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FREEZING FOODS FOR HOME USE

AGRICULTURAL EXTENSION SERVICE UNIVERSITY OF MINNESOTA

TIPS FOR FREEZING

- Select products of good quality; freezing does not improve low grade food.
- Select varieties of fruits and vegetables that are suitable for freezing. Process at optimum stage of maturity—generally when ready for table use. Field ripened fruits are preferable. Prompt handling is important for retaining quality.
- Chill meats promptly and thoroughly after slaughtering. Don't age beef intended for freezer storage as long as meat for immediate use. Beef that is aged too long before freezing has a shorter life.
- Generally, freeze foods in packages or containers that are only large enough to hold the quantity you will use or cook at one time.
- Use good packaging and wrapping materials.
- When freezing the product, avoid close packing in the freezer so heat can escape from food.
- Use a storage temperature at 0° F. or lower for most foods.

Frozen meat, poultry, fish, and eggs equal the fresh products in nutritive value. Retaining nutritive value of fruits and vegetables depends largely on the treatment before freezing, storage temperature, and method of cooking and serving—much the same as with the fresh products.

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FREEZING FOODS FOR HOME USE

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Freezing preserves many foods with little change in flavor, color, texture, and nutritive value. It is one of the simplest methods of home food preservation. Completely well-balanced meals can be prepared at almost a moment's notice from the freezer. Sometimes just heating or thawing is necessary to put them on your table.

Many People, For Many Reasons, Freeze Food

The homemaker has almost endless possibilities in the freezing of ready-to-eat cooked foods, bakery goods, and school lunches. Frozen fruits and vegetables are popular because they add out-of-season foods to year-round menus. With a variety of foods in a home freezer or locker drawer, marketing can be an occasional pleasure instead of a daily chore.

And freezing allows farmers to slaughter their animals in prime condition instead of feeding them until cold weather comes. It also allows families to purchase meat in wholesale cuts at quantity prices.

Gardeners can freeze homegrown fruits and vegetables during peak seasons while consumers may purchase these foods in season at a saving. Hunters and fishermen find freezing an ideal way to preserve game and fish.

Quality Can Be Retained

A common belief is that "quick frozen" foods must be frozen very rapidly to retain quality. But "quick freezing" really means getting the product frozen before deterioration begins.

No quality loss was noted in laboratory tests on most foods when temperature was reduced to 20° F. within 10 to 15 hours after freezing began. However, the food temperature must be lowered below 40° F. within 4 hours to halt the growth of spoilage organisms. For most foods the rate of freezing, if fast enough to retard growth of spoilage organisms, has relatively little effect on quality retention.

Retention of quality depends chiefly on: (1) proper handling of food before it is frozen, (2) good packaging, (3) storage at a temperature no higher than 0° F., and (4) proper handling and cooking after removal from storage.

Freezing does not sterilize the product, but the low temperature prevents the growth and development of harmful yeasts, molds, and

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bacteria. Many micro-organisms are killed by freezing storage but some survive. Consequently, cleanliness and sanitary methods are just as important in handling foods for freezing as in preparing them for immediate use.

Choose Proper Packaging Materials

Undesirable flavors in frozen meat, poultry, and fish usually result from rancidity. Rancidity is most commonly caused by exposure of natural fats and oils to atmospheric oxygen—oxygen must be excluded from the stored packages. Fish, shellfish, beef, pork, and certain fruits and vegetables such as cherries, peaches, strawberries, and asparagus especially need protection from atmospheric oxygen.

When a package is properly wrapped, the major loss of moisture is through the packaging material itself rather than the folds. Oxygen moves into the package the same way. A covering that provides excellent protection from loss of moisture may not satisfactorily bar oxygen for long storage periods.

For Meat and Poultry—"Freezer burn," a surface discoloration of meat and poultry, often results from improper packaging. The meat tissue or skin of the carcass dries out. Freezer burn appears as light gray spots or areas on meat. On poultry, it appears as light-colored circular spots around feather follicles or as large discolored areas on the skin surface.

To prevent freezer burn, use a wrapping material that protects the product from loss of moisture. The material should be pliable enough so that you can make a tight wrap to prevent air pockets.

Freezer burn frequently occurs when packaging material is damaged in the freezer. If packages become ripped or torn, rewrap them to adequately protect the contents. Freezer burn detracts from the appearance of meat and poultry and in moderate and severe cases lowers the quality.

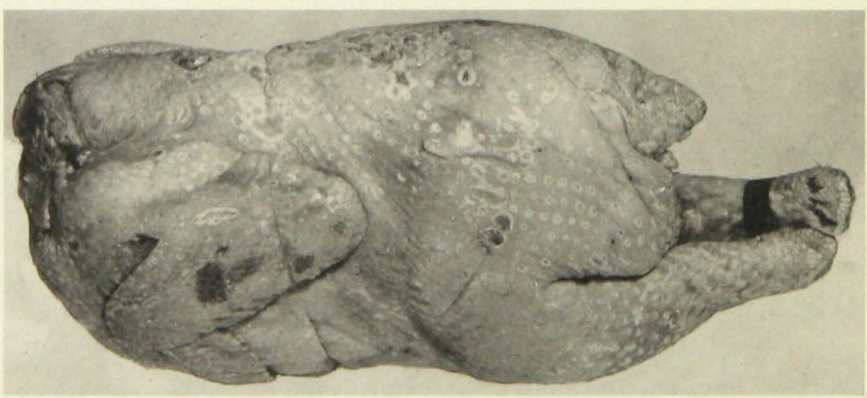

Figure 1. Freezer burn on a bird results from poor packaging.

A good wrapping material for meats should:

- Be odorless.
- Possess high wet strength.
- Be greaseproof.
- Not adhere to the meat.
- Resist puncturing.
- Be easy to mark.
- Not become brittle or crack at low temperatures.

A **single** wrap of a good material gives better protection than a double wrap of an ordinary waxed freezer paper. And you need less labor and less material.

For Foods Sensitive To Oxygen—Research studies at the Minnesota Agricultural Experiment Station show that packaging materials can be classified into three groups for frozen foods that appear sensitive to even small amounts of oxygen during storage:

Group 1 includes the ordinary waxed-one-side freezer papers. These can be used for storage periods not exceeding 2 months.

Group 2 includes the various coated and laminated freezer papers and polyethylene films. These materials were satisfactory for 0° F. storage of ground pork for about 3 or 4 months and ground beef for about 4 or 5 months. Nearly all these materials are good barriers to water vapor.

Group 3 includes materials that are relatively impermeable to oxygen such as aluminum foil, saran-type film, polyester films, and films combining cellophane and polyethylene.

These materials are satisfactory for longer storage periods especially for fish and ground pork kept over 90 days, than are those of Group 2. For example, ground beef and pork were kept satisfactorily for 6 to 8 months and beefsteak for 10 to 12 months when stored at 0° F. All these materials are good barriers to water vapor.

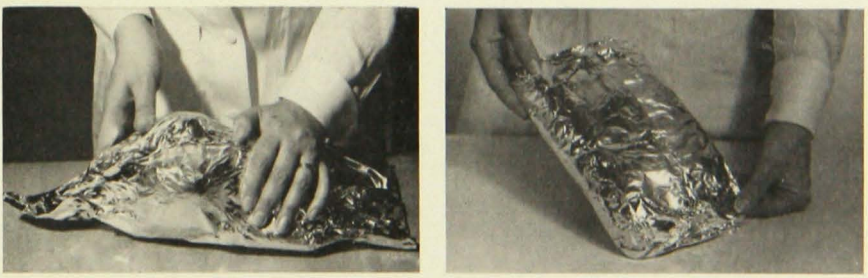

Figure 2. Left: You may use foil for wrapping poultry and other unevenly shaped products. When making the lock seam, do not draw the foil too tight. Allow surplus for pressing and molding around the product. Press while ends are still open. Right: Close a foil wrap by pressing the ends of the wrap, starting next to the product. Then fold over to make a lock seam and press snugly against the product. No tape or twine is needed.

For Foods Less Sensitive To Oxygen—Chickens, turkeys, and bread do not appear sensitive to the small amounts of oxygen that may enter through packaging if there is little loss of moisture.

Research studies showed that polyethylene film is as satisfactory as heavy-duty aluminum foil and saran-type films for these foods, although polyethylene is more permeable to oxygen. Polyethylene bags were satisfactory for storing chicken thighs and turkey fryer-roasters for about 8 months and white bakery bread for at least 10 months.

For Fruits And Vegetables—Packaging materials listed in Groups 2 and 3 usually provide adequate protection for vegetables and most fruits. They prevent any appreciable loss of moisture during storage. Some experimental evidence showed that a heavier gage of polyethylene film provides better protection for fruits and vegetables than the 1½ milligram thickness commonly sold for this purpose.

Polyethylene is widely accepted as a packaging film for frozen vegetables. It is tough, durable, and flexible—even at relatively low temperatures. It has a low level of taste and odor transfer, although it may be penetrated and softened by many types of fats and oils.

Wrap With Care

Freezer burn and rancidity may develop wherever air pockets exist in frozen food packages, even when you use the best wrapping materials. So tight wrappings are a must.

The "freezer wrap" is the easiest method of making tight folds and a close tight wrap. This wrap also takes about 20 percent less wrapping material than the "butcher" type wrap commonly used at meat markets.

To make the freezer wrap, place the product in the center of the paper. Bring the two longest sides of the paper together over the product and fold these edges over about 1 inch. Fold again as many times as necessary to bring the paper tight and flat against the top of the product. To avoid waste, the paper should be only long enough to make two folds (see figure 3).

Turn the package over and fold end corners toward each other. Then fold the ends over, stretch them tightly, and secure with locker

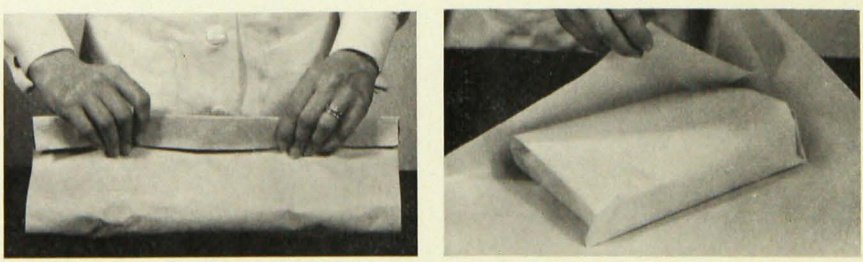

Figure 3. Left: Start a freezer wrap by folding edges over, usually twice, to make a tight lock seam. Except when using foil, use locker tape or twine to hold end folds in place—tape is preferred. Right: Start a butcher-type wrap by placing the meat close to one corner of the paper. Use a double wrap with waxed freezer paper.

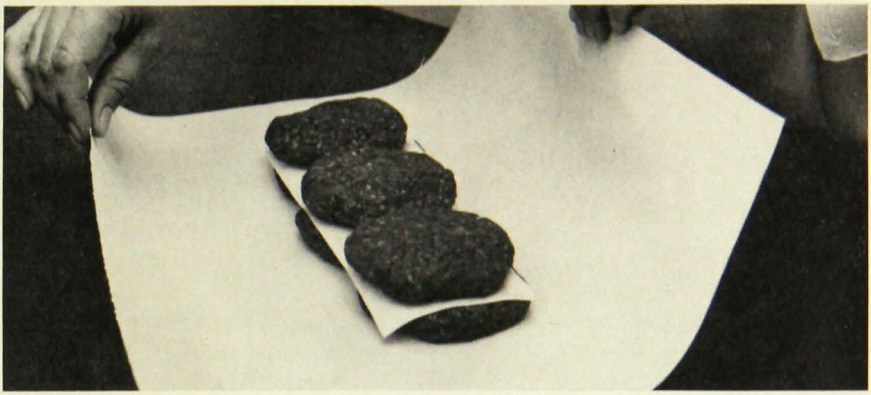

Figure 4. Use freezer paper between layers of fish, chops, steak, or cut poultry so pieces separate easily after the product is frozen. Notice the product is placed in the center of wrapping when starting a freezer wrap.

tape or twine. Plain aluminum foil needs no tape or twine because you can fold and roll the ends tightly into place.

To make the butcher wrap, place the product close to one corner of the paper. Then fold all sides over; roll the package over and over until all the paper is used. Secure with tape or twine; tape makes a tighter seal.

An 18-inch width of paper is satisfactory for wrapping most meats at home, although some large cuts of meat and large chickens require a 24-inch width.

In order to separate the layers of meat and fish while they are still frozen, place "steak paper" between them—use any frozen-food wrapping material or parchment paper. Unless the paper is waxed or coated on both sides, fold it double to make separation easy. Package all cuts flat so you can start cooking before the meat thaws. Do not roll steaks. Wrap meat promptly after cutting.

Label all packages with the name of the product and the date. Use a soft crayon, china-marking pencil, or a special pen or brush.

A single freezer wrap requires about 80 square feet of paper per 100 pounds of meat, or 70 square feet of foil. A double butcher wrap requires about 200 square feet.

Containers Are Varied

Good results have been obtained with almost all types of frozen-food containers now on the market. Select any container on the basis of convenience for use, space occupied in the locker or home freezer, and cost.

Wide mouth glass canning jars may be used in a home freezer, but are not recommended for a locker plant. Unwaxed, lightly waxed, or plastic coated cartons made for ice cream, cottage cheese, and milk are unsatisfactory for freezing foods.

A clean used can with a tight cover is adequate. If without lid, cover the can with a circle of freezer wrap held in place with a binder. Then secure it snugly with locker tape and remove the binder. You can purchase special snap-on lids to fit Number 2 and Number 303 cans for this purpose. Reuse only enamel-lined cans for fruits and vegetables and other moist foods. Clean and dry the cans immediately after use.

You can store a bulky frozen vegetable, such as corn-on-the-cob, in used potato chip or popcorn cans and 30-pound tins. Tray freeze before placing in large containers. Polyethylene plastic bags are excellent for freezing bread, rolls, and similar baked foods.

New polyester film boil-in-the-bag containers have good protective qualities in the freezer. They are especially suitable for precooked foods such as stew, chow mein, and many dishes containing gravies and sauces. And they are good for some uncooked foods such as corn-on-the-cob and other vegetables, shrimp, and foods that may be cooked in boiling water. These bags endure temperatures from below 0° to 240° F. without change. So you can cook or heat frozen foods in water without removing the bag.

Rapid thawing and heating—from freezer to the table in 10 to 12 minutes—are the keys to the anticipated popularity of these boil-in-the-bag containers for commercially frozen foods. You can prepare several kinds of food for the table in one uncovered pan of boiling water with no cooking odors.

To satisfactorily close most bag containers, twist the tops and tie them with soft twine, rubber binders, or 4-inch twist-ems. The latter, used by florists for tying, are inexpensive and easy to use. Under home conditions, heat-sealing does not approach the effectiveness of factory heat-sealing and therefore is not recommended.

