

Preservation of Fruits and Vegetables by Freezing

MICHIGAN STATE COLLEGE : : EXTENSION SERVICE
EAST LANSING

General Directions

Many Michigan-grown fruits and vegetables may be prepared at home, frozen and stored in refrigerated food lockers. These suggestions for preparation of fruits and vegetables for freezing are based on experimental work conducted at the Michigan and other state and federal experiment stations.

SELECTION OF PRODUCTS

Most Michigan fruits and many vegetables may be frozen successfully. Strawberries, red raspberries, blueberries, blackberries, red sour cherries, sweet red cherries and rhubarb all are easily prepared and are especially good when frozen. Peaches and the light-colored sweet cherries make excellent frozen products, but turn brown if not properly prepared. It is doubtful economy to freeze apples and pears because they may be stored easily at home.

Peas, lima beans, corn cut from the cob, asparagus, broccoli, green beans, peppers, spinach and other greens are suitable for freezing. Those vegetables with a high-water content—tomatoes, lettuce, celery, cucumbers, cabbage and similar crops—as well as those with a high-starch content—potatoes and certain varieties of peas and lima beans—are not suitable for freezing. Corn may be frozen on the cob but it takes up a good deal of space in the locker.

How good the frozen product will be depends on color, flavor and texture. All three must be tops to give eating satisfaction. Many good canning and market varieties are not suited for freezing. In the tables given for fruits and vegetables, desirable varieties are suggested. Other less commonly grown varieties freeze well but are not listed below.

PROPER HARVESTING AND HANDLING IMPORTANT

Freezing will retain the goodness but will not increase it in any product. All fruits and vegetables used should be the best quality obtainable. Fruits should be picked at the proper stage for immediate table use. Green fruits lack flavor and lose their color when frozen. Over-ripe,

badly bruised or moldy fruits develop off-flavors. Only the best fresh vegetables should be used and all tough or over-mature parts should be discarded. The produce should be packed and frozen within a few hours after harvest. The directions for harvesting, handling and preparation as given in the tables should be followed closely.

CLEANLINESS IS ESSENTIAL

Freezing kills only a portion of the bacteria, yeasts, and molds usually present on the products. Since freezing does not sterilize, cleanliness throughout all preparations is essential. There is no known danger of food poisoning developing while fruits and vegetables remain in the frozen state. Holding in a warm room before freezing or after thawing may cause spoilage. All water used in washing, cooling, and preparing sirups and brines should be drinking water.

PREPARING FRUITS

Most fruits are washed and prepared as for canning. Then they are packed in the containers and covered with sugar sirup or packed with dry sugar. Some fruits may be packed without sugar or sirup (see table) but many fruits will lose their flavor, and light-colored fruits such as peaches will turn brown if packed dry. A crumpled wad of waxed paper placed under the lid of the container just before closing will help to hold the fruit under the sirup and prevent browning on the top surface.

The sirups may be made with either hot or cold water but should be chilled before using. The following table gives the amounts of sugar to use for one quart of water in preparing sirups of different concentrations.

SUGAR SIRUPS FOR FRUITS

% Sirup (Approximate)	Amount of Sugar	Amount of Water
20	1 cup	4 cups
30	2 cups	4 cups
40	3 cups	4 cups
50	4 cups	4 cups

