



The two most common methods of preserving vegetables are freezing and canning. Freezing keeps the food so cold that microorganisms cannot grow and enzyme activity is slowed down. When you can vegetables, you put them in a jar and heat them. They must be heated enough to kill microorganisms that cause spoilage, and the jar must be sealed to keep microorganisms and air out. Canning requires more work than freezing but is more economical.

This publication gives information on freezing only. Here are some things you will learn:

- ▶ What causes food spoilage.
- ▶ How freezing prevents food spoilage.
- ▶ The meaning of words related to food preservation for your family.
- ▶ How to select vegetables for freezing.
- ▶ Steps in freezing vegetables.
- ▶ How to use the vegetables you have preserved.

Plan to do the following in this project:

- ▶ Learn how to use a blancher.
- ▶ Learn to select and prepare vegetables for freezing.
- ▶ Prepare and freeze at least five packages of vegetables.
- ▶ Give one visual presentation on freezing vegetables to your family, friends, or club.

- ▶ Exhibit an example of a frozen vegetable using proper packaging and a non-food material to represent food.
- ▶ Keep a complete record of foods you have frozen.

What causes vegetables to spoil?

Microorganisms

Molds, yeasts, and bacteria are found in the soil, water, and air, and on all surfaces they contact. If these microorganisms are not destroyed by heat or stopped by cold, they cause food to spoil. This will happen at room temperature if jars are not sealed; microorganisms get into jars and cause the food to spoil. You cannot see yeasts, molds, and bacteria without a microscope. This is why they are called microorganisms. “Micro” means “very small”; an organism is a living thing.

Molds form fuzzy patches on foods, causing a bad taste and sometimes developing toxins or poisons. **Yeasts** cause foods to ferment, creating gases and off-flavors. Yeasts and molds need air to grow; they are also easily destroyed by heat.

Bacteria can cause any number of spoilage symptoms, ranging from sour taste to gas formation to serious poisoning. Some bacteria grow best in a vacuum without air.

Enzymes

Enzymes are chemical substances present in all living things. They cause changes in flavor, texture, color, and food value. They cause vegetables to mature, and if allowed to remain active, they eventually cause vegetables to spoil. To preserve food, enzymes must be destroyed, stopped, or slowed down. Enzymes are destroyed by heat but not cold.

How to prevent spoilage

To stop the spoilage of vegetables, you must heat them enough to kill the microorganisms, or you must keep them cold enough (0°F or -18°C or colder) to keep them inactive. It is not hard to make food safe to eat, but you want the food to taste good and be good for you. It is important, therefore, to follow correct procedures that will result in a good product.

Words to know

To be able to freeze vegetables, you need to understand the words that are used in freezing instructions.

Blanch (scald)

Blanching is the process of placing vegetables in boiling water or steam for a certain period of time. Blanching is a very important step and needs to be done right. It stops the action of enzymes in vegetables. If you do not blanch vegetables, they will lose some of their color, flavor, and texture after they have been stored in the freezer.

Freezer burn

This is the drying out or dehydration of food. It happens when the food is not packaged correctly and results in a loss of flavor, color, and texture. The food, however, is safe to eat.

Headspace

This is the amount of space left between the top of the food and the top of the container. Food expands when it freezes, so it is important to leave enough room.

Overblanching

This occurs when vegetables are blanched too long. It destroys enzymes but causes a loss of vitamins, minerals, flavor, and color.

Quick-freeze

This is the process used when freezing raw foods. Turn the freezer down to -10°F, and place the packaged foods in single layers on the freezer shelves. As soon as the foods are frozen hard, stack the packages. Slow freezing causes large ice crystals to form. These ice crystals puncture the cells of the food, and the food will be mushy when thawed. The texture of food that is quick-frozen will be better than the texture of foods frozen slowly.

Underblanching

This is blanching that did not last long enough to slow down the enzymes. If vegetables are underblanched, they are just warmed. The heat actually speeds up the enzymes. It is worse than not blanching.