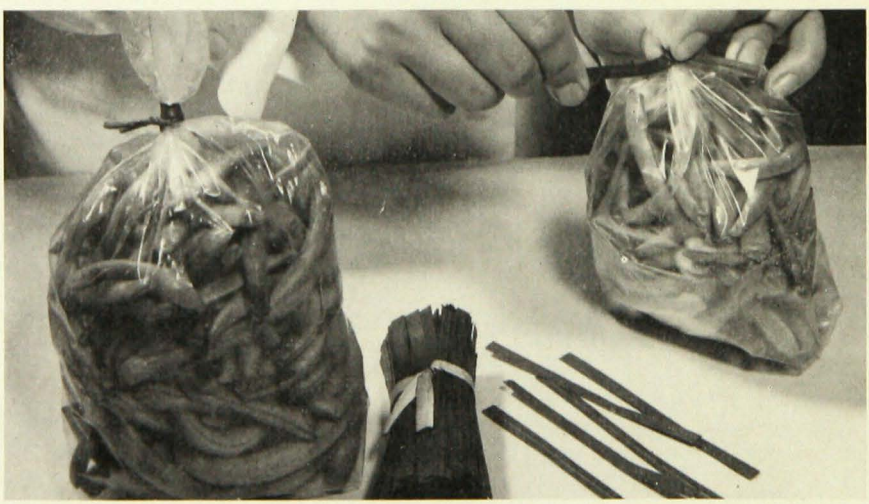

Figure 5. Close polyethylene bags by twisting and tying the tops with soft twine, rubber binders, or twist-ems.

The different containers vary in the amount of space they occupy in the home freezer or locker. Approximately 40 pint cartons, either rectangular or cube shape, can be stored in 1 cubic foot. A cubic foot also holds 27-30 cylindrical or tube-type waxed pint containers. About 25 glass freezer jars (pint) fit into the same space.

Freezing Operations

Foods freeze satisfactorily at temperatures of 0° to —10° F. or lower. How rapidly heat can emerge from the product is more important than air temperature. Space packages of unfrozen food at least 1 inch apart to help heat escape. In single-compartment chest units, spread out packages in the lower third of the storage space, preferably in contact with refrigerated surfaces.

Home freezers have a limited freezing capacity. In well-designed commercial units, a freezing load of 2 to 3 pounds per cubic foot of storage space is allowable. For example, 24 to 36 pounds of unfrozen food may be placed in a 12-cubic foot freezer. With the packages spread out and in contact with refrigerated surfaces whenever possible, all the food freezes in about 10-12 hours.

Leave at least a 1-inch space at the top of chest-type home freezers because it is difficult to keep the top packages at the desired temperature when the storage space is overcrowded. See page 12 for amount of food that may be stored per cubic foot.

You may freeze a few pounds of food in a home unit at the regular storage temperature of 0° F. But for larger quantities, set the cold control at —10° F. or lower, about 24 hours in advance. This temporary lowering of temperature has no ill effect on the frozen food already in storage and it facilitates more rapid freezing. The rate of freezing is not increased by lowering the temperature control just before placing unfrozen food in the box.

Because of the limited freezing capacity, small home freezers are not satisfactory for freezing a quarter of beef or similar food quantities at one time. Take large amounts to a locker plant for freezing, or freeze them outdoors if the temperature permits.

In home freezers, leave the packages in the freezing position for 24 hours before packing them close together. At locker plants, packages usually are held in the sharp-freeze room overnight.

A separate freezing compartment in a home freezer is sometimes convenient but not a necessity; foods may be frozen satisfactorily in a single-compartment home freezer. In either case, the condensing unit must be large enough to handle the added heat load.

Storage Temperature Matters

Many persons believe that frozen foods keep indefinitely if kept "frozen hard." This is not true. For example, many foods noticeably lose quality and vitamin content in 10 to 20 days when stored at about 25° F. in an "open-at-one-end" ice cube compartment of a household refrigerator.

You can expect similar results for many foods after 3 to 4 weeks in household refrigerator "freezer compartments" which maintain temperatures of about 15° to 18° F., or after 3 months in 10° F. storage compartments. Foods cannot be properly stored in such compartments for long periods unless 0° F. or lower is maintained. A temperature of 0° F. can be maintained in most modern locker plants and home freezers. Some operate at −5° to −10° F. which is even better. Check the operating temperature of a home freezer with an accurate thermometer placed on top of the food packages.

Table 1. Maximum storage periods recommended at 0° F.

Food	Months
Baked Foods:	
Brown-and-serve rolls	2-3
Cake batter	less than 1
Cakes, baked	4-6
Cakes, frosted	2-3
Chiffon pies	less than 1
Chocolate cake, baked	4
Cookies	9-12
Fruit cake	9-12
Gingerbread, baked	less than 1
Mincemeat pie	2-3
Pies, baked	4-6
Pies, unbaked	2-3
Quick breads, baked	2-3
Quick breads, unbaked	less than 1
Sponge cake, egg yolk	4
Yeast breads, baked	9-12
Yeast dough, unbaked bulk	2-3
Yeast rolls, baked	9-12
Yeast rolls, unbaked	less than 1
Candies	12
Citrus fruits	3-4
Citrus juices, concentrate	12-18
Dairy products:	
Butter, fresh creamery	9
Cheese, in small amounts	6
Cream, 40 percent or more	4
Eggs, processed	9
Ice cream	less than 1
Milk, homogenized	less than 1
Fish and seafoods* (See page 46)	
Fruits, except citrus	12-18
Game animals	9
Game birds	9
Gelatin	less than 1
Margarine	9-12
Meats:*	
Bacon, not sliced	2-3
Beef, except ground	9
Beef, ground	4
Beef liver, heart, tongue	6
Ham, not sliced	2-3
Lamb	9
Pork, except ground	4
Pork, ground, unsalted	2-3
Pork sausage, no antioxidant	less than 1
Stew meat, cut	4
Veal	6
Mushrooms	6
Nuts:	
Salted	6
Unsalted	9-12
Poultry:	
Chicken and turkeys	9
Ducks and Geese	9
Giblets	3
Cooked poultry (slices or pieces)	
Covered with broth or gravy	6
Not covered with broth or gravy	1
Fried chicken	4
Precooked foods	3
(In sauce or gravy)	(6)
Sandwiches	less than 1
	See page 54
Vegetables (most)	12-18
Asparagus	10-12
Onions	3-6

* Reduce time one-half or more when bought at store at indefinite time after killing.

Note—Light smoking of unsalted fresh meat, poultry, and fish greatly prolongs storage life.

Table 2. Approximate thawing time for frozen foods

Product	Room temperature*	Household refrigerator	Other
	hours		minutes
Bread	3-4	....	20-25 (in 325° F. oven)
Cake	1-2	....	20-25 (in 250°-300° F. oven)
Pie, baked	..	....	See page 51
Pie, unbaked	..	....	See page 51
		hours	
Fruit, pint	3-4	5-6	½-¾ (in cold running water)
Meat, per pound	2-2½	5-8	
Chickens, less than 4 lbs.	4-6	12-16	1-2 (in cold running water)
Chickens, 4 lbs. and over	..	24-36	2-2½ (in cold running water) Or not over 15 hrs. in paper bag at 70-80° F.
Ducks, 3 to 5 lbs.	..	24-36	2-2½ (in cold running water)
Geese, 4 to 14 lbs.	..	24-48	3-5 (in cold running water)
Turkeys, 4 to 11 lbs.	..	24-36	Not over 15 hrs. in paper bag at 70-80° F. or 4-6 (in cold running water)
Turkeys, 12 to 24 lbs.	..	48-72	Not over 20 hrs. in paper bag at 70-80° F. or 6-7 (in cold running water)

* Food should not be thawed without special protection at room temperature for longer than 6 hours.

Most frozen vegetables rapidly lose their vitamin C value at 10° F. but the loss is slow at 0° F. or lower. Store fish and pork in the coldest part of the freezer (usually near the bottom in chest types) because they keep better at a few degrees below 0° F. than at 0° F.

Frozen foods do not store well at temperatures above 0° F. because higher temperatures permit undesirable enzyme activity. Enzyme action speeds up chemical changes which result in unpleasant flavors, changes in color, and destruction of vitamin C.

When food is held at 0° F., loss of quality during storage does not result from bacterial action. For example, although temperatures of 10°-15° F. are required to check all growth of micro-organisms on stored beef, comparatively few grow to any appreciable extent below 19° F. In fact, destruction of bacteria in frozen beef and pork is more rapid at 20-25° than 0° F.

Food which is properly prepared and frozen may become unpalatable during storage due to enzyme action if the temperature is too high or if it has been stored too long. But such food is usually not dangerous to eat if it has remained frozen. The dangerous botulinum toxin is not known to develop below 40° F.

Some foods are not suitable for home freezing. These include bananas, cabbage (raw), cake batters, celery (raw), cream pie fillings, custards, egg whites (hard cooked), lettuce, mayonnaise, potato salad, salad dressing, and watermelon.

Storage Time and Capacity

The length of time various frozen foods should keep without appreciable loss of quality is shown in table 1. But you must prepare and package the foods according to instructions in this bulletin and store them at 0° F. or below.

Improper handling of food before freezing, poor packaging, and a storage temperature higher than 0° F. all reduce the indicated storage time. The rate of freezing, as explained on page 3, makes little difference.

The accepted standard capacity is 35 pounds of frozen food per cubic foot of usable space. Actually, this amount varies—15 to 25 pounds for vegetables, 30 to 42 pounds for meats, 20 to 50 pounds for fruits—but the average is 25 to 35 pounds.

Utensils To Avoid

Because copper destroys vitamin C, don't allow food to contact this metal. However, contact with copper, aluminum, or nickel does not result in any form of food poisoning. Contact with iron darkens sweet potatoes. Because of the danger of zinc poisoning, don't cook acid foods or juices in galvanized iron kettles. And don't place acid foods or juices in cadmium-plated utensils.

FREEZING FRUITS

Fruit for freezing should be slightly riper than for canning but not soft or mushy. Tree- or vine-ripened fruits contain more vitamins and a richer flavor than fruits picked green and allowed to ripen before freezing.

Freezing fruit at just the right stage of ripeness is important, even though it may mean some delay. Freezing fruits before jelly making results in greater yields of juice. Freshly made jam and preserves prepared from frozen fruit have better quality than if made in season and stored for several months. When you use frozen fruit, you can make the jam or preserves at your convenience.

Varieties of fruit best adapted to freezing differ according to the region in which they are grown. In each area, certain varieties retain their original color, texture, and flavor exceptionally well when frozen.

For information on freezing fruit juices, see table 6, page 23.

How To Pack

When packing fruit for freezing, sort, wash, and prepare as for table use. Most fruits to be used for dessert are best packed in sirup, but a dry-sugar pack is preferred for sliced strawberries and apples and is optional for raspberries, blueberries, and peaches. Pack most fruits intended for jam, pies, and similar cooking purposes in dry sugar and some without any sweetening.

Table 3. Yields of frozen fruits from fresh fruits

Product	Quantity	Approximate yield (pints)
Apples	1 bushel (42-44 pounds)	40
Apricots	1 crate (14 pounds)	24
Cherries (sweet)	1 crate (15 pounds)	24
Peaches	1 crate (16 pounds)	24
Raspberries	1 crate (24 pints)	28
Strawberries	1 crate (24 quarts)	28

Table 4. Average ready-for-freezing weight obtained from 10 pounds of fresh product purchased on market

Product	Prepared product (pounds)
Lima beans, peas, sweet corn	3½-4
Broccoli, muskmelon	4½-5
Asparagus, cauliflower, pineapple	5 -5½
Apples (small)	6 -6½
Apples (large), Brussels sprouts, carrots, spinach, leafy greens	7 -7½
Pears, plums, rhubarb	8 -8½
Beans (bush and pole), peaches, strawberries	8½-9
Blackberries, blueberries, raspberries	9½-10

Losses of vitamin C are greatest when fruits are packed without sugar. Use sweetening materials when possible as they best preserve the quality of almost all fruits.

Sirup Pack

Dissolve needed sugar in cold water. Stir occasionally and allow to stand until sugar is completely dissolved. Do not heat. You may hold sugar sirup in the refrigerator for 2 days. A sirup pack best preserves vitamins.

Table 5. Approximate quantity of sirup needed for packing fruits

Fruit	Amount of fruit	Water	Sugar	Containers filled
		quarts	cups	pints
Apricots	14-pound crate	3	9	24
Peaches	16-pound crate	3	9	24
Raspberries	24-pint crate	3	9	28
Sweet cherries	15-pound crate	3	9	24

Replacing one-third of the sugar with light-colored corn sirup, cup for cup, sometimes results in improved texture, flavor, and color of fruits.

When freezing peaches, apricots, sweet cherries, and figs, add ½ teaspoon ascorbic acid for each quart of water, just before pouring sirup over fruit. Mix the ascorbic acid (citric acid, also, if recommended) with 2-3 tablespoons of sirup and add to remainder of sirup. Mix thoroughly, but avoid beating air into the sirup.

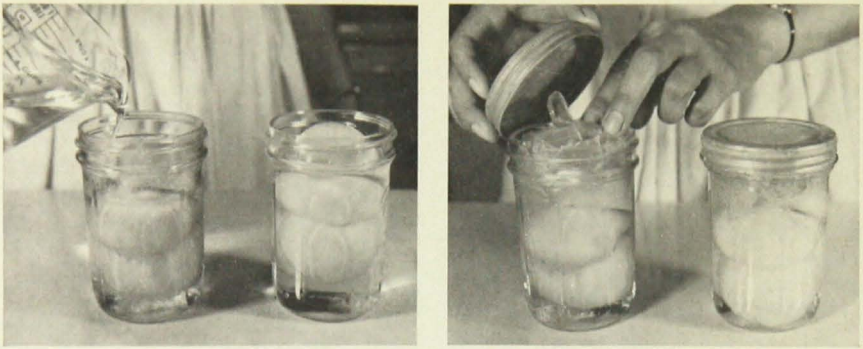

Figure 6. Left: When packing with sirup, place fruit in container and cover with liquid. Leave a space one-tenth the volume of the container for expansion. Right: A wad of waxed paper under the cover keeps peaches, sweet cherries, and apricots immersed and helps prevent discoloration.

Place the prepared fruit in containers and cover with sirup. Allow about ½ inch at top of container for expansion. For fruits that darken, place crumpled waxed paper between lid and fruit to keep fruit submerged.

Sugar Pack

Place prepared fruit in a bowl. To avoid crushing berries, don't use more than about three boxes of berries.

