



Food Preservation Workshop



University of Kentucky
College of Agriculture,
Food and Environment
Cooperative Extension Service

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Table of Contents

A	Home Canning Basics.....	1	FAQ	FAQ – Drying.....	105
A	Measuring Headspace.....	8	J	Home Canning Pickled and Fermented Foods...	107
FAQ	FAQ – General.....	9	FAQ	FAQ – Pickles.....	130
FAQ	FAQ – Misc.....	11	K	Home Canning Jams and Jellies.....	131
B	Home Canning Vegetables.....	13	FAQ	FAQ – Jellied Fruit...	143
e	Home Canning Tomatoes and Tomato Products....	27	L	Home Canning Soups, Stocks & Stews.....	145
D	Home Canning Salsa.....	43	M	Home Canning Meats....	159
E	Home Canning Fruit.....	55	N	Jerky Safety.....	169
FAQ	FAQ – Veggies & Fruits....	67	FAQ	FAQ – Meats.....	170
F	Home Freezing Basics.....	69	O	Safe Home Canning: Altitude Adjustments..	171
G	Freezing Fresh Fruits.....	73	P	Kentucky Proud Produce Chart.....	173
H	Freezing Vegetables.....	81			
FAQ	FAQ – Freezing.....	85			
I	Drying Food at Home....	89			





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Home Canning Basics

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Introduction

People choose to can foods at home for many reasons: to preserve the harvest from their gardens or local farmers markets for year-round enjoyment; to gain more control over what is in their food by limiting or avoiding salt, sugar or preservatives; to save money; to get better-tasting canned foods; to follow family traditions; or just for the sense of satisfaction that home canning provides.

Home canning has changed over the last 200 years. Scientists have found ways to produce safer, higher quality products, including the design of better home canning equipment and supplies. Because many microorganisms live and multiply quickly on the surfaces of fresh fruits and vegetables, methods of home canning should always follow research-based recommendations. The advantages of home canning are lost when you start with poor quality fresh foods; when jars fail to seal properly; when food spoils; or when color, texture, flavors and nutrients deteriorate during prolonged storage. Following the correct procedures can ensure safely canned foods that are of top quality and may be stored for up to two years.

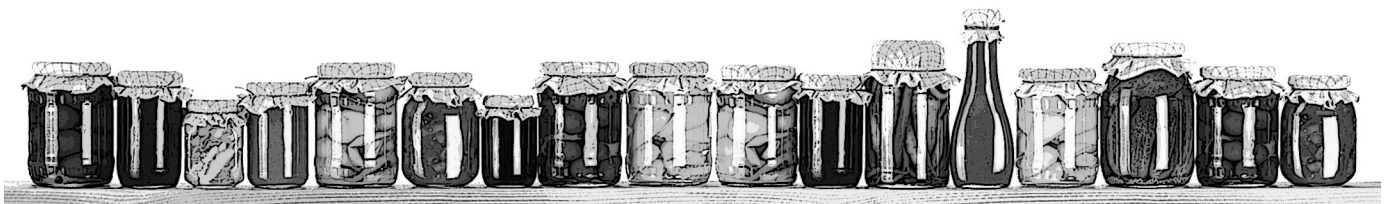
Jars and Equipment

Home canning requires the use of specialized jars that have been designed to be reused under home canning methods. The USDA recommends Mason-

type jars with two-piece screw-on caps. Jars come in a variety of sizes for efficient use of your home-canned products. There are numerous manufacturers of canning jars. It is important that you purchase jars and lids that were manufactured and advertised as canning jars. Canning jars go through a tempering process during manufacturing and are less susceptible to breakage. Commercial single-use jars from mayonnaise, peanut butter, etc., should not be used because they are more prone to breaking during the canning process.

Jars advertised as storage jars should not be used for canning. Likewise you should not use glass mason jars purchased in the crafting section of certain stores. Storage jars and crafting jars cannot withstand the repeated heating and cooling associated with the canning process and are more susceptible to breakage. In addition, the necks of the jar and sealing edges are often different than canning jars so lids and bands do not apply correctly.

Before use, all empty jars should be washed with soap and hot water and rinsed, with a dishwasher if desired. Hard water films may be removed easily with a soak in a solution containing 1 cup of vinegar per gallon of water. All jars to be processed less than 10 minutes should be sterilized for 10 minutes. They can be boiled in the boiling water canner before using it for processing. Jars that



will be processed 10 minutes or longer should be washed and rinsed but do not need to be boiled.

A canning funnel, flexible spatula, jar lifter, and lid wand will make home canning easier. These items are usually available from any local grocery store that carries home canning supplies.

Filling

You must correctly fill jars and adjust the two-piece caps for successful home canning. There are two methods of packing food into the jars: raw pack and hot pack.

The raw pack method is used for delicate foods that are usually easier to handle raw. There may be shrinkage during processing, causing some foods to float to the top of the jar or expand into the headspace.

The hot pack method involves preheating the food for a specified length of time before placing it into the hot jars. Heating the food first allows for a tighter pack that requires fewer jars and removes more air from the food. In the boiling water canner, hot packed food also requires less time for the canner to reach boiling because the food and jars are already hot. Hot packed home canned foods maintain color and flavor better than raw packed foods.

Headspace is the space between the top of the jar and the top of the food. The less air in this space, the higher the quality of the canned product. As a general rule, juices, jams, and jellies require a quarter inch of headspace; high-acid foods, fruits, tomatoes, pickles, and relishes require a half inch; and low-acid foods, vegetables, and meats require a headspace of one inch or more. A USDA-recommended recipe will specify the correct headspace to use.

Once the jars are packed with food, any air bubbles should be removed. A plastic knife or spatula can be pressed from the side of the jar into the food to release trapped air. Do not use metal

utensils as this may result in glass chipping or breakage. After removing air bubbles, adjust the headspace if necessary by adding more product.

The research-recommended two-piece metal cap consists of a screw band and a flat lid. The lid has a sealing compound inside the edge, designed to allow air to escape as the food in the jar is heated during processing and then to adhere to the glass rim as the jar cools and a vacuum is formed. Lids are designed to be used only once, but bands may be reused if they are without rust or nicks. Before use, wash lids and bands in hot soapy water and rinse well. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids. The jar rim should be wiped clean before adding the lid. The band should be tightened only fingertip tight to prevent disturbing the seal when you remove the band for storage. Over tightening may also cause the metal lid to buckle during processing.

Processing

Presently, only two research-based methods are acceptable for the home canning of safe and quality products: the boiling water method or the pressure canner method. The method used to process home canned products depends on the type of raw product and whether or not the recipe has the addition of an acid. To ensure that the finished product is safe, it is crucial not to change or modify the recipe, processing method or processing time. There are no USDA-approved conversions between boiling water canner and pressure canner processing times available to home canners. Inspect your equipment and supplies for proper working condition before you begin to process food.

Note: Currently, open-kettle canning, oven canning, and the use of small pressure cookers are *not* recommended for home canning.

Pressure cookers are sometimes advertised as canners but should not be used for pressure canning.

Research by the National Center for Home Food Preservation (NCHFP) has found atmospheric steam canners safe for processing high acid foods or acidified foods with a pH of 4.6 or below. Examples include peaches, pears, apples, salsa or pickles. USDA research-based recipes and process times and methods, along with other guidelines are recommended to produce a safe and good tasting product. Atmospheric steam canners are not appropriate or safe to pressure can low acid foods, such as vegetables. For more information on safely using an atmospheric steam canner for home food preservation, contact your local Extension Office or http://nchfp.uga.edu/publications/nchfp/factsheets/steam_canners.html.

The Boiling Water Method

High-acid foods can be processed in a boiling water canner. Fruits are considered naturally high-acid foods. With the addition of lemon juice, citric acid, or vinegar in the right proportion, tomatoes, pickles, and relishes also become high-acid foods. When high-acid foods are processed at a boiling water temperature (212°F) for the time specified in the recipe, the process is adequate to inactivate enzymes and destroy molds, yeast, and some bacteria. (Tomatoes are usually considered a high-acid food, but some varieties are not high acid; thus, it is recommended to add an acid to safely process tomatoes in a boiling water canner.)

Steps for successful boiling water canning

1. Assemble all equipment and utensils. Rinse ingredients as needed.
2. Fill the canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. If you have a canner rack, position it in the canner. Begin preparing the recipe while the water is preheating. In about 20 to 30 minutes the water will begin to boil.
3. Prepare the recipe, fill the jars to the appropriate headspace, and remove any air bubbles. After adjusting the two-piece caps, load the jars into the canner one at a time. (A jar lifter will make this activity safer and more efficient.) Keep the jars upright at all times to prevent food from spilling into the sealing area and interfering with the final seal.
4. Add more boiling water if needed so that the water level is at least one inch above the jar tops.
5. Turn up the heat so that the water boils vigorously. Place the lid on the canner. When the water begins to boil, begin timing the process, as indicated in the recipe. The heat setting may be lowered as long as a gentle but complete boil is maintained for the entire processing time.
6. Set a timer for the total number of minutes indicated in the recipe.
Note: If the water stops boiling at any time during the process, increase the heat to return to a complete boil and start the timing of the process all over again.
7. When the jars have been processed in boiling water for the recommended time, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
8. Using a jar lifter, remove the jars one at a time, keeping them upright. Carefully place them on a towel, leaving a one-inch space between the jars for proper cooling.
9. Leave the jars undisturbed for at least 12 hours. (As the jars cool, the vacuum seal forms.)
10. After 12 to 24 hours, test seals and remove bands. Wash outside of jars and lid surfaces. Date and label jars and store in a cool, dry place for up to two years.

The boiling water method should not be used for processing low-acid foods such as meats, poultry, seafood, milk, and fresh vegetables, since it does not reach high enough temperatures to destroy certain bacterial spores and toxins that cause botulism. All low-acid foods should be processed in a pressure canner following research-recommended instructions.

The boiling water canner is generally made of aluminum or porcelain-covered steel. It usually includes a removable rack for ease of loading and unloading jars and a fitted lid to keep the heat in while the water is boiling during processing. The canner must be deep enough to cover the tops of the jars by at least one inch with briskly boiling water during processing. Any pan that meets these specifications will work as a boiling water canner.

If you have an electric range, you will need a boiling water canner that has a flat bottom. A boiling water canner that has either a flat or ridged bottom may be used on a gas range. A loaded canner is heavy. If you have a flat-top electric range, you will need to lift the canner straight up, without sliding it, to prevent scratching the flat top.

The Pressure Canner Method

Low-acid foods have a pH higher than 4.6. Meats, seafood, poultry, milk, and all fresh vegetables are considered low-acid foods. These foods must be processed in a pressure canner, where temperatures of 240° to 250°F can be attained at 10 to 15 pounds of pressure. Maintaining this high temperature for the amount of time specified in the recipe destroys spores that can cause botulism. The specified time depends on the kind of food being canned, the way it is packed into the jar, and the size of the jar.

Buying a pressure canner at a yard sale is probably not a good idea, as replacement parts and manufacturer's instructions may no longer be available.

