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FOOD PRESERVATION

Freezer Problem Solver

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Emergency care

When you know or suspect that power will be off in your house, set the freezer control to between -10 degrees F and -20 degrees F immediately. The colder the freezer and foods, the longer foods stay frozen.

Do not open the freezer if power fails or a mechanical failure occurs. Opening the door will hasten thawing of foods. With the door closed, food will usually stay frozen in a fully loaded freezer about two days. Exactly how long food in a freezer will stay frozen depends on:

- The amount of food in the freezer — A full freezer will stay cold many hours longer than a half-filled freezer.
- The kind of food in the freezer — A freezer full of meat will not warm up as fast as a freezer full of baked items.
- The size of the freezer — A larger freezer will keep foods frozen longer than a small freezer.

Cover the freezer with blankets to help hold in the cold. Pin the blanket away from the air vent openings because air will be needed to keep the motor from overheating when the electricity comes back on.

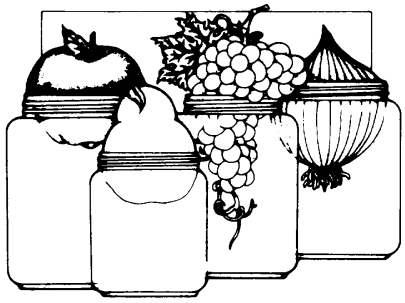
If power will not be back on for several days, use dry ice to keep the temperature below freezing and to prevent spoilage of frozen foods. Dry ice may be available from a local dairy or freezer locker plant. Fifty pounds of dry ice should keep the temperature of food in a full 20-cubic-foot freezer below freezing for three to four days and in a half full freezer for two or three days.

Place dry ice on boards or heavy cardboard on top of the packages, and do not open the freezer unless necessary. Do not handle dry ice with bare hands because it can cause burns. When using dry ice, the room should be well ventilated.

Locate a commercial freezer locker plant and move foods there in insulated boxes if you cannot get dry ice or if the freezer will be out of commission for more than three to four days.

It is always a good idea to be prepared for emergencies before they occur. Locate a source of dry ice and a freezer locker plant in your community before a freezer failure occurs.

Quality for Keeps



Refreezing

In general, food can safely be refrozen only if it still contains ice crystals or if it has been at refrigerator temperature (40 degrees F) for no longer than two days. In addition, use the following guidelines

- If foods are completely thawed and have warmed above room temperature, foods should not be refrozen. Discard these foods.
- Refreeze vegetables only if they contain plenty of ice crystals.
- Fruits ferment when they spoil. This is not dangerous, but taste will be unacceptable. Fruit can be refrozen if taste and smell are acceptable, or it can be used in cooking or for making sweet spreads.
- Refreeze meat only if it contains ice crystals. When cooked, use in casseroles and similar type dishes to mask any flavor changes. Texture will be affected.
- Seafoods containing many ice crystals should be cooked immediately — never refreeze.
- Ice cream has air incorporated into it during the freezing process. If thawed, the air escapes and refreezing does not result in an

acceptable product. In addition, if ice cream has been at an unsafe temperature long enough, food safety may be a problem.

Note: Defrosted low-acid foods such as vegetables, seafood, meat, poultry and pre-cooked dishes may spoil without having a distinct odor. If refrozen and cooked, they could be dangerous. Do not try to save these foods.

Refreeze partially thawed foods quickly by setting the temperature control of your freezer to the coldest position. More care should be taken with foods that have partially thawed and been refrozen because they deteriorate faster. Label containers as "Refrozen" and use as soon as possible.

Most frequently asked freezing questions

General

1. Can frozen food be stored in refrigerator-freezer combinations?

Refrigerator-freezer combinations can be used for storing frozen food if the freezer is a true freezer (will maintain 0 degrees F or less) and not just the freezing compartment of a refrigerator. A better quality product with a much longer shelf life results if foods are held at a temperature of 0 degrees F or less. If a refrigerator freezing compartment is used, store food for only one to two weeks.