Sprinkle required amount of sugar over fruit. Gently stir fruit until each piece is coated with sugar and juice. Then pack fruit tightly into containers but do not crush.

Dry Pack

Pack prepared fruit in containers without sugar, sugar sirup, or other liquid.

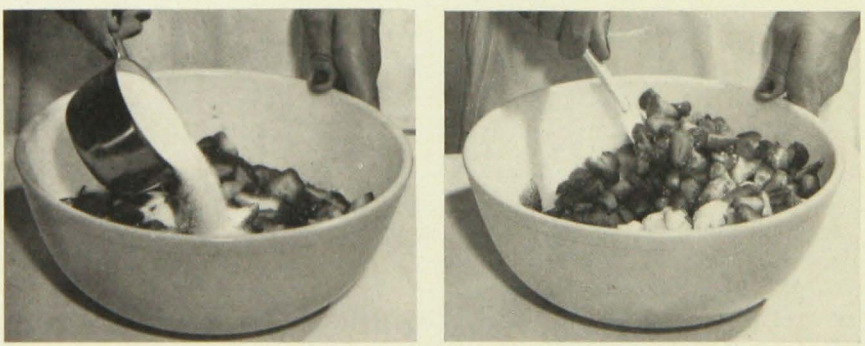

Figure 7. Left: When mixing sugar with strawberries, first sprinkle sugar over the fruit. Right: Stir the mixture carefully until each berry is coated with sugar and fruit juice.

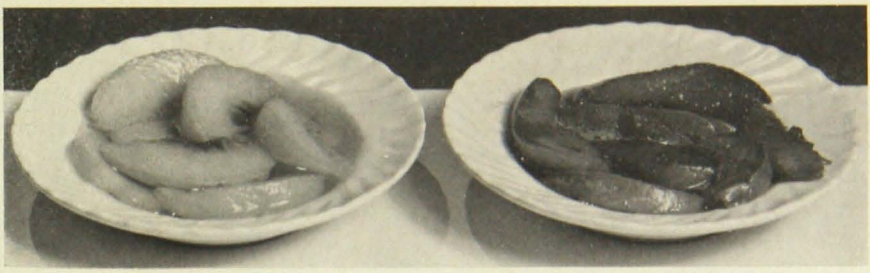

Figure 8. Peaches do not darken (left) when ascorbic acid (vitamin C) is added to the sirup. Otherwise, they darken when standing at room temperature after thawing.

You may freeze apricots and peaches in water mixed with 1 teaspoon ascorbic acid per quart of water. You may crush and freeze most berries in their own juice. Blueberries may be frozen whole without sugar or sugar sirup.

Fruit Puree

Crush or chop fruit. Add 1 cup sugar to 6-8 cups puree according to taste. Indicate the sugar used on the label. Package, label, date, and freeze immediately.

Use of Ascorbic Acid

Add ascorbic acid (vitamin C) to sugar sirup when packing such fruits as peaches, apricots, figs, and sweet cherries; otherwise these fruits darken rapidly and lose flavor when thawed. Ascorbic acid also enriches the vitamin content.

Ascorbic acid is a natural constituent of fruits and vegetables. You may purchase pure ascorbic acid in crystalline or powdered form in 25- or 50-gram bottles. You can pack six to seven 16-pound crates of peaches with a 25-gram bottle. Vitamin C tablets can also be used but the cost is considerably higher. Add about 100-150 milligrams of ascorbic acid to a 1 pint (1 pound) container filled with fruit (½ teaspoon ascorbic acid equals 1,000 milligrams).

Commercial preparations of ascobic acid for frozen fruits are on the market. These generally contain sugar or citric acid. Because of its acidity, citric acid used in large proportions may mask delicate natural flavors of fruits. When using commercial mixes, always follow manufacturer's directions.

Fruits For Freezing

Varieties known to be suitable for freezing are listed. However, many other varieties of good quality are satisfactory for home freezing.

Apples

Selection—Use firm-fleshed cooking varieties suitable for pie or sauce; freezing tends to soften texture. Apples held in storage for long

periods may darken more easily after freezing than apples processed shortly after harvest.

Preparation—Peel apples and cut into pie slices. To prevent darkening, submerge slices for at least 5 minutes in a sodium bisulfite solution. Do not use sodium sulfide or sodium sulfate.

To prepare the solution, dissolve 1 teaspoon sodium bisulfite (U.S.P. grade) in 1 gallon cold water (60-70° F.). Mix solution in a glass, earthenware, stainless steel, or enameled container. You may treat about ½ bushel of apples with the same solution.

Use of stronger solutions results in a distinct toughening of slices and a sulfur taste after cooking. Two ounces of sodium bisulfite (11 level teaspoons) are enough for about 7 bushels of apples.

Sliced apples used in baked frozen pies need no special treatment.

After the 5-minute dip, remove slices from solution and drain. Pack in sugar, using 5-7 pounds of slices to 1 pound of sugar (1 cup sugar to 10-12 cups apples). Sprinkle the sugar evenly over the slices and allow them to stand for a few minutes or until the sugar dissolves into the fruit juice. Then stir carefully until each slice is coated with sugar. Fill containers, label, date, and freeze immediately.

An alternative treatment is to soak apple slices for 15 minutes in a weak brine solution, using ½ cup salt to each gallon water. Drain. Pack apple slices in a sugar sirup, mixing 2 cups sugar and ½ teaspoon ascorbic acid with 1 quart water.

You can also freeze whole apples. Wash them. Without peeling or slicing, place apples in polyethylene or similar plastic bags. Label, date, and freeze. These apples are suitable for pie, sauce, or other cooked desserts, but they are not desirable as fresh eating apples.

To prepare, run cold water over each frozen apple and use immediately. Do not thaw apples before peeling as they darken readily.

Apple Sauce—Freezing may not produce as good an apple sauce as canning. However, you may prepare apple sauce in the usual way, sweeten to taste after cooking, cool, pack in containers, label, date, and freeze immediately.

Apricots

Selection—Use Blenheim (Royal), Moorpark, and Tilton. Select well-ripened fruits of a uniform golden-yellow color.

Preparation—Follow instructions given for peaches using a sugar sirup. Unless you peel apricots before freezing, the canned product is considered superior for dessert use. Unpeeled frozen apricots are satisfactory for pies.

Soft ripe fruit, which has the best flavor, may be halved, pitted, steamed 4 minutes, crushed, and then packed with sugar. Use 1 pound sugar to 4-5 pounds fruit or 1 cup sugar to 7-8 cups fruit. Pack in con-

tainers, label, date, and freeze immediately. Ascorbic acid is not needed when the fruit is steamed.

Avocados

Selection—Use soft ripe fruit, free from dark blemishes.

Preparation—Wash, peel, and pit fruit. Puree and add ¼ teaspoon ascorbic acid to each quart of puree. Pack into containers, label, date, and freeze immediately.

Blackberries, Boysenberries, Dewberries, Loganberries, Youngberries, and Nectarberries

Selection—Choose firm berries with a rich flavor and bright appearance.

Preparation—Discard inferior berries. Wash berries carefully in cold water, lift them out, and drain. For dessert use, pack in sugar sirup using 3 cups sugar to 1 quart water. For pies, pack dry without sweetening.

Or, you may crush berries and pack them in sugar using 1 pound sugar to 4-5 pounds fruit (1 cup sugar to 7-8 cups whole berries). Label, date, and freeze immediately.

Blueberries

Selection—Use either wild or cultivated firm, fully ripe berries of good color.

Preparation—Remove leaves, stems, and inferior berries. Wash in cold water and drain. For best quality and dessert use, pack berries in a sugar sirup using 3 cups sugar to 1 quart water. Or pack berries in sugar, using 1 pound sugar to 5 pounds fruit (1 cup sugar to 7-8 cups berries). For pies, however, you may pack blueberries dry without either sugar or sugar sirup. Then label, date, and freeze immediately.

Cantaloupe

See directions under muskmelon on page 31.

Cherries, Pie

Selection—Use any good quality cherry.

Preparation—Wash, stem, and pit. Mix sugar and cherries (usually 1½-2 cups sugar to 4 cups cherries, for a 9-inch pie. To improve color retention, mix ¼ teaspoon ascorbic acid with sugar. Label, date, and freeze immediately.

Cherries, Sweet

Selection—Use Bing (preferred), Schmidt, Lambert, Black Tartarian, and Windsor varieties. Choose bright, fully ripe cherries.

Preparation—Chill cherries in cold water to keep them from bleeding when pitted. Then lift them from water and drain. Discard inferior cherries; stem and pit. Pack in sugar sirup, using 2 cups sugar for 1 quart water plus ½ teaspoon ascorbic acid (see page 15).

The natural fruit flavor is not retained unless you add ascorbic acid. One teaspoon citric acid or 4 teaspoons lemon juice plus ascorbic acid gives a desirable acidity to the frozen product. Label, date, and freeze immediately. These cherries are suitable for salads and fruit cups.

Citrus Fruits and Citrus Fruit Mixes

Citrus fruits are on the fresh fruit market during much of the year. For freezing, citrus fruits are best when they are mixed with other fruits.

Sprinkle sugar over each layer of citrus fruit, sweetening to taste. When you have added all the sugar, allow fruit to stand in the refrigerator until the juice that forms covers as much fruit as possible.

Pack into containers, label, date, and freeze immediately. If you plan to store the fruit mix for long, add ¼ teaspoon ascorbic acid to the sugar used for each 2 pints fruit.

Coconuts

Cut into pieces or shred, cover with liquid from the nut, and package. Label, date, and freeze immediately.

Cranberries

Selection—Use any available variety. Choose firm plump berries with glossy skins.

Preparation—Sort and discard off-colored berries. Wash in cold water and then drain. Pack without sugar, label, date, and freeze.

Cranberry Sauce—This also freezes well. Cook in the usual manner. Cool, label, date, and freeze immediately.

Currants

Selection—Use Red Lake and similar large-fruited varieties.

Preparation—Stem, wash in cold water, lift out fruit, and drain. Gently mix 1 pound sugar to 4 pounds currants (1 cup sugar to 7-8 cups currants). For better sugar penetration, crush slightly. You can also pack currants dry without sugar. Label, date, and freeze immediately.

Gooseberries

Selection—Use any good cooking variety.

Preparation—Remove blossom ends and stems. Wash, lift from water, and drain. Pack without sugar or sirup or mix berries and sugar called for in a pie recipe. Label, date, and freeze immediately.

Grapes

Selection—Use Thompson Seedless and Tokay grapes that are ripe and firm.

Preparation—Sort, stem, and wash grapes; lift them from water and drain. Pack Thompson Seedless whole or halved; remove seeds from Tokays and pack halved or quartered. Pack in sugar sirup using 3 cups sugar to 1 quart water. Label, date, and freeze immediately.

Ground Cherries (Husk Tomatoes)

Husk and scald ground cherries for 2 minutes. Pack in sugar sirup—3 cups sugar to 1 quart water. Label, date, and freeze immediately.

Muskmelons

See directions on page 31.

Nectarines

Follow directions given for peaches.

Peaches

Selection—Use Dixigem, Redhaven, Southland, Sunbeam, Triogem (these are nonbrowning varieties and do not need ascorbic acid); Elberta, July (Early) Elberta, Fireglow, J. H. Hale, Halehaven, and Sunhigh.

July Elberta, a top freezing variety, comes into midwest markets before Elberta. It is superior to Elberta in color and texture. Cling stone varieties are not recommended except for preserves or pies.

Choose well-ripened fruits, slightly riper than for canning. Unripened shipped-in peaches ripen best when held at about 75° F.

Preparation—Prepare sugar sirup using 3 cups sugar to 1 quart water plus ½ teaspoon pure ascorbic acid (see page 15). Dip only three or four peaches (or about six apricots) at one time into boiling water for 15 to 20 seconds until the skins loosen; chill quickly in cold water. Peel, halve, and remove pits. Work rapidly.

Use containers with lids. Fill containers about one-third full of prepared sirup and add halves, quarters, or slices directly. Delay at this

stage may result in darkening of the outer fruit layer. Completely cover the fruit with sirup but leave about ½ inch for expansion.

Keep top slices submerged in sirup by placing a generous piece of crumpled wax paper under the lid. This keeps top slices from darkening. Seal, label, date, and freeze immediately. For better retention of color and flavor, use glass or other airtight containers.

If ascorbic acid is not available, pack peaches in glass containers. For best results use a sugar sirup made with 4 cups sugar per quart water.

Some varieties of peaches, especially nonbrowning types, may be frozen in sugar. Mix ½ teaspoon pure ascorbic acid with 4 cups sugar, then mix with 8 pounds (about 4 quarts) sliced fruit.

If you can't pack peaches immediately, submerge the cut fruit for a short time in cold water containing 1¼ level teaspoons ascorbic acid per gallon water. This treatment prevents darkening and may also be used on sliced peaches for table use.

Pears and Plums

It is better to can pears and most plums than to freeze them.

Pineapples

Selection—Use fruit of bright appearance, dark orange-yellow color, with fragrant odor. If top pulls out easily, pineapple is ripe for freezing.

Preparation—Peel and core. Dice, slice, or cut in wedges. Pack pineapple in sugar sirup or sugar. For the sugar sirup pack, use 3 cups sugar for 1 quart water. For the sugar pack, use 1 pound sugar to 5 pounds pineapple (1 cup sugar to 8 or 9 cups diced pineapple). Label, date, and freeze immediately.

If you are going to use pineapple in gelatin molds, you must first cook it to inactivite the enzyme bromelin which would otherwise prevent gelling.

Prunes

Selection—Use Italian and Stanley varieties.

Preparation—Wash, halve, and pit. Pack into containers and cover with sugar sirup, using 3 cups sugar to 1 quart water. Label, date, and freeze immediately.

You can freeze whole prunes without sugar or sirup for cooking purposes.

Raspberries

Selection—Of the red raspberries, use: Taylor, September, Chief, Latham, and Newburgh; of the purple raspberries, use: Sodus and Black Bristol. Choose firm, fully ripened berries of good bright color.

Figure 9. When packing raspberries in sugar, you may mix berries in a shallow pan to reduce crushing the fruit.

Preparation—Pick out immature and moldy berries. Wash berries in cold water, but do not allow to soak. Drain. Pack raspberries in sugar sirup or sugar—many persons prefer a sugar pack (see figure 9).

For the sugar sirup pack, use 3 cups sugar for 1 quart water (see page 13). For sugar pack, use 1 pound sugar for 4-5 pounds fruit according to sweetness of the berries (1 cup sugar to 7-8 cups berries). A 24-pint crate yields about 17 pounds of berries or about 28 pints of frozen berries. Label, date, and freeze immediately.

Pack black raspberries for dessert use in sirup; for jam, pack without sweetening.

Rhubarb

See directions on page 33.