Many people are intimidated by the thought of using a pressure canner. With a little information and the correct process, you'll be pressure canning like a pro. Pressure canners made after 1997 have been redesigned with more safety features, and they are lighter in weight. The newer lids usually have a sealing ring that fits into a groove in the lid, preventing steam from escaping between the lid and the canner rim. Choose a pressure canner that has been approved by Underwriter's Laboratory (UL) to ensure that it meets current safety guidelines. Follow the manufacturer's instructions regarding care and maintenance of the canner. Pressure canners only need one to two inches of water in the bottom of the canner. Read the manufacturer's instructions to find this information.

Two types of gauges are available to regulate pressure: the dial gauge and the weighted gauge. A dial gauge is easy to read because it indicates the pounds of pressure on the dial. A counterweight or pressure regulator will cover the vent to allow pressure to build up within the pressure canner. A dial gauge should be checked for accuracy annually. Your local county Extension office has equipment to perform this test. If the gauge reads high or low by more than two pounds at 10 pounds of pressure, replace it. A weighted gauge is round with different-sized holes around the edge. Each hole indicates the amount of pressure that will build up inside the pressure canner. A weighted gauge will usually jiggle several times a minute or rock gently when the correct pres-

Older canner models may take up to one hour to cool when fully loaded with quart jars.

Newer canner models cool more rapidly and are usually fitted with vent locks that open when the pressure is at zero. These canners are depressurized when the piston in the vent lock drops to a normal position. If the lid will not open, there may be a hidden lock in the canner handles.

Steps for successful pressure canning

1. Assemble all equipment and utensils. Rinse ingredients as needed.
2. Prepare the recipe, fill the jars to the appropriate headspace, remove air bubbles, and adjust the two-piece caps.
3. Depending on your manufacturer's instructions, place one to two inches of hot water in the canner. Place filled jars on the rack using a jar lifter. Keep jars upright at all times to prevent food from spilling into the sealing area and interfering with the final seal. Fasten the canner lid securely. Leave the weight off the vent port or open the petcock.
4. Heat the canner on high until the water boils and generates steam that can be seen escaping through the open vent port or petcock. When a funnel shape of steam begins to continuously escape the canner, set a timer for 10 minutes.
5. After 10 minutes of continuous steam, you can close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner. The canner should pressurize within three to ten minutes.
6. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or for canners without dial gauges, when the weighted gauge begins to jiggle or rock as the manufacturer describes.
7. Regulate the heat under the canner to maintain a steady pressure at, or slightly above, the correct gauge pressure. Loss of pressure at any time can result in underprocessing or unsafe food. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars.
Note: If the pressure drops below the recommended pounds, increase the heat to bring the canner back up to pressure and start the timing of the process all over again.
8. When the timed process is finished, it is best to remove the canner from the stove and allow it to cool naturally to return to zero pressure. Forced cooling before the canner is fully depressurized will cause a loss of liquid from jars and failed seals. Forced cooling may also warp the canner lid.
9. After the canner is completely depressurized, remove the weight from the vent port or open the petcock. At this point, the canner and contents will still be hot. Wait 10 minutes; then unfasten the lid and remove it carefully. Lift the lid with the underside away from you so that the steam coming out of the canner does not burn your face.
10. Using a jar lifter, remove the jars one at a time, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
11. Leave the jars undisturbed for at least 12 hours. (As the jars cool, the vacuum seal forms.)
12. After 12 to 24 hours, test seals and remove bands. Wash outside of jars and lid surfaces. Date and label jars and store in a cool, dry place for up to two years.

Altitude affects processing times and pressures. If you live at an altitude greater than 1,000 feet, please consult the website for the National Center for Home Food Preservation located at <http://nchfp.uga.edu/>.

sure is being maintained. Always read the manufacturer's directions to know how a particular weighted gauge should rock or jiggle. A weighted gauge should maintain its accuracy as long as you don't drop it or plug the vent.

Once the lid is firmly in place on the canner, usually secured with a twist, the air trapped inside the canner must be removed. This process is known as venting or exhausting the canner. To vent a canner, leave the vent port uncovered (or manually open the petcock on some older models). Heat the canner on high until the one to two inches of water boils and generates steam that can be seen escaping through the open vent port or petcock. When a funnel shape of steam begins to continuously escape the canner, set a timer for 10 minutes. After 10 minutes of continuous steam, the canner is vented. You can close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner.

Reprocessing Unsealed Jars

After cooling, the metal lids on properly sealed jars will be concave (curved down slightly in the center). If any jars fail to seal, remove the lids and check the jar edges for nicks. If necessary, change the jars. If the jars are sound, wipe the rims, add new (properly prepared) lids, and reprocess within 24 hours. Use the processing time specified in the recipe.

As an alternative to reprocessing, the jar contents may be frozen for storage. Adjust the headspace to one and a half inches and apply a clean lid before freezing. The food in single unsealed jars may be refrigerated and eaten within several days.

Signs of Spoilage in Canned Foods

Before using stored canned foods, check each jar for signs of spoilage. Do not use any that have come unsealed or show any of the following signs: dried

food on the outside of the jar, indicating seepage; rising air bubbles; cloudiness; unnatural color; spurting liquid when opened; disagreeable odor; or mold growth on the food surface or underside of the lid. Spoiled food should be disposed of safely. If the suspect jars are still sealed but exhibiting signs of spoilage (swollen lid, rising air bubbles, streaks of dried food, yeast or mold growth, unnatural color), place the jars in a heavy garbage bag. Close the bag and place in a regular trash container or dispose in a landfill. If the suspect jars are unsealed, open or leaking, they should be detoxified before disposal. To detoxify canned food start by wearing disposable rubber or heavy plastic gloves. Gently place the suspect jars and lids on their sides in an 8-quart or larger stock pan or boiling water canner. Wash your gloved hands thoroughly. Add water to the pot and be careful not to splash the water. The water should cover the jars with a minimum of 1-inch level above the jars. Place a lid on the pot and heat to boiling. Boil for 30 minutes to ensure detoxifying the food and all jar components. Cool the jars, lids and food before throwing away or dispose in a landfill. Use a fresh bleach solution made from 1 part unscented liquid bleach (5%-6% sodium hypochlorite) to 5 parts clean water to sanitize work surfaces, equipment, or other items that may have come in contact with the suspect jars or food. Spray or dampen all contaminated surfaces with the bleach solution and let stand for 30 minutes. Wearing gloves, clean up any spills with paper towels. Place the paper towels and gloves in a plastic bag before putting them in the trash. The same sanitizing procedure above should be used on surfaces where spills were cleaned. NOTE: Bleach is an irritant. The vapors should not be inhaled and the liquid should not come in contact with the skin.

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Measuring Headspace



Most Frequently Asked Canning Questions

General

1. Can food be re-canned if the lid does not seal?

Canned food can safely be re-canned if the unsealed jar is discovered within 24 hours. To re-can, remove the lid and check the jar sealing surface for tiny nicks. Change the jar if necessary; add a new prepared lid and reprocess using the same processing time.

2. If canned foods have been frozen during storage, are they safe to eat?

Freezing does not cause food spoilage unless the seal is damaged or the jar is broken. These often happen as the food expands during freezing. Frozen foods, however, may be less palatable than properly stored canned food. In an unheated storage place, protect canned foods by wrapping the jars in paper or covering them with a blanket.

3. If my recipe doesn't call for processing, do I need to do so?

Many recipes passed down through the years or found in older cookbooks do not include instructions for processing. The foods are usually canned by the open kettle method, sealed and stored. Foods prepared in this manner present a serious health risk — particularly low acid foods. To minimize the risk of food spoilage, all high acid foods should be processed in a water bath canner or pressure canner and all low acid foods in a pressure canner.

4. Do I really need to leave a certain amount of headspace in the jar?

Yes, leaving the specified amount of headspace in a jar is important to assure a vacuum seal. If too little headspace is allowed the food may expand and bubble out when air is being forced out from under the lid during processing. The bubbling food may leave a deposit on the rim of the jar or the seal of the lid and prevent the jar from sealing properly. If too much headspace is allowed, the food at the top is likely to discolor. Also, the jar may not seal properly because there

will not be enough processing time to drive all the air out of the jar.

5. How long will canned food keep?

Properly canned food stored in a cool, dry place will retain optimum eating quality for at least 1 year. Canned food stored in a warm place near hot pipes, a range, a furnace, or in indirect sunlight may lose some of its eating quality in a few weeks or months, depending on the temperature. Dampness may corrode cans or metal lids and cause leakage so the food will spoil.

6. Is it necessary to sterilize jars before canning?

Jars do not need to be sterilized before canning if they will be filled with food and processed in a boiling water bath canner for 10 minutes or more or if they will be processed in a pressure canner. Jars that will be processed in a boiling water bath canner for less than 10 minutes, once filled, need to be sterilized first by boiling them in hot water for 10 minutes before they're filled.

7. Is it safe to process food in the oven?

No. This can be dangerous because the temperature will vary according to the accuracy of oven regulators and circulation of heat. Dry heat is very slow in penetrating into jars of food. Also, jars explode easily in the oven.

8. Can two layers of jars be processed in a canner at one time?

Yes, two layers can be processed at one time, in either the boiling water bath or pressure canner. Place a small wire rack between the layers so water or steam will circulate around each jar. Make certain that the water covers the tops of all jars by 1 inch in a boiling water bath canner. The pressure canner should have 2 to 3 inches of water in the bottom.

9. Is it necessary to exhaust a pressure canner?

Yes, it is very important to allow steam to escape for 10 minutes before closing the valve, or placing the weight on the vent. If the canner is not exhausted, the inside temperature may not correspond to the pressure on the gauge.

10. Should liquid lost during processing be replaced?

No. Loss of liquid does not cause food to spoil, though the food above the liquid may darken. If, however, the loss is excessive (for example, if at least half of the liquid is lost), refrigerate the jar(s) and use within 2 to 3 days.

11. Is it alright to reuse jar fittings (lids and bands)?

Lids should not be used a second time since the sealing compound becomes indented by the first use, preventing another airtight seal. Screw bands may be reused unless they are badly rusted or the top edge is pried up which would prevent a proper seal.

12. Why is open kettle canning not recommended?

In open kettle canning, food is cooked in an ordinary kettle, then packed into hot jars and sealed without processing. The temperatures obtained in open kettle canning are not high enough to destroy all spoilage and food poisoning organisms that may be in the food. Also, microorganisms can enter the food when it is transferred from the kettle to jar and cause spoilage.

13. Why do the undersides of metal lids sometimes discolor?

Natural compounds in some foods, particularly

acids, corrode metal and make a dark deposit on the underside of jar lids. This deposit on lids of sealed, properly processed canned foods is harmless.

14. What causes jars to break in a canner?

Breakage can occur for several reasons: 1. Using commercial food jars rather than jars manufactured for home canning, 2. Using jars that have hairline cracks, 3. Putting jars directly on bottom of canner instead of on a rack, 4. Putting hot food in cold jars, or 5. Putting jars of raw or unheated food directly into boiling water in the canner, rather than into hot water (sudden change in temperature-too wide a margin between temperature of filled jars and water in canner before processing).