How much to freeze?

Frozen vegetables are best if used within a year. They will keep longer, but quality and nutritive value decline gradually. Something else to consider is how frequently your family will enjoy a certain vegetable. If they like green beans, for example, you can plan on 52 packages.

Selecting the vegetables

What kinds of vegetables do you like? You should select vegetables your family likes. Where will you get the vegetables to freeze? You can grow them in your garden, or you can buy fresh vegetables to freeze. No matter what kind of vegetables you choose, they should be young and tender. Do not use vegetables if they are bruised, too ripe, or immature. The frozen vegetables will not be better than the fresh ones. Freezing cannot improve a poor product.

Varieties Suitable for Freezing

Vegetable	Variety
asparagus	Mary Washington
bean, snap (bush)	Falcon, Maestro, Astro, Green Isle, Early Gallatin, Contender, Slenderwhite, Cherokee (wax)
bean, snap (pole)	Kentucky Wonder 191, Blue Lake, Dade
bean, lima (bush)	Thaxter, Henderson's Bush, Nemagreen, Jackson Wonder, Butterpea
bean, lima (pole)	Carolina, Willow Leaf, Florida Speckle
beet	Detroit Dark Red, Burpee Red Ball, Ruby Queen
broccoli	Spartan, Costal, Gem
carrot	Red Core Chantenay, Emperor, Commander
cauliflower	Snowball E, Snowball M
collard	Vates
corn, sweet	Royal Gold, Golden Security, Aristogold Bantam Evergreen, Seneca Chief, Silver Queen, Jubilee, Merit, Midway
eggplant	Black Beauty, Florida Market
mustard	Florida Broadleaf, Southern Giant Curled, Tendergreen
okra	Emerald, Clemson Spineless, La. Green Velvet
pea, English	Little Marvel, Laxton, Creole, Wando
pea, southern	Mississippi Silver, Dixilee, Mississippi Purple, Pinkeye Purple Hull
pepper, sweet	Keystone, Resistant Giant, Yolo Wonder L, Miss Belle, Sweet Banana, Emerald Giant
pepper, hot	Long Cayenne, Tabasco, Hungarian wax (yellow), Jalapeno
potato, Irish	Red LaSoda, Superior, LaChipper, Norchip
potato, sweet	Centennial, Goldrush, Unit 1 Porto Rico
spinach	Early Hybrid No. 7, Bloomsdale Longstanding, Dixie Market, Chesapeake Hybrid, New Zealand (summer)
squash	Early Yellow Summer Crookneck, Early Prolific Straightneck, Patty Pan (white), Aristocrat (zucchini)
turnip	Purple Top White Globe, Shogoin (for greens), Just Right, Crawford

Basic steps

Wash the vegetables

It is a good idea to wash the vegetables in several changes of cold water. Lift the vegetables out of the water as you wash them. If you let the water drain off, dirt may be left on the vegetables.

Assemble equipment

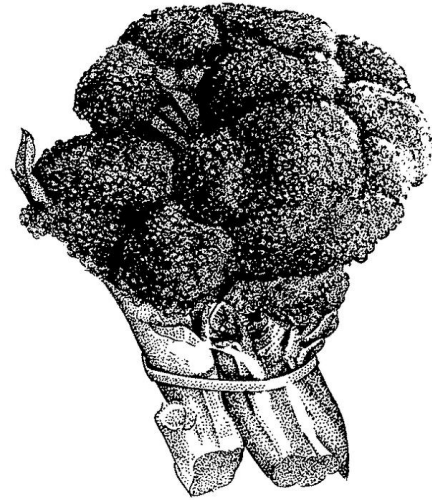
It will save you time if you gather all of the equipment you need for freezing vegetables. You will need a blancher with a basket and cover (or large saucepan and cover and a basket for the vegetables), a sharp paring knife, a cutting board, kitchen scales (optional), a colander, cooking spoons, clean dish towels, pot holders, and a wide-mouth funnel.