Strawberries

Selection—Earlimore, Trumpeter, Red Rich, and Sparkle varieties are preferred. Other desirable varieties are Dunlap, Gem, and Superfection. Beaver and Premier are also acceptable for home freezing.

Choose firm, ripe berries of a bright red color, of rich aromatic flavor, and free from rots.

Preparation—Pick out immature and defective berries. Wash and hull them in cold water. Then slice each berry into about three pieces. Select smaller berries if frozen whole, but sliced berries are more flavorful. You may chop the berries instead of slicing them, using a chopper with stainless blades.

Use 1 pound sugar to 4-5 pounds fruit, depending on the sweetness of the berries. This is equivalent to 1 cup sugar to 7-8 cups hulled whole

strawberries. A sirup pack, 3-4 cups sugar to 1 quart water, is equally desirable for whole berries (see pages 13 and 14).

Label, date, and freeze immediately.

A 24-quart crate of berries yields about 28 pints of frozen berries. Unsweetened strawberries are much less desirable except for persons who do not eat sugared products.

Tomatoes

It is better to can tomatoes than to freeze them. However, you can wrap whole tomatoes and freeze them for cooking if you plan to cook them within 3 months.

Tomato juice and stewed tomatoes may be frozen. Cool, pack in containers, label, date, and freeze immediately.

Watermelons

Freezing is not recommended. However, for general instructions see muskmelon on page 31.

Fruit Cocktails and Salads

Mixed fruits frozen for cocktails and salads add menu variety. Select well-ripened fruits that contrast in color, flavor, and texture. Each fruit retains most of its original flavor. Sort, wash, and prepare each as you would for table use. Cut fruits into attractive sizes and shapes.

Fruits for Mixes

Use: apricots, sliced or cubed; Bing cherries, quartered; Maraschino cherries, halved or quartered; grapefruit, segmented; oranges, segmented or crosscut; peaches, sliced or cubed; pineapple, cubed or wedge cut; pomegranate seeds; Thompson Seedless grapes, whole; Tokay grapes, halved or quartered.

Pack fruits in sugar sirup using 2-3 cups sugar, depending on desired sweetness, to 1 quart water and ½ teaspoon ascorbic acid.

Use Maraschino cherries and pomegranate seeds sparingly and only for color effect. Muskmelon, raspberries, and strawberries usually do not blend well in frozen fruit mixes. You may add nuts or fresh fruits, such as bananas and apples, at time of serving.

Thaw fruit mixes in original sealed containers. The amount of thawing depends on how you will use the fruits.

You can use frozen mixed fruit in:

- Cocktails—serve cocktail fruits while ice crystals still glisten in the fruit.
- Salads—completely thaw fruit but use while still chilled. Drain and mix with dressing or whipped cream.

■ Gelatin salads—completely thaw fruit and drain. Add to gelatin. If mix contains pineapple, you must first cook the pineapple to inactivate the enzyme bromelin which prevents gelling.

Nuts

The storage life of fresh unprocessed nuts, shelled or unshelled, is greatly prolonged by storage at 35° F. and even longer at 0° F. Initial freshness is important. Preferably, pack nuts—shelled or unshelled, salted or unsalted—into metal containers with tight fitting lids. Label, date, freeze. Nuts unsalted keep 9-12 months; salted, 6.

For easier handling on a household basis, repack large quantity packs of frozen fruits into smaller frozen food containers and return to the freezer.

Allow the fruit to stand at room temperature in the original container. When ice crystals between the fruit defrost enough to separate individual pieces without damaging fruit, repack.

Thawing Frozen Fruits

Thaw all fruits in their original containers. Quality and nutritive values are best retained by fairly rapid defrosting so thawing at room temperature is preferred. If you desire faster defrosting, place packages in front of an electric fan or submerge them (if watertight) in cool or lukewarm water. Serve as soon as defrosted, preferably while a few ice crystals remain.

Table 6. Freezing fruit and vegetable juices

Product	Method of preparation	Type of pack
Apple	Extract juice. Some apple varieties make better juice than others. Blends of 4 to 6 varieties are most satisfactory. Add ½ teaspoon ascorbic acid per gallon juice to best preserve flavor.	Pour juice into suitable containers, leaving head space. Seal, label, date, and freeze immediately.
Berry, cherry, or grape	Wash, drain, and crush fruit; simmer until pulpy. Strain, sweeten to taste, and chill. You may press juice from sweetened frozen berries, cherries, or grapes after they are thawed without heating.	Pour juice into suitable containers leaving head space. Seal, label, date, and freeze immediately. Thaw and decant grape juice after 2 weeks or more to eliminate cream of tartar crystals in sediment; refreeze or heat before use.
Orange or grapefruit	Squeeze and strain juice of cooled ripe fruit. Add 2 tablespoons sugar and ¼ teaspoon ascorbic acid per quart juice to help preserve flavor.	Pour juice into suitable containers, preferably glass, leaving head space. Seal, label, date, and freeze immediately. Do not store more than 3 to 4 months.
Tomato	Wash, core, quarter, simmer tomatoes 5-10 minutes or until pulpy. Strain, add 1 teaspoon salt per quart. Other seasonings optional. Cool.	Pour juice into suitable containers, leaving head space. Seal, label, date, and freeze immediately.

FREEZING VEGETABLES

Speed in getting vegetables from the garden to the freezer is a must for top-quality frozen vegetables. During hot weather, harvest vegetables in the early morning before they absorb much heat. Select vegetables at optimum maturity—when they reach their best flavor and texture.

Process and freeze all garden products with as little delay as possible.

If you must store vegetables for a short time after harvesting, spread them out loosely in a cool well-ventilated place, or pack them loosely in the refrigerator. Prompt cooling in ice water followed by refrigerator storage helps retain flavor, quality, and vitamin C in many freshly picked vegetables such as asparagus and unshelled peas. For longer storage periods, pack in crushed ice.

Never store vegetables after shelling or cutting. Souring may result from delay between preparation and freezing, improper cooling after scalding, or stacking packages too close when freezing.

For information on freezing vegetable juices, see table 6, page 23.

Scalding Is Necessary

To prevent loss of quality and to preserve the vitamin content of vegetables for freezing, scald them in boiling water or steam. The boiling water method is recommended for home use because household equipment generally can't perform a satisfactory steam scald.

Nutritive values are best retained when:

- Water is brought to a boil quickly.
- Scalding period is as short as possible.
- Vegetable is chilled quickly and removed from cold water promptly.

The scalding (or blanching) process is necessary to inactivate enzymes. If these enzymes are left in their active state, the frozen vegetable loses quality after 1-2 months or less. "Off" flavors develop and the vegetable tends to lose its garden-fresh color, vitamin content, and texture. When enzymes are inactivated by heat, the storage life is 9-12 months.

For **water scalding**, follow this procedure:

1. Place water in a large kettle (aluminum, enamelware, or stainless steel) and bring to rolling boil. Use 1 gallon water per pound vegetable —2 gallons for leafy greens.

2. Clean and prepare vegetable.

3. Place prepared vegetable in a wire basket or large loose cheesecloth bag; submerge in boiling water. The small amount of vegetable in proportion to the large amount of water allows proper heat penetration in the required time. The vegetable's internal temperature must be brought up to about 180° F.

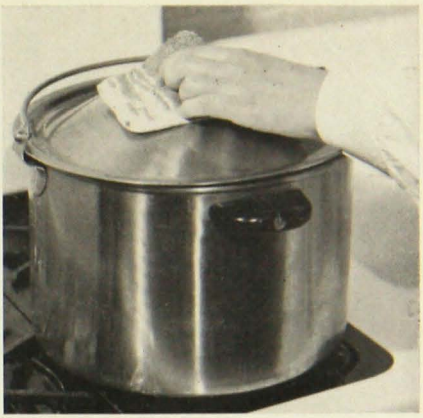

Figure 10. Left: When scalding (blanching) vegetables, do not scald more than about 3 pounds at one time. Right: Keep the kettle covered during scalding. Count time from the instant you first immerse the vegetable.

4. Keep the kettle covered during scalding and keep the heat high. The use of two sets of baskets and kettles saves time.

You may use the scalding water over again, but keep the water at the proper level. Change water if it becomes overly cloudy.

Each vegetable requires a different scalding time. Too long a period results in softening of texture and unnecessary loss of water-soluble vitamins and nutrients. Underscalding produces results similar to no scalding. Start counting scalding time as soon as you put the vegetable into the boiling water.

Complete cooking prior to freezing is not recommended for most vegetables because they tend to have a warmed-over flavor when reheated.

Additional scalding time is required at altitudes greatly above sea level. At 2,000-4,000 feet, add ½ minute; 4,000-6,000, add 1 minute; over 6,000 feet, add 2½ minutes.

For **steam scalding**, follow this procedure:

Place about 1 inch of water in a large kettle and bring to a rolling boil. Place a thin layer of the vegetable in a wire basket or a loose cheesecloth bag and suspend over the water. Keep cover on during the entire process.

Next, Chill

Place the scalded vegetable immediately into running cold or ice water. About 1 pound of ice is necessary to cool 1 pound of vegetable. Chilling stops any further cooking and also prevents loss of quality.

To conserve water-soluble nutrients, chilling should be only long enough to cool the vegetable. Test coolness by biting the vegetable into several pieces. If the product is cool to the tongue, it is ready to pack.

If you plan to take vegetables to a locker plant, place them in the refrigerator for not more than 2 hours before you make the trip.

Vegetables For Freezing

Varieties known to be suitable for freezing are listed. However, many other varieties of good quality are satisfactory for home freezing.

Asparagus

Selection—Use Martha Washington, Mary Washington, and F_1 Hybrid varieties. Pick bright colored, brittle stalks that snap when broken and have tight compact tips.

Preparation—Discard woody and blemished stalks. Wash asparagus in cold running water. Sort into medium and large stalks; break off fibrous ends. Pack whole or cut into 1- to 2-inch lengths. Process as quickly as possible; asparagus becomes woody and loses vitamins rapidly after harvesting.

Fibrous ends may be completely cooked and pureed for soups. Asparagus tips are a rich source of vitamin C.

Scald medium stalks in water for 3 minutes; large stalks (½- to ¾-inch diameter), 4 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Beans, Lima

Selection—Use Fordhook No. 242, Burpee Improved Bush, and Triumph varieties. Pick well-filled pods containing green, young, tender beans (white beans are overmature).

Figure 11. Quick cooling is important in preparing vegetables for freezing. Cold running or ice water is best for this purpose.

Preparation—Wash and remove beans from pods. Use kitchen shears to snip tough pods and don't wash beans after shelling. Discard blemished beans. Prepare immediately: shelled beans lose flavor rapidly.

Scald small and medium beans 3 minutes in water; larger beans, 4 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Beans, Snap (Green Podded)

Selection—Use Kentucky Wonder and Blue Lake (pole), Tendercrop, and Topcrop varieties. Pick young tender beans that snap when broken. Harvest while seeds are still small and tender.

Preparation—Omit off-colored and blemished beans. Wash beans in cold running water; snip off tips and sort beans for size. Cut or break beans into about 1½-inch lengths. You can freeze small beans whole. Do not delay processing cut beans.

There are approximately 4 cups of cut beans to 1 pound; 1 bushel equals 25-30 pints.

Scald in water for 3½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Beans, Snap (Italian)

Selection—Use any good garden variety.

Preparation—Wash beans in cold water. Snip off ends and cut or break into 1-1½-inch lengths. Scald in water for 3½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Beans, Snap (Yellow Podded)

Selection—Cherokee and Kinghorn Wax varieties.

Preparation—Process the same as green podded beans.

Beans, Soy

Selection—Use Giant Green, Bansei, and Sousei varieties. Pick well-developed pods that contain green beans.

Preparation—Wash beans in cold running water. Scald in pods in water for 5 minutes. Chill in cold running or ice water and then shell; discard blemished beans. No further scalding is necessary. Package, label, date, and freeze immediately.

Beets

Selection—Use King Red, Ruby Queen, and other garden varieties of good color and quality. Pick smooth tender small to medium beets.

Preparation—Discard blemished beets; remove tops and wash. Cook beets until tender. Chill thoroughly in cold running or ice water. Remove skins and slice or dice larger beets. Package, label, date, and freeze immediately.

Broccoli

Selection—Use Waltham 29 and Green Mountain varieties. Choose firm tender stalks with compact heads.

Preparation—Discard off-colored heads or any that blossom. Remove tough leaves and woody butt ends. Cut stalks to fit container. Cut through stalks lengthwise leaving heads about 1 inch in diameter. This gives more uniformity for scalding and more attractive pieces for serving.

Before processing, soak stalks—heads down—for ½ hour in salt brine (¼ cup salt to 1 quart water) to drive out small insects. Rinse in fresh water and drain.

Scald in water 4 minutes or in steam for 5 minutes; steam is usually preferred. Chill in cold running or ice water and then drain. For more compactness, pack heads and stalk ends alternately in the container. Label, date, and freeze immediately.

Brussels Sprouts

Selection—Use Jade Cross and Catskill varieties. Pick firm compact heads of good green color.

Preparation—Discard all discolored heads. Wash thoroughly and trim. Before processing, soak sprouts for ½ hour in salt brine (¼ cup salt to 1 quart water) to drive out small insects. Rinse in cold water and drain.

Scald medium heads in water for 4 minutes; larger heads, 5 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Carrots

Selection—Use Nantes, Imperator, and Chantenay varieties. Pick smooth tender carrots before roots become woody. Plan time of planting so as to harvest in cool weather. Small immature roots harvested during hot weather usually are not of good quality when frozen—they contain less carotene.

Preparation—Remove tops, wash, and scrape. Dice or slice ¼-inch thick. Scald in water for 3½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Cauliflower

Selection—Use Snowball strains. Choose well-formed, compact, white heads with fresh leaves.

Preparation—Trim and discard leaves; wash thoroughly. Split heads into individual pieces about 1 inch in diameter. Before processing, soak pieces for ½ hour in salt brine (¼ cup salt to 1 quart water) to drive out small insects. Rinse in cold water and drain. Work rapidly to prevent discoloration.

Scald in water 4 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Celery

Selection—Although celery is not generally recommended for freezing, especially if freezer space is limited, green varieties can be frozen.

Preparation—Trim; discard tough and blemished stalks. Wash and dice or cut into 1-inch pieces. Scald in water 4 minutes. Chill in cold running or ice water. Package, label, date, and freeze immediately. Use only in prepared foods.

Corn, Sweet

Selection—Sugar and Gold, Golden Beauty, Golden Cross, Bantam, and Sugar King varieties are preferred for corn-on-the-cob. Almost any good table corn is suitable for cut corn. Hybrid corn is desirable because of its more uniform maturity.