15. If I find mold growing inside a jar of canned food, can I just scrape it off and eat the food?

Mold growth in foods can raise the pH of the food. In home canned products, this could mean that the high acid products could become low acid and therefore run the risk of botulism or other bacterial spoilage. Thus, any home canned product that shows signs of mold growth should be discarded. USDA and microbiologists now recommend against even scooping out the mold on jams and jelly products and using the remaining jam or jelly, even though that used to be suggested.

16. How can I remove scale or hard-water film from canning jars?

Soak jars for several hours in a solution containing 1 cup of vinegar and 1 gallon of water.

Source: National Center for Home Food Preservation

Most Frequently Asked Canning Questions

Miscellaneous

1. Can I can bread or cake in a jar?

These products are not recommended for canning; choose recipes that you can freeze. In fact, most of these products are not really "canned." The directions call for baking in the jar and then closing with a canning lid. Many recipes for quick breads and cakes are low-acid and have the potential for supporting the growth of a bacteria like *Clostridium botulinum* if it is present inside the closed jar. One university's research showed a high potential for problems. You will see these products made commercially; however, additives, preservatives and processing controls not available for home recipes are used. Canning jar manufacturers also don't endorse baking in their canning jars.

2. How do I can oil with herbs? Can I make pesto?

Herbs and oils are both low-acid and together could support the growth of the disease-causing *Clostridium botulinum* bacteria. Oils may be flavored with herbs if they are made up for fresh use, stored in the refrigerator and used within 2 to 3 days. There are no canning recommendations. Fresh herbs must be washed well and dried completely before storing in the oil. The very best sanitation and personal hygiene practices must be used. Pesto is an uncooked seasoning mixture of herbs, usually including fresh basil, and some oil. It may be frozen for long term storage; there are no home canning recommendations.

Source: National Center for Home Food Preservation

Home Canning Vegetables

Home canning vegetables from your garden or local farmers market can help you save money and gain control over what's in your food while preserving the bounty of summer for your family's year-round enjoyment. To ensure safe, high quality home-canned products, always follow research-based recommendations when canning.

Ingredients

Select fresh, firm, young vegetables with no signs of spoilage and process them as soon as possible after harvesting. Canning will not improve the quality of produce. If you buy the vegetables you are going to can, try to get them from a local farm or farmers market, since spoilage and loss of vitamins can begin right after harvest. Wash vegetables well, whether or not they will be peeled before processing. Soil may contain many bacteria, including the spores of *Clostridium botulinum*. For ease of packing, uniform cooking, and even heat penetration during processing, vegetables should be sorted or cut into uniformly sized pieces.

Salt is optional in canning vegetables. It is used only for seasoning and does not help to preserve the food. If salt is used, canning salt is recommended to prevent cloudiness in the canned product.

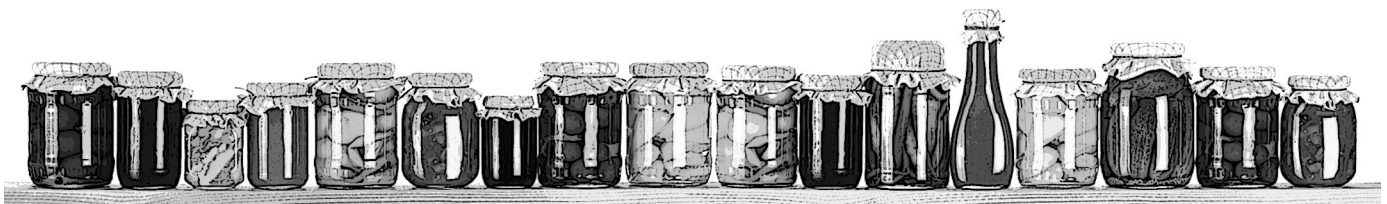
Filling Jars

There are two methods that can be used for packing food into the jars—raw pack and hot pack. Raw pack means putting raw, unheated food into the jars. When using this method, most vegetables should be packed tightly because the raw vegetables will shrink during processing. However, some starchy raw vegetables (corn, lima beans, potatoes, and peas) will expand during processing, and these should be packed loosely into the jars.

Hot pack involves cooking or heating the food for a specified length of time before packing it into the jars. This practice helps to remove the air from food tissues, shrinks the food, increases the vacuum in sealed jars, and improves shelf life. When using this method, the hot vegetables should be packed loosely into the jars, since shrinkage has already taken place.

Some recipes have directions for both raw and hot packs. Others specify one or the other, depending on which method is most suitable for

To prevent the risk of botulism, all home-canned vegetables must be processed in a pressure canner.



Some vegetables, including broccoli, cauliflower, cabbage, zucchini, summer squash, kohlrabi, and Brussels sprouts, are not suitable for home canning. Try freezing, pickling, or drying these vegetables for long-term storage. When preserving food, always use research-based recipes, such as those found on the National Center for Home Food Preservation website at <http://nchfp.uga.edu/>, or in the University of Georgia's *So Easy to Preserve*.

the specific vegetable being canned. Always use the type of pack specified in the recipe and the processing time that goes with that pack. If given a choice, the hot pack usually yields better color and flavor.

The size of the jar will affect the rate of heat penetration into the food. To ensure that all of the food in the jar receives the full heat treatment needed to destroy spores of harmful bacteria that may be present, use only the jar sizes specified in the recipe and the processing time given for each jar size. Do not use jars that are larger than those specified in the recipe.

Why Do I Need to Use a Pressure Canner?

High-acid foods (those with a pH of 4.6 or lower) contain enough acid to help control the growth of harmful bacteria and can be safely processed in a boiling water canner. However, all fresh vegetables are low-acid foods, with pH levels ranging from 4.9 to 7.3. They do not contain enough acid to prevent the growth of the bacterium *Clostridium botulinum*, which produces the toxin that causes botulism. For these foods, the high temperatures reached in a pressure canner (240 to 250°F at 10 to 15 pounds of pressure) are necessary to destroy any spores of *Clostridium botulinum* that might be present. This method prevents the spores from growing into bacterial

cells in the canned product and producing the deadly botulism toxin. The high temperature must be maintained for a specified length of time, depending on the vegetable being canned, the way it is prepared and packed into the jar, and the size of the jar. It is important to always use the full processing time and pressure specified in each recipe.

If there is any question as to whether or not home canned foods were processed according to USDA guidelines, it is recommended that low-acid and tomato foods be boiled in a saucepan for at least 10 minutes before consuming even if there are no visible signs of spoilage.

Altitude affects processing times and pressures. The processing times and pressures given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, please consult the website for the National Center for Home Food Preservation located at <http://nchfp.uga.edu>.

For more information on safe home canning and the pressure canner method, please see *Home Canning Basics* (FCS3-578).

Step-By-Step Canning

Pressure Canner Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids
3. Use top-quality ingredients; wash fresh vegetables well. Prepare the recipe, following the directions given.
4. Fill the hot jars, leaving the headspace specified in the recipe. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
5. Following your manufacturer's instructions, place one to two inches of hot water in the pressure canner. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Fasten the canner lid securely. Leave the weight off the vent port or open the petcock.
6. To vent the canner, heat on high until the water boils and generates steam that can be seen escaping in a funnel shape through the open vent port or petcock. Set a timer for 10 minutes. After 10 minutes of continuous steam, close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner. The canner should pressurize within three to ten minutes.
7. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the manufacturer describes. Regulate the heat under the canner to maintain a steady pressure at, or slightly above, the correct gauge pressure for the whole processing time.
8. When the processing time specified in the recipe is complete, turn off the heat to allow the canner to cool naturally and return to zero pressure. After the canner is completely depressurized, remove the weight from the vent port or open the petcock. At this point, the canner and its contents will still be hot. Wait 10 minutes, then unfasten the lid and remove it carefully, with the underside away from you so that the steam coming out of the canner does not burn your face.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years.
12. Enjoy your very own canned vegetables.

Beans—Green (Snap, Wax or Italian)

Ingredients

- 2 pounds beans per quart
- 1 teaspoon canning salt per quart (optional)
- water to cover

Directions

Hot Pack

- Prepare beans: Select filled but tender, crisp pods. Remove and discard diseased and rusty pods. Wash beans and trim ends. Leave whole or cut or snap into 1-inch pieces.
- In a large saucepan, cover beans with boiling water; boil 5 minutes.
- Pack hot beans loosely into hot pint or quart jars, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle boiling hot cooking liquid over beans, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 20 minutes, quart jars 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare beans: Select filled but tender, crisp pods. Remove and discard diseased and rusty pods. Wash beans and trim ends. Leave whole or cut or snap into 1-inch pieces.
- Pack raw beans tightly into hot pint or quart jars, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle boiling water over beans, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 20 minutes, quart jars 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 14 pounds is needed per canner load of 7 quarts; an average of 9 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 19 calories, 0 g fat, 3 g carbohydrate, 1 g protein

Beans or Peas—Shelled, Dried (All Varieties)

Ingredients

- ¾ pound shelled beans or peas per quart
- 1 teaspoon canning salt per quart (optional)
- water to cover

Directions

Hot Pack

- Prepare beans: Select mature, dry beans or peas. Sort out and discard discolored seeds. Wash beans or peas.
- Rehydrate dried beans or peas by using one of the following soaking methods:
 - » Place dried beans or peas in a large saucepan and cover with water. Soak 12 to 18 hours in a cool place. Drain water.
 - » Place dried beans or peas in a large saucepan and cover with boiling water. Boil 2 minutes. Remove from heat; soak 1 hour. Drain water.
- In a large saucepan, cover soaked, drained beans or peas with fresh water and boil 30 minutes.
- Add ½ teaspoon salt to each hot pint jar or 1 teaspoon salt to each hot quart jar, if desired.
- Fill hot jars with hot beans or peas and cooking water, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes, quart jars 90 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 5 pounds is needed per canner load of 7 quarts; an average of 3¾ pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 98 to 149 calories, 0 to 1 g fat, 18 to 28 g carbohydrate, 6 to 10 g protein (depending on variety)

Carrots—Sliced or Diced

B

Ingredients

- 2½ pounds carrots (without tops) per quart
- 1 teaspoon canning salt per quart (optional)
- water to cover

Directions

Hot Pack

- Prepare carrots: Select small carrots, preferably 1 to 1¼ inches in diameter. Larger carrots are often too fibrous. Wash, peel, and rewash carrots. Slice or dice.
- In a large saucepan, cover carrots with boiling water; bring to a boil and simmer for 5 minutes.
- Pack hot carrots into hot pint or quart jars, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle hot cooking liquid over carrots, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 25 minutes, quart jars 30 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare carrots: Select small carrots, preferably 1 to 1¼ inches in diameter. Larger carrots are often too fibrous. Wash, peel, and rewash carrots. Slice or dice.
- Pack raw carrots tightly into hot pint or quart jars, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle hot water over carrots, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 25 minutes, quart jars 30 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 17½ pounds (without tops) is needed per canner load of 7 quarts; an average of 11 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 18 calories, 0 g fat, 4 g carbohydrate, 0 g protein

Corn—Cream Style

Ingredients

- 2¼ pounds sweet corn per pint
- ½ teaspoon canning salt per pint (optional)
- 1 cup boiling water per pint

Directions

Hot Pack

- Prepare corn: Select ears containing slightly immature kernels, or of ideal quality for eating fresh. Husk corn, remove silk, and wash ears.
- In a large saucepan, blanch ears 4 minutes in boiling water.
- Cut corn from cob at about the center of kernel. Scrape remaining corn from cobs with a table knife.
- To each pint of corn and scrapings, in a large saucepan, add 1 cup of boiling water. Heat to boiling.
- Add ½ teaspoon salt to each pint jar, if desired.
- Fill hot pint jars with hot corn mixture, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 1 hour 25 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 20 pounds (in husks) is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 92 calories, 1 g fat, 23 g carbohydrate, 2 g protein

Caution. Quart jars are not recommended due to the denseness of the canned product.



