Storage of Home-Preserved Foods

by Ralph W. Johnston

Proper storage of home-preserved foods, especially of home-canned products, and close scrutiny before serving are essential. If proper storage requirements are not met, home-preserved foods may lose their quality or spoil.

Homemakers should observe some simple techniques for checking home-canned foods before serving them. This will help prevent consumption of food that could cause the rare but extremely dangerous food poisoning called botulism.

Most canned foods are highly perishable yet do not require refrigeration until opened. Unlike frozen foods, they are unaffected by power interruptions or mechanical failures.

However, the hazard of botulism must always be kept in mind. Although botulism is rare, it results in a high death rate of about 65 percent among its victims. Yet it is an easy problem to avoid. Botulism results when home-canned foods are improperly processed. Under these conditions, the spore (a seed-like structure which is highly heat-resistant) of a soil bacterium called *Clostridium botulinum* may survive.

If the food product is low in acidity, as with peas, corn, or beans, the spore can germinate (sprout) and grow during storage at room temperatures. As *Clostridium botulinum* grows, it produces a powerful poison that when ingested can cause severe illness or death. Most cases of botulism in the United States stem from home-canned foods.

The home canner can avoid botulism primarily by following prescribed, reliable processing instructions such as those given in USDA Home and Garden Bulletin No. 8, *Home Canning of Fruits and Vegetables*. If you don't have reliable processing instructions, don't attempt home canning. If you have these instructions, read them before and during home canning and do not take short cuts or modify the instructions.

Do not use processing instructions of neighbors or relatives; although frequently given with the best of intentions, they may contain modifications that are inadequate and dangerous. Remember that past safe history of a relative's processing procedure is no guarantee of future safety. Botulism doesn't always occur even in inadequately processed home-canned foods.

After home-canned foods have cooled they are ready to be stored until needed. At this point, the home canner should make his first quality control and safety check, just as commercial canners do.

Jar lids should be examined. If the center of the lid is not depressed or is loose, refrigerate the product immediately and serve at the next meal. Before serving, boil low acid products for 10 minutes. Check all jars for cracks; if they are found, treat jars the same way as those with loose lids.

Observe cans for any evidence of leakage around seams; again if leakage is observed, refrigerate the cans immediately, serve at the next meal, and boil for 10 minutes before serving.

During this first integrity check on home-canned foods, it is unlikely that swelling of the cans or foaming in the jars will be noticeable, because of the short lapse of time since processing. But the first check can easily detect

Ralph W. Johnston is Chief, Microbiology Staff, Meat and Poultry Inspection Program, Food Safety and Quality Service.

loose lids, cracked jars and leaking seams on cans.

The next step is to store home-canned products. Proper storage will protect the products from loss of quality and in some cases from spoilage. Store canned foods in a clean, cool, dry area away from bright light —particularly sunlight—and in an area where the foods will not freeze or be exposed to high temperatures. Under these conditions, the products will remain at high quality for at least a year.

Excessive dampness will rust cans or metal lids. If this condition becomes severe, leakage will occur and the product will spoil. Freezing causes expansion of the product and the jar lid may loosen, the jar may crack, or can seams may be stressed. This can lead to leakage and food spoilage.

When foods are preserved by heating, as in home canning or commercial canning, the heating process is designed to destroy all normal spoilage bacteria that can grow under usual storage conditions, and all bacteria capable of causing human harm. The products are called "commercially sterile" but are not always truly sterile.

A group of bacteria produce extremely heat-resistant spores that can only germinate and grow at high storage temperatures such as those above 103° F. These bacteria often survive both the home and commercial canning process. Even though present, they normally are of little concern from the viewpoint of spoilage and no concern at all from the standpoint of human health. However, if canned foods are stored in attics or near hot water pipes or in any other area where the temperature will exceed 102° F at any time, these heat-loving bacteria (called thermophilic) can grow and spoil the product.

As a rule of thumb, home-canned foods will remain high in quality for one year if properly stored. After a year, loss of quality may occur.

Fred Farout

Containers for home-preserved foods are designed to resist any chemical reactions between the product and the containers. However, some products—particularly high acid ones like tomatoes—will slowly react with the metal in the can or the jar lid. Corrosion and container failure may follow during subsequent storage. This action occurs from the inside out and can take place even under good storage conditions.

Jars should be dated when stored, and used within a year from the processing date. Always rotate stock on the shelves so as to use the oldest container first, and can no more units of any single product than you can use in a year.

The last and perhaps most important quality control steps are the final inspection and serving procedures.

After removing the product from storage, carefully inspect the container, and in the case of jars the

Boil home-canned low-acid foods 10 minutes before tasting or serving.

visible contents. This should be done before opening.

If a can or jar lid shows any sign of swelling (bulging) or leakage of product, do not open the container. If a jar lid is loose or the contents of a jar are foamy or otherwise visibly abnormal, do not open. When any of these defects are noted, place the whole container in a heavy plastic bag and tie the top securely. Place this in doubled paper bags with heavy packing of newspapers. Tape or tie the top securely, place in a lidded garbage can, then wash your hands thoroughly.

