

# Home Freezing Basics

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Are you interested in saving time on meal preparation? Do you want to minimize food waste? Would you like to save money by extending the harvest from your garden, prolonging the use of leftovers, or stretching out the shelf life of sale items from the store? If the answer to any or all these questions is “yes,” consider preserving these foods by freezing. Freezing is one of the easiest, most convenient, and least time-consuming methods of preserving foods. Using your home freezer, basic containers, and research-based preparation techniques, you can extend the shelf life of most foods.

Freshness and quality at the time of freezing will affect the condition of frozen foods. When starting with peak-quality fruits and vegetables, meats, or leftovers, freezing allows you to preserve their vitamin content, natural color, flavor, and texture. Let’s look at the science of freezing so you can enjoy year-round freshness of your favorite foods.

## Understanding the Freezing Process

Freezing at a temperature of 0°F or below preserves food for extended periods by preventing the growth of microorganisms (bacteria, yeasts, and molds) that cause both food spoilage and foodborne illnesses. For example, *Clostridium botulinum*, the microorganism that causes botulism and is of greatest concern in canning, does not grow or produce toxins at 0°F. For this reason, freezing can provide a safe and easy alternative to pressure canning low-acid foods.

The freezing process itself does not destroy microorganisms; it slows their growth. After thawing, however, microbes that may be present can become active under the right conditions and multiply

to levels that can lead to foodborne illness. Because of the risk of contamination, handle thawed foods like any perishable product. Thorough cooking will kill most microorganisms.

In addition to the food safety aspects of freezing, the process also affects enzymes naturally present in fruits and vegetables that promote the chemical reactions that cause ripening. Freezing slows down enzyme activity but does not stop these chemical and physical reactions that can lead to spoilage and deterioration. Blanching is a brief cooking technique using boiling water to inactivate enzymes that can affect the flavor, color, and texture of produce. A quick cooling in ice water stops the cooking process and aids in freezing. Most vegetables should be blanched before freezing for the best quality.

Fruits are not blanched like vegetables; they are pre-treated with an acid or packed in liquid for best quality. The exposure of cut fruit to oxygen results in enzymatic browning. Soaking fruit in a dilute solution of ascorbic acid (vitamin C), sugar, or lemon juice can prevent this naturally occurring process. For more information on freezing fruits and vegetables, refer to the University of Kentucky Cooperative Extension Service publications *Freezing Fresh Fruits* (FCS3-336) and *Freezing Vegetables* (FCS3-335).

Over time, chemical and physical reactions in meat reduce the shelf life of meat products. The fat in meats becomes rancid and may develop off-flavors more quickly if exposed to air, light, moisture, or bacterial contamination. Controlling these factors by freezing these foods within a few days of purchase and using airtight containers or wrapping can improve the quality of frozen meat.

## Quality Freezing

The amounts of water, sugar, muscle tissue, and air influence the freezing process of specific foods. As the temperature is lowered, the water molecules in food form ice crystals. Rapid freezing allows small ice crystal formation, improving the quality of the freezing process. Slow freezing results in large crystal formation, which can rupture the cell walls of the food, resulting in deterioration of the product. Then during thawing, products will drip and lose their moisture. This loss of moisture is known as freezer burn. Freezer burn occurs when frozen food is exposed to air. It is primarily caused by food not being properly wrapped or packaged in airtight containers. Damage from crystal growth or freezer burn results in a loss of color (gray or brown), change in texture (tough or dry), difference in aroma, and modification to flavor. While the appearance of freezer burn indicates a loss of food quality, it is not a food safety issue. Cut away any freezer-burned portions of the food before or after cooking. Food with a large amount of freezer burn should be discarded for quality reasons.

If freezing is your preferred method of food preservation, a vacuum sealer is a good investment. Here are a few additional tips to improve the quality of your home-frozen foods.

- Cool all food before packaging.
- Pack or wrap food tightly to remove as much air as possible. If freezing in glass jars or containers with press-on lids, leave a headspace between the packed food and the lid of the container to allow for expansion of the food as it freezes. If using freezer paper, follow the directions on the package.
- Freeze food immediately after it is packaged to retain its nutritional value, natural color, flavor, and texture.

- Ideally, food should be quick-frozen within two hours and stored at 0°F or lower.
- Allow space between the packages in the freezer for air circulation. If the packages are stacked in several layers, those in the middle may freeze too slowly and result in a lesser-quality product. Once food is frozen, you can store the packages close together.

## Foods That Don't Freeze Well

Certain foods may become soft and mushy, waterlogged, tough, or soggy when frozen, or their ingredients may separate. Some produce or combinations of food do not freeze well. Vegetables that do not freeze well include cabbage, celery, radishes, cucumbers, salad greens, and herbs.

