



Cornell University
Cooperative Extension
of Delaware County

Resource Center Telephone: 607-865-6531
34570 St Hwy 10 Suite 2 Fax: 607-865-6532
PO Box 184 mail: delaware@cornell.edu
Hamden NY 13782 www.cce.cornell.edu/delaware

Food for Health

Freezing Fruits and Vegetables

Division of Nutritional Sciences, Cornell University, Reviewed: May, 2006

Freezing is one of the easiest and least time consuming methods of food preservation. Most foods retain their natural color, flavor and texture better than when other methods of food preservation are used.

Freezing does not improve quality. Choose firm ripe fruits and young tender vegetables of best quality at optimum maturity and freshness. If produce cannot be frozen immediately, refrigerate or keep it in a cool, airy place for as short a time as possible.

Select varieties of fruits and vegetables suitable for freezing. (Check a seed catalog or ask the grower.) Most fruits can be frozen successfully. As a rule, vegetables that are usually cooked before being eaten freeze well. Vegetables high in water content such as cucumbers, lettuce, radishes and tomatoes lose their crispness when frozen and become limp. If you are not sure of how a particular fruit or vegetable will freeze, test it first by freezing a small amount. Then sample the food after thawing. This will show the effect of freezing, but not the effect of long term storage.

FREEZING FACTS

Fruits and vegetables to be preserved in the freezer should be frozen as quickly as possible. In rapid freezing, a large number of small ice crystals are formed. These small ice crystals cause less damage to cell walls than slow freezing, which produces larger ice crystals.

For best results, food should be extremely cold when placed in the freezer and the freezer should be set at 0°F or lower. Do not overload the freezer with unfrozen food. Add only the amount that will freeze in 24 hours, which is no more than two pounds of food per cubic foot of freezer space. Overloading results in a long, slow freeze, large ice crystals and a poor quality product.

Place packages in a single layer and separated from each other on the coldest surfaces of the freezer. Leaving space between packages allows the air to circulate freely. When the food is frozen, packages can be restacked closer together.

To maintain top quality, store frozen foods at 0°F or lower. For highest quality and nutritive value, use home frozen foods within 8 to 12 months. Food will be safe to eat after the recommended storage time period if the freezer has been kept at 0°F or lower. However, the quality and nutritive value will suffer.

Moisture loss, or ice crystals evaporating from the surface area of a product, produces freezer burn. Freezer burn appears as a fuzzy, grayish white spot on the food surface. It is not harmful, however it causes off-flavors and dries out and toughens food. To prevent freezer burn, package food according to directions in this publication.

PREPARING FRUITS AND VEGETABLES FOR FREEZING

Wash produce in cool, running water, or lift in and out of several changes of water. Avoid soaking. Sort products by size and ripeness so they will cook more evenly.

To prevent quality changes during freezing, pre-treat fruits by the addition of ascorbic acid and vegetables by blanching.

Enzymes are proteins present in plants. While the plant lives, enzymes help speed up the ripening and maturing process. Even after harvest, enzyme reactions can continue causing undesirable color, flavor and texture changes in the food. Freezing slows down, but does not destroy enzymes in fruits and vegetables. That is why it is important to stop enzyme activity before freezing.

Revised by Judy Price, Katherine Humphrey, Christina Stark and Donna Scott. 2002.
Original by Mary Lou Tenney, 1987, Division of Nutritional Sciences, Cornell University.

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Fruits, like peaches, apples, pears and apricots, darken quickly when exposed to air. They also may lose flavor and texture when thawed. Crystalline (powdered) ascorbic acid, or Vitamin C, is the most common chemical agent used to prevent fruit from darkening. Ascorbic acid in crystalline form may be purchased at drug stores or where freezer products are sold. Lemon juice may also be used to prevent fruit from darkening, however it is not as effective as ascorbic acid and may add its own flavor to the fruit. See the *Handy Reference for Freezing Fruits* chart for ascorbic acid directions.

Blanching (scalding vegetables in boiling water or steam for a short time) is a must for almost all vegetables to be frozen. It stops enzyme actions which can cause loss of flavor, color and texture. Blanching cleanses the surface of dirt and organisms, brightens the color and helps retard loss of vitamins. It also wilts or softens vegetables and makes them easier to pack.

Blanching time is crucial and varies with the size and type of vegetable. Under-blanching stimulates the activity of enzymes and is worse than no blanching. Over-blanching causes loss of flavor, color, vitamins and minerals. For best results, follow recommended blanching times in *Handy Reference for Freezing Vegetables* or in other up-to-date reference books.