Not all spoiled or leaking home-canned foods contain the deadly botulism toxin but some do, so extreme caution in disposal is necessary.

If a defective product is found, all of that product prepared at the same time should be removed from storage and similarly inspected.

Never taste the contents of a suspect product. Under certain circumstances, a spoonful of "off" unheated, suspect product has been known to kill.

Finally, bring all home-canned vegetables to a rolling boil after opening and before tasting. Heating makes any odor of spoilage more noticeable. Again, if an odor of spoilage is noted, destroy the product with caution. If the product is normal, cover the pan and continue to boil at least 10 minutes before serving. Only after these precautions are taken are home-canned vegetables safe to taste and serve.

Home Frozen Foods

A plus for home freezing is that slight variations in following directions do not result in a botulism hazard. The bacterium that causes botulism cannot grow in the freezer. Proper freezing prevents the growth of microorganisms that cause spoilage and those that can cause illness.

Besides the initial cost of the freezer itself, energy costs are significant. Utilize the freezer fully to keep the energy costs per unit as low as possible. Fill the freezer when foods are least expensive, use the products as needed, and be careful to use the oldest products first.

Take care not to overload the freezer. If you pack it too tightly with containers of warm food, the freezer will be unable to remove the heat fast enough and spoilage from bacterial growth can result.

To avoid this, freeze foods soon after they have been packed; put no more unfrozen food into a home freezer than will freeze within 24 hours. Usually, this will be about 2 or 3 pounds of food to each cubic foot of capacity.

For quickest freezing, place packages against freezing plates or coils and leave a little space between packages so air can circulate.

Small excesses of product destined for freezing can be held in the refrigerator until the first load is frozen. If a large excess of product exists, chill and carry it in an insulated box or bag as soon as possible to a locker plant.

After freezing, packages may be stored close together. Store them at 0° F or below in order to retain the highest quality for the longest time.

Prolonged storage of frozen foods results in slow loss of quality. The rate of this loss differs with various foods. To maintain high quality, obtain information on recommended storage periods for the foods you freeze. This may be obtained from your county Extension office or from USDA Home and Garden Bulletin No. 10, *Home Freezing of Fruits and Vegetables.*

Storage periods are recommended to guarantee food quality only. If these periods are exceeded, taste may be affected but as long as the product has been kept at 0° F or below there is no question of safety.

The homemaker's greatest concern with a home freezer is mechanical or power failure, which can result in food losses. Some but not all of these can be avoided. Freezers are very dependable mechanical devices yet they do fail. Most failures develop after 5 or more years of use.

The homeowner should clean dust from coils of the freezer once or twice each year in strict accordance with the instruction manual for the unit. At this time watch for any changes that have occurred. Have a dealer or repairman check unusual noises or excessive running.

Air circulation around the coils should not be covered or blocked in any way. Check the plug itself for a firm fit. If the plug is loose in the receptacle, it may fall or be easily bumped out without notice. Replace loose plugs. Better yet, some hardware stores sell clips that clamp the plug in by means of the screw that holds the receptacle plate onto the outlet.

Freezer owners should know where the closest commercial freezer is, in case of an extensive failure. Check your home freezer after thunderstorms or power failures, since freezers have been known to be damaged occasionally when power falls or surges.

Don't Open

A well packed freezer will hold the product for many hours even if the unit is not operating. Normally, power failures are short in duration and no food thawing results. If the power is off, do not open the freezer as this will hasten thawing. Telephone or otherwise determine when the power will be turned on again.

Sometimes freezer failure is discovered only when a homemaker goes to the freezer to get something. If this occurs, condition of the food should be determined immediately. Discard all foods that are thawed and warm, since extensive bacterial growth may have taken place.

Foods may be saved if they remain frozen; or if they are thawed but very cold, about 40° F, and have been held no longer than 1 or 2 days at refrigerator temperatures after thawing. Bacteria grow only slowly in thawed but cold foods. Prompt refreezing of thawed cold foods will lower the quality but not result in spoilage or danger. If you have doubt as to whether the foods are cold or warm, throw them out as the safest course.

Once condition of the foods is determined, plan fast for the next step. If the freezer cannot be repaired quickly, make arrangements to move the food to a commercial locker plant or another freezer. To do so, package the products closely together in paper bags. Place these in cardboard cartons lined and covered with newspapers for insulation, and transfer them immediately.

Another way to save the freezer load is to use dry ice in the freezer itself. Dry ice must be handled with gloves to prevent burns. Also keep in mind that carbon dioxide gas evolves as dry ice evaporates, and can cause unconsciousness if allowed to concentrate.

When transporting dry ice, leave a car window open at least several inches. If you use dry ice in the freezing compartment, make sure a nearby window is cracked open. When packing dry ice into a freezer, figure on 25 to 50 pounds to do the job. Don't break up the ice any more than necessary.

To summarize, frozen foods are seldom involved in food spoilage or food poisoning. Even so, mechanical devices occasionally fail, and freezer owners should have prearranged plans for such an emergency. Preventive maintenance will help reduce the likelihood of failure. If a failure results in food becoming thawed and warm, discard it for safety.