2. Is it necessary to leave headspace in packages to be frozen?

With the exception of vegetables that pack loosely, such as broccoli and asparagus, and baked goods, leave adequate headspace between packed food and closure. This allows for expansion of food as it freezes.

3. At what temperature should the freezer be maintained?

Freeze and store foods at 0 degrees F or less.

4. How long will food remain frozen if the power goes off?

Foods stay frozen longer if the freezer remains unopened, is full, is in a cool place and is well insulated. Usually food in a loaded freezer will stay frozen for about two days, depending on its size. A half-filled freezer will keep food frozen only about 24 hours. Cover the freezer with blankets, keeping them away from the air vents, to help hold in the cold.

5. Can food be refrozen if it has thawed?

In general, foods that have only partially thawed and still have ice crystals in them or have been at refrigerator temperature (40 degrees F or below) for no more than two days, can safely be refrozen, though quality will be lower. Thawed low-acid foods such as vegetables and precooked casseroles may be spoiled without any off-odors. Do not try to save these foods if there is any doubt about their safety. Seafoods containing many ice crystals should be cooked immediately, Never refreeze.

6. What is freezer burn?

Freezer burn is dehydration or drying that occurs on the surface of a product if it is improperly wrapped. The food is of such poor quality, we do not recommend eating it. To prevent freezer burn, the package must be sealed airtight in moisture vapor proof containers or wrap.

7. Does freezing improve the quality of food?

Freezing does not improve the quality of the product. Frozen food is only as good as the quality of the fresh food. So, select only high quality products at optimum maturity and freshness.

8. Does freezing kill germs?

Freezing does not kill all germs (microorganisms) present in food, but it does prevent their growth and multiplication if the freezer is held at 0 degrees F or lower. When thawed, surviving microorganisms can grow again.

9. How much food can be frozen at one time?

Add only the amount of food that will freeze in 24 hours, usually about two or three pounds of food per cubic foot of freezer space. Overloading the freezer slows down the freezing rate resulting in foods of lower quality.

10. Will food spoil if the freezer temperature is above 0 degrees F?

Food may not spoil but the quality (color, flavor and texture) and nutrient content will drop. The higher the temperature, the faster the quality and nutrient levels will drop.

11. Will food spoil if it is held longer than the recommended storage time?

Food will not spoil if the temperature has been kept at 0 degrees F or lower. However, quality (flavor, color and texture) and nutrient levels will be lower. The recommended storage time is the time in which foods should be used to ensure maximum quality and nutrient levels.

12. How can you be sure that your freezer is at 0 degrees F or less?

Purchase a freezer thermometer (one that can withstand a wide range of temperatures), keep it in the freezer and check the temperature regularly.

13. Will it pay to buy a freezer?

A freezer is usually more of a convenience than a savings. To make the best use of it: 1) keep the freezer full, 2) use and replace the food — don't just store it, and 3) use older food first.

14. Is a chest or upright freezer best?

This depends on personal preference as well as available floor space. Generally speaking, the upright freezer

is easier to organize and takes up less floor space. Chest freezers, however, are more economical to operate.

Packaging materials

15. What kind of packaging materials should be used for freezing?

Packaging materials must be moisture/vapor proof; be durable and leakproof; not become brittle and crack at low temperatures; be resistant to oil, grease or water; protect foods from absorption of off-flavors or odors; and be easy to seal and easy to mark. Good freezing materials include rigid containers made of aluminum, glass, plastic, tin or heavily waxed cardboard; bags and sheets of moisture/vapor proof freezer wraps; and laminated papers made especially for freezing.

16. Can aluminum foil be used as a freezer wrap?

Heavy duty aluminum foil can be used as a freezer wrap. Because it can be torn or punctured easily, it is wise to use an overwrap. Lightweight (household) aluminum foil is not satisfactory for home freezing.

17. Is wax paper a suitable freezer wrap?

No. Wax paper is not moisture/vapor proof.

18. Can bread wrappers be used for freezing?

No. Bread wrappers are not sufficiently moisture/vapor proof to be used for freezing. A plastic bag made especially for freezing should be used.