Corn—Whole Kernel

Ingredients

- 4½ pounds sweet corn per quart
- 1 teaspoon canning salt per quart (optional)
- 1 cup hot water per quart

Directions

Hot Pack

- Prepare corn: Select ears containing slightly immature kernels, or of ideal quality for eating fresh. Husk corn, remove silk, and wash ears.
- In a large saucepan, blanch ears 3 minutes in boiling water.
- Cut corn from cob at about $\frac{3}{4}$ the depth of kernel. **Caution: Do not scrape cob.**
- In a large saucepan, add 1 cup boiling water to each quart of clean kernels. Heat to boiling and simmer 5 minutes.
- Fill hot pint or quart jars with hot corn, leaving 1-inch headspace.
- Add 1 teaspoon salt to each quart jar or $\frac{1}{2}$ teaspoon salt to each pint jar, if desired.
- Ladle hot cooking liquid over corn, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 55 minutes, quart jars 1 hour 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare corn: Select ears containing slightly immature kernels, or of ideal quality for eating fresh. Husk corn, remove silk, and wash ears.
- In a large saucepan, blanch ears 3 minutes in boiling water.
- Cut corn from cob at about $\frac{3}{4}$ the depth of kernel. **Caution: Do not scrape cob.**
- Fill hot pint or quart jars with raw kernels, leaving 1-inch headspace. Do not shake or press down.
- Add 1 teaspoon salt to each quart jar or $\frac{1}{2}$ teaspoon salt to each pint jar, if desired.
- Ladle fresh boiling water over corn, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 55 minutes, quart jars 1 hour 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 31½ pounds (in husks) is needed per canner load of 7 quarts; an average of 20 pounds is needed per canner load of 9 pints.

Nutritional Analysis ($\frac{1}{2}$ cup): 65 calories, 1 g fat, 15 g carbohydrate, 2 g protein

Canning of some sweeter varieties or too immature kernels may cause browning. Can a small amount; check color and flavor before canning large quantities.

Peas—Green or English (Shelled)

Ingredients

- 4½ pounds peas (in pods) per quart
- 1 teaspoon canning salt per quart (optional)
- water to cover

It is recommended that sugar snap and Chinese edible pod peas be frozen for best quality.

Directions

Hot Pack

- Prepare peas: Select filled pods containing young, tender, sweet seeds. Discard diseased pods. Shell and wash peas.
- In a large saucepan, cover peas with boiling water. Bring to a boil; boil 2 minutes.
- Fill hot pint or quart jars loosely with hot peas, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle hot cooking liquid over peas, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 40 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare peas: Select filled pods containing young, tender, sweet seeds. Discard diseased pods. Shell and wash peas.
- Fill hot pint or quart jars with raw peas, leaving 1-inch headspace. Do not shake or press down peas.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle boiling water over peas, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 40 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 31½ pounds (in pods) is needed per canner load of 7 quarts; an average of 20 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 59 calories, 0 g fat, 11 g carbohydrate, 4 g protein

B Potatoes (White)—Cubed or Whole

Ingredients

- 2½ to 3 pounds potatoes per quart
- 1 teaspoon canning salt per quart (optional)
- water to cover

Directions

Hot Pack

- Prepare potatoes: Select small to medium-size mature potatoes of ideal quality for cooking. Potatoes stored below 45°F may discolor when canned. Choose potatoes 1 to 2 inches in diameter if they are to be packed whole. Wash and peel potatoes. If desired, cut into ½-inch cubes. Place in ascorbic acid solution (1 teaspoon per gallon) to prevent darkening. Drain.
- In a large saucepan, cook cubed potatoes 2 minutes in boiling water. For whole potatoes, boil 10 minutes. Drain and discard cooking liquid.
- Fill hot pint or quart jars with hot potatoes, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle fresh hot water over potatoes, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 35 minutes, quart jars 40 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 20 pounds is needed per canner load of 7 quarts; an average of 13 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 54 calories, 0 g fat, 12 g carbohydrate, 1 g protein

Pumpkins and Winter Squash—Cubed

B

Ingredients

2¼ pounds pumpkin or winter squash
per quart
water to cover

Caution. Do not mash or puree pumpkin or squash before packing into jars. For making pies, drain jars and strain or sieve the cubes at preparation time.

Directions

Hot Pack

- Prepare pumpkin or squash: Pumpkins and squash should have a hard rind and stringless, mature pulp of ideal quality for cooking fresh. Small size pumpkins (sugar or pie varieties) make better products. Wash, remove seeds, cut into 1-inch wide slices, and peel. Cut flesh into 1-inch cubes.
- In a large saucepan, add pumpkin or squash cubes to boiling water. Boil 2 minutes. **Caution: Do not mash or purée.**
- Pack hot cubes into hot pint or quart jars, leaving 1-inch headspace.
- Ladle hot cooking liquid over cubes, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 55 minutes, quart jars 1 hour 30 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 16 pounds is needed per canner load of 7 quarts; an average of 10 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): 42 calories, 0 g fat, 10 g carbohydrate, 1 g protein



Mixed Vegetables

Ingredients

- 6 cups sliced carrots
- 6 cups cut, whole kernel sweet corn
- 6 cups cut green beans
- 6 cups shelled lima beans
- 4 cups whole or crushed tomatoes
- 4 cups diced zucchini
- 7 teaspoons canning salt

You may change the suggested proportions or substitute other favorite vegetables *except* leafy greens, dried beans, cream-style corn, squash, or sweet potatoes.

Directions

Hot Pack

- In a large saucepan, combine all vegetables. Add enough boiling water to cover pieces and return to boil. Boil 5 minutes.
- Fill hot vegetables into hot pint or quart jars, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle hot cooking liquid over vegetables, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 1 hour 15 minutes, quart jars 1 hour 30 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: 14 pint jars or 7 quart jars

Nutritional Analysis (½ cup): 45 calories, 0 g fat, 9 g carbohydrate, 2 g protein

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Additional Information

The recipes in this publication are from the *USDA Complete Guide to Home Canning*. They are used with permission for educational purposes only. Complete instructions for canning other fresh vegetables are available in the *USDA Complete Guide to Home Canning* or on the National Center for Home Food Preservation website.

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Home Canning Tomatoes and Tomato Products

Home canning tomatoes and tomato products can help you save money and gain control over what's in your food while preserving the bounty of summer for your family's year-round enjoyment. To ensure safe, high quality home-canned products, always follow research-based recommendations when canning.

Ingredients

When canning tomatoes and tomato products, start with disease-free, preferably vine-ripened, firm tomatoes. Do not use tomatoes that are overripe or beginning to spoil. Do not can tomatoes from dead or frost-killed vines as they may be lower in acid. Green tomatoes can be safely substituted for ripe tomatoes in USDA-approved recipes, but the taste of the final products will be different.

The recipes included in this publication are research-based for safe home canning. Do not change the proportions of ingredients or reduce the amount of lemon juice or vinegar specified in each recipe. To ensure a safe level of acidity in the final product, use only bottled lemon juice and commercial vinegar that is at least 5 percent acidity.

Salt is optional in canning tomatoes and tomato products. It is used only for seasoning and does not help to preserve the food. If salt is used, canning salt is recommended to prevent cloudiness in the canned product. Sugar can be added to taste if desired, and spices and herbs can be varied.

Why Add Acid?

High acid foods, those with pH values less than 4.6, can be safely processed in a boiling water canner. Low acid foods, those with pH values greater than 4.6, must be processed in a pressure canner to reach temperatures high enough to kill the spores that can cause botulism.

Tomatoes are often thought of as being a high acid food. However, their natural acidity varies, depending on the variety, how and where they are grown, and their ripeness. Many have pH values higher than 4.6. For this reason, whole, crushed or juiced tomatoes must be acidified with bottled lemon juice or citric acid before processing in a boiling water bath canner. Although tomatoes processed in a pressure canner may not include acidification, USDA highly recommends adding bottled lemon juice or citric acid before processing all tomato products.



Filling Jars

There are two methods that can be used for packing food into the jars—raw pack or hot pack. Raw pack means putting raw, unheated food into the jars; hot pack involves cooking or heating the food for a specified length of time before packing. Some recipes have directions for both raw and hot packs; others specify one or the other. Always use the type of pack specified in the recipe and the processing method and time that goes with that pack. If given a choice, the hot pack will yield better color and flavor, especially when processing in a boiling water canner. In addition, an enzyme in fresh tomatoes causes the solids and liquids in canned tomato products to separate. Quick heating in the hot pack method inactivates this enzyme and prevents separation.

Processing

Many tomato products are mixtures of high and low acid foods. Whether these are processed in a boiling water canner or a pressure canner will depend in part on whether enough acid has been added to bring the pH of the mixture below 4.6, the cut-off for safe boiling water canning. For recipes that specify only one processing method, that method must be used. *There are no USDA-approved conversions between boiling water canner and pressure canner processing times available to home canners.*

Some USDA-approved home canning recipes give you the option of using either a boiling water canner or a pressure canner. For these recipes, either method can be used, although pressure canning will generally yield higher quality and more nutritious canned tomato products. Whichever processing method you use, it is important to follow all of the preparation steps and processing instructions given in the recipe.

For more information on safe home canning, please see *Home Canning Basics*, publication FCS3-578.

Altitude affects processing times and pressures. The processing times and pressures given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, please consult the web site for the National Center for Home Food Preservation located at <http://nchfp.uga.edu/>.

Step-By-Step Canning

Boiling Water Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Fill the boiling water canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. Begin preparing the recipe while the water is preheating. The water will begin to boil in about 20 to 30 minutes.
4. Use top-quality ingredients; wash fresh produce well. Prepare the recipe, following the directions given.
5. Fill the hot jars, leaving the headspace specified in the recipe. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
6. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Add boiling water to cover the jars by one to two inches. Turn the heat up so the water boils vigorously, and place the lid on the canner.
7. Begin timing the process when the water has reached a full boil. Set a timer for the total number of minutes indicated in the recipe. The water must remain at a boil for the whole processing time. Add boiling water, if necessary, to keep the water level at least one inch above the jar tops.
8. When the processing time specified in the recipe is complete, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years.
12. Enjoy your very own tomato products.



