vegetable used; uniform size pieces; free from blemishes or crushed and broken units that affect appearance; no stems (except on gherkins and crabapples); no discolored areas; liquid clear and free from scum.	30
Texture	- Vegetable pickles should be crisp, succulent, and unshriveled; fruit pickles should be firm, tender, and succulent.	25
Flavor	- Characteristic of pickle; definite; sharp; not too sweet, sour, or spicy; well-blended.	35

Your Assignment

Look through the pickle recipes you are now using or have collected for possible use. List those made by the fresh-pack method and those which are brined. Star those recipes which you have used with good success; discard any which were of poor quality.

Fresh-pack Brined

Look at your own living quarters for a spot to put a crock of brining cucumbers. Remember that the temperature needs to be in the 70° to 75°F range, and that brining will take two to three weeks.

My Assignment
(Questions You Asked)

Q. Can dried dill seed be used in pickling?

A. Yes, you can substitute dried dill seed for fresh or dried dill heads. Use a teaspoon of dill seed to replace one dill head.

For those of you who haven't seen dill growing, it is a fernlike plant with a bloom similar to Queen Anne's Lace which becomes a mass of seeds. Each large bloom is a dill head. The seeds may be used green or dried. The green plant (dill weed) can be minced and incorporated into salads.

Q. I used an aluminum pan for pickling. Are the pickles safe to eat? Is the pan safe to use again?

A. The pickles are safe to eat. Aluminum is very poorly absorbed by the body so that even if some aluminum has contaminated the pickles, little will be absorbed.

About the pan--aluminum pans are pitted by acids and salt. Pitting affects the appearance of the pan but not the safety.

Q. How much loss in nutritive value occurs in home preserved foods?

A. Although most studies of nutrient loss in canned foods have been based on commercial methods, it is assumed that nutrient losses are very similar for home canned products.

Ascorbic acid (vitamin C) is well protected in acid foods such as citrus juices and tomatoes. One-fourth to one-half of the vitamin C in low-acid foods such as beans and peas may be lost, but these foods are not considered to be major sources of vitamin C. Probably the most significant loss is in greens, as these low-acid foods do contain good amounts of vitamin C naturally.

Carotene which is converted to vitamin A in the body, riboflavin, and niacin are stable under canning conditions. The loss of any one of these nutrients rarely exceeds 15 percent.

Thiamin is sensitive to heat, particularly in low-acid foods. Thiamin is present in greater quantities in meats and enriched and whole-grain bread and cereal products, so the loss of small quantities in fruits and vegetables is not serious.

Water-soluble vitamins--ascorbic acid, thiamin, niacin, and riboflavin--will be present in both solids and liquids.

Freezing itself has little, if any, effect on the nutritive value of foods. There is some loss of water-soluble vitamins in blanching and subsequent chilling of vegetables before freezing. There is some additional loss of ascorbic acid if the food is stored at temperatures above 0°F. Losses during blanching and storage may be offset by the shorter cooking times required for frozen than for fresh vegetables. Overcooking or cooking in a large volume of water will increase the loss of water soluble nutrients.

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