Assemble packaging containers

Containers for frozen foods should be moisture- and vapor-resistant. (**Moisture-resistant** means liquid cannot get out of the container or get into it. **Vapor-resistant** means odor or vapors from other foods cannot get into the container.) The container or packaging material should be odorless, tasteless, greaseproof, and easy to close tightly. The most common types of containers are freezer weight polyethylene (plastic) bags and rigid polyethylene containers or cartons. Freezer bags are easy to use and work well for food frozen without liquid. Be sure the bags you use are made for freezing. Use a rubber band or twist-tie to seal the bag. Plastic cartons are also good for freezing vegetables. When you choose containers, be sure they are the right size for your family. You may need half-pints, pints, or quarts. You also want them to be airtight. (If the lid does not fit well, or if the bag has a hole in it, the vegetables will freezer burn.)

Blanch the vegetables

Blanching is very important in freezing vegetables. Do not let anyone talk you into skipping this step. Blanching inactivates enzymes that can cause undesirable quality changes during storage even at 0°F. When you are ready to blanch vegetables, place 1 gallon of water in the blancher and bring it to a boil. When the water is boiling rapidly, place 1 pound of vegetables in the basket and lower into the water. Put the lid on the saucepan and begin counting the blanching time (see Directions for Freezing). When the time is up, remove the basket immediately from the boiling water. If too many vegetables are blanched at once, the water does not return to a boil quickly, and the vegetables will be underblanched.



Cool the vegetables

Plunge the hot, blanched vegetables into cold or ice water. The quicker the vegetables are cooled, the better the frozen product. Keep changing the water so it will always be cold. It should take about as long to cool the vegetables as it did to blanch them. As soon as the vegetables are cool, drain them thoroughly.

Package and label the product

Place the vegetables in the appropriate kind of container. If you are using plastic bags, be sure to press all of the air out of the bags before you seal the bags. If you are using a plastic carton, leave a half-inch of headspace so there will be room for the food to expand. Be sure to label each package before it is frozen with the name of the vegetables, the amount, and the date frozen. You may want to use freezer tape and a wax pencil.

Quick-freeze the packages

Place a single layer of packages directly on the freezer shelf. After 24 hours, you can stack the packages. Quick-freezing should be done at -10°F. Be sure the freezer stays at -10°F or lower at all times. Vegetables can be held in the freezer up to 12 months.

What to do if your freezer quits

Occasionally foods are partially or completely thawed before you know the freezer is not operating. Vegetables that still contain ice crystals may be safely refrozen. If they are completely thawed but are still cold, 40°F or less, they may be cooked and refrozen separately or used in a casserole or other dish. Remember that while many thawed or partially thawed foods may be refrozen with no danger, they may lack some of their original quality.

Directions for freezing

Below are directions for freezing several vegetables. If you would like information on freezing other vegetables, contact your [MSU Extension county office](#).

Broccoli

Select firm, young, tender stalks with compact heads. It takes about 1 pound of fresh broccoli to make 1 pint. One crate (25 pounds) yields about 24 pints. Remove leaves and woody sections. Separate heads into convenient-size sections and immerse in brine (4 teaspoons salt to 1 gallon of water) for 30 minutes to remove insects. Split lengthwise so flowerets are no more than 1.5 inches across. Blanch 3 minutes or steam 5 minutes. Cool promptly, drain, and package, leaving no headspace. Seal, label, and quick-freeze.

Corn

Use only tender, freshly gathered corn that is in the milk stage. 2 to 2.5 pounds yield 1 pint. A bushel yields about 16 pints. Work with small quantities. Shuck, silk, and wash the corn in cold water and sort according to size. Corn can be frozen by different methods:

Whole-kernel corn: Blanch 4 minutes. Cool promptly, drain, and cut from cob. Cut kernels from cob at about two-thirds the depth of the kernels. Package, leaving a half-inch of headspace. Seal, label, and quick-freeze.