Step-By-Step Canning

Pressure Canner Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Use top-quality ingredients; wash fresh produce well. Prepare the recipe, following the directions given.
4. Fill the hot jars, leaving the headspace specified in the recipe. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
5. Following your manufacturer's instructions, place one to two inches of hot water in the pressure canner. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Fasten the canner lid securely. Leave the weight off the vent port or open the petcock.
6. To vent the canner, heat on high until the water boils and generates steam that can be seen escaping in a funnel shape through the open vent port or petcock. Set a timer for 10 minutes. After 10 minutes of continuous steam, close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner. The canner should pressurize within three to ten minutes.
7. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached or when the weighted gauge begins to jiggle or rock as the manufacturer describes. Regulate the heat under the canner to maintain a steady pressure at, or slightly above, the correct gauge pressure for the whole processing time.
8. When the processing time specified in the recipe is complete, turn off the heat to allow the canner to cool naturally and return to zero pressure. After the canner is completely depressurized, remove the weight from the vent port or open the petcock. At this point, the canner and its contents will still be hot. Wait 10 minutes, then unfasten the lid and remove it carefully, with the underside away from you so that the steam coming out of the canner does not burn your face.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years.
12. Enjoy your very own tomato products.

Recipes for Beginners

Tomatoes Packed in Water

Ingredients

- 2½ to 3½ pounds tomatoes per quart
- 2 tablespoons bottled lemon juice per quart
- 1 teaspoon salt per quart (optional)
- hot water to cover

Directions

Raw Pack

- Prepare tomatoes: Blanch tomatoes in a large saucepan of boiling water for 30 to 60 seconds or until skins begin to split. Remove from boiling water. Dip immediately into cold water. Slip off skins and remove cores. Leave tomatoes whole or cut into halves.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar.
- Pack tomatoes into hot jars, leaving ½-inch headspace.
- Ladle hot water over tomatoes, leaving ½-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 40 minutes, quart jars 45 minutes, in a boiling water canner.

Hot Pack

- Prepare tomatoes: Blanch tomatoes in a large saucepan of boiling water for 30 to 60 seconds or until skins begin to split. Remove from boiling water. Dip immediately into cold water. Slip off skins and remove cores. Leave tomatoes whole or cut into halves.
- Place tomatoes in a large saucepan; add enough water to cover tomatoes. Boil gently 5 minutes, stirring to prevent sticking.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar.
- Pack hot tomatoes into hot jars, leaving ½-inch headspace.
- Ladle hot cooking liquid over tomatoes, leaving ½-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 40 minutes, quart jars 45 minutes, in a boiling water canner.

Yield: An average of 21 pounds tomatoes is needed per canner load of 7 quart jars; an average of 13 pounds is needed per canner load of 9 pint jars.

Nutritional Analysis (½ cup): 40 calories, 0.5 g fat, 8 g carbohydrate, 1 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Recipes for Beginners



Tomatoes Packed in Their Own Juice

(Boiling Water Canner)

Ingredients

- 2½ to 3½ pounds tomatoes per quart
- 2 tablespoons bottled lemon juice per quart
- 1 teaspoon salt per quart (optional)

Directions

Raw Pack

- Prepare tomatoes: Blanch tomatoes in a large saucepan of boiling water for 30 to 60 seconds or until skins begin to split. Remove from boiling water. Dip immediately into cold water. Slip off skins and remove cores. Leave tomatoes whole or cut into halves.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar.
- Pack tomatoes into hot jars, pressing gently on tomatoes until the spaces between them fill with juice, leaving ½-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 1 hour and 25 minutes in a boiling water canner.

Yield: An average of 21 pounds of tomatoes is needed per canner load of 7 quart jars; an average of 13 pounds is needed per canner load of 9 pint jars.

Nutritional Analysis (½ cup): 40 calories, 0.5 g fat, 8 g carbohydrate, 1 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Intermediate Recipes

Tomato Juice

Ingredients

- 3 to 3½ pounds tomatoes per quart
- 2 tablespoons bottled lemon juice per quart
- 1 teaspoon salt per quart (optional)

Directions

- Remove stems from tomatoes and trim off bruised or discolored portions. To prevent juice from separating, quickly cut about 1 pound of tomatoes into quarters and put directly into a large saucepan. Heat immediately to boiling while crushing. Continue to slowly add and crush freshly cut tomato quarters to the boiling mixture. Make sure the mixture boils constantly and vigorously while you add the remaining tomatoes. Simmer 5 minutes after you add all the pieces. (If you are not concerned about juice separation, simply slice or quarter tomatoes into a large saucepan. Crush, heat, and simmer for 5 minutes before juicing.)
- Juice cooked tomatoes in a food processor or food mill.
- Strain tomato juice to remove peels and seeds.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar. Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Reheat tomato juice to boiling.
- Ladle hot juice into hot jars, leaving ½-inch headspace. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 35 minutes, quart jars 40 minutes, in a boiling water canner.

Yield: An average of 23 pounds of tomatoes is needed per canner load of 7 quart jars; an average of 14 pounds is needed per canner load of 9 pint jars.

Nutritional Analysis (½ cup): 45 calories, 0.5 g fat, 9 g carbohydrate, 1 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Intermediate Recipes



Tomato-Vegetable Juice Blend

Ingredients

- 22 pounds tomatoes
- $\frac{3}{4}$ cup finely chopped carrots
- $\frac{3}{4}$ cup finely chopped celery
- $\frac{3}{4}$ cup finely chopped green or red pepper
- $\frac{3}{4}$ cup finely chopped onion
- 2 tablespoons salt (optional)
- 14 tablespoons bottled lemon juice

Quantities of vegetables can be varied to taste, as long as no more than 3 cups (total) of chopped carrots, celery, peppers, and onions are added for each 22 pounds of tomatoes.

Directions

- Remove stems from tomatoes and trim off bruised or discolored portions. To prevent juice from separating, quickly cut about 1 pound of tomatoes into quarters and put directly into a large saucepan. Heat immediately to boiling while crushing. Continue to slowly add and crush freshly cut tomato quarters to the boiling mixture. Make sure the mixture boils constantly and vigorously while you add the remaining tomatoes. Simmer 5 minutes after you add all the pieces. (If you are not concerned about juice separation, simply slice or quarter tomatoes into a large saucepan. Crush, heat, and simmer for 5 minutes before adding vegetables.)
- Add carrots, celery, peppers, and onions. Simmer mixture 20 minutes, stirring to prevent sticking.
- Juice tomato-vegetable mixture in a food processor or food mill.
- Strain juice to remove peels and seeds.
- Stir in salt, if desired.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar.
- Reheat tomato-vegetable juice to boiling.
- Ladle hot juice immediately into hot jars, leaving $\frac{1}{2}$ -inch headspace. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 35 minutes, quart jars 40 minutes, in a boiling water canner.

Yield: about 14 pint jars or 7 quart jars

Nutritional Analysis ($\frac{1}{2}$ cup): 45 calories, 0.5 g fat, 9 g carbohydrate, 1 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Intermediate Recipes

Tomatoes Packed in Their Own Juice

(Pressure Canner)

Ingredients

- 2½ to 3½ pounds tomatoes per quart
- 2 tablespoons bottled lemon juice per quart
- 1 teaspoon salt per quart (optional)

Directions

Raw Pack

- Prepare tomatoes: Blanch tomatoes in a large saucepan of boiling water for 30 to 60 seconds or until skins begin to split. Remove from boiling water. Dip immediately into cold water. Slip off skins and remove cores. Leave tomatoes whole or cut into halves.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar.
- Pack tomatoes into hot jars, pressing gently on tomatoes until the spaces between them fill with juice, leaving ½-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 25 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: An average of 21 pounds of tomatoes is needed per canner load of 7 quart jars; an average of 13 pounds is needed per canner load of 9 pint jars.

Nutritional Analysis (½ cup): 40 calories, 0.5 g fat, 8 g carbohydrate, 1 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.



Intermediate Recipes



Stewed Tomatoes

Ingredients

- 4 quarts chopped tomatoes
- ½ cup chopped green peppers
- ½ cup chopped onions
- 4 teaspoons celery salt
- 4 teaspoons sugar
- ½ teaspoon salt

Directions

- Combine all ingredients in a large saucepan. Cover and cook 10 minutes, stirring occasionally to prevent sticking.
- Ladle hot vegetables into hot pint or quart jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 15 minutes, quart jars 20 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: about 6 pint jars or 3 quart jars

Nutritional Analysis (½ cup): 25 calories, 0 g fat, 6 g carbohydrate, 1 g protein

Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.

Intermediate Recipes



Tomatoes – Crushed

Ingredients

- Tomatoes
- 2 tablespoons bottled lemon juice per quart
- 1 teaspoon salt per quart (optional)

Directions

Hot Pack

- Prepare tomatoes: Blanch tomatoes in a large saucepan of boiling water for 30 to 60 seconds or until skins begin to split. Remove from boiling water. Dip immediately into cold water. Slip off skins and remove cores. Trim off any bruised or discolored portions and quarter.
- Heat about 1 pound of the quarters quickly in a large pot, crushing them with a wooden mallet or spoon as they are added to the pot. Continue heating the tomatoes, stirring to prevent sticking.
- Once boiling, gradually add the remaining quartered tomatoes, stirring constantly. These will not need to be crushed. They will soften with heating and stirring. Continue until all the tomatoes are added.
- Boil gently 5 minutes.
- Add 1 tablespoon bottled lemon juice to each pint jar or 2 tablespoons bottled lemon juice to each quart jar.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece lids.

Process Options

Boiling Water Bath

- Process pint jars 35 minutes, quart jars 45 minutes in a boiling water bath canner.

Pressure Canner

- Process pint or quart jars 15 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial gauge pressure canner.

Nutritional Analysis (1/2 cup): 40 calories, 0.5g fat, 8g carbohydrate, 1g protein

This recipe was adapted from So Easy To Preserve. Used with permission for educational purposes only.

Advanced Recipes



Barbecue Sauce

Ingredients

- 4 quarts chopped, peeled, cored tomatoes
- 2 cups chopped celery
- 2 cups chopped onions
- 1½ cups chopped sweet red or green peppers
- 2 hot red peppers, cored and chopped
- 1 teaspoon black peppercorns
- 2 cloves garlic, crushed
- 1 cup brown sugar
- 1 tablespoon dry mustard
- 1 tablespoon paprika
- 1 tablespoon salt
- 1 teaspoon hot pepper sauce
- ⅛ teaspoon cayenne pepper
- 1½ cups vinegar

When cutting or seeding hot peppers, wear plastic or rubber gloves to prevent hands from being burned. Wash hands with soap and water immediately afterward. Do not touch your face or eyes.