Preparation Of Fruits For Storage In Refrigerated Lockers

Fruit	Desirable Varieties	Harvesting and Handling Instructions	Preparation	Packing (preferred method given first)
Rhubarb	MacDonald Ruby Victoria	Pack early in season when color is best and stalks are not stringy. Harvest early in morning. Trim off leaves and bases of stalks.	Wash and cut in 1" sections. Do not peel.	Pack dry without sugar.
Strawberries	Premier Dunlap Gem (everbearing) Catskill	Use only bright red, firm, ripe berries. Avoid green or over-ripe fruit. Sort, wash, hull and drain thoroughly. Handle quickly.	May be packed sliced, crushed, or whole.	Cover with 40% sirup; or mix thoroughly with 1 cup sugar to 4 cups fruit.
Red Raspberries	Taylor Latham	Select firm ripe berries. Avoid over-ripe berries, and those harvested after rains or during hot weather as they turn dark. Rapid handling essential; reduce to minimum to avoid bruising.	Sort, wash and drain thoroughly. Do not crush berries in filling containers.	Pack dry without sugar; or cover with 40% sirup; or mix with 1 cup sugar to 6 cups fruit.
Black Raspberries	Cumberland Logan	Slightly seedy for dessert purposes. Handle same as red raspberries.	Same as red raspberries.	Cover with 40% sirup.
Dewberries Blackberries Boysenberries	Lucretia Eldorado	Avoid immature and over-mature berries. Careful and rapid handling essential. Use care to prevent bruising.	Sort, wash and drain. Pack loosely in containers.	Cover with 40% sirup; or mix with 1 cup sugar to 6 cups fruit; or pack dry without sugar.
Blueberries	Jersey Pioneer Rubel Rancocas Wild Low Bush type	Harvest when firm-ripe; use. May be held for several days at cool temperatures. Remove undersized, immature berries and pieces of leaves and stem.	Wash, drain and pack loosely in containers.	Cover with 40% sirup; or pack dry without sugar.
Sour Red Cherries	Montmorency	Harvest when fully tree ripe. Immature fruits turn pale and over-ripe fruits dark after freezing. Handle quickly after picking. Avoid soaking in water after washing.	Wash, remove pits and pack in containers rapidly.	For eating fresh, cover with 50% sirup; for use in pies, mix 1 cup sugar with 4 cups fruit.
Sweet Cherries	Windsor Schmidt Bing (Napoleon and other light color varieties are likely to turn brown)	Harvest when firm-ripe; immature fruits shrivel, fade and are tough after freezing. Handle carefully to prevent bruising.	Sort, wash, stem, and drain. Pack loosely in containers. May be pitted.	Cover with 50% sirup.
Peaches	J. H. Hale Halehaven Fertile Hale Elberta	Excellent frozen product but difficult to prepare. Harvest at firm-ripe stage, usually a few days later than the stage when harvested for market but before fruit reaches soft-ripe stage. Avoid bruising by excessive handling.	Rapid preparation essential to prevent browning. Peel by submerging in boiling water. Plunge in cold water and rub off peelings. Remove pits and cut each half in 4 or 6 pieces. Pack quickly into containers. Leave as little head space as possible.	Cover with 50% sirup. Addition of crystalline ascorbic acid to the sirup will help prevent browning of the fruit. Add $\frac{3}{4}$ teaspoon ascorbic acid to each quart of sirup.
Cantaloupes	Hearts of Gold	Select high quality melons with firm-ripe flesh.	Cut flesh in balls or squares. Pack loosely in containers. Defrost enough to separate pieces before serving.	Cover with 40% sirup; or mix with 1 cup sugar to 2 quarts fruit; or pack in layers with waxed paper between, and freeze without sugar.
Watermelons	Kleckley's Sweet Northern Sweet			

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PREPARING VEGETABLES

All vegetables intended for frozen pack should be blanched (scalded or steamed) before packing, as suggested in the table. Blanching prevents loss of color and flavor during frozen storage, and makes packing easier. Large quantities of boiling water (1 gallon per pint of product) should be used so that the addition of the vegetables will not lower the temperature of the water too much. After blanching, the products should be plunged immediately in running cold water to cool them quickly before packing. Large wire baskets or muslin bags may be used to hold the vegetables. Vegetables are usually packed dry but may be packed in a 2% salt solution prepared by dissolving 1 teaspoon salt in 1 cup of water, or 4 teaspoons in 1 quart of water; cool before using.

CONTAINERS

The ideal container for frozen foods should be airtight and moisture-vapor-proof, as otherwise the dry air in the frozen storage room will take the moisture from the produce. Besides drying out, some fruits will turn brown if the air gets to them, and vegetables will lose their fresh color and flavor.

The containers should be of such shape as to prevent a loss of valuable locker storage space, and permit easy removal of contents. Glass jars with well-fitting lids and rubbers are airtight and may be used if handled carefully to prevent breakage, but do not stack well. Tin cans may be used if sealed or if provided with suitable friction-top covers. Cans coated with sanitary (R) enamel should be used for highly colored fruits and berries and for beets to prevent fading of color. C-enamel is used to prevent discoloration of sulfur-bearing foods like corn.

Containers of paper board, provided with moisture-vapor-proof linings of cellophane or other suitable material, are satisfactory if properly sealed. Square or round heavily-waxed cartons with an air-tight closure are often used for fruits. Most locker plants keep a supply of containers for sale to patrons. Room must be left in the top of the container for the contents to expand. In tin cans and paper board containers, $\frac{1}{2}$ to 1 inch is enough. Glass jars should not be filled above 1 to $1\frac{1}{2}$ inches below the place where the glass curves in at the top.

FREEZING AND STORAGE

After packing, the products should be frozen immediately. If there is any delay, the packages should be held in the refrigerator until they can be frozen. Even when kept in a refrigerator or chill room, fruits and vegetables packed for freezing will lose color and flavor rapidly. A temperature of 10° below zero or lower is usually used for freezing. For best results storage temperatures should be maintained uniformly near 0° F.