Harvest in early morning if weather is hot. Corn is at optimum maturity (73- to 75-percent moisture content) for only a short period of time, usually 48 hours. To test for maturity, press the thumbnail into a kernel. If milk spurts out freely, the corn is at or near the proper stage.

If corn is picked when immature, it is watery when cooked; if it is too mature, it is doughy. Process as rapidly as possible. A delay of more than a few hours may result in a significant loss of quality unless the corn is refrigerated.

Preparation—Husk corn, remove all silks, and trim ends. To scald, you should preferably use a large canning kettle or other container

Table 7. Scalding time for sweet corn-on-the-cob

Size of ears	Number of ears scalded at one time with each 12 quarts of water	Diameter at large end after trimming (inches)	Scalding time (minutes)
Midget	24	1¼ or less	8
Small to medium	14	1¼-1½	8
Medium to large	10	Over 1½	11

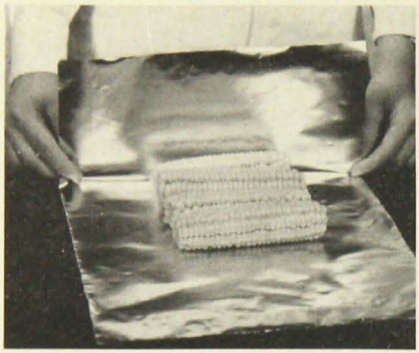

Figure 12. Left: When wrapping with laminated foil, use the aluminum side next to the product. Right: Make a snug, tight wrap and label and date the package.

holding at least 12-15 quarts of boiling water. Keep kettle covered. Follow the schedule in table 7 for scalding corn-on-the-cob.

Chill corn thoroughly in cold running or ice water. Corn which is not thoroughly cooled may become mushy. Drain, package, label, date, and freeze immediately. Or freeze chilled unwrapped ears on a tray; then pack into large, clean, metal containers or plastic bags.

Scald whole-kernel corn to be cut from the cob 4½ minutes before cutting.

Eggplant

Precooked eggplant usually is more satisfactory for freezing than the scalded product. French fried eggplant freezes fairly well as do many eggplant casseroles.

Selection—Use any good variety. Harvest heavy firm eggplant uniformly dark in color before too mature, while seeds are tender.

Preparation—Peel. Slice into ¼- to ½-inch slices or dice. To retain light color, drop pieces at once into cold water containing 4 tablespoons salt per gallon. Add the same proportion of salt to water used for scalding.

Scald in water 4½ minutes. Chill in cold running or ice water. Drain and package in layers separated by freezer wrap. Label, date, and freeze immediately.

Garden Herbs

Many garden herbs may be preserved by freezing. Wash and drain, but do not scald leaves. Wrap a few sprigs or leaves in foil or seal in film bags. Store in a carton or glass jar.

Ground Cherries (Husk Tomatoes)

See directions on page 19.

Kohlrabi

Selection—Use Early White or Purple Vienna. Choose young and tender kohlrabi.

Preparation—Cut off tops, wash, peel, and dice in ½-inch cubes. Scald in water for 2½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Mushrooms

Selection—Pick young firm mushrooms.

Preparation—Process quickly to prevent bruises and deterioration. Wash and remove base of stem. Freeze small mushrooms whole; cut large ones into four or more pieces.

To prevent darkening, add citric acid (or lemon juice or ascorbic acid) to the scalding water. Use 1 teaspoon citric acid (or 3 teaspoons lemon juice or ½ teaspoon ascorbic acid) per quart water. Scald medium or small whole mushrooms in water 4 minutes, and cut pieces 3 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Steam scalding sometimes may be desirable to preserve the flavor of mild flavored mushrooms.

Alternate Method—Slice ¼-inch thick. Sauté in butter for 2 minutes. Cool and pack in containers. You may pour excess butter over mushrooms in container.

Muskmelons

Selection—Use Honey Dew, Burpee Hybrid, Iroquois, and other firm-fleshed varieties. Choose firm, ripe, fine-textured muskmelons of top quality with well-developed netting or veining. If melon is slightly immature, quality when frozen is inferior.

Preparation—Wash, halve, and remove seeds. Cut flesh into ½- to ¾-inch cubes or balls. Pack in sugar sirup using 2 cups sugar to 1 quart water. Whole seedless grapes may be added. Label, date, and freeze immediately. Serve partially frozen.

Okra

Selection—Use any good garden variety. Choose young tender pods, 2 to 4 inches in length.

Preparation—Remove stem and wash. Scald in water for 3 to 4 minutes; 4 to 5 minutes for large podded types grown on West Coast.

Chill in ice or cold running water. Drain, package, label, date, and freeze immediately.

Onions

Because onions store well in a cool dry place, freezing usually is not recommended. You may freeze chopped onions. However, after 3-6 months in 0° F. storage, they tend to lose flavor.

Selection—Sweet Spanish types are preferred or use any good garden variety. Choose mature good quality onions.

Preparation—Peel onions, wash, and cut into quarter sections. Chop. Scald in water 1½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Parsnips

Selection—Use any garden variety of good quality. Choose smooth firm roots free from woodiness. In northern regions, parsnips may be harvested either in late fall or early spring.

Preparation—Remove tops, wash thoroughly, and peel. Slice, dice, or cut lengthwise. Scald in water 3 minutes. Chill and drain. Package, label, date, and freeze immediately.

Peas (Green)

Selection—Little Marvel, Frosty, Laxton's Progress, and Dark Seeded Perfection. Avoid Alaska (smooth skin) and other starchy peas. Pick bright-green crisp pods with peas tender and sweet, but not overmature. Peas are at their optimum maturity for a short time, usually only 24 hours.

Preparation—If peas are hard to shell, scald pods in boiling water for 1 minute and dip in ice cold water for 1 minute. Shell a few at a time; do not wash after shelling. Discard small poorly formed peas. Delay between shelling and freezing toughens skins. A pound yields approximately 3-3¼ cups of shelled peas, a bushel: 15 to 20 pints.

Scald peas in water for 1½-2 minutes; black-eyed peas require 2 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Peas (Edible-Podded, Sugar or Chinese)

Selection—Any good variety with bright green, flat, tender pods.

Preparation—Wash peas well. Remove stems, blossom ends, and any string; leave whole.

Scald in water for 2½-3 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Peppers (Green and Pimiento)

Selection—Peppers lose their crispness when frozen but are still excellent for hot dishes. Use any good variety. Choose crisp, well-developed peppers of deep green or red.

Preparation—Wash peppers thoroughly. Cut out stem ends and remove seeds of green peppers. Halve, slice, or dice. You can peel pimiento peppers by roasting them in a 400° F. oven for 3-4 minutes until peel is charred. Cool and pack dry without additional heating.

Scald halved green peppers in water 3 minutes; 2 minutes if sliced or diced. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately. You may freeze chopped peppers without scalding.

Potatoes

Selection—Use any good quality potato.

Preparation—Wash, peel, and remove deep eyes, bruises, and green surface coloring. Cube potatoes into ¼-½-inch cubes. Scald 5 minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

French fries—Peel and cut into thin strips. Fry in hot fat until a very light golden brown. Drain on absorbent paper. Cool. Package, label, date, and freeze immediately. To serve, spread frozen potatoes on a cookie sheet or broiler pan and place either in a 350° F. oven for 8 to 10 minutes, or under the broiler for 5 to 8 minutes. Salt to taste.

Pumpkin

Selection—Use any good pie pumpkin. Pick at optimum maturity, indicated by good color and stem that breaks loose easily.

Preparation—Wash pumpkin thoroughly. Cut or break into fairly uniform pieces and remove seeds. Bake or steam until tender. Cool, scoop pulp from rind, and mash or put through ricer. Package, label, date, and freeze immediately.

If desired, prepare pie mix from favorite recipe by adding milk, egg, sugar, and spices (except cloves) before freezing.

Rhubarb

Selection—Use Valentine, Chipman's Canada Red, and McDonald Crimson varieties. Select stalks—crisp, tender, and of good red color—in early spring.

Preparation—Remove leaves and woody ends; discard blemished and tough stalks. Wash rhubarb thoroughly and cut into 1-inch lengths. Do not scald.

Cover with sugar sirup—3½ cups sugar to 1 quart cold water. You may use a dry pack without sugar for only a few months' storage. When freezing rhubarb for pie, pack with sugar—1 cup to 4 cups rhubarb. No additional sugar is needed when making a pie. Label, date, and freeze immediately.

Rutabagas

Selection—Use Laurentian variety. Choose tender young rutabagas.

Preparation—Wash rutabagas and remove tops. Peel and slice or dice into ½-inch cubes. Scald in water 3 minutes. Chill in cold running or ice water. Package, label, date, and freeze immediately.

Spinach and Other Greens

Selection—For spinach, use America, Bloomsdale Long Standing, and New Zealand. For Swiss chard, use Fordhook, Lucullus, and Burgundy. Beet greens, kale, mustard greens, and turnip tops are also satisfactory for freezing. Pick young tender leaves. Harvest early in the morning if weather is hot.

Preparation—Cut off large tough stems and discard all infected leaves. Wash greens thoroughly in cold running water. Scald leafy greens in water for 2 minutes—collards and stem portions of Swiss chard require 3-4 minutes. Very small tender spinach requires only 1½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Squash, Summer

Selection—Use any strains of Summer Crookneck, Zucchini, and Summer Straightneck varieties. Pick squash when they are 5-7 inches long and when rind is tender and seeds are small.

Preparation—Wash and cut into pieces ¼-1½-inches thick. Scald in water: 3 minutes for ¼-inch slices, 6 minutes for 1½-inch slices. Then chill in ice or cold running water. Package, label, date, and freeze immediately.

Squash, Winter

Selection—For pies, use Banana, Golden Delicious, Hybrid R, and Greengold varieties. For table use, use Buttercup, Greengold, Rainbow, and Hybrid R. Pick mature squash with shells hard enough so you can't push thumbnail through them. "Dry" types are recommended.

Preparation—Wash squash and cut or break into fairly uniform pieces. Remove seeds. Bake or steam until tender. Cool. Scoop pulp from rind and mash or put through ricer. Package, label, date, and freeze

immediately. You may prepare pie mix, if desired, by adding milk, egg, sugar, and spices (except cloves) before freezing. You can blend two or more varieties or blend squash with pumpkin.

Sweet Potatoes

Selection—For pies, use Puerto Rico types. For table use, use Puerto Rico (Nancy Hall) and Jersey types. Pick medium to large mature sweet potatoes that are smooth and bright.

Preparation—Wash thoroughly. Cook in water, steam, a pressure cooker, or oven until almost tender. Cool, peel, and slice ½-inch thick. Package, label, and freeze immediately.

To help preserve bright color, dip slices in solution of 4 tablespoons lemon juice to 1 pint cold water. For candied sweet potatoes, drain and roll in granulated sugar. Color is less bright when brown sugar is used.

You may also puree sweet potatoes. Steam or bake the potatoes, cool, scoop flesh from skin, and puree through ricer. Add 2 tablespoons lemon juice for each 10 cups (5 pounds) puree to help preserve color. Also add 1 cup sugar. For pie mix, add milk, egg, and spices (except cloves) to puree before freezing.

Tomatoes

See directions on page 22.

Turnips

Selection—Use Purple Top, White Globe, and Just Rite varieties. Choose young tender turnips.

Preparation—Remove tops and wash turnips. Peel, slice, or dice (½ inch). Scald in water 2½ minutes. Chill in cold running or ice water. Drain, package, label, date, and freeze immediately.

Mixed Vegetables

Prepare and scald each vegetable separately according to instructions. You may freeze the vegetables separately and mix them later after the pieces have defrosted only enough to separate.

Vegetable Puree

Scald as directed, cool, and put through a puree or chopper. Package, label, date, and freeze immediately.

Watermelons

Freezing not recommended, but see muskmelon method, page 31.

Cooking Frozen Vegetables

You may cook all vegetables from the frozen state except corn-on-the-cob which should be partially defrosted. If desired, allow vegetables frozen in a solid block to defrost slightly so you can separate pieces easily. But don't let the vegetable itself defrost. Or put the solid block of vegetable into boiling water and separate with a fork as it thaws.

Do not overcook vegetables—cook only until tender. Most vegetables have already been partially cooked (some completely) and therefore require less cooking time than fresh vegetables.

Cook the vegetables (except purees) in a small amount of water—about ½ cup is sufficient. Add salt to taste. Have the water boiling before adding the vegetables. Keep the heat high until the water returns to a boil after adding the vegetables. Then reduce heat so the water simmers gently for remaining time. Keep the cover on during cooking.

Table 8. Timetable for cooking frozen vegetables in covered pan*

Vegetable	Minutes after water returns to a gentle simmer	Vegetable	Minutes after water returns to a gentle simmer
Asparagus	6-10	Corn, whole kernel	4-6
Beans, lima (large)	12-15	Corn-on-the-cob (thaw partially)	5-8
Beans, lima (small)	8-10	Kale	10-15
Beans, soy (garden type)	8-12	Kohlrabi	7-10
Beans, wax or green	8-12	Mixed vegetables	6-10
Beet greens	6-12	Peas, green	5-8
Broccoli	5-8	Spinach	4-6
Brussels sprouts	4-8	Swiss chard	7-10
Carrots	7-10	Turnip greens	8-12
Cauliflower	5-10		

* Beets, winter squash, pumpkin, and sweet potatoes have already been completely cooked and need only be heated to serving temperature. Sauté mushrooms 5-7 minutes.

Use the cooking times in table 8 merely as guides. The length of time for the various cooking methods differs with the variety and maturity of vegetable, size of pieces, length of scalding time before freezing, and amount of defrosting before cooking.

Follow package instructions for commercially frozen vegetables.

Serve the cooked vegetables while piping hot. If you hold vegetables warm or reheat them, they lose valuable nutrients and attractiveness. Serve the cooking liquid with the vegetable or save it for soup stock.

Partially or completely defrost corn-on-the-cob before cooking. Follow general cooking instructions. Keep the cooking time short because the ears are almost completely cooked during the scalding process. Serve immediately—delay causes sogginess, making the corn unattractive. For best results, cook a second serving separately instead of holding corn in the hot water.

Some other methods of cooking frozen vegetables are:

■ **Pressure Saucepan.** Add frozen vegetables to a small amount of boiling water in a pressure saucepan; break them apart with fork. Follow manufacturer's directions for use and length of cooking time. Careful timing is necessary to prevent overcooking.

■ **Oven Cooking.** Many vegetables may be seasoned, buttered, put in a covered casserole dish, and cooked in a 350° F. oven. Try this method for corn-on-the-cob. Or, wrap two or three ears in heavy aluminum foil to which butter and seasoning have been added. Place on a cookie sheet in a 350° F. oven 30-45 minutes.