Cream-style corn: Blanch 4 minutes. Cool promptly and drain. Cut kernel tips and scrape the cobs with the back of the knife to remove the juice and the heart of the kernel. Package, leaving a half-inch of headspace. Seal, label, and quick-freeze.

Corn on the cob: Blanch small ears (1.25 inches or less in diameter) 7 minutes; medium ears (1.25 to 1.5 inches in diameter) 9 minutes; and large ears (more than 1.5 inches in diameter) 11 minutes. Cool promptly and drain. Pack ears into containers or wrap. Seal and quick-freeze.

Lima Beans

Pick beans while the seed is in the green stage. 2 to 2.5 pounds yield 1 pint. A bushel yields about 14 pints. Freeze beans as soon as possible after picking. Shell, wash in cold water, and sort according to size. Blanch small beans 2 minutes; medium beans 3 minutes; large beans 4 minutes. Cool quickly. Drain, package in moisture- and vapor-resistant bags or cartons, leaving a half-inch of headspace. Seal, label, and quick-freeze.

Green Beans

Pick young, tender pods when the seed is first formed. Two-thirds to 1 pound yield 1 pint. A bushel yields about 40 pints. Freeze beans as soon as possible after picking. Wash in cold water, trim ends, and break into 2- to 4-inch lengths. Blanch beans 3 minutes. Cool quickly. Drain thoroughly. Package in moisture- and vapor-resistant bags or cartons, leaving a half-inch of headspace. Seal, label, and quick-freeze.

Carrots

Freeze mild-flavored, tender carrots. Remove tops, wash, and peel. Leave small carrots whole. Cut others into quarter-inch cubes, thin slices, or lengthwise strips. Heat in boiling water, depending on size: small, whole – 5 minutes; diced, sliced, or lengthwise strips – 2 minutes. Cool quickly in cold water and drain. Pack into containers, leaving a half-inch of headspace. Seal and freeze.

Okra

Select young, tender, green pods. Wash thoroughly. Cut off stems in such a way as not to cut open seed cells. Heat in boiling water: small – 3 minutes; large – 4 minutes. Cool quickly in cold water; drain. Leave whole or slice crosswise. Pack into containers, leaving a half-inch of headspace. Seal and freeze. An alternate method for sliced okra is to heat it on a baking sheet in a 350° oven for about 20 minutes. Cool on trays, package, and freeze.

Peas

Select well-filled, flexible pods with tender seeds. Shell; discard hard peas. Heat in boiling water 2 minutes. Cool quickly in cold water; drain. Pack into containers, leaving a half-inch of headspace. Seal and freeze.



Squash

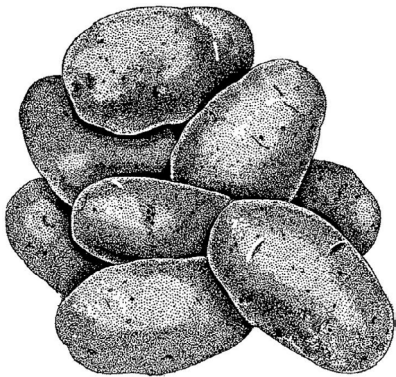
Summer: Select young squash with small seeds and tender rinds. Wash and cut into half-inch slices. Heat in boiling water 3 minutes. Cool quickly in cold water and drain. Pack into containers, leaving a half-inch of headspace. Seal and freeze.

Winter: Select firm, mature squash. Wash, cut into pieces, and remove seeds. Cook pieces until soft in boiling water, in steam, in a pressure cooker, or in the oven. Remove pulp from rind and mash or press through a sieve. To cool, place pan containing squash in cold water and stir squash occasionally. Pack into containers, leaving a half-inch of headspace. Seal and freeze.

Using frozen vegetables

One of the best things about the food preservation project is eating the foods you preserve. Follow the instructions below for thawing and cooking vegetables.

Most vegetables should not be thawed before they are cooked. You can take them from the freezer to the range and cook them. Greens and corn on the cob should be partially thawed before cooking.



