

Freezing Fruits



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Introduction

Freezing is a quick, convenient, and easy method of preserving fruits. Freezing preserves nutritive quality so that frozen foods resemble fresh foods.

Successful Freezing

The five factors that are responsible for most of the quality losses of frozen foods are enzymes, air, microorganisms, large ice crystals, and evaporation of moisture.

Enzymes

Enzymes are naturally occurring substances in plants that control the ripening process. Freezing only slows enzyme activity. Enzyme activity in fruits is controlled by the addition of ascorbic acid (vitamin C). Ascorbic acid may be used in its pure form or in commercial ascorbic acid mixtures. Sometimes lemon juice or other citrus fruit solutions are used to control browning, but they are not as effective as treatment with ascorbic acid. Sugar and sugar syrup also help to prevent browning, but they do not prevent it entirely. Scalding or steaming are sometimes used to prevent enzymatic browning of fruits that will be cooked before use.

Air

Exclusion of air from the food prevents the enzyme reactions and oxidation that cause surface browning. This is most noticeable in light-colored fruits such as peaches, apricots, and cherries. An ascorbic acid product improves the long-term color of these fruits. Exposure to air is also related to moisture loss.

Microorganisms

Bacteria, molds, and yeast are present on all fresh foods and multiply rapidly when the temperature is between 40°F and 140°F. Unlike canning, freezing does not kill most microorganisms in food, but it does prevent their growth if the food is held at 0°F or lower. When thawed, the surviving organisms can grow again. This is why proper handling and preparation techniques are essential.

Ice Crystals—Freeze Quickly

The size of ice crystals determines the quality of frozen fruits—especially in fruits with a high moisture content, such as berries. Small ice crystals are desirable to preserve the texture of fruit. Large ice crystals rupture food cells and cause a soft, mushy texture. Small crystals are formed when food is frozen quickly and kept at a constant storage temperature of 0°F or lower. Avoid add-

ing more than 2 pounds of frozen food per square foot of freezer space. This allows cold air to circulate around the containers so that the fruit will freeze quickly. Overcrowding will slow the freezing process and may raise the temperature of already frozen food. People who object to the softness of thawed fruits might enjoy the product more if eaten while there are still some frozen crystals in the fruit—it will be somewhat like a slushy.

Evaporation of Moisture—Packaging Materials

Poorly packaged foods leave the fruit unprotected in the freezer, causing moisture loss. Moisture loss leaves the fruit exposed to oxygen, which accelerates loss of color, flavor, and texture, resulting in what is known as freezer burn. Proper packaging materials aid in preventing quality loss from freezer burn. Remove as much air as possible from the container or freezer bag before sealing it. Use only the recommended headspace (see table below). If excess headspace is unavoidable, fill the space with crushed plastic wrap before sealing.

Recommended headspace for freezing fruit.

Type of Pack	Container with Wide-Top Opening		Container with Narrow-Top Opening	
	Pint	Quart	Pint	Quart
Liquid Pack*	½ inch	1 inch	¾ inch	1½ inches
Dry Pack**	½ inch	½ inch	½ inch	½ inch
Juices	½ inch	1 inch	1½ inches	1½ inches

*Fruit packed in juice, sugar, syrup, or water; crushed or pureed fruit.

**Fruit or vegetable packed without added sugar or liquid.

Tips for Freezing Fruits

- Select varieties of fruits that are suitable for freezing. (Check a seed catalog or ask the grower.)
- If the fruit cannot be frozen immediately, refrigerate it.
- Work in small quantities, enough for only a few containers at a time, to prevent loss of quality and nutrients. Freeze foods as soon as they are packaged and sealed.



- Lift the fruit out of the wash water so the dirt that is washed off will not get back on the food. Do not let the fruit soak. Trim and discard parts that are green or bruised.
- Prepare fruits for freezing by packing with or without sugar or syrup. Treat to prevent browning of light-colored fruit. See page 3 for directions.
- When preparing fruits for freezing, do not use galvanized, copper, or iron equipment. The acid in the fruit could react with the metals to form harmful compounds or off-flavors.
- Cool or chill foods before filling them into packages.
- Package foods in quantities that will be used for a single meal-sized serving.
- Allow adequate headspace for fruits packed in sugar, syrup, or liquid to keep expanded juices from overflowing the container. Liquid expands when frozen. Place a piece of waterproof paper or plastic wrap on top of the fruit to keep it submerged in the syrup or liquid.
- When fruits are packaged in bags, press the air from the bag.
- Label packages with the name of the product; added ingredients, such as sugar or juice; the date packaged and the date to use by; number of servings or quantity; and the type of pack, such as whole, sliced, or diced.
- Freeze foods as soon as they are packaged and sealed.
- Do not overload the freezer with unfrozen food.
- Spread unfrozen foods out in the freezer so that they freeze more rapidly. After they are frozen, packages can be stacked.