■ **Double Boiler.** You may warm vegetables in the top of a double boiler. If vegetable seems dry, add milk or melted butter. Season to taste. Frozen vegetables may also be used in deep-fat frying, pan frying, creamed dishes, hot dishes, souffles, fritters, and soups—the same as fresh vegetables.

FREEZING MEATS

Much space in a home freezer or locker drawer is devoted to meat storage. As with other products for freezing, you must handle meat properly in order to retain its original fresh qualities and flavor.

Selection

Official U.S. grades of beef are prime, choice, good, standard, commercial, and utility. Cows generally grade no higher than commercial; however, if carcasses are from young beef-type cows with sufficient finish, they may be graded choice. Beef carcasses from stags and bulls are labeled as such and are not graded prime.

Veal carries the same designations as beef; sex is not a factor. Lambs, yearling mutton, and mutton are identified as such. They are graded as prime, choice, good, and utility; there is no prime grade on mutton.

Commercial grading is done by the packer; brand names are indications of quality. Your retailer or locker operator is familiar with these brands and grades and can guide your purchases. Most locker operators are equipped to slaughter, chill, cut, wrap, and freeze your meats, and usually have facilities for curing, sausage making, and smoking meats.

Select animals that are physically sound, and free from disease for slaughter. If you doubt the relative health of the animal, consult a veterinarian. Degree of finish, age, conformation, and type of animal you should select depend upon the quality of meat you prefer.

Front quarters are more economical in price and yield. Choice and lower grade fronts yield about 90 percent of their weight in retail cuts and ground beef. Prime and choice hind quarters yield about 75 percent; a grade of good or lower yields about 82 percent of the wholesale cut.

Table 9. Meat yields from the live animal

	Live weight	Dressed carcass yield before cutting		Carcass quality grade	Packaged meat yield after cutting		Conversion index
	pounds	pounds	percent*		pounds	percent†	pounds‡
Beef	1,000	600	57-62	Good to choice	450	66-76	2.15-2.30
Lamb	100	50	48-52	Good to choice	41	76-86	2.35-2.50
Pork	200	140	68-72	U.S. No. 1	112	72-82	1.75-1.90

* Percent of original live weight. Lower yields may be expected from lower grades of beef and lamb.
† Percent of dressed carcass. Higher yields may be expected from lower grades of beef and lamb.
‡ Approximate pounds of live weight necessary to get one pound of packaged meat.

Table 9 gives representative values for determining the weight of cut and wrapped meat that one might expect from a given grade carcass in each of the three red meat species. The weight losses incurred in cutting the carcasses are largely due to removal of a portion of the leg bones, internal fat deposits, and other fat trim not incorporated in the ground meat. Therefore, a leaner carcass will have a higher percentage of its weight in cut and wrapped meat than a wasty or excessively fat carcass. However, the fatter animal will generally have a higher conversion of live weight into carcass weight than an animal with less finish or fat.

Slaughtering, Chilling, and Aging

Less bruising, better bleeds, and ease in dressing result from keeping animals calm, in comfortable quarters, and off feed (with water) for 24 hours before slaughter.

After slaughtering, hang the carcass where it will cool rapidly without freezing. Prompt and thorough chilling is important to prevent spoilage and inferior quality in meat. Proper temperatures of chill rooms range from 32-34° F.

Separate chilling and aging rooms are desirable so that incoming warm carcasses are separated from chilled carcasses. The usual temperature for an aging room is 36-38° F. with humidity at 85-90 percent.

Cutting The Carcass

Less tender or less desirable cuts such as brisket and shank may be ground or boned and cut into stew meat. And you may bone cuts with a large percentage of bones in order to conserve freezer space, save wrapping material, and lessen danger of bones puncturing wrapping. Removal of bones prior to freezing has no effect on the flavor or juiciness of cooked meat. If meat is not boned, pad sharp bones with freezer paper.

Specify thickness of steaks, number of steaks or chops per package, and proportion of stew meat and ground beef desired. It is economical to remove the tail ends of T-bone and porterhouse steaks (often wasted)

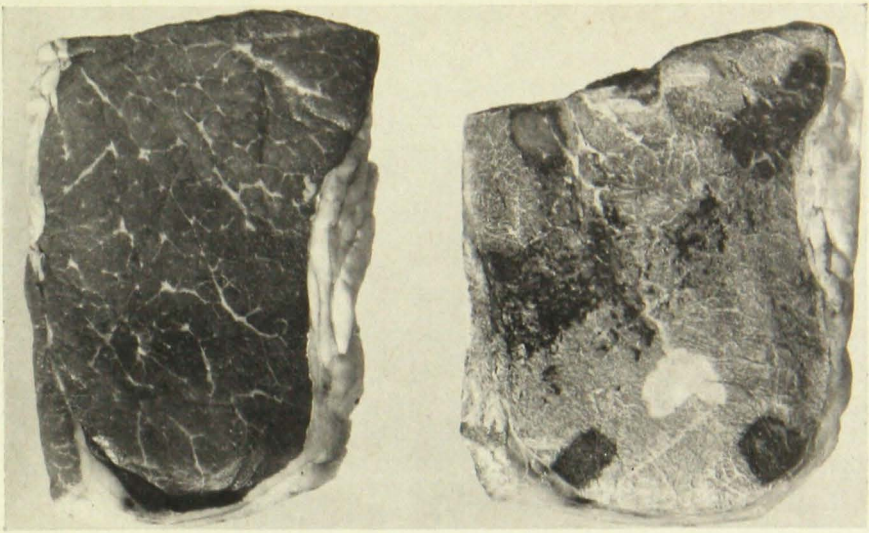

Figure 13. These two beefsteaks were stored for 7½ months at temperatures fluctuating between 0° F. and 20° F. The steak at the left was wrapped in a single thickness of laminated aluminum foil; it shows no freezer burn. But the steak on the right was wrapped in a single thickness of waxed locker paper; note the severe freezer burn.

and use them in the ground meat. Chops and steaks should be at least ¾-inch thick for broiling.

Wrapping

Use good wrapping material, especially for ground meat (see pages 4 and 5).

Meats For Freezing

Beef

You may age hind quarters of good quality at 36-38° F. for 10-12 days after slaughter; front quarters only 6-7 days. Age beef of young cattle of standard or lower grades for only 5-6 days after slaughter.

If you desire the "aged" flavor, age beef longer, but this greatly reduces the storage period at zero and causes larger weight losses in trimming. If beef has been aged a long time prior to freezing, carefully trim external fats exposed to air to remove rancid flavors which are likely to develop during the aging period. Don't include this trimmed fat in the meat to be ground.

As the storage period lengthens, the aging period becomes less of a factor in making the meat tender. This is because zero storage over a period of several weeks has a tenderizing effect.

Don't purchase meat for freezing if the chilling and aging period has been much longer than recommended except if the meat will be held at zero for only a relatively short period.

Pork

Hang a hog carcass whole; chilling requires about 24 hours at 34° F. To speed cooling, open the body cavity and pull loose leaf fat from the pork carcass and leave it attached to the ham. Failure to chill promptly to 38° F. at the ham bone may result in bone souring and spoilage in the pickling process.

Cut, package, and freeze pork as soon as it is chilled to the bone. Never hold chilled pork longer than 3 days after slaughtering.

Fish oil or fish meal included in rations fed to hogs may accelerate the development of rancidity during storage.

Ham and Bacon—The length of time that ham and bacon can be held in freezer storage depends on the degree of freshness, curing, and smoking. Salt has an undesirable effect on quality of a product if stored in the freezer longer than 2-3 months. If you plan to store pork cuts for longer periods, freeze them fresh; then cure and smoke them prior to use.

Slicing cured meats before freezing is not recommended because of a short storage life. Hams and bacon as purchased over the counter, unless freshly cured, also have a short storage life at zero.

Sausage—If you use spices and good wrapping material, sausage quality can be maintained satisfactorily for 3-4 months. Don't add salt until cooking time. Seasonings with antioxidants are available for this purpose from your local plant. Smoked sausage has a longer storage life than unsmoked sausage, other factors being equal.

Bologna and lunch meats do not freeze satisfactorily because of change of texture. Wieners may be frozen, but have a short storage life and texture changes frequently are noticed.

Lard—Render fat trimmed from hog carcasses into lard as quickly as possible and pack it into metal containers or greaseproof packaging material. To increase the storage life of lard, mix in an antioxidant—available from your locker operator—while the fat is cooling. Or, mix in 3 pounds of hydrogenated vegetable shortening for every 50 pounds of lard.

Lard can be stored in a cool dry place like any other shortening or stored at 0° F.

Veal, Lamb, and Mutton

These carcasses are also hung whole during the chilling period and require about 10-16 hours to reach an internal temperature of 38° F. Process veal for the freezer as soon as it is chilled to the bone. You may hold lamb and mutton for an aging period of 4-7 days after slaughtering.

Big Game Animals

Handle these animals much the same as beef. Bleed, dress, and cool the carcass immediately after killing. Clean blood from cavity and

trim parts damaged by gunshot. If the weather is warm, sprinkle cavity with pepper to keep the flies away. Hang carcass in a cool breezy place until it is well chilled. Sometimes it is desirable to spread ribs apart with a stick to allow cold air to circulate.

Usually, don't remove the hide because it helps to protect the meat from contamination. However, in some states during warm weather you must skin antelope promptly after killing to prevent spoilage.

If you are going to move the carcass over dusty roads or otherwise expose it to contamination, wrap it. If it is in good condition, age the meat 5-6 days. Otherwise, cut, wrap, and freeze it at once.

Cooking Frozen Meat

Defrosting

Whether the meat is defrosted or not before cooking makes little difference in the taste or juiciness of the cooked meat. Thin steaks, chops, and cutlets are often cooked from the frozen state with no previous thawing. At least partially defrost thick steaks and roasts to permit uniform cooking and shorten cooking time. Partially thaw cutlets, liver, or any meat that will be dredged or dipped before cooking.

Defrost meat in its original wrapping material and cook soon after thawing. It is best to defrost large cuts of meat in the refrigerator. Smaller cuts may be defrosted at room temperature. Thawing will be hastened if you place the package in front of an electric fan. Meat may be thawed rapidly in water if the wrapping is watertight. See table 2, page 11 for defrosting time.

Cooking

Completely defrosted meats are cooked for the same length of time as fresh meats. Frozen or only partially thawed meats require a longer cooking time because the meat has to both thaw and cook. Roasts require an additional 10 to 15 minutes per pound.

FREEZING POULTRY AND GAME BIRDS

Chickens and Turkeys

Selection

For home processing, select only healthy, well-fleshed, and well-finished birds. Younger birds are more tender-meated; older birds often carry more flavor. You can freeze and store chicken broilers (fryers) at 8-12 weeks of age, roasters at 3-5 months, stewing chickens (mature hens), turkey fryer-roasters at 12-15 weeks, and young tom and hen turkeys at 5-7 months.

Figure 14. You can use water to remove air from plastic bags. Submerge all but the open end and then twist seal the bag. Tie securely.

Poultry already processed can also be purchased for home freezing. Buy only birds that have been freshly processed and properly dressed.

Preparation

Starve birds for 6-8 hours, or overnight, before processing. Then there will be less danger of rupturing the digestive tract and contaminating the carcass during evisceration (drawing).

Suspend the birds by the legs from a shackle or rope to prevent bruising and promote better bleeding in the killing operation. With the bird's head stretched out in line with its neck, make a clean cut with a sharp knife across the side of the throat just behind the lower jaw. This method is more satisfactory than beheading or making a cut inside the throat. Allow the bird to bleed thoroughly.

Scalding the bird aids in feather removal. If you plan to use air chilling, scald the birds in 125-130° F. water for 30-60 seconds. This scalding time and temperature leaves the outer cuticle layer of skin on the bird; however, pinfeather removal may be more difficult.

A scald water temperature of 138-140° F. for 30-60 seconds can also be used. This treatment will remove the outer cuticle layer of skin and the surface will dry and discolor rapidly. These carcasses must be processed and packaged without prolonged exposure to air.

During scalding, continuously move birds up and down in the water to aid penetration of the feathers. After removal of the feathers, the carcass should be singed with a gas flame or other means to remove remaining hairs. Then wash the bird thoroughly.

Only eviscerated (drawn) poultry should be frozen. Prompt evisceration in a sanitary manner helps prevent "visceral taint" and off-flavor from bacterial growth. Trim excess abdominal fat from roasters and stewing hens.

Wash the bird thoroughly inside and out after evisceration. Then quickly lower the temperature to 36° F. or lower by packing the birds in crushed ice (1 pound per pound of poultry) or in a water-and-ice slush.

Keep the birds covered with ice to prevent drying and discoloration. It has been a common procedure to age birds under ice in the chilling container to insure maximum tenderness. This aging period varies from a few hours for fryers to 18-24 hours for turkeys. After the first 3-4 hours of chilling, drain the chilling container periodically to help prevent excessive water absorption by the carcasses. Carcasses chilled in ice water should reach 40° F. or below in less than 4 hours if they weigh less than 4 pounds; in less than 6 hours if they weigh from 4-8 pounds; and in less than 8 hours if they are somewhat larger.

Packaging

Save meal preparation time by freezing poultry in quantities tailored to fit your needs. Poultry can be packaged whole and ready for roasting; in halves and quarters ready for broiling or barbecuing; or cut up for frying or stewing. You can save freezer space by packaging only choice meaty parts. Cook and debone necks and backs and freeze the meat in broth for use in soups and prepared dishes.

Proper packaging is necessary to maintain poultry quality in freezer storage. Use vapor-resistant films (polyethylene, saran-type, and polyester) to protect the product from freezer burn. Because of the odd shape of the carcass and its parts, it is convenient to use bags for packaging. Aluminum foil applied with a freezer wrap and molded tightly around the bird is also satisfactory. Plastic films used in the packaging of fresh market poultry normally are not made of materials that protect the product during freezer storage periods.

Prior to packaging, remove birds from chilling container and allow them to drain thoroughly for 10-15 minutes. Be sure all water-and-ice is drained from the body cavity. To pack whole birds compactly, truss the wings and legs tightly to the body with butcher twine. To prevent puncture of the wrapping material cover any sharp bones with paper. Parts are easier to separate when thawing if you separate each piece with freezer paper. Use paper waxed on both sides to minimize problems in separation.

Wrap giblets separately from the whole carcass to speed freezing rate. Livers should be used within a short period of time (3 months).

After placing poultry in the bag, remove as much air as possible. Air pockets in the bag may lead to freezer burn and are easily punctured. Figure 14 shows how to use a container of water to aid in removal of air. Apply a twist seal by twirling the bag while holding the open end. Loop the twist seal back on itself and tie securely. Label, date, and freeze immediately.