Boiling water blanching is done by cooking the vegetables in a large amount of boiling water for a specific time, and then immediately chilling the product in very cold water to stop the cooking process. Use a blancher that has a blanching basket and cover, or place a wire basket into a large pot with a well fitting lid.

Steam blanching, recommended for some vegetables, is done by placing vegetables in a single layer in a basket that fits in a pot above a few inches of boiling water. Blanching time begins as soon as the lid is placed on the pot. When blanching is completed, quickly cool in very cold water. Contact your Cornell Cooperative Extension office for steam blanching times.

Microwave blanching may result in over or under blanching due to uneven heating and differing oven wattage. Microwave blanching will not save time or energy.

CONTAINERS FOR FREEZING

How food is packed for freezing is very important in freezing to assure that the quality of food is maintained. Proper packaging keeps food from drying out and losing its color, flavor and texture. Freezer wrappings or containers must be:

- moisture and vapor proof (should not absorb moisture, let food dry out, or absorb odors)
- durable (should not break or tear easily when handled)
- able to withstand temperatures below freezing without cracking, breaking or becoming brittle.

There are two types of packaging materials for use in home freezing: rigid containers and flexible bags or wrap made for freezer use. Check the label to make sure the material is specifically for freezer use.

Rigid Containers

Moisture/vapor-proof rigid containers are best for liquids or foods that will conform to the container's shape, leaving less air space. Rigid containers hold their shape, stand upright and stack well. Freezer containers are made of plastic or tempered glass. Covers should fit tightly. If they do not, reinforce the seal with freezer tape. Freezer tape, unlike other tapes, is designed to stick at freezing temperatures.

Plastic freezer containers are available in various shapes. Plastic containers that originally held a frozen food can be re-used after sanitizing. Immerse them in a solution of 1 teaspoon chlorine bleach to 1 gallon of water for 7 seconds. Allow them to air dry before using. The wide mouth and straight sides of glass freezer jars allow easy removal of partially thawed foods.

Flexible Bags or Wraps

Freezer bags and sheets of moisture/vapor-proof materials made from plastic, coated paper or heavy-duty aluminum foil are suitable to use. Foil may be protected from tearing by over-wrapping with a plastic bag.

Labeling

Label each package with the name of the product, any added ingredients, packaging date, number of servings or amount, and the form of the food, such as whole, sliced, etc. Use freezer tape or self-adhesive labels and special marking pens or crayons to label packages.

PACKING FRUITS FOR THE FREEZER

Types of Packs - There are several ways to pack either sweetened or unsweetened fruits for freezing. Whichever method you choose be sure to leave ½ inch head space in containers to allow for expansion. Fruits frozen on trays and then packaged do not require any head space. To keep fruits covered with liquid in rigid containers, cover with a small piece of parchment or plastic wrap and then fill the remaining head space with crumpled waxed paper before sealing.

How you plan to use the fruit determines the type of pack to use. Uncooked desserts may be made from fruit that has been packed in syrup, packed with or without sugar or from the tray pack method. Fruit to be used for cooking purposes such as for pies, may be packed either with sugar, left dry and unsweetened or using the tray pack method. If sweet spreads will be made later from frozen fruit, leave the fruit unsweetened. The correct amount of sweetener can be added at preparation time.

SWEETENED FRUIT

Syrup Pack

The sweetness of the fruit to be frozen determines the proportion of sugar to water in the syrup. A heavy syrup (40%) is recommended for most fruits. Lighter syrups are desirable for mild-flavored fruits to prevent masking of flavors. Heavier syrups may be needed for very sour fruits. The addition of ascorbic acid helps to prevent darkening of light colored fruits. See *Handy Reference for Freezing Fruits* for syrup and ascorbic acid proportions. Use just enough cold syrup (about ½ to 1 cup of syrup per pint) to cover the prepared fruit after it has been placed in the container. Leave appropriate head space and keep fruit submerged with plastic wrap and crumpled waxed paper. Seal container tightly, label and freeze.

Sugar Pack

Tossing fruit with granulated sugar is one way to prepare fruits that do not darken. Depending on personal taste, use ¼ to 1 cup sugar per quart of fruit. Sprinkle sugar over the fruit and mix gently until the juice is drawn out and the sugar dissolved. Fruit can be layered with sugar and allowed to stand 15 minutes before packaging.

Artificial Sweeteners

Artificial sweeteners containing saccharin or aspartame provide a sweet flavor. However, they do not function like sugar which thickens syrup, preserves color and gives a firm texture. A better alternative is to freeze fruit using an unsweetened pack, and then adding the artificial sweetener at serving time. Use directions on the artificial sweetener container to determine the amount of sweetener needed.

