Information from

Human

Environmental

Sciences

Extension

FOOD PRESERVATION

Before You Start to Can, Learn the Basics

Nutritional Sciences
University of Missouri Extension

Canning preserves food by using heat to destroy the microorganisms that cause spoilage. Heat forces air out of the jar. As the jar cools, a seal (vacuum) forms. The processing times and temperatures in University of Missouri Extension publications have been set through scientific research. For safe, high-quality home-canned food, it's important that you follow these directions carefully.

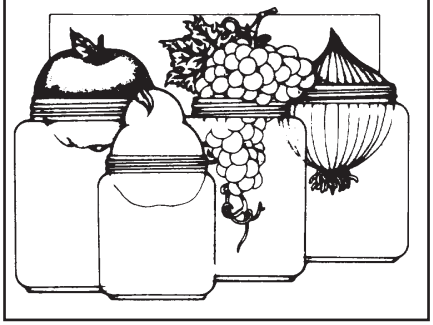
How canning preserves foods

Fresh foods spoil for a variety of reasons. Bacteria, molds and yeasts cause damage and so do food enzymes and contact with the air. Microorganisms live and multiply quickly on the surfaces of fresh food and inside bruised, insect-damaged and diseased food. Proper canning techniques will stop the growth and activity of microorganisms and can prevent spoilage and quality loss. Use these techniques to get safe food and high-quality results:

- Carefully select and wash fresh food.
- Prepare foods according to MU Extension recommendations — you may need to peel some fresh foods, add acids (lemon juice, citric acid or vinegar), or use hot packs. See MU publications GH1452, GH1454, GH1455, GH1456, GH1457, GH1459 and GH1461 for specific instructions.
- Use acceptable jars and self-sealing lids.
- Process jars in a boiling-water bath or pressure canner for the correct period of time.

Only use tested recipes from Cooperative Extension, USDA or *Ball Blue Book* (dated 1989 or later). Follow canning procedures from the same sources dated 2009 or later.

Quality for Keeps



For safety's sake

Pressure canning is the only canning method recommended for low-acid foods like meat, poultry, seafood and vegetables. Clostridium botulinum, the bacterium that causes botulism food poisoning, is destroyed in low-acid foods when they are processed at the correct time and temperature in pressure canners. Canning low acid foods in boiling-water canners is absolutely unsafe because the botulinum bacteria can survive this process. If Clostridium botulinum bacteria survive and grow inside a sealed jar of food, they can produce a deadly toxin. Even a taste of food containing this toxin can be fatal. Before eating canned foods, be sure of the following:

- Food was processed following current recommendations from MU Extension, USDA or Ball Blue Book.
- Food was processed in a pressure canner with a gauge that was checked at the beginning of the canning season. (Many local MU Extension centers can check pressure gages. Find the center nearest you online at *http://extension.missouri.edu*)
- Time and pressure were adjusted for altitude.
- Process times and pressures matched the size of jar, style of pack and kind of food being canned.
- Jar lid is firmly sealed and concave (curved inward).
- Nothing has leaked from the jar.

- No liquid spurts out when jar is opened.
- No unnatural or "off" odors can be detected.

Acidity affects processing methods

Whether you should process food in a pressure canner or boiling-water canner to control botulinum bacteria depends on the amount of acid in the food. The term "pH" is a measure of acidity. The lower the pH, the more acid the food.

Acid foods include pickles, most fruits and jams and jellies made from fruit. (In pickling, the acid level is increased by adding lemon juice, citric acid or vinegar.) Acid foods contain enough acidity either to stop the growth of botulinum bacteria or destroy the bacteria more rapidly when heated.

Low-acid foods don't contain enough acid to prevent the growth of botulinum bacteria. Process these foods at temperatures of 240 degrees F to 250 degrees F. To reach these high temperatures, you must use a pressure canner operated at 10 to 15 pounds per square inch of pressure (PSI). The exact time depends on the kind of food being canned, the way it is packed into jars and the size of jars.

Low-acid foods include red meats, seafood, poultry, milk, all fresh vegetables and some tomatoes. When you mix low-acid and acid foods, assume that the mixture remains low-acid.

Although tomatoes used to be considered an acid food, some are now known to have pH values slightly above 4.6, which means they are low-acid. To safely can them as acid foods in a boiling-water canner, you must add lemon juice or citric acid. For specific instructions on canning tomatoes, see MU publication GH1456, *Tantalizing Tomatoes: How to Can Fresh Tomato Products.*

Examine foods carefully

Don't taste foods that show any signs of spoilage, and never taste food from a jar with an unsealed lid. Some types of spoilage are easier to detect in jars stored without screw bands. When bacteria and yeast grow, they produce a gas that swells lids and breaks jar seals. Examine lids for tightness and vacuum. Lids with concave (curved inward) centers have good seals.

Next, hold the jar at eye level. While rotating the jar, look for streaks of dried food that have dripped down the exterior. Also, check for rising air bubbles and unnatural color in the food.

While opening the jar, try to smell unnatural odors, but do not actually sniff the jar contents. Look for spurting liquid and cotton-like mold growth (white, blue, black or green) on the food surface and underside of lid.

Adjust for altitude to ensure safety

It's important that you know your altitude — even in Missouri. Don't use process times recommended for canning food at sea level if you live at altitudes above 1,000 feet. (See the map of altitudes in Missouri.) Water boils at lower temperatures as altitude increases. Lower boiling temperatures are less effective for killing bacteria. You must increase either the process time or canner pressure to make up for lower boiling temperatures.

Suspect spoilage? Handle with care

Treat all jars and cans of spoiled low-acid foods, including tomatoes, as if they contained botulinum toxin. Be especially careful if jars have come unsealed. Use tongs to lift jars off shelf, then place them in a newspaper-lined, heavy garbage bag. Try not to spill jar contents. If any spills occur, put on rubber gloves and thoroughly scrub area. Discard sponge or wash cloth in the garbage bag. Seal garbage bag tightly and place in the trash or bury in a nearby landfill.

Stay clear of unsafe canning equipment and methods

Never open-kettle can or process jars of food in conventional ovens, microwave ovens or dishwashers. These practices do not prevent spoilage.

Steam canners are not recommended because safe processing times have not been adequately researched. Using boiling-water canner processing times with steam canners may result in spoilage. So-called "canning powders" are useless as preservatives and do not replace the need for proper heat processing.

Jars with wire bails and glass caps make attractive storage containers for dry foods, but don't use them for canning. One-piece zinc, porcelain-lined caps are also no longer recommended.

This material was adapted from the Complete Guide to Home Canning, United States Department of Agriculture, Agriculture Information Bulletin No. 539.

For more specific information on the canning process, jars, canners, testing for a good seal and storing canned foods, see MU publication GH1452, *Steps to Success in Home Canning*.

Map courtesy of MU Geography Extension, 1989.

For more information, visit MU Extension:
http://extension.missouri.edu

UNIVERSITY OF MISSOURI Extension

■ Issued in furtherance of the Cooperative Extension Work Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Director, Cooperative Extension, University of Missouri, Columbia, MO 65211
■ an equal opportunity/ADA institution ■ 573-882-7216 ■ extension.missouri.edu

$.50 GH1451 Revised 3/10/5M