Thawing Frozen Poultry

Many methods have been recommended for thawing frozen poultry. Some recommendations for thawing birds at room temperature are being made. There is always the danger that bacteria on the bird's carcass may reach levels high enough to cause food poisoning if birds are left

thawed at room temperature for prolonged periods of time. If room temperature defrosting is practiced, care must be taken to insure that the carcass is refrigerated or cooked as soon as it is thawed.

Recent research at the U. S. Department of Agriculture's Western Regional Research Laboratory, Albany, Calif. shows that use of a protective overwrap, such as a paper bag, can be a safe, practical procedure to minimize hazards of bacterial growth, yet thaw the bird in a convenient way for the homemaker. Thawing the bird in a paper bag keeps surface temperature low without greatly extending thawing time. For birds enclosed in a paper bag and thawed at room temperature, it is suggested the thawing times should not exceed 15 hours for 4- to 6-pound birds and 20 hours for 12- to 24-pound birds.

Another recent study was made at Virginia Polytechnic Institute comparing six different thawing methods for turkeys. The thawing methods tested were 1. immersion in cold tap water, 2. immersion in warm tap water, 3. placed in a shallow pan overnight at room temperature, 4. placed in shallow pan in a low temperature oven, 5. placed in a household-type refrigerator, and 6. wrapped in newspaper and placed in a corrugated box held at room temperature.

The study found considerable variation in numbers of bacteria on the carcasses before and after thawing. However, bacterial counts did not vary to an appreciable extent with the thawing methods used and did not increase to a level considered harmful.

Defrost the bird in its original packaging film unless it is placed in the oven. Approximate thawing times for various sizes and classes of poultry are given in table 2 (see page 11). After defrosting, cook as you would fresh market poultry.

Stuffing Poultry

Don't stuff poultry carcasses you are preparing to freeze. The slow freezing rate in home freezers and locker plants may not prevent the growth of food spoilage and food poisoning bacteria in the stuffing material. This statement does not apply to commercially prepared stuffed poultry since it has been processed under conditions which can freeze large volumes rapidly.

Mix stuffing ingredients together and place in the bird just prior to cooking. Don't hold freshly stuffed birds overnight.

Cool leftover cooked poultry promptly. Remove the dressing and refrigerate it separately from the carcass.

Ducks and Geese

Handle ducks and geese in almost the same manner as other poultry. Scald domestic birds at 160° F. for 60-90 seconds; add ½ cup vinegar per 10 gallons water to aid in penetration of feathers. A commercial wax is helpful in removing down and pin feathers. Wild birds usually are plucked dry without scalding.

Game Birds

Avoid heaping birds together. Instead, promote loss of body heat by spacing birds to allow for air circulation. Don't pile or stack birds in a car trunk for any longer than necessary—deterioration will then be rapid. Birds may be frozen at a locker plant before you return from a long trip, but be sure birds are drawn before freezing.

Scald pheasants at 155°-160° F. and continue processing and packaging as with other poultry.

FREEZING FISH

Because fish deteriorates rapidly, eviscerate and freeze the fish soon after it is caught. If this is not possible, eviscerate and pack the fish in crushed ice.

Fresh Fish

Prepare all types of fish for freezing in the same way as for table use. Scale, eviscerate, remove head and fins, wash thoroughly, and drain. Freeze small fish whole; fillet or steak large fish.

Package fish in aluminum foil, saran-type film, or equally good wrapping material. Do not freeze uncleaned.

One good way to freeze small fish, such as smelts and panfish, is in a block of ice. Place the dressed fish in any clean watertight container, such as a breadpan or 2-pound coffee can, and cover with water. Ice is a good barrier to atmospheric oxygen. When ready to use the fish, thaw the ice under a slow stream from the cold water faucet.

Store fish in the coldest part of the freezer—near the bottom of chest types or directly on refrigerated shelves of upright models. A storage temperature of —10° F. is better than 0° F.

Partially or completely defrost fish in original wrapping material. Cook fish while it is still chilled. Prepare defrosted fish in the same manner as fresh fish, but allow additional cooking time at a lower temperature if the fish is only partially defrosted.

Shellfish

Shellfish are very susceptible to spoilage; therefore, process and freeze them at or near the original source of supply. Oysters that have been held on ice for 1 week are not likely to be of high enough quality for freezing.

Frozen unpeeled shrimp may be cooked, peeled, and then refrozen immediately. Don't store cooked peeled shrimp longer than 2 to 3 months and cooked unpeeled shrimp no longer than 4 to 6 months. Shrimp cocktail or shrimp creole may be frozen and stored for about 6 weeks.

Table 10. Length of storage time at 0° F. for fish*

Months	Type of fish
3-4	Lake herring, crab meat, cooked and peeled shrimp
4-6	Bullhead, catfish, sea herring, lake trout, mackerel, northern pike, pollock, rainbow trout, chum salmon, shrimp, smelt, tuna
7-9	Lake bass, bluegill, crappies, flounder, halibut, shellfish, ocean perch, rockfish, most salmon, sunfish, whitefish
9 months or more	Cod, blue pike, haddock, hake, lingcod, lutefish, whiting, yellow pike (walleye), yellow perch.

* Storage life is increased 1-2 months if temperature is lowered to —10° F. and if fish is glazed or frozen in ice.

Crab and lobster which have been frozen and cooked may be removed from the shell and refrozen immediately. Don't store longer than 2-3 months.

Table 11. Approximate thawing times for fish*

Fish	Refrigerator	Room temperature	Cold running water†
		hours	
Whole fish (about 4½ pounds)	20	4	1¼
Fish steaks, fillets (about 1 pound)	8	2	½
Shellfish (1 pound container or package)	8	3	½

* Thaw in unopened freezer wrappings; cook immediately, do not refreeze.
† Usually the best way to thaw fish. Keep wrapped.

FREEZING DAIRY PRODUCTS

Butter

You may freeze freshly made creamery butter, but don't freeze butter made from unpasteurized cream: it may become rancid more easily during storage. Wrap butter in good packaging materials, even if previously wrapped in parchment or a carton.

Butter purchased at the retail market may have been in storage many months and may keep only a few months longer.

Cheese

The University Department of Dairy Industries found that Cheddar, Brick, Port du Salut, Swiss, Provolini, Mozzarella, Liederkranz, Camembert, Parmesian, and Romano cheeses freeze satisfactorily in ½ pound pieces or less. Cheese frozen in large pieces or at temperatures above 0° F. frequently become crumbly and mealy: the rate of freezing is too slow.

Some Limburger, Colby, Gouda, and Club cheeses freeze satisfactorily while others become crumbly and mealy. Wrap all cut cheese in saran-type film and overwrap with aluminum foil or a good freezer paper.

Cottage cheese usually becomes watery and grainy when frozen.

Cream

Frozen cream may change in flavor and lose its ability to whip. Only freeze pasteurized cream and cream containing not less than 30-35 percent butterfat. Do not store at 0° F. for over 4 months. To keep cream longer than 4 months, add about 10 percent sugar by weight. However, this may impair the whipping quality.

Ice Cream

For top quality desserts, don't store ice cream longer than 3 weeks if in original containers. To extend storage life of commercially packed ice cream, overwrap with a good packaging material and place a sheet of saran-type film over the unused portion left in the container.

Milk

Freezing milk is not recommended as undesirable flavor and texture changes may occur. If milk must be frozen, only freeze and store pasteurized homogenized milk for about 3 weeks at 0° F. or about 6 weeks at —10° F.

Eggs

Eggs to be broken for freezing should be chilled to about 32° F. Select only sound-shelled eggs. Checks and leakers may be contaminated with bacteria. Freezing doesn't kill bacteria, but merely prevents growth while the food is frozen. Clean eggs just prior to breaking by washing in water at about 110° F. A detergent can be used to help loosen soil. Dry eggs quickly.

Break eggs into a cup to check quality. Then put them in a mixing bowl and stir with a fork or slow-speed mixer. Break all yolks and mix them well with the whites without adding air. To improve texture of mixed whites and yolks, add 1 tablespoon of sugar or corn sirup, or ½ teaspoon salt, per cup. This prevents gumminess when the egg is thawed.

Whites and yolks can also be frozen separately. Egg whites need no further treatment, but can be put through a food mill or sieve to obtain a more uniform product. Surplus egg whites that sometimes accumulate from feeding yolks to infants may be frozen until needed. Break and stir yolks that are to be frozen, but do not beat air into the product. To prevent the gummy condition on thawing, add twice the amount of salt or sweetener recommended for whole eggs.

Package liquid egg in small containers to use immediately after thawing. Allow ¼- to ½-inch of head space in the container to allow for expansion during freezing. Package, label, date, and freeze immediately at 0° F. or lower. Be sure to list salt or sweetener added.

One cup equals 5 whole large eggs, 14 yolks, or 7 whites. One whole large egg equals about 3 tablespoons; one egg white equals 2 tablespoons; one yolk equals 1½ tablespoons.

FREEZING READY-TO-EAT FOODS

Many cooked and baked foods may be frozen at home. In fact, freezing is the only method of preserving some of these foods. And special methods, not available in the home, make it possible for commercial firms to freeze many additional products successfully.

Cooked Foods

You may cook combination dishes and soups that require a long cooking period in larger quantities than usual. Then cool, freeze, and store away for future use. This method saves time because the heating period for these foods is only a small fraction of their original cooking time. Most soups freeze well.

Do not overcook foods to be frozen. Simmer but do not boil the food. Only partially cook vegetables as the subsequent freezing and heating make them mushy and unattractive. If completely cooked before freezing, vegetables develop a warmed-over flavor when heated. For stew, add the vegetable when the meat is nearly cooked. Meat should be tender but firm—not overdone.

Use reliable recipes. If you plan to freeze only part of the recipe, take a portion of the food from the saucepan before it is completely cooked. Then cool it quickly, package properly in containers, and freeze immediately.

Because flavors of cloves and garlic become stronger during storage, don't add before freezing. Onions gradually lose flavor. Nutmeg and cinnamon show little change in strength; green peppers, sage, and pimientoes increase in strength.

Monosodium glutamate enhances the flavor of various meats, poultry, seafoods, precooked foods, and vegetables. Add ¼ teaspoon monosodium glutamate to such items as meat stews, creamed chicken or seafoods, and fish fillets. Add to precooked foods while cooking or dust over both sides of fish fillets.

You must cool **cooked foods promptly** to prevent continued cooking. Loss of flavor occurs rapidly when foods are held at high temperatures. Warm foods are excellent media for growth of bacteria. Temperatures between 68° and 130° F. are most conducive to spoilage. So if foods were heated to these temperatures, cool them rapidly.

Large quantities of food are difficult to cool rapidly. To hasten cooling, partially submerge the saucepan of cooked food in a large pan of ice water. Stir occasionally, being careful not to mash or break up the food. Keep the saucepan covered to reduce loss of aroma and to prevent contamination.

After cooling, **package immediately.** Pack all types of cooked foods as solidly as possible to avoid air spaces in the container. Gravy and sauces are desirable with meats and vegetables as they fill air spaces.

Label and date your packages. Freeze and store at 0° F. or colder. Do not refreeze. If you use metal containers, you may pack the food hot. Promptly cool the filled container in water.

To heat cooked frozen foods, place in a covered saucepan with a small amount of melted butter or fat in the bottom. Cook over medium-low heat until food is completely thawed and heated, or put in a covered casserole dish and heat in a moderate oven until the center is bubbly. The size and shape of the baking dish, the kind of food, the quantity, and whether food is frozen or partially thawed will all determine the length of heating time needed for frozen prepared foods.

You may partially thaw the food—this often prevents scorching. Reheat in a double boiler for 30-40 minutes creamed dishes, stews, creamed soups, and similar dishes that scorch easily.

If necessary, break up large clusters of frozen food with a fork, but keep stirring at a minimum. Heat rapidly to prevent unnecessary loss of flavor and aroma. Do not overcook. Prolonged heating changes texture and causes loss of vitamins. Serve foods immediately after cooking.

Do not overestimate your food needs—a rapid turnover is the secret to success. Many foods lose their distinctive flavors after 3 to 4 months of storage unless held at —10° F. or lower. And you can purchase the ingredients for many cooked dishes the year around.

Differences in the quality of fat used greatly affect the length of time that many cooked foods may be stored.

Roasted and Fried Meats

Leftover roasted meats such as beef, pork, ham, chicken, and turkey with dressing and gravy, and Swiss steak covered with gravy freeze satisfactorily. Fried foods are the least desirable for freezing; they may become rancid after relatively short storage and develop a warmed-over flavor when heated. Meat loaf may be frozen—either cooked or uncooked.

Gravies, Sauces, and Stews

Fat tends to separate in frozen gravies, sauces, and stews but usually recombines during heating. To prevent separation, you can thicken with flour made from waxy rice or waxy maize, but these flours are difficult to obtain. Starch made from waxy maize is best for thickening chow mein, but can't be obtained in small lots.

Sauces and gravies tend to thicken with freezing, but you may thin them during heating. Dishes containing large amounts of milk may curdle or separate during thawing, but generally recombine when heated.

Casserole Dishes

Casserole dishes containing macaroni, spaghetti, noodles, or rice may be frozen—in baking dishes or in freezing containers.

To serve, bake in 350° F. oven for 40-60 minutes. You can move the baking dish directly from the freezer to the oven with little danger of breakage. If casserole dishes become too sticky or dry, add liquid at heating time. Be sure to heat until center is bubbly.

Meat and sauce combinations for such dishes as Italian spaghetti, Spanish rice, and chow mein may be frozen separately. Then add other ingredients when reheating.

Potatoes

Diced or cubed potatoes become mushy and grainy when frozen in stew and other main dishes: it is best to add them during heating. However, whipped and stuffed baked potatoes make tempting frozen products. To serve, reheat unthawed in a 350° F. oven for about 15-20 minutes. You may brown stuffed potatoes slightly under the broiler.

French fried potatoes freeze best when cut very thin. See page 33.

Baked Beans

Beans freeze, store, well (if the salt pork is fresh). Don't overcook.

Leftovers

It seldom pays to freeze small amounts but cooking "planned leftovers" is worthwhile. Leftovers may have a warmed-over flavor when heated because they have been completely cooked. Do not allow food to stand before freezing.

Gelatin Dishes

Whipped gelatin freezes well. To freeze molded salads successfully make them with 1½ instead of 2 cups liquid. Store less than 1 month.

Baked Foods

Pies

It takes little extra work to make five or six pies instead of one or two. Although a frozen pie crust is not quite as flaky as that of a fresh pie, it runs a close second.

Fresh fruit pies; vegetable pies such as squash, pumpkin, and sweet potato; mince pies; and chiffon pies freeze successfully. In chiffon pies,

always include egg white or whipping cream to prevent "weeping" during thawing. Chiffon pies toughen when stored over 1 month.

Most custard pies do not freeze successfully. Meringue toppings tend to toughen, shrink, separate, and stick to wrappers. Baked and unbaked pie shells and graham cracker and cookie crusts may be frozen. Meat pies freeze well.