Tray Freezing

Fruits such as strawberries, cranberries, blueberries, cherries, gooseberries, currants, raspberries, rhubarb, and grapes may be frozen individually on a tray before packing in containers. After

Good packing materials:

- Resistant to moisture and vapor
- Durable and leak proof
- Resistant to cracking and brittleness at low temperatures
- Resistant to oil, grease, and water
- Able to protect foods from absorption of off-flavors and odors
- Easy to seal
- Easy to label

Tips for packing:

- Plastic freezer bags are suitable for dry packs.
- Vacuum packaging designed for freezing is suitable for dry packs.
- Rigid plastic containers are suitable for all packs.
- Glass or plastic freezing jars with wide mouths and straight sides are suitable for all packs, especially liquid packs.
- Do not use paper cartons, cottage cheese tubs, cardboard ice cream and milk cartons, thin plastic (deli plastics), or any rigid carton with cracks or a poorly fitting lid—these are not suitable for long-term storage, nor do they adequately prevent moisture loss and freezer burn from exposure to air.

fruits have been washed, pretreated for browning (if necessary), and drained, place them one layer deep on cookie sheets or shallow trays and freeze uncovered just until solid (four to six hours); then quickly package and seal. This prevents the fruit from sticking together and allows removal of desired portions at one time without thawing. This fruit can be served frozen as snacks or thawed and used as a topping for salads and desserts.

Pack Fruit with or without Sugar

Without Sugar

Any fruit can be frozen without sugar. However, sugar helps to firm the texture and maintain color of the fruit. Non-nutritive sweeteners may be used but will not provide the beneficial effects of sugar. An alternative is to add non-nutritive sweeteners to the fruit just before serving. Use directions on the sugar substitute container to determine the amount of sweetener needed.

Liquid packs without sugar include water, fruit juice, and pectin syrup. Juice extracted from the fruit or purchased fruit juice can be used. Concentrated fruit juices have some of the beneficial effects of sugar from the natural sugars in the juice. However, people on restricted-calorie diets need to account for the additional calories in the juice.

Fruits frozen without sugar freeze harder and take longer to thaw.

Pectin syrup can be used to freeze fruits that have a poor texture when frozen without sugar (e.g., peaches and strawberries). To make pectin syrup, combine 1 package of powdered pectin and 1 cup water in a saucepan. Heat to boiling and boil for 1 minute. Remove from heat and add 1¾ cups more water. Cool. Makes about 3 cups of moderately thick syrup. Add more water if thinner syrup is desired. Pack fruit into pectin syrup as you would any syrup pack.

Syrup Pack

Fruits to be served uncooked are often packed in syrup made of sugar and water. Honey or maple syrup may be used to replace a portion of the sugar; however, this will affect the flavor.

Select the strength of syrup based on the sweetness of the fruit, personal preference, and intended use. Allow ½ to ⅔ cup syrup for each pint of fruit, 1½ cups for each quart of fruit. Syrup should cover fruit. Dissolve sugar in hot or cold water. If hot, cool before using.

Strength of Syrup	Water (cups)	Sugar (cups)	Yield (cups)
<i>Very Light</i>	4	½	4½
<i>Light</i>	4	1	4¾
<i>Medium</i>	4	1¾	5
<i>Heavy</i>	4	2¾	5½
<i>Very Heavy</i>	4	4	6

Sugar Pack

Fruits that will be used for pies or other cooked products are often packed in sugar. Use about 1 cup of sugar for every 2 to 3 pounds of fruit. As fruit sits in the sugar, juice will form. Record the amount of sugar added so that it can be factored in when using the fruit in a recipe.