Directions

- Combine tomatoes, celery, onions and peppers in a large saucepan. Cook until vegetables are soft, about 30 minutes.
- Purée vegetables using a food processor, blender or food mill.
- Cook purée until reduced by about one half, about 45 minutes.
- Tie peppercorns in a spice bag; add spice bag and remaining ingredients to tomato purée. Cook slowly until mixture is the consistency of ketchup, about 1½ to 2 hours. As mixture thickens, stir frequently to prevent sticking. Remove spice bag.
- Ladle hot sauce into hot pint or half-pint jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or half-pint jars 20 minutes in a boiling water canner.

Yield: about 4 pint jars or 8 half-pint jars

Nutritional Analysis (2 tablespoons): 25 calories, 0 g fat, 6 g carbohydrate, 1 g protein

Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.

Advanced Recipes

Spaghetti Sauce without Meat

Ingredients

- 30 pounds tomatoes, peeled, cored and quartered
- 1 cup chopped onions
- 5 cloves garlic, minced
- 1 cup chopped celery or green pepper
- 1 pound fresh mushrooms, sliced (optional)
- ¼ cup vegetable oil
- 2 tablespoons oregano
- 4 tablespoons minced parsley
- 2 teaspoons black pepper
- 4½ teaspoons salt
- ¼ cup brown sugar

Directions

- Boil tomatoes 20 minutes, uncovered, in a large saucepan.
- Put cooked tomatoes through a food mill or sieve.
- Sauté onions, garlic, celery or peppers, and mushrooms (if desired) in vegetable oil until tender.
- Combine sautéed vegetables with tomato pulp in a large saucepan. Add spices, salt and sugar; bring to a boil. Simmer, uncovered, until volume is reduced by nearly one half and sauce is thick enough for serving. Stir frequently to prevent burning.
- Ladle hot sauce into hot pint or quart jars, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 20 minutes, quart jars 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: About 9 pint jars or 4 quart jars

Nutritional Analysis (½ cup): 110 calories, 3 g fat, 20 g carbohydrate, 3 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Do not increase the proportion of onions, celery, peppers or mushrooms.

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Advanced Recipes

Spaghetti Sauce with Meat

Ingredients

- 30 pounds tomatoes, peeled, cored, and quartered
- 2½ pounds ground beef or sausage
- 1 cup chopped onions
- 5 cloves garlic, minced
- 1 cup chopped celery or green peppers
- 1 pound fresh mushrooms, sliced (optional)
- 2 tablespoons oregano
- 4 tablespoons minced parsley
- 2 teaspoons black pepper
- 4½ teaspoons salt
- ¼ cup brown sugar

Do not increase the proportion of meat, onions, celery, peppers or mushrooms.

Directions

- Boil tomatoes 20 minutes, uncovered, in a large saucepan.
- Put cooked tomatoes through a food mill or sieve.
- Sauté beef or sausage until brown. Add onions, garlic, celery or peppers, and mushrooms (if desired). Cook until vegetables are tender.
- Combine sautéed meat and vegetables with tomato pulp in a large saucepan. Add spices, salt and sugar; bring to a boil. Simmer, uncovered, until volume is reduced by nearly one-half and sauce is thick enough for serving. Stir frequently to prevent burning.
- Ladle hot sauce into hot pint or quart jars, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 1 hour, quart jars 1 hour 10 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: About 9 pint jars or 4 quart jars

Nutritional Analysis (½ cup): 170 calories, 6 g fat, 20 g carbohydrate, 9 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

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Home Canning Salsa

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Salsas are usually mixtures of high acid foods, such as tomatoes and/or fruit, with low acid foods, such as onions and peppers. With the addition of lemon juice, citric acid, or vinegar in the right proportion, salsa becomes a high acid food and can be safely processed in a boiling water canner. However, only research-based recipes should be used. Other salsa recipes, found on the internet, in published books, or from grandma's recipe stash, should not be home canned unless they have been properly tested for safety. Enjoy those salsas fresh, or frozen for longer storage.

The recipes included in this publication are research-based for safe home canning. Do not change the proportions of ingredients. However, one variety of pepper can be substituted for another in the same amount (for example, bell peppers for hot peppers to make a milder salsa). Likewise, red, yellow, or white onions may be used, as long as the total amount of onions in the recipe is not increased. Green tomatoes may be used in place of ripe tomatoes, but the flavor will be different. The amount of lemon juice, lime juice, or vinegar should never be changed. To ensure a safe level of acidity in the final product,

use only bottled lemon or lime juice and commercial vinegar that is at least 5 percent acidity. Sugar may be added to taste if desired, and spices and herbs can be varied.

Wear plastic or rubber gloves while cutting or handling hot peppers to prevent hands from being burned. Wash hands with soap and water immediately afterward. Do not touch your face or eyes.

Altitude affects processing times. The processing times given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, please consult the web site for the National Center for Home Food Preservation located at <http://nchfp.uga.edu/>.

For more information on safe home canning, please see *Home Canning Basics*, publication FCS3-578.



Step-By-Step Canning

Boiling Water Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Fill the boiling water canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. Begin preparing the recipe while the water is preheating. It will take about 20 to 30 minutes for the water to begin to boil.
4. Use top-quality ingredients; wash fresh produce well. Prepare salsa, following the directions given in the recipe. Do not change the proportions of ingredients used or reduce the amount of lemon juice, lime juice, or vinegar specified. Cook as directed.
5. Immediately fill hot salsa into hot jars, leaving the headspace specified in the recipe, usually ½ inch. Remove air bubbles and adjust headspace, if necessary, by adding hot salsa. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
6. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Add boiling water to cover the jars by one to two inches. Turn the heat up so the water boils vigorously and place the lid on the canner.
7. Begin timing the process when the water has reached a full boil. Set a timer for the total number of minutes indicated in the recipe. The water must remain at a boil for the whole processing time. Add boiling water, if necessary, to keep the water level at least one inch above the jar tops.
8. When the processing time specified in the recipe is complete, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years. Use within one year for best quality. If jars do not seal, refrigerate and consume contents within one week.
12. Enjoy your very own salsa.

Recipes for Beginners

Medium Salsa

Ingredients

- 6 pounds fresh tomatoes (about 18 medium) OR 6 cans (14.5 ounces) petite diced tomatoes
- ½ cup white or cider vinegar (5% acidity)
- 1 pouch (4 ounces) Mrs. Wages® Medium Salsa Mix

Directions

- Prepare tomatoes: Scald fresh tomatoes for 3 minutes in boiling water. Dip into cold water. Cut out cores, remove skins, and chop coarsely. If using canned tomatoes, do not drain liquid.
- Combine tomatoes, vinegar and salsa mix in a large saucepan and bring to a boil. Stir occasionally. Reduce heat and simmer 10 minutes, stirring occasionally.
- Pour hot salsa into hot pint jars, leaving ½-inch head space. Remove air bubbles and adjust head-space if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 40 minutes in a boiling water canner.

Yield: about 5 pint jars

Nutritional Analysis (2 tablespoons): 15 calories, 0 g fat, 3 g carbohydrate, 0 g protein

Recipe adapted from the Mrs. Wages® package. Used with permission of Kent Precision Food Group, 11457 Olde Cabin Rd., St. Louis MO 63141, for educational purposes only.



Recipes for Beginners

Traditional Salsa

Ingredients

- 7 cups diced, seeded, peeled, cored tomatoes
- 6 green onions, sliced
- 2 jalapeño peppers, diced
- 4 cloves garlic, minced
- ½ cup vinegar
- 2 tablespoons bottled lime juice
- 4 drops hot pepper sauce
- 2 tablespoons minced cilantro
- 2 teaspoons salt

When cutting or seeding hot peppers, wear plastic or rubber gloves. If a less hot salsa is desired, seed jalapeño peppers before dicing.

Directions

- Prepare tomatoes: Peel tomatoes by dropping into boiling water for 30 to 60 seconds or until the skins begin to split. Remove from the boiling water and dip immediately into cold water. The skins will slip off easily. Remove cores and seeds; dice.
- Combine all ingredients in a large saucepan. Bring mixture to a boil. Reduce heat and simmer 15 minutes.
- Ladle hot salsa into hot pint or half-pint jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 15 minutes in a boiling water canner.

Yield: about 4 pint jars or 8 half-pint jars

Nutritional Analysis (2 tablespoons): 5 calories, 0 g fat, 1 g carbohydrate, 0 g protein

Recipe adapted from Jarden Home Brands website. Used with permission from <http://www.freshpreserving.com/recipes.aspx> for educational purposes only.

Recipes for Beginners

Pineapple Chili Salsa

Ingredients

- 4 cups cubed, seeded, peeled papaya
- 2 cups canned pineapple pieces, drained, juice reserved (about one 20-ounce can)
- 1 cup golden raisins
- ½ cup chopped, seeded Anaheim, poblano, or hot banana peppers
- 2 tablespoons minced green onions
- 2 tablespoons minced cilantro
- 2 tablespoons brown sugar
- 1 cup bottled lemon juice
- ½ cup bottled lime juice
- ½ cup pineapple juice

When cutting or seeding hot peppers, wear plastic or rubber gloves. If a hotter salsa is desired, leave some seeds in peppers before chopping.

Directions

- Combine all ingredients in a large saucepan. Bring to a boil over medium-high heat, stirring constantly. Reduce heat and simmer, stirring frequently, until slightly thickened, about 10 minutes.
- Ladle hot salsa into hot half-pint jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 15 minutes in a boiling water canner.

Yield: about 6 half-pint jars.

Nutritional Analysis (2 tablespoons): 25 calories, 0 g fat, 6 g carbohydrate, 0 g protein

Recipe adapted from Jarden Home Brands website. Used with permission from <http://www.freshpreserving.com/recipes.aspx> for educational purposes only.

Intermediate Recipes

Tomato/Green Chile Salsa

Ingredients

- 3 cups peeled, cored, chopped tomatoes
- 1 jalapeño pepper, seeded and finely chopped
- 3 cups prepared Anaheim, ancho, Hungarian yellow wax, or other mild long green chile peppers
- $\frac{3}{4}$ cup chopped onions
- 6 cloves garlic, finely chopped
- $1\frac{1}{2}$ cups vinegar
- $\frac{1}{2}$ teaspoon ground cumin (optional)
- 2 teaspoons oregano leaves (optional)
- $1\frac{1}{2}$ teaspoons salt

When cutting or seeding hot peppers, wear plastic or rubber gloves. If a hotter salsa is desired, leave some seeds in peppers before chopping.

Directions

- Prepare peppers: The jalapeño pepper does not need to be peeled. The skin of long green chiles may be tough after canning and can be removed by heating the peppers. Slit each pepper along the side to allow steam to escape. Blister the skins by placing in a hot oven (400°F) or broiler for 6 to 8 minutes, or by placing on a hot gas or electric burner covered with heavy wire mesh for several minutes. Once the skins blister, place peppers in a pan and cover with a damp cloth. Cool several minutes; peel off skins. Discard seeds and chop.
- Combine all ingredients in a large saucepan. Bring mixture to a boil, stirring frequently. Reduce heat and simmer for 20 minutes, stirring occasionally.
- Ladle hot salsa into hot pint jars, leaving $\frac{1}{2}$ -inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 15 minutes in a boiling water canner.