You may **freeze baked or unbaked pies**—both methods are satisfactory. However, the lower crust of an **unbaked** pie may absorb juices from the filling and become soggy. Deep dish pies may be frozen.

If you use frozen fruit in an **unbaked** pie, thaw completely or partially and drain excess juice. Use only a small amount of liquid or thicken excess juice. Cool it quickly and pour over the fruit. Fill the pie and freeze immediately. Follow a similar procedure with canned fruit.

For a clear bright pie filling in either a **baked** or **unbaked** frozen pie, thicken with tapioca or cornstarch rather than flour.

Prepare frozen baked pies in the same way as fresh pies. If you use frozen fruit, thaw and drain off a small amount of excess juice. Then proceed as you would using fresh or canned fruit.

Cool a baked pie rapidly; then place the unwrapped pie in the freezer. Both **baked** and **unbaked** pies freeze faster unwrapped and they are easier to wrap after they are frozen. Keep pie level while freezing. Then wrap, label, date, and freeze. **Baked pies** usually store well for 4-6 months; **unbaked pies,** 2-3 months.

When ready to use, **thaw** the **unbaked frozen pie** by placing it on the lower shelf of a preheated oven. Bake at 450° F. for 10 to 15 minutes; complete baking at 375° F. Allow the **baked fruit or vegetable pie** to stand at room temperature for a short time. Then put it in a 350° F. oven on the lower shelf before it begins to thaw; heat until just warm, about 30 minutes. If using lightweight aluminum pie plates, place on a cookie sheet. Do not thaw chiffon pies in the oven.

Pie Mixes

Frozen pies are bulky. So if your freezer space is limited, try packaging special pie mixes in frozen food containers. A pint container holds about the right amount for an 8-inch pie.

You may mix together and freeze the ingredients for squash, pumpkin, and sweet potato pies including the milk, sweetening, eggs, and spices (except cloves). When ready to use, partially thaw in the original container. Add other ingredients (if necessary) and pour into a pastry-lined pie plate.

Cakes

Most cakes and cupcakes freeze satisfactorily. You may want to bake cakes on a "slack" day and then freeze and store them until needed.

Results are quite uncertain with frozen cake batter because some of the rising capacity may be lost during freezing and thawing. Also, it is simpler to thaw out a baked cake than to thaw out the batter and then bake.

Completely cool baked cakes before packaging. The type of wrapping material is not as important for cakes to be eaten within a couple of days as it is for cakes to be stored longer. For long storage periods, package in moisture-proof materials.

If desired, package in "family-size" pieces. Label, date, and freeze. Cakes do not freeze solid, particularly angel food or sponge cakes. After wrapping and freezing, place the cake in a rigid container to protect it from being crushed.

Thaw a baked cake in its original wrapping to prevent moisture formation on the cake's surface. A large cake thaws in about 2-3 hours at room temperature. For quicker thawing, set cake in its wrap or container in front of an electric fan. Or quicker still, thaw in a 250°-300° F. oven for a short time. Watch closely so cake doesn't dry out. Don't thaw frosted or filled cakes in the oven.

When properly wrapped, unfrosted baked cakes remain in top condition about 4-6 months. Frosted cakes last only 2-3 months. Fruit cake may be stored considerably longer.

For best results, do not frost or fill cakes before freezing. Some frostings do not freeze satisfactorily; fillings make the cake soggy. Confectioners' sugar frostings and fudge frostings freeze best. Boiled frostings freeze well, but are difficult to wrap because the frosting sticks to the wrapper. To eliminate some sticking, freeze the cake before wrapping. Or insert toothpicks around the top of the cake to prevent the frosting from touching the wrapper.

Cookies

You may freeze cookies baked or unbaked—both methods produce excellent results. Freezing cookie dough is the simplest method. Less freezer space is then needed but, of course, you must do more work after freezing than with baked cookies.

Shape dough for freezer (refrigerator) cookies in a roll of desired diameter. Wrap in locker paper and freeze. When ready to use, remove from freezer and slice with a sharp knife. Place on greased cookie sheet and bake in usual manner.

Or, chill dough for several hours in refrigerator and slice into cookies before freezing. Package unbaked cookies in layers in frozen food containers. Separate each layer with two sheets of waxed paper. Keep layers at a minimum to avoid crushing. When ready to bake, place frozen unbaked cookies on a greased cookie sheet.

Pack drop-cookie dough in frozen food containers. When ready to bake, thaw dough until soft enough to drop with a spoon onto greased cookie sheets.

Cookie dough frozen in pans may be slipped into the oven without previous thawing; bake in usual manner. If you package dough in containers, thaw dough until you can easily transfer it into baking pan.

If you freeze baked cookies, cool them first. Package in frozen food containers, cookie jars, or canisters with tight fitting covers. On the top of each layer of cookies, place a sheet of packaging film. Frosted cookies do not store as well as unfrosted cookies. Thaw cookies in original containers. The thawing period is short.

Cookies and cookie dough may be stored 9-12 months.

Yeast Breads and Rolls

You may freeze bread and rolls either baked or unbaked. If you follow proper methods of packing, freezing, and storing, baked rolls are just as light and tender after thawing as before. But unbaked roll dough may lose some rising capacity after being frozen and thawed—the texture may be tougher and volume smaller. Brown-and-serve rolls may be frozen and stored for 2 to 3 months.

Or prepare your own brown-and-serve rolls for freezing. Let rolls rise only half as high as usual. Bake at 300° F. for about 20 minutes or until a light brown. Remove from pans, cool, package, label, date, and freeze. When ready to serve, remove wrapping and place frozen rolls on cookie sheet. Brown in 400° F. oven for 7-10 minutes.

Bakery bread may be stored in its original wrap for about 4 months if a good wrap has been used. For longer periods, overwrap in polyethylene bags.

Freezing Baked Rolls and Bread—Use your favorite plain or sweet dough recipe. Bake at 400° F. for 45-50 minutes to a light golden brown. After baking, remove from pans and cool to room temperature. Wrap in moisture-proof material; polyethylene bags are excellent for this purpose. Bread baked at a higher temperature and for a shorter time is less crumbly and more desirable for freezing.

To thaw frozen baked rolls, heat in a covered container or aluminum foil wrap in a 350° F. oven for about 20-25 minutes, or keep wrapped and thaw at room temperature approximately 2-3 hours.

To thaw frozen baked bread, leave it in original wrapper at room temperature. A 1-pound loaf of bread thaws completely in about 3 hours. Slices of frozen bread may be put in the toaster without thawing.

Baked bread products may be stored as long as 9-12 months; however, since these products are bulky, it is best to have a fairly rapid turnover.

Freezing Shaped or Bulk Dough—Allow dough to rise until double in bulk. Dough frozen in bulk form should yield acceptable products. But doughs shaped before freezing may be inferior, even when stored only 2 weeks.

Then grease all surfaces. Package in moisture-proof wrappings or containers. Place two sheets of locker paper between layers.

To thaw dough, set it in a warm moist place away from drafts with the wrapper on to prevent surface drying; surface drying may result in streaks in the baked loaf. Shape bulk dough and let rise in a warm moist place.

Place shaped frozen rolls and loaves in appropriate greased pans. Allow dough to thaw and rise in a warm moist place away from drafts. Bake.

Do not store unbaked dough in bulk longer than 2-3 weeks.

Quick Breads

Quick breads such as baking powder biscuits, muffins, and nut breads may be frozen baked or unbaked. However, unbaked products may be tough and of poorer texture and volume.

Freezing Baked Quick Breads—Cool and package the same as for yeast breads. Freeze immediately. When ready to serve, thaw in original wrapping at room temperature or warm in a 325°-350° F. oven. Waffles may be frozen; heat them in a toaster.

Do not store baked quick breads longer than 3 months.

Freezing Quick Bread Batter—Freeze batter in baking pan and overwrap with moisture-proof paper. Thaw at room temperature. As soon as batter has thawed, bake in usual manner.

Freeze cut baking powder biscuits in frozen food containers. Partially thaw before baking.

Store less than a month.

Sandwiches

The following are suggestions for sandwich fillings and spreads: roast beef, roast pork, baked ham, chicken, turkey, dried beef, tuna, salmon, sliced cheese and cheese spreads, hard-cooked egg yolks, and peanut butter. Hard-cooked eggs tend to toughen and become rubbery when frozen. But if they are mashed, sieved, put through a blender or grinder, they may be frozen satisfactorily for use in sandwiches.

Sliced or chopped olives and chopped dill or sweet pickles may be added to any of the sandwich fillings. Small amounts of mayonnaise, salad dressing, cream cheese, or creamed butter may be combined with the sandwich filling to make spreading easy. You may freeze fillings and spreads separately in frozen food containers for later use.

Some sandwich spreads don't freeze satisfactorily. Jelly, mayonnaise, and salad dressings used as spreads soak into the bread.

Do not freeze lettuce, celery, tomatoes, and carrots. Add these to sandwiches after you remove them from the freezer. Frozen slices of bread may be used to make sandwiches.

Fancy party sandwiches and hors d'oeuvres may also be frozen. Although fillings and spreads are different from those used in lunch

sandwiches, the rules for making, packaging, freezing, and storing are the same. Crust trims easily when bread is frozen.

To freeze lunch sandwiches, wrap them separately in good freezer wrapping material. Pack party sandwiches in layers with two sheets of waxed paper in between. But place party sandwiches of only one kind in a container as there may be a transfer of flavor if different kinds are together. Pack sandwiches in containers. Label, date, and freeze immediately.

The storage life for most sandwiches is about 3 weeks—do not refreeze them.

Candies

Almost all candies keep fresh for 1 year or longer when stored at 0° F. They do not discolor or lose quality on refreezing. Spun candy chips, chocolate covered nuts, and candy with hard centers may crack or split. Marshmallows freeze well.

An effective moisture-proof wrap is necessary to prevent damage due to condensation on removal to room temperature. Many wraps used for boxed candies and candy bars do not fully prevent such damage. Don't remove the moisture-proof wrap until the candy has warmed to room temperature—about 4-8 hours.

Frozen Foods For Lunches

During the fruit season, freeze sauce and juice in individual half-pint containers. Add these to the lunch box for extra vitamins and variety.

You may freeze complete lunches including sandwiches, sauce, juice, cakes, and cookies. Or pack similar foods in one box and make up the individual lunches as needed. Pack in boxes for protection from crushing. Label, date, and freeze immediately.

Lunches completely thaw in 3 to 4 hours at room temperatures. Frozen lunches are more appetizing because sandwiches are fresh and not soggy and baked foods are moist and fresh. The sauce or juice is refreshingly cool. Sandwiches should be eaten soon after thawing to prevent spoilage.

REFREEZING FOODS

Do not eat or refreeze defrosted foods after they have passed through slow temperature changes and reached a temperature above refrigeration temperatures, 34°-45° F.

The danger arises from the fact that thawed foods spoil faster than fresh foods, so thawed foods may spoil before being refrozen. Refreezing, itself, is not harmful.

Meats, Poultry, and Fish

If the product temperature has remained below 45° F., the food is probably in good condition. You usually can detect beginning spoilage by color and odor. Thawed meats and cut poultry lose some juices.

Shellfish and Eggs

These products spoil quickly and it is difficult to determine by odor or appearance whether they are dangerous to eat. So it is unwise to refreeze them.

Fruits and Fruit Juices

When fruits start to spoil they ferment. This destroys their flavor but does not make them dangerous to eat. Thawed fruits may be refrozen; if their table quality has been impaired, make them into jams, jellies, and preserves. Thawed fruits usually shrink and become mushy.

Some deterioration occurs when concentrated juices are refrozen. Other juices show little change.

Vegetables

Thawed frozen vegetables spoil sooner than fresh vegetables. So don't refreeze vegetables that have completely defrosted unless their temperature has remained below 45° F. Thawing and refreezing toughens some vegetables.

YOUR HOME FREEZER

With a home freezer you can make more extensive use of frozen cooked foods, ice cream, leftovers, and other items. It is especially useful for freezing small amounts of fruits and vegetables without delay.

Size and Power

Most people buy units with too little storage space. About 5 cubic feet of storage space should be allowed for each person in most families. However, 8-10 cubic feet per person may not be excessive if most of the food for the year is stored in the home freezer. Of course, if you use a home freezer to supplement a rented locker, you need less home storage space—about 3 cubic feet per person.

Some families prefer a small freezer or a combination freezer-refrigerator in the kitchen with a large unit elsewhere in the house. It is desirable to ground the metal case of a freezer kept in a basement.

Electricity used varies considerably, depending a great deal on room temperature. Records on a large number of units in use showed a range of 60-120 kilowatt-hours per month, averaging 80 kilowatt-hours, for freezers of 15- to 18-cubic foot size.

How To Defrost

Scrape frost from chest-type units when it becomes one-half inch thick. Scraping isn't as easy with upright models: complete defrosting may be necessary.

Move all or almost all food to another part of the freezer or pile it under a blanket outside the freezer. Lay towels at the bottom (or on top of any remaining food) to collect the frost. Use a wooden or plastic paddle for scraping—never a metal scraper. Do not shut off the electricity.

Complete defrosting is necessary to remove all frost, ice, or spilled food that can't be removed by scraping. You should do this once or twice a year. Shut off electricity, remove food, and leave lid or door open. To hasten thawing, direct an electric fan into the open freezer. The ice loosens and then may be scraped off. Use towels at bottom of chest freezer or shelves of upright freezer to collect ice and to soak up water.

After thawing, wash the inside with a warm baking soda solution (3 tablespoons baking soda to 1 quart water) or with synthetic detergent added to water. Wipe dry and turn on electricity. Replace food after remaining moisture inside has frozen.

Covering shelves of upright types with aluminum foil makes frost removal easier next time.

Frost-free freezers do not need defrosting. However, such a freezer should be cleaned once or twice a year in the same manner as a regular freezer.

Power Failure or Mechanical Breakdown

Keep the cabinet closed in the event of power failure or mechanical breakdown. Relatively little thawing occurs during the first 12-20 hours if the freezer is fairly full of food stored at about 0° F.

If freezer will not be operating for longer than 1 day, move the frozen food, if possible, to a locker plant or other place where low temperature storage is available. Most locker plants provide this service. If much of the food thaws out, the freezer might not be capable of refreezing a large quantity of food before spoilage starts.

Dry ice may be used to prevent thawing. A 50-pound cake of dry ice placed in a freezer fairly soon after it stops operating prevents thawing for 2 to 3 days.

Handle dry ice with care. Wear gloves. Place chunks of it on top of cardboard or board, not directly on top of food packages.

Records indicate that in large chest-type freezers with frozen foods, it may take 50 hours or more for food in the top layer and 85 hours or more for the rest to reach 32° F.