Fruits with a high water content, such as watermelon, grapes, and citrus fruit, do not freeze well. However, if you are not concerned with texture, they work well in smoothies. Fresh tomatoes will separate, but if you plan to use them in chili or vegetable soup, they will work fine. If any of these foods are used in sauces, be warned that once these foods thaw, they may be mushy or cause a thinner sauce. This is true of foods made with eggs, milk, or mayonnaise as well; they may separate, causing less than a quality product.

Many baked casseroles or dishes that contain rice or pasta may not reheat well either. Fried foods also fall into this category. While many fried foods do not freeze well, the advent of the air fryer has allowed us to reclaim the original crispy texture when reheated. Remember, if your dinner wasn't your favorite, maybe wasting the electricity, time, and container required for freezing isn't a good idea.



## Proper Packaging and Labeling

Proper packaging helps in preventing freezer burn and maintaining flavor, moisture content, and nutritive value in the dry climate of the freezer. The selection of containers depends on the type of food to be frozen, personal preference, and the container types that are available for purchase. Containers specially labeled “made for freezer storage” or marked with a snowflake symbol are available in most stores. ❄️ In general, freezer containers should be

- moisture-vapor resistant;
- durable and leakproof;
- strong and pliable, yet crack-resistant at very low temperatures;
- resistant to oil;
- able to protect foods from absorption of unpleasant odors; and
- easy to seal and label.

All frozen products should include a label on the container. Include the name of the product, the date it was frozen, and the weight or number of servings. Good freezer management is essential to avoid wasting the food you have so carefully frozen. Keeping a record of the foods in your freezer will help you use your freezer wisely. Write down everything you put in or take out of the freezer, and use the “first in, first out” or FIFO method so you can use up older frozen food first.

Color changes can occur in frozen foods. Follow recommended storage times for optimum quality results for specific foods. For more information, refer to the University of Kentucky Cooperative Extension Service publication *Recommended Food Storage Times* (FCS3-595).

## Thawing Food Safely

There are only three ways to safely thaw food: in the refrigerator, in cold water, or in the microwave. **Do not thaw foods at room temperature or outside.** Doing so may lead to foodborne illness.

*Refrigerator thawing* is the preferred method, as the internal temperature of the food does not rise above 40°F. Unfortunately, this is also the slowest method, so you need to plan ahead when defrosting large food items. Small food items may defrost overnight in the refrigerator, but most foods require a day or two. For example, a ten-pound turkey would take around two days to be ready to cook.

*Cold-water thawing* is much faster than refrigerator thawing, but it requires more attention. More importantly, this method should only be used for food that will thaw in less than four hours. Food should be placed in a leakproof plastic bag under cold running water or submerged in cold water. A leaking bag may allow bacteria from the air or the sink to contaminate the food. Also, food tissue absorbs water, resulting in watery, less-than-high-quality food. If the water isn't running, change the water every 30 minutes to keep the food cool. After thawing, refrigerate the food until ready for use or cook it immediately.

*Microwave thawing* should be used to defrost food only if you plan to cook it immediately upon defrosting. For best results, use your microwave's defrost setting. If your microwave does not have a defrost setting, check your microwave manual for instructions. If you can stir or rotate the food frequently, it will heat evenly as it defrosts. Always use a microwave-safe container when thawing.

## Food Safety During Power Outages

If power for your freezer is interrupted, or if the unit is not operating normally, do not open the freezer door. Food in a loaded freezer will usually stay frozen for two days, even in the summertime. If repairs cannot be made or service restored within one to two days, you could use dry ice to keep the food frozen, if it is available. **Discard any foods that have been warmer than 40°F for more than two hours. Discard any foods that have been contaminated by meat juices.** Dispose of soft or melted ice cream, due to loss of quality.

If it is freezing outside or there is snow on the ground, you may be tempted to keep food frozen outside until the power is restored. However, food stored outside may be exposed to the sun or environmental contamination, such as animals, rodents, or birds. Sometimes, cans left in the car or garage may accidentally freeze and become swollen. If the cans are merely swollen (not rusted or bursting at the seams) and you are sure the swelling was caused by freezing, the cans may still be usable. Allow the unopened can to thaw in the refrigerator. **Once opened, do not taste the food if you are unsure about its safety.** If the contents of the can look or smell abnormal, throw the can away. When in doubt, throw it out!

You may safely refreeze frozen food that has thawed, if the food still contains ice crystals or if its temperature is still below 40°F. In general, if food is still safe to eat, it is safe to refreeze. Partial thawing and refreezing will lower the quality of fruits and vegetables. Meats may be cooked and then frozen again with little loss of quality. Use refrozen foods as soon as possible to maintain an acceptable quality.

## Cooking Frozen Foods

Frozen raw or cooked meat, poultry, casseroles, and leftovers can be cooked or reheated right out of the freezer. Remember to plan for cooking times to be about 50 percent longer than the usual recommended cooking times.

## Conclusion

Freezing is a simple, quick, and reliable way to preserve foods. By following proper procedures for freezing, thawing, and preparing foods, you can enjoy safe, high-quality, nutritious foods straight from the freezer.



## References

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