Yield: about 3 pint jars

Nutritional Analysis (2 tablespoons): 10 calories, 0 g fat, 1 g carbohydrate, 1 g protein

Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.

Intermediate Recipes

Salsa Verde

Ingredients

- 7 cups chopped, cored, peeled green tomatoes
- 5 to 10 jalapeño, habanero or Scotch bonnet peppers, seeded and finely chopped
- 2 cups chopped red onion
- 2 cloves garlic, finely chopped
- ½ cup bottled lime juice
- ½ cup loosely packed, finely chopped cilantro
- 2 teaspoons ground cumin
- 1 teaspoon dried oregano OR 1 tablespoon fresh oregano, minced
- 1 teaspoon salt
- 1 teaspoon black pepper

When cutting or seeding hot peppers, wear plastic or rubber gloves. If a hotter salsa is desired, leave some seeds in peppers before chopping.

Directions

- Combine tomatoes, peppers, onion, garlic and lime juice in a large saucepan. Bring to a boil. Stir in cilantro, cumin, oregano, salt, and pepper. Reduce heat and simmer 5 minutes.
- Ladle hot salsa into hot half-pint jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 20 minutes in a boiling water canner.

Yield: about 6 half-pint jars

Nutritional Analysis (2 tablespoons): 10 calories, 0 g fat, 2 g carbohydrate, 0 g protein

Recipe adapted from Jarden Home Brands website. Used with permission from <http://www.freshpreserving.com/recipes.aspx> for educational purposes only.

Intermediate Recipes

Tomato/Tomato Paste Salsa

Ingredients

- 3 quarts peeled, cored, chopped slicing tomatoes
- 3 cups chopped onions
- 6 jalapeño peppers, seeded, finely chopped
- 4 long green chiles (e.g. Anaheim, ancho, or Hungarian yellow wax), seeded and chopped
- 4 cloves garlic, finely chopped
- 2 12-ounce cans tomato paste
- 2 cups bottled lemon or lime juice
- 1 tablespoon salt
- 1 tablespoon sugar
- 1 tablespoon ground cumin (optional)
- 2 tablespoons oregano leaves (optional)
- 1 teaspoon black pepper

When cutting or seeding hot peppers, wear plastic or rubber gloves. If a hotter salsa is desired, leave some seeds in jalapeño peppers before chopping.

Directions

- Prepare peppers: The jalapeño peppers do not need to be peeled. The skin of long green chiles may be tough and can be removed by heating the peppers. If you choose to peel the chiles, slit each pepper along the side to allow steam to escape. Blister the skins by placing in a hot oven (400°F) or broiler for 6 to 8 minutes, or by placing on a hot gas or electric burner covered with heavy wire mesh for several minutes. After blistering the skins, place peppers in a pan and cover with a damp cloth. Cool several minutes; slip off skins. Discard seeds and chop.
- Combine all ingredients in a large saucepan and heat, stirring frequently, until mixture boils. Reduce heat and simmer for 30 minutes, stirring occasionally.
- Ladle hot salsa into hot pint jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 15 minutes in a boiling water canner.

Yield: about 7 to 9 pint jars

Nutritional Analysis (2 tablespoons): 10 Calories, 0 g fat, 3 g carbohydrate, 0 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Advanced Recipes

Tomatillo Green Salsa

Ingredients

- 5 cups chopped tomatillos
- 1½ cups seeded, chopped long green chiles
(e.g. Anaheim, ancho, or Hungarian yellow wax)
- ½ cup seeded, finely chopped jalapeño peppers
- 4 cups chopped onions
- 1 cup bottled lemon or lime juice
- 6 cloves garlic, finely chopped
- 1 tablespoon ground cumin (optional)
- 3 tablespoons dried oregano (optional)
- 1 tablespoon salt
- 1 teaspoon black pepper

When cutting or seeding hot peppers, wear plastic or rubber gloves. If a hotter salsa is desired, leave some seeds in jalapeño peppers before chopping. Green tomatoes may be substituted for the tomatillos in this recipe.

Directions

- Prepare tomatillos: Remove the dry outer husks from tomatillos; wash thoroughly; chop. They do not need to be peeled or seeded.
- Prepare peppers: The jalapeño peppers do not need to be peeled. The skin of long green chiles may be tough and can be removed by heating the peppers. If you choose to peel the chiles, slit each pepper along the side to allow steam to escape. Blister the skins by placing in a hot oven (400°F) or broiler for 6 to 8 minutes, or by placing on a hot gas or electric burner covered with heavy wire mesh for several minutes. After blistering the skins, place peppers in a pan and cover with a damp cloth. Cool several minutes; slip off skins. Discard seeds and chop.
- Combine all ingredients in a large saucepan and stir frequently over high heat until mixture begins to boil. Reduce heat and simmer for 20 minutes, stirring occasionally.
- Ladle hot salsa into hot pint jars, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 15 minutes in a boiling water canner.

Yield: about 5 pint jars

Nutritional Analysis (2 tablespoons): 10 calories, 0 g fat, 2 g carbohydrate, 0 g protein

Recipe adapted from *USDA Complete Guide to Home Canning*. Used with permission for educational purposes only.

Advanced Recipes

Peach Apple Salsa

Ingredients

- 6 cups peeled, chopped (½-inch) Roma tomatoes
- 2½ cups diced (¼-inch) yellow onions
- 2 cups cored, seeded, diced (¼-inch) green bell peppers
- 10 cups peeled, pitted, chopped (½-inch) hard, unripe peaches
- 2 cups peeled, cored, chopped (½-inch) Granny Smith apples
- 4 tablespoons mixed pickling spice, tied in spice bag
- 1 tablespoon canning salt
- 2 teaspoons crushed red pepper flakes
- ¾ cups packed light brown sugar
- ¼ cups cider vinegar

Directions

- Combine tomatoes, onions and peppers in a large saucepan.
- Prepare peaches and apples: Prepare ascorbic acid solution (1500 mg in half gallon water). Peel and pit peaches; cut into halves and soak for 10 minutes in ascorbic acid solution. Peel and core apples; cut into halves and soak for 10 minutes in ascorbic acid solution. After soaking and draining, quickly chop peaches and apples to prevent browning. Add chopped peaches and apples to the saucepan with the vegetables.
- Add the pickling spice bag to the saucepan; stir in the salt, red pepper flakes, brown sugar, and vinegar. Bring to a boil, stirring gently to mix ingredients. Reduce heat and simmer 30 minutes, stirring occasionally. Remove spice bag and discard.
- With a slotted spoon, fill salsa solids into hot pint jars, leaving 1¼-inch headspace. Cover with cooking liquid, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process 15 minutes in a boiling water canner

Yield: about 7 pint jars

Nutritional Analysis (2 tablespoons): 35 calories, 0 g fat, 9 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.

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Home Canning Fruit

Home canning fruit from your garden, orchard, or local farmers market can help save you money and gain control over what's in your food, while preserving the taste of summer for your family's year-round enjoyment. To ensure safe, high quality home-canned products, always follow research-based recommendations when canning.

Ingredients

Select top-quality fruit at its peak of flavor, texture, and color. Do not can overripe or diseased fruit. Canning will not improve the quality of poor quality produce.

Fruit may be canned in water, juice, or syrup. The sugar in canning syrup helps retain the fruit's flavor, color, and shape; it does not prevent spoilage. The amount of sugar can be safely reduced to satisfy dietary needs or personal tastes. Lighter syrups contain fewer calories from added sugar. To make syrup, combine sugar and water in a saucepan. Heat the syrup to boiling to dissolve the sugar. Keep the syrup hot until ready for use, but do not let it boil down. Usually 1 to 1½ cups of syrup is needed for each quart jar of fruit. Choose syrup from the table below to suit the sweetness of the fruit and your own taste.

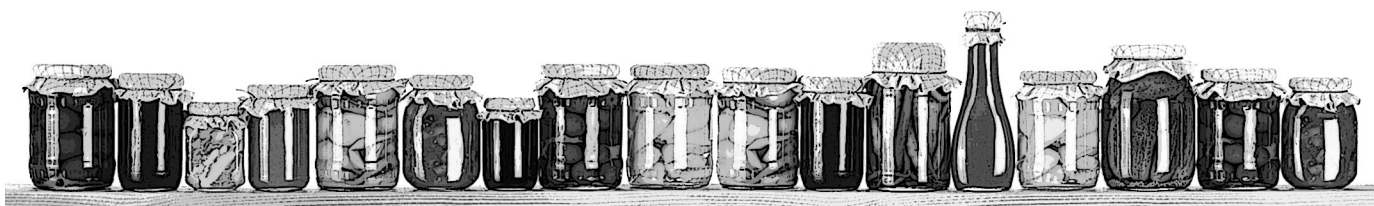
Table 1. Syrups for use in canning fruit.

Type of syrup	Percent sugar*	Cups of sugar per 4 cups water**	Yield of syrup in cups	Fruits commonly packed in syrup
Very light	10	½	4½	Approximates natural sugar level in most fruits and adds the fewest calories
Light	20	1	4¾	Very sweet fruit
Medium	30	1¾	5	Sweet apples, sweet cherries, berries, grapes
Heavy	40	2¾	5½	Tart apples, apricots, sour cherries, gooseberries, nectarines, pears, peaches, plums
Very heavy	50	4	6	Very sour fruit

* Approximate

** In general, up to one half the sugar may be replaced by light corn syrup or mild-flavored honey. Some or all of the water may be replaced by fruit juice.

Table adapted from So Easy to Preserve. Used with permission for educational purposes.



If fruit juice is used as the canning liquid, it is best to use juice made from the fruit being canned. To extract juice, thoroughly crush ripe, sound fruit. Heat to a simmer over low heat. Strain through cheese cloth or a jelly bag. Commercial unsweetened apple, pineapple, or white grape juice can also be used. These may be used as is, or diluted with water.

E If artificial sweeteners are used, it is generally best to add them just before serving the canned fruit. Saccharin-based sweeteners can become bitter during processing, and aspartame-based sweeteners lose their sweetening power. Splenda[®] is the only sugar substitute currently on the market for which there are USDA recommendations for use in canning. However, stevia-based sweeteners are heat stable and may be used in canning fruit. You may follow the manufacturer's suggestions or experiment to determine the desired level of sweetness.

To prevent light-colored fruits such as apples, pears, and peaches from darkening after cutting, or the stem ends of grapes and cherries from darkening after stemming or pitting, the fruit should be treated with an anti-darkening solution during preparation. To make the solution, dissolve one teaspoon or 3,000 milligrams (mg) of ascorbic acid (vitamin C) in one gallon of water, or follow the directions on the label for a commercial ascorbic acid mixture. If using vitamin C tablets, crush thoroughly before adding to the water. Hold the prepared fruit in the solution until you're ready to pack the jars; then drain the fruit well.