19. Can zip-lock type bags be used for freezing?

Yes, if they have been appropriately designed and their box marked "for freezer use.'

20. Can milk or cottage cheese cartons be used for freezing foods?

Containers from cottage cheese, ice cream or milk are not sufficiently moisture/vapor proof to be suitable for long term freezer storage.

21. Can glass jars be used for freezing?

Regular glass jars break easily at freezer temperatures. If using glass jars, choose wide-mouth dual purpose jars made for freezing and canning; these jars are made to withstand extremes in temperatures.

Fruits

22. Is it safe to freeze fruits without sugar?

Yes, it is safe because sugar is not used as a preservative for frozen fruits. However, because sugar helps maintain flavor, color and texture, fruits frozen without sugar will be lower in quality.

23. Can artificial sweeteners be used in place of sugar for freezing fruits?

Artificial saccharin-based sweeteners give a sweet taste but do not function like sugar to protect color, thicken syrup and give a firm texture. Additionally, artificial sweeteners may become bitter during freezer storage. A better alternative is to freeze fruit using an unsweetened pack, adding artificial sweetener at serving time.

Note: Preliminary research has shown that strawberries and peaches frozen with aspartame (Equal™) are similar in quality to sugar-sweetened frozen fruit.

24. How do you prevent fruit from turning brown during freezing?

There are several ways to prevent darkening of fruit. Use pure ascorbic acid or ascorbic acid mixtures. Citric acid or lemon juice may be used but are not as effective as ascorbic acid. Some fruits that are to be cooked before serving may be steamed to prevent browning.

25. Why are frozen fruits sometimes soft when thawed?

If fruits are frozen slowly, large ice crystals form and rupture cell walls causing a soft mushy product. For best results, quick-freeze fruits at -10 degrees F and serve fruit with a few ice crystals still remaining. In addition, fruits frozen without sugar will be mushier when thawed.

Vegetables

26. What is blanching?

Blanching is heating or scalding the vegetables in boiling water or steam for a short period of time.

27. Is it recommended to blanch vegetables before freezing?

Yes. If done for the right amount of time, blanching stops the action of enzymes that cause loss of flavor, color and texture. Blanching cleanses the surface of dirt and microorganisms, brightens the color and helps retard loss of vitamins. Blanching also wilts or softens vegetables and makes them easier to pack.

28. How do you blanch vegetables?

Use a wire blanching basket and cover, or fit a wire basket into a large kettle with fitted lid. Use one gallon of water per pound of prepared vegetable. These proportions will ensure that the water will continue to boil when the vegetables are added. Put vegetables in blanching basket and lower it into vigorously boiling water. Place lid on blancher and start counting processing time immediately.

29. Why is it necessary to cool vegetables after blanching?

Vegetables should be cooled quickly and thoroughly after blanching to stop the cooking process. Otherwise, they will be overcooked and loss of flavor, color, vitamins and minerals will occur.

30. What causes frost or ice crystals to appear on the surface of frozen vegetables such as broccoli?

Inadequate draining of vegetables before freezing, slow freezing or fluctuation of storage temperatures above

0 degrees F may cause undesirable formation of large and excessive ice crystals. This can affect the texture as well as appearance of frozen vegetables.

31. Can I blanch in my microwave oven?

Research has shown that microwave blanching is not an effective method because some enzymes may not be inactivated. This could result in low quality frozen vegetables with off-colors, off-flavors and poor texture. If blanching is done in a microwave oven, follow individual manufacturer's instructions. Microwave blanching does not save time or energy.

32. Can vegetables be fully cooked before freezing?

Some fully cooked vegetables, such as baked beans and candied sweet potatoes, maintain high quality for many months when frozen. Most fully cooked vegetables, however, have less desirable color, aroma and flavor when reheated. Loss of flavor may be retarded by covering the vegetable with cooking liquid, meat broth or cream sauce.

33. Does it matter how long vegetables are blanched?

Blanching time is crucial and varies with the vegetables and size. Underblanching speeds up the activity of enzymes, which cause off-flavors, and is worse than no blanching. Overblanching causes loss of color, flavor, vitamins and minerals.