Prevention of Browning

Ascorbic acid can be added to light-colored fruits to reduce enzymatic browning. Ascorbic acid is available from some pharmacies. Ascorbic acid in the form of vitamin C tablets may be used. Three finely crushed 500-milligram vitamin C tablets equals ½ teaspoon of ascorbic acid.

Commercial ascorbic acid mixtures are available in grocery stores and where canning supplies are sold. Follow the manufacturer's directions for their use.

Pretreatment

Ascorbic acid is added to holding water to prevent browning during preparation at the rate of 3,000 milligrams (1 teaspoon) to 1 gallon of water. Drain fruit thoroughly before continuing with sweetening and packaging.

During Freezing

Add ascorbic acid to individual packs of frozen fruits to prevent browning during freezing. For syrup or liquid packs, use ½ teaspoon of powdered or crushed ascorbic acid to each quart of cold syrup. For sugar or dry packs, dissolve ½ teaspoon of ascorbic acid in 3 tablespoons of cold water and sprinkle over 4 cups of fruit before adding sugar.

Storage and Use

Use frozen fruits within 8 to 12 months for best quality. Unsweetened fruits lose their quality faster than those sweetened with sugar or syrup. To serve, thaw frozen fruit in its original package in the refrigerator, under cold running water, or in the microwave if serving immediately. Serve with a few ice crystals remaining, if desired.

Freezing Specific Fruits

Fruit	Preparation	Dry Pack	Suggested Syrup Pack	Sugar Pack	Ascorbic Acid in Pack	Additional Notes
Apples	Select crisp, firm fruit (not mealy). Wash, peel, core, and slice medium apples into twelfths and large apples into sixteenths.	Yes	Heavy	Yes	Yes	A sugar pack is good for making pies. A syrup pack is good for apples that will be used for uncooked desserts or fruit salad. Tray freezing is an option.
Applesauce	Make as usual. Cool quickly and pack into rigid containers.	N/A	N/A	N/A	Optional	Ascorbic acid or lemon juice may be added to improve color.
Apricots	Select firm, ripe, uniformly yellow apricots. Wash, halve, and pit. Peel and slice, if desired. To loosen skins, score skin and dip into boiling water until skin starts to split. Cool in ice water and drain.	No	Heavy	Yes	Yes	If apricots are not peeled, heat them in boiling water for 30 seconds to keep skins from toughening during freezing.
Avocados	Select avocados that are soft with rinds that are free of blemishes. Best frozen as puree (not whole or sliced).	No	No	No	Yes	Add ¼ teaspoon (750 mg) of ascorbic acid to each quart of puree.
Bananas	Select firm, ripe bananas. Peel and mash thoroughly. Bananas may also be frozen whole, in the peel.	N/A	N/A	N/A	Yes	Add ½ teaspoon (1,500 mg) of ascorbic acid per cup of mashed bananas.
Blackberries	Select firm, fully ripe berries. Wash carefully and drain. Discard any soft, underripe, or defective fruit.	Yes	Heavy or very heavy	Yes	No	Adjust sugar level in syrup or sugar pack to the level of sweetness of the berries. Tray freezing is an option.
Blueberries (Whole)	Select ripe berries with tender skins. Wash, drain, and dry thoroughly. Water on skins results in a tougher skinned product.	Yes	No	No	No	Tray freezing is an option.
Blueberries (Crushed or Pureed)	Wash berries. Crush by pressing berries through a fine sieve or puree in a blender or food processor. Mix 1½ cups of sugar with each quart of crushed or pureed berries, if desired. Pack in freezer container.	Yes	N/A	Yes	No	
Cantaloupe (and Other Melons)	Select firm, well-colored, ripe melons. Wash skin with vegetable scrub brush. Cut in half, remove seeds, and peel. Cut into slices, cubes, or balls.	Yes	Medium	No	No	Thawed product will be watery.
Cherries, Sour	Select bright-red, tree-ripened fruit. Wash and stem. Drain and pit.	Yes	Very heavy	Yes	No	May be frozen with or without pits. If leaving the pits in, prick the skin with a clean needle to prevent cracking. If frozen without pits, add ½ teaspoon (1,500 mg) of ascorbic acid per quart.
Cherries, Sweet	Select tree-ripened, deep-colored varieties. Wash and stem. Drain and pit.	Yes	Heavy	Yes	Yes	May be frozen with or without pits. If leaving the pits in, prick the skin with a clean needle to prevent cracking. If frozen without pits, add ½ teaspoon (1,500 mg) of ascorbic acid per quart.
Cranberries	Choose firm, deep-red berries with glossy skins. Stem and sort. Wash and drain.	Yes	Very heavy	No	No	Tray freezing is an option.