LABELS AND RECORDS

All containers should be marked with name, product and date of packing. Gummed labels do not stick well at low temperatures, and ink is likely to become smeared. A small piece of adhesive tape may be used on glass and tin containers or packages may be marked with a china-marking pencil or pen. A record of each container stored with method of preparation and date should be kept.

CARE OF FROZEN FOOD IN THE HOME

Unless frozen food can be kept frozen, it should be used promptly. Once thawed, the food should not be re-frozen. Vegetables should be cooked if they cannot be used within a few hours after thawing.

COOKING AND SERVING

Fruits taste best when served just before they are completely thawed. Dry pack or sugar pack fruits may be put in pies or into the preserving kettle with only enough thawing to separate the pieces. During thawing, the products should be left in the unopened containers and, if the containers used for fruits packed in sirup are leak-proof, it is well to turn them upside down when thawing.

All frozen vegetables should be cooked before they are eaten. Dry-pack vegetables are best when plunged into boiling salted water. Corn on the cob, greens and asparagus should be thawed slightly before cooking. Brine packs may be started cooking slowly while still frozen and the frozen masses broken apart with a fork. A small amount of water may be added to prevent burning.

Frozen vegetables usually cook in about half the time needed for fresh ones, counting from the time the water starts to boil after the frozen vegetable has been added.

Preparation of Vegetables for Storage in Refrigerated Lockers

Vegetable	Suggested Varieties	Harvesting and Handling Instructions	Preparation	Blanching (preferred method given first)
Asparagus	Mary Washington	Avoid small and woody stalks. Handle quickly.	For "tips" cut in 4½" lengths. For cuts, use 1" lengths. Wash thoroughly. Do not use iron utensils.	3 minutes in boiling water; or 5 minutes in steam. Cool quickly, drain and pack.
Beans: Green Wax	Kentucky Wonder (pole) Decatur (pole) Stringless Green Pod Tendergreen Round Pod Kidney Wax Pencil Pod Black Wax	Avoid over-mature and small pods. Handle quickly after harvest.	Prepare as for canning.	Same as asparagus.
Beans: Lima	Fordhook King of the Garden (pole) Burpee Bush Early Baby Potato Henderson	Harvest when beans have reached full size but before they have started to turn white and harden.	Shell. Process as soon as possible after shelling. Freeze beans of different color separately or discard white beans.	1 to 2 minutes in boiling water; or 2 to 3 minutes in steam, depending on size of beans. Cool quickly, drain and pack.
Broccoli	Italian Green Sprouting	Harvest as for fresh use. Avoid yellow or tough flower heads.	Examine carefully. Cut in small pieces. Use only tender portions of flower stems.	5 minutes in steam; or 3 minutes in boiling water. Cool quickly, drain, pack.
Brussels Sprouts	Long Island Improved	Use only medium-sized firm sprouts.	Remove outer yellow leaves.	Same as broccoli.
Carrots	Red Cored Chantenay Nantes or Coreless	As for table use.	Top, scrub under running water, trim, and dice. Young carrots may be left whole.	Same as asparagus.
Cauliflower	Snowball Snowdrift or White Mountain	As for table use. Avoid discolored or spreading heads.	Examine carefully. Trim and break into small pieces.	4 minutes in boiling water; or 6 minutes in steam. Cool quickly, drain, pack.
Corn: Yellow (Sweet)	Golden Cross Bantam Golden Bantam	Harvest early in morning. Select ears with well filled rounded kernels and sweet flavor. Avoid hard and immature kernels. Handle quickly to preserve quality and flavor.	Husk, silk and trim ears. Avoid submerging corn in water as much as is possible. Scald on cob for cut corn.	For cut corn: 3 minutes in boiling water, cool quickly, cut from cob, pack. For corn on cob: 8 to 10 minutes in boiling water, depending on size of cob. Cool quickly, pack.
Peas	Thomas Laxton World Record Alderman (Alaska not suited)	Use only adapted varieties. Avoid over-ripe pods. Handle quickly from time of harvest to freezing to preserve quality and flavor.	Shell. Sort out small immature and large hard peas, split peas and foreign material.	1½ minutes in boiling water; or 2½ minutes in steam. Cool quickly, drain, pack.
Peppers (sweet)	California Wonder or similar varieties	Select thick-walled green or red fruits.	Wash, halve, remove seeds. Slice or dice, as preferred.	Blanching not necessary, but makes packing easier. Blanch 1 minute in boiling water; or 2 minutes in steam. Cool quickly, drain, pack in 2% brine.
Spinach and other greens	Giant Nobel King of Denmark Long Standing Bloomsdale Viking	Harvest as for table use. Do not hold long before packing.	Wash thoroughly. Remove all discolored leaves and large stems.	2 minutes in boiling water; or 3 minutes in steam. Cool quickly, drain, pack.