34. Are frozen vegetables safe to eat if they are not blanched?

Yes. They are safe to eat, but the quality (color, flavor and texture) will be poor when compared to vegetables that have been blanched. Blanching slows or stops the action of enzymes that cause loss of flavor, color and texture.

35. How can you prevent corn-on-the-cob from tasting "cobby?"

After blanching ears for the recommended time, chill immediately with ice water until the cobs are completely cold. Partially thaw the ears of corn before cooking.

36. Should frozen vegetables be thawed before cooking?

For most vegetables the answer is no. A fresher tasting vegetable results if it has not been thawed before cooking. Exceptions are corn-on-the-cob and leafy greens, which cook more evenly if partially thawed first.

37. Is it necessary to wash peas and lima beans before shelling?

Any vegetable should be washed before shelling to remove any foreign material such as dirt, insects, leaves, etc.

Animal products

38. Is it necessary to thaw meat or fish before cooking?

No. Meat and fish can be cooked from the frozen state if extra cooking time is allowed. The amount of time will depend on the size and shape of the cut.

39. Can meat and poultry be thawed in the conventional oven?

Meat and poultry should never be thawed in the conventional oven or at room temperature. There is greater danger of bacterial growth and food spoilage if food is thawed in the oven or at room temperature. Thaw meat and poultry in the refrigerator in the original wrappings. To speed thawing, loosen the wrapping. Frozen meat and poultry can also be cooked without thawing.

40. Why is it important to chill meat or poultry before freezing?

Slaughtered meat and poultry should be refrigerated immediately after slaughter to remove animal heat from the carcass. Prompt and thorough chilling is important to reduce bacterial growth and decrease the action of enzymes, which can lower the quality. Bone souring in beef and pork also may occur if carcasses are not properly chilled.

41. Can stuffed turkey be frozen?

Poultry should never be stuffed before freezing. The reason is that the center of the cavity that is packed with stuffing will cool slowly, allowing time for spoilage organisms to grow. Normal roasting will not destroy these organisms. Pre-stuffed frozen poultry sold by commercial processors are prepared under controlled conditions that cannot be duplicated at home.

Table 1. Remedies for freezing problems.

Problem	Cause	Prevention
Freezer burn (surface of food light colored and dried out; food is tough, dry and less flavorful).	1. Package torn or unsealed.	1. Be sure all packages are sealed tight so no air can get in. Handle carefully to avoid tears. Overwrap foil wrapped packages.
	2. Packaging not moisture/vapor proof.	2. Use only packaging approved for use in freezing (see MU publication GH 1501, *Freezing Basics.*
	3. Too much air in package.	3. Always press out all air in wrapped food. Use the right size container and allow adequate headspace
Gummy liquid in fruits.	1. Fruits frozen too slowly.	1. Freeze foods at 0 degrees F or below immediately after packaging. Do not freeze more than 2 to 3 pounds of food per cubic foot of storage space at one time.
	2. Freezer temperature too warm.	2. Always keep the temperature set at 0 degrees F or below.
	3. Fluctuating temperature.	3. Maintain a constant temperature of 0 degrees F or below.
Rancid flavors.	1. Spoilage of the fat.	1. Trim excess fat from meat before freezing as it may become rancid before the lean portion is used. Package foods correctly and exclude all unnecessary air. Do not store longer than recommended.
"Grassy" flavors in vegetables.	1. Freezing unblanched vegetables.	1. Blanch all vegetables for the recommended times before freezing.
Mushy food.	1. Large ice crystals form in the food, breaking the cell structure.	1. Freeze foods at 0 degrees F or below immediately after packaging and maintain that temperature throughout storage. Do not freeze more than 2 to 3 pounds of food per cubic foot of freezer space at one time.
Maroon-colored bones or pink meat in frozen poultry after it is cooked.	1. Hemoglobin (color pigment) in bones.	1. Natural occurrence. The meat is safe to eat.
Green vegetables turn olive-brown.	1. Not blanching green vegetables.	1. Blanch all vegetables as directed.

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