Continued

Freezing Specific Fruits *(Continued)*

Fruit	Preparation	Dry Pack	Suggested Syrup Pack	Sugar Pack	Ascorbic Acid in Pack	Additional Notes
Citrus Fruits	Select firm, tree-ripened fruit that is heavy for its size and free from soft spots. Wash and peel. Divide fruit into sections, removing membranes and seeds. Slice oranges, if desired.	No	Heavy	No	No	
Figs	Select tree-ripened, soft, ripe fruit. Wash and cut off stems. Peel, if desired. Slice or leave whole.	Yes	Heavy	No	Yes	
Grapes (Whole)	Choose fully ripe, firm, sweet grapes. Sort, stem, and wash. Leave seedless grapes whole; cut table grapes with seeds in half and remove seeds.	Yes	Heavy	No	No	Tray freezing is an option.
Grapes (Pureed)	Wash, stem, and crush the grapes. Heat to boiling. Drain off free juice and freeze it separately. Remove seeds and hulls with a colander. Add ½ cup of sugar to 1 quart of puree. Pack in freezer containers.	No	N/A	Yes	No	
Peaches and Nectarines (Sliced)	Select firm, fully ripe, well-colored fruit. Handle carefully to avoid bruising. Wash, peel, and remove pit. Cut in halves, quarters, or slices.	No	Heavy	Yes	Yes	Add ½ teaspoon (1,500 mg) of ascorbic acid to each quart of syrup or ¼ teaspoon (750 mg) of ascorbic acid mixed in 3 tablespoons cold water to each quart of fruit in a sugar pack.
Peaches and Nectarines (Crushed or Pureed)	Select firm, fully ripe, well-colored fruit. Handle carefully to avoid bruising. Wash, peel, and remove pit. Coarsely crush peeled and pitted nectarines or peaches. For puree, press through a sieve or puree in a blender or food processor (heating pitted nectarines or peaches for 4 minutes in just enough water to prevent scorching makes them easier to puree). Pack into freezer containers.	No	N/A	Yes	Yes	For better quality, add ½ teaspoon of ascorbic acid to each quart of fruit.
Pears	Select well-ripened, firm fruit. Wash and peel. Cut in halves or quarters and remove cores. Slice medium pears into twelfths and large pears into sixteenths. Heat in boiling syrup for 1 to 2 minutes (depending on size of pieces). Drain, cool, and pack in syrup.	No	Heavy	No	Yes	Add ¾ teaspoon (2,250 mg) of ascorbic acid to each quart of cold syrup.
Pineapple	Select firm, ripe pineapple with full flavor and aroma. Peel, remove core and eyes. Slice, dice, crush, or cut into wedges or sticks.	Yes	No	No	No	
Plums	Select firm, tree-ripened fruit. Wash. Leave whole or cut in halves or quarters; remove pits. Pack in syrup or without sugar. Use ascorbic acid to retard browning.	Yes	Heavy or very heavy	No	Yes	
Raspberries	Select fully ripe, firm berries. (Seedy berries are best for purees or juice.) Wash and drain.	Yes	Heavy	Yes	No	Tray freezing is an option.
Rhubarb	Select firm, well-colored stalks with good flavor and few fibers. Wash, trim, and cut into ½-inch or larger pieces.	Yes	Heavy	No	No	Blanching rhubarb in boiling water for 1 minute (do not overcook) and cooling promptly in ice water will help retain color and flavor. It can also be frozen raw. Tray freezing is an option.
Strawberries, whole	Select firm, ripe, red berries. Wash, drain, and remove hulls.	Yes	Very heavy	Yes	No	If freezing in sugar pack, allow to stand for 15 minutes before putting into containers. Tray freezing is best.
Strawberries, crushed or sliced	Select firm, ripe, red berries. Wash, drain, and remove hulls. Slice or crush.	N/A	N/A	Yes	No	When freezing in sugar pack, allow to stand for 15 minutes before putting into containers.

For additional information about food preservation, visit the Penn State Extension Home Food Preservation website at extension.psu.edu/food/preservation, or contact Penn State Extension in your county.

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