

FNH-00562A

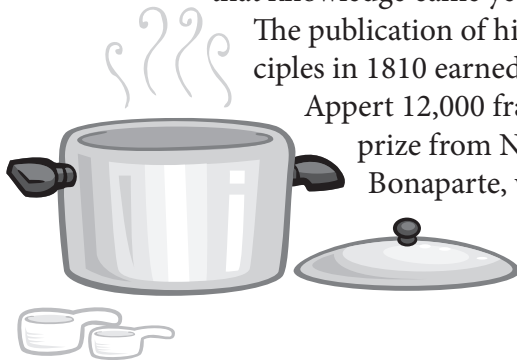
Back to Basics

by Roxie Rodgers Dinstel

Preserving food has been a problem for humans from the earliest times. If they lived in the Arctic, it was frozen. If they lived in the desert, food was dried. And if they lived near the ocean, it was pickled with salt water. Otherwise, food was eaten as fast as possible before it spoiled.

The big breakthrough in food preservation came in 1810, when a French confectioner, Nicholas Appert, discovered that food heated and sealed in glass bottles kept safely for months, or even years. He didn't know why; that knowledge came years later.

The publication of his principles in 1810 earned Mr. Appert 12,000 francs, a prize from Napoleon Bonaparte, who was



seeking a means of providing wholesome food for his undernourished troops.

Although the canning process eventually went commercial, canning food at home retains its importance. What was both a necessity and a source of satisfaction to farm wife and avid gardener now extends beyond the rural scene. Urban homemakers are experiencing the same sense of accomplishment from home canning.

Since 1810, of course, canning has been thoroughly and scientifically researched. Today, home canning is as safe and as easy as cooking a meal for immediate use, providing a few simple rules are followed. Whether home-canned and frozen foods make up a major part of your family's diet, or whether you just want to "put up" a few jars of old favorites, this series of food preservation information will help you every step of the way.

Preserving By Various Methods

Method of Preserving Food	Ease of Using Method	Costs	Nutrient Retention	Shelf Life
Canning	Intermediate	Best	Intermediate	Best
Freezing	Best	Worst	Best	Intermediate
Drying	Worst	Intermediate	Worst	Worst

Canning Basics

Canning is a simple method for capturing food's delicious and wholesome qualities at nature's very best and for preserving food for enjoyment at a later time. There are four reasons most people choose to can. These are: (1) saving available food for later use, (2) preference over commercial canned products, (3) family tradition and (4) special dietary considerations.

For all people, some understanding of what canning is and why it works will be most helpful. Canning is a perfectly safe method of preserving food, if directions are followed, and the basics of canning are easy to learn. Unless these basics are followed, canned goods may be unsuccessful and they can be quite harmful or even deadly to eat.

In the air and all around us are invisible microorganisms, such as molds, yeasts and bacteria. Many of these microorganisms are beneficial to us, while others can be harmful under certain conditions. All foods in their natural state contain these microorganisms to some degree. They are what cause food to spoil. The natural progression is that food left unprotected will begin to change color and flavor and will eventually spoil and decompose.

Canning interrupts this natural process by heating the food in containers that seal. The heat destroys the potentially harmful microorganisms. At the same time, air is driven from the container and a partial vacuum is formed, preventing other microorganisms from entering and recontaminating the food. This partial vacuum indicates the sealing of the jar.



Two Kinds Of Food

For the purpose of canning, all foods are divided into two classifications:

Acid or Low-Acid

Acid Food — Acid foods are those that contain natural acid. Each food is different and may vary in acidity. Generally, all fruits are acid. Tomatoes, which many of us think of as a vegetable, are technically a fruit and are treated as acids in canning.

Sauerkraut and rhubarb and foods to which vinegar is added, such as certain pickles and relishes, are also treated as acids.

Low-Acid Food — Low-acid foods contain very little natural acidity. Low-acid foods are all vegetables, meats, poultry, seafoods, mushrooms and soups. Mixed canned foods, which might contain part low-acid and part acid foods (such as tomatoes) should be treated as low-acid food.

The importance of acidity to the home canner is that molds and yeasts, which exist in acids, are easily destroyed by heating filled jars in briskly boiling water for a period of time. The acid in food in combination with the heating is adequate to safely preserve the acidic food. Some bacteria, however, thrive in low acids and cannot readily be destroyed at boiling water temperatures.