Frozen vegetable recipes

Buttered Lima Beans

½ cup water
½ teaspoon salt
1 pint lima beans
butter or margarine

Place about ½ cup of water in saucepan. Add salt and bring to a boil. Add frozen beans. Heat to boiling. Separate beans with fork. Cover. Reduce heat. Cook 20–30 minutes or until beans are tender. Drain. Place in serving dish and dot with butter or margarine. Makes four servings.

Lemon Broccoli

½ cup water
¼ teaspoon salt
1 pint frozen broccoli
¼ cup chopped green onion with tops
¼ cup chopped celery
3 tablespoons butter
2 tablespoons lemon juice
¼ teaspoon finely shredded lemon peel

Bring ½ cup water and ¼ teaspoon salt to a boil in saucepan. Add broccoli and cook 7–10 minutes or until tender. Drain well. In small saucepan, cook green onion and celery in butter until tender but not brown. Stir in lemon juice; heat through. To serve, layer broccoli and butter mixture.



Freezing Vegetables

4-H Project Record

Name _____ Date _____

Name of 4-H or Project Group _____

Your age _____ Your grade in school _____

What are the most important things you learned in this project?

How many Food Preservation project group meetings did you attend? _____

List assistance you have given to other 4-H'ers with their food preservation projects.

Number helped	Kind of assistance given

List exhibits made in this project. What did you exhibit?

List talks and demonstrations given that relate to this project. Include radio and television appearances.

Topic	Number in audience	Number of times given on each level

List awards and recognition received in this project. Levels: Local (L), County (C), District (D), State (S).

Type of award	Level	Number received

List vegetables you froze this year.

Date	Name of vegetable	Number of packages	Size of package

List other foods you froze or canned this year.

Date	Name of food	Number and size of jars or packages	Method of preparation

Tally the grand total pints and quarts you froze and canned this year.

Method	Pints	Quarts
Frozen		
Canned		

On a separate sheet of paper, write a story about what you did and learned in your Food Preservation project.

Leader's Signature

Date

Extension Agent's Signature

Date

The foods you eat

The foods you eat determine how you look and how you feel. Following are the food groups and the nutrients they provide.

Fruit group

2–4 servings daily (include vitamin C-rich food each day)

Vegetable group

3–5 servings daily (include vitamin A-rich food every other day)

- ▶ Vitamin A
 - Normal vision
 - Healthy skin
 - Resistance against infection of nose and throat
 - Growth
- ▶ Vitamin C
 - Healthy body tissue
 - Healthy gums
 - Quick healing of cuts
 - Prevent hemorrhage in joints and tissues

Bread and cereal group

6–11 servings daily. This group provides B vitamins, which are needed to prevent anemia.

Meat group

2–3 servings daily

- ▶ Protein
 - Growth
 - Repair and maintenance of body tissues

- ▶ Thiamin
 - Normal functioning of muscles, nerves
- ▶ Iron
 - Needed to prevent anemia

Milk group

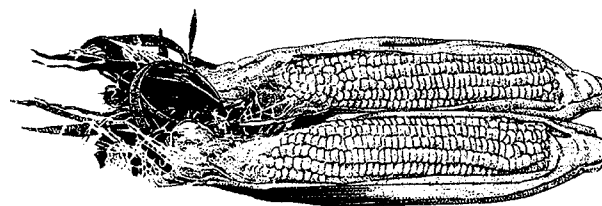
2–3 servings daily

- ▶ Protein
 - Growth
 - Repair and maintenance of body tissues
- ▶ Calcium and phosphorus
 - Growth
 - Normal activity of heart, muscles, and nerves
 - Building strong teeth and bones
- ▶ Riboflavin
 - Healthy skin
 - Normal digestion and to enable cells to use protein

Fats and sweets group

(include this group sparingly)

This group mainly provides calories. It includes foods like butter, margarine, salad dressing, and other fats and oils. It also includes sugars, candy, jams, jellies, and other sweets as well as soft drinks and highly sugared beverages.



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