UNSWEETENED FRUIT

Most fruits have a better texture, color and flavor if packed in some sugar or syrup. However, it is not necessary to preserve fruit with sugar. Fruit may be packed without any sugar, or covered with water, unsweetened juice containing ascorbic acid, or pectin syrup. When fruit is packed in liquids, keep fruit submerged with plastic wrap and crumpled wax paper

as described under Types of Packs. Seal container tightly, label and freeze. Raspberries, blueberries, blanched apples, gooseberries, cranberries and rhubarb freeze well without sugar.

Pectin Syrup Pack

Prepare syrup by combining 1 package powdered pectin with 1 cup water in a saucepan. Heat to boiling and boil 1 minute. Remove from heat and add 1¾ cups cool water. Cool. Makes about 3 cups of moderately thick syrup. Add more water if thinner syrup is desired. Pack as described for Syrup Pack.

Puree Pack

Puree fruit and add ascorbic acid. Sweetening is optional. Pack, leaving ½ inch head space for pints and 1 inch for quarts. With such a large head space, use plastic wrap and crumpled wax paper as described under Types of Packs to reduce surface moisture crystallization. Seal container tightly, label and freeze.

Dry Pack

Dry pack is a good method for small or whole fruits. Wash fruit, dry on paper towels, pack, seal, label and freeze.

Tray or Loose Pack

This method is a dry, unsweetened pack that is good for small whole fruits, such as blueberries, raspberries and cranberries. This results in a good quality product without sugar. Spread a single layer of prepared fruit on shallow trays and freeze. (A jelly roll pan is ideal for this.) Leave in the freezer just long enough to freeze firm (2 to 1 hour). Longer exposure to dry freezer air will result in moisture loss and a decrease in quality. When frozen, promptly package, leaving no head space. Seal tightly, label and return to the freezer. The advantage of tray packing is that food pieces remain loose and can be poured from the container and the package re-closed.

THAWING AND USING FRUITS

Fruit is best served while it is still partially frozen, that is, with a few ice crystals still remaining. If thawed completely, frozen fruit will become mushy because of cell wall damage from ice crystals that form during the freezing process.

PACKING VEGETABLES FOR THE FREEZER

Dry Pack and Tray Pack are the two recommended methods for packaging vegetables for the freezer.

Dry Pack

Dry pack is recommended for vegetables because it results in a good quality product and preparation for freezing and serving is easy. After

vegetables are blanched, cooled and drained, package quickly in rigid freezer containers or freezer bags. Remove as much air as possible from bags. Leave 2 inch head space in rigid containers, place a small piece of parchment or plastic wrap over the surface of the vegetables and then fill the remaining head space with crumpled waxed paper. Seal container tightly, label and freeze.

Tray Pack

After vegetables are blanched, cooled and drained, spread in a single layer on shallow trays and place in the freezer uncovered. (A jelly roll pan is ideal for this.) Leave in the freezer just long enough to freeze firm (2 to 1 hour). Longer exposure to dry freezer air will result in moisture loss and quality changes. When frozen, promptly package, leaving no head space. Seal tightly, label and return to the freezer. The advantage of tray packing is that the right amount of vegetable may be measured out for cooking, and the package re-closed and quickly returned to the freezer.

THAWING AND COOKING VEGETABLES

Reference:

So Easy to Preserve, 4th Edition, Cooperative Extension Service, University of Georgia, 1999.
For additional information or for a copy of *Handy Reference for Freezing Fruits* or *Handy Reference for Freezing Vegetables*, contact your local Cornell Cooperative Extension Office.

Cook frozen vegetables without thawing them. Exceptions are corn-on-the-cob and leafy greens that cook more evenly if partially thawed first.

When cooking frozen vegetables, use a small amount of water, about ¼ to 2 cup, and cook covered. The addition of salt is optional. As the food thaws, separate it with a fork for more even heating. Blanching partially cooks frozen vegetables, so they need much less cooking time than fresh vegetables.

Do not overcook. Approximately half the normal cooking time is the usual rule. The nutrients as well as the color, flavor and texture are best preserved if vegetables are cooked until just fork tender.

Cook only enough frozen vegetables for one meal. If you find you have leftovers, these can be frozen after cooking for use in soups, stews, and casseroles. Frozen cooked vegetables will not be as nutritious, flavorful, and colorful as vegetables that have only been blanched before being frozen.

Other methods of cooking frozen vegetables include steaming, stir frying, pressure cooking or microwaving. Frozen vegetables can be added without thawing to soups or stews. Add them near serving time to prevent over-cooking.