The heating of the food within the canning containers is called processing. Unless canned food is thoroughly processed for the proper time and at the proper temperature, it is likely to spoil, because all the microorganisms may not be destroyed. In addition, a proper seal may not be achieved, allowing microorganisms to enter the food, causing spoilage or food-borne illness.

The Spoilers

Molds and yeasts are fungi, easily destroyed at temperatures between 140° and 190°F.

Enzymes are proteins present in all living things. They promote normal organic changes necessary to the life cycle. Enzymes are easily destroyed by heat at a temperature of 140°F.

Bacteria are not so easily destroyed. Certain bacteria actually thrive at temperatures that destroy molds, yeasts and enzymes.

Salmonella bacteria are destroyed when held at 140°F. *Staphylococcus aureus* (staph) bacteria are stopped if food is kept above 140°F. But staph produces a toxin that can be destroyed only by long hours of boiling or by superheating to 240°F for a relatively short time. *Clostridium botulinum* is a bacterium that may exist in spore form in food. The spores must be destroyed during processing or they can grow and produce one of the most powerful poisons known. The toxin and the spores cannot be destroyed at 212°F. Furthermore, the botulism-causing bacteria thrive on low-acid foods in the absence of air and in a moist environment, conditions that are exactly like the conditions inside a jar of canned meat or vegetables. Because of bacteria, low-acid foods must be brought to 240°F, which is hotter than the boiling point of water.

Two Methods Of Canning/Processing

Boiling Water Method

High acid foods can be processed in a boiling-water canner. This is any kettle large enough for the canning jars to be completely immersed in and fully surrounded by boiling water, with the water covering the jars by at least 1 to 2 inches. The kettle should be big enough to allow room for a rolling boil.

Generally, boiling-water canners have a tight-fitting cover and a metal basket or rack to



hold the jars off the bottom of the kettle and to separate the jars from each other. The jars must be held off the bottom so the heat can penetrate properly and to protect the jars from breakage.

Pressure Method

Low-acid foods must be processed in a pressure canner. This is a heavy kettle with a lid which can be clamped or locked down to make a steam-tight lid. The lid is fitted with a safety valve, a vent to allow air to escape (petcock) and a pressure gauge.

Two types of pressure canners are available commercially: those with dial gauges and those with weighted gauges. Dial gauges must be checked periodically for accuracy. If the gauge is incorrect, the processing of canned goods will not be accurate and all bacteria, including botulism, may not be killed. Your pressure cooker gauge can be checked at your local Extension office.

The vent (petcock) on your pressure canner allows steam to escape under a controlled pressure. If the petcock should inadvertently become plugged, the safety valve is designed to pop, which releases pressure and prevents the kettle from exploding.

Because of the twin dangers of underprocessed food and steam under high pressure, it is imperative that all parts of the pressure canner be kept clean and in good working order. Make sure the petcock and safety valve are free of obstructions. As long as the canner is clean

and working well and foods are processed for the prescribed times and temperatures, pressure canning is a perfectly safe and efficient method for canning low-acid foods. If, for any reason, the pressure should drop during processing, the processing time must be recounted from the beginning.

The manufacturer's directions should be followed for your own pressure canner.

Pressure saucepans — or pressure cookers, as they are sometimes called — work similarly to pressure canners, except they usually are smaller. The smaller pressure saucepans or cookers cannot be used in place of a pressure canner.

References

USDA Complete Guide to Home Canning. Online version: www.uga.edu/nchfp/publications/publications_usda.html. Print version (\$18): https://mdc.itap.purdue.edu/item.asp?item_number=AIG-539#.VWTLiZRdWrY.

So Easy to Preserve. \$18. University of Georgia Cooperative Extension Service: www.uga.edu/setp.

Ball Blue Book. Ball Corporation, Consumer Products Division, Consumer Affairs, 345 S. High, Muncie, IN 47305-2326.

www.uaf.edu/ces or 1-877-520-5211

Roxie Rodgers Dinstel, Extension Faculty, Health, Home and Family Development.



Published by the University of Alaska Fairbanks Cooperative Extension Service in cooperation with the United States Department of Agriculture. The University of Alaska Fairbanks is an affirmative action/equal opportunity employer and educational institution.

©2016 University of Alaska Fairbanks.

9-05/RD/10-16

Revised June 2015