Pie Fillings

Home-canned fruit pie fillings are safe, tasty products when they are made following research-based recipes. The recipes for fruit pie fillings in this publication use a modified food starch called Clear Jel[®] to provide the correct amount of thickening when the filling is canned and baked. Clear Jel[®] must be used as the thickener; there is

no substitute. Other starches, such as corn starch, will break down during processing and result in runny fillings. Do not use Instant Clear Jel[®]. Clear Jel[®] is not commonly available in local stores, but several sources can be found on the Internet.

The amount of lemon juice specified in the recipe should not be changed, because it helps with safety and storage stability of the fillings. The amount of sugar and spices can be safely adjusted to suit personal tastes.

Filling Jars

There are two methods that can be used for packing food into the jars – raw pack and hot pack. Raw pack means putting raw, unheated food into the jars. Hot pack involves cooking or heating the food for a specified length of time before packing it into the jars. This practice helps to retain color and flavor, remove the air from food tissues, shrinks the food, increases the vacuum in sealed jars, and improves shelf life.

Some recipes have directions for both raw and hot packs. Others specify one or the other, depending on which method is most suitable for the specific fruit being canned. When fruit is canned without added sugar, the hot pack method must be used. Always use the type of pack specified in the recipe and the processing time that goes with that pack. If given a choice, the hot pack usually yields better color and flavor.

Altitude affects processing times and pressures. The processing times given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, please consult the website for the National Center for Home Food Preservation located at <http://nchfp.uga.edu>.

The size of the jar will affect the rate of heat penetration into the food. To ensure that all of the food in the jar receives the full heat treatment needed to destroy any harmful bacteria that may be present, use only the jar sizes specified in the recipe and the processing time given for each jar size. Do not use jars that are larger than those specified in the recipe.

Processing

Most fruits are high acid foods, with pH levels below 4.6, the cut off for safe boiling water canning. Thus, fruit can be safely processed in a boiling water canner following USDA recommendations. The recipes in this publication provide directions for canning fruit in a boiling water

canner. Be sure to use the full processing time specified in each recipe for the type of pack and jar size used.

Some people prefer to pressure can fruit. A pressure canner can be used for some fruits, but the total time needed for the canning process will be much longer, due to the extra time needed to heat up, exhaust, pressurize, and cool down the canner. Processing times for some fruits in a pressure canner can be found in the *USDA Complete Guide to Home Canning* or on the National Center for Home Food Preservation website.

For more information on safe home canning, please see *Home Canning Basics*, publication FCS3-578.



Step-By-Step Canning

Boiling Water Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Fill the boiling water canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. Begin preparing the recipe while the water is preheating. It will take about 20 to 30 minutes for the water to begin to boil.
4. Use top-quality ingredients; wash fresh fruits well. Prepare the recipe, following the directions given.
5. Fill the hot jars, leaving the headspace specified in the recipe, usually ½ inch. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
6. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Add boiling water to cover the jars by one to two inches. Turn the heat up so the water boils vigorously and place the lid on the canner.
7. Begin timing the process when the water has reached a full boil. Set a timer for the total number of minutes indicated in the recipe. The water must remain at a boil for the whole processing time. Add boiling water, if necessary, to keep the water level at least one inch above the jar tops.
8. When the processing time specified in the recipe is complete, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years. Use within one year for best quality. If jars do not seal, refrigerate and consume contents within one week.
12. Enjoy your very own canned fruit.

Recipes

The following selected recipes are from the *USDA Complete Guide to Home Canning*. They are used with permission for educational purposes only. Complete instructions for canning other fresh fruits are available in the *USDA Complete Guide to Home Canning* or on the National Center for Home Food Preservation website.

Apples-Sliced

Ingredients

2½ to 3 pounds apples per quart

1 pint water or syrup (very light, light, or medium) per 5 pounds of sliced apples

Directions

Hot Pack:

- Prepare apples: Select apples that are juicy, crisp, and preferably both sweet and tart. Wash, peel, core, and slice into ½-inch wedges. To prevent darkening, slice apples into ascorbic acid solution. Drain.
- Place drained apple slices into a large saucepan and add 1 pint of water or syrup per 5 pounds of sliced apples. Boil 5 minutes, stirring occasionally to prevent burning.
- Fill hot pint or quart jars with hot apple slices and cooking liquid, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 20 minutes in a boiling water canner.

Yield: An average of 19 pounds is needed per canner load of 7 quarts; an average of 12¼ pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): Canned in medium syrup: 90 calories, 0 g fat, 23 g carbohydrate, 0 g protein; Canned in water: 60 calories, 0 g fat, 16 g carbohydrate, 0 g protein



Applesauce


Ingredients

2½ to 3½ pounds apples per quart

½ cup water

⅛ cup sugar per quart (optional)

Directions

- 
- Prepare apples: Select apples that are sweet, juicy, and crisp. For a tart flavor, add 1 to 2 pounds of tart apples to each 3 pounds of sweeter fruit. Wash, peel, core, and slice. If desired, slice apples into ascorbic acid solution to prevent browning. Drain well.
 - Place drained apple slices in a large saucepan. Add ½ cup water. Heat quickly and cook until tender (5 to 20 minutes, depending on maturity and variety), stirring occasionally to prevent burning.
 - Press through a sieve or food mill, if desired. Skip this step if you prefer chunk-style applesauce.
 - If desired, add ⅛ cup sugar per quart of sauce. Taste and add more sugar, if preferred. Skip this step if you prefer unsweetened applesauce.
 - Reheat applesauce to a rolling boil.
 - Fill hot pint or quart jars with hot applesauce, leaving ½-inch headspace.
 - Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
 - Process pint jars 15 minutes, quart jars 20 minutes, in a boiling water canner.

Yield: An average of 21 pounds is needed per canner load of 7 quarts; an average of 13½ pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): Sweetened with ⅛ cup sugar per quart: 80 calories, 0 g fat, 21 g carbohydrate, 0 g protein; Unsweetened: 70 calories, 0 g fat, 18 g carbohydrate, 0 g protein

Berries—Whole (Blackberries, Blueberries, Raspberries)

Ingredients

1½ to 2 pounds berries per quart

¾* cup syrup, juice, or water per quart (*Approximately)

Directions

Hot Pack (for blueberries):

- Prepare blueberries: Select ripe, sweet berries with uniform color. Wash 1 or 2 quarts of berries at a time. Drain. Remove stems if necessary.
- Berries may be canned in syrup, juice, or water. Prepare and heat to boiling the canning liquid of your choice, following the instructions given in the **Ingredients** section of this publication.
- Heat to boiling about 1 gallon of water for each pound of blueberries. Blanch berries in boiling water for 30 seconds. Drain.
- Add ½ cup of hot syrup, juice, or water to each hot pint or quart jar.
- Pack hot berries into hot jars, leaving ½-inch headspace. Ladle hot syrup, juice, or water over berries to cover, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 15 minutes in a boiling water canner.

Raw Pack (for any of the listed berries):

- Prepare berries: Select ripe, sweet berries with uniform color. Wash 1 or 2 quarts of berries at a time. Drain, cap, and stem if necessary.
- Berries may be canned in syrup, juice, or water. Prepare and heat to boiling the canning liquid of your choice, following the instructions given in the **Ingredients** section of this publication.
- Add ½ cup of hot syrup, juice, or water to each hot pint or quart jar.
- Fill hot jars with raw berries, shaking down gently while filling, leaving ½-inch headspace. Ladle hot syrup, juice, or water over berries to cover, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 15 minutes, quart jars 20 minutes, in a boiling water canner.

Yield: An average of 12 pounds is needed per canner load of 7 quarts; an average of 8 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): Canned in medium syrup: average 73 calories, 0 g fat, 18 g carbohydrate, 1 g protein; Canned in water: average 48 calories, 0 g fat, 12 g carbohydrate, 1 g protein



Cherries-Whole (Sweet or Sour)

Ingredients

- 2 to 3 pounds cherries per quart
- ½ to ¾ cup syrup, juice, or water per quart

Directions

Hot Pack:

- Prepare cherries: Select bright, uniformly colored cherries that are mature (of ideal quality for eating fresh or cooking). Stem and wash. Remove pits if desired. If pitted, place cherries in ascorbic acid solution to prevent stem-end discoloration; drain well. If canned unpitted, prick skins on opposite sides with a clean needle to prevent splitting.
- Cherries may be canned in syrup, apple juice, white grape juice, or water. Prepare the canning liquid of your choice, following the instructions given in the **Ingredients** section of this publication.
- Place cherries in a large saucepan. Add ½ cup syrup, juice, or water for each quart of cherries. Bring to a boil.
- Pack hot cherries into hot pint or quart jars, leaving ½-inch headspace. Ladle hot cooking liquid over cherries to cover, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 15 minutes, quart jars 20 minutes, in a boiling water canner.

Raw Pack:

- Prepare cherries: Select bright, uniformly colored cherries that are mature (of ideal quality for eating fresh or cooking). Stem and wash. Remove pits if desired. If pitted, place cherries in ascorbic acid solution to prevent stem-end discoloration; drain well. If canned unpitted, prick skins on opposite sides with a clean needle to prevent splitting.
- Cherries may be canned in syrup, apple juice, white grape juice, or water. Prepare and heat to boiling the canning liquid of your choice, following the instructions given in the **Ingredients** section of this publication.
- Add ½ cup of hot syrup, juice, or water to each hot pint or quart jar.
- Fill hot jars with raw cherries, shaking down gently while filling, leaving ½-inch headspace. Ladle hot syrup, juice, or water over cherries to cover, leaving ½-inch headspace.
- Process pint or quart jars 25 minutes in a boiling water canner.

Yield: An average of 17½ pounds is needed per canner load of 7 quarts; an average of 11 pounds is needed per canner load of 9 pints.

Nutritional Analysis (½ cup): Canned in medium syrup: 100 calories, 0 g fat, 25 g carbohydrate, 1 g protein; Canned in water: 80 calories, 0 g fat, 20 g carbohydrate, 1 g protein

Zucchini-Pineapple

Ingredients

- 4 quarts peeled zucchini, cut into ½-inch cubes or shredded
- 46 ounces canned unsweetened pineapple juice
- 1½ cups bottled lemon juice
- 3 cups sugar

Directions

- Combine all ingredients in a large saucepan; bring to a boil. Simmer 20 minutes.
- Fill hot pint or half-pint jars with hot mixture and cooking liquid, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or half-pint jars 15 minutes in a boiling water canner.

Yield: About 8 to 9 pint jars or 16 to 18 half-pint jars

Nutritional Analysis (½ cup): 100 calories, 0 g fat, 25 g carbohydrate, 1 g protein



Apple Pie Filling

Ingredients

- 7 to 8 pounds apples (to yield 6 quarts sliced)
- 5½ cups sugar
- 1½ cups Clear Jel®
- 1 tablespoon cinnamon
- 2½ cups cold water
- 5 cups apple juice
- 1 teaspoon nutmeg (optional)
- 7 drops yellow food coloring (optional)
- ¾ cup bottled lemon juice (if apples lack tartness, use an additional ¼ cup bottled lemon juice for each 6 quarts of slices)

Directions

- Prepare apples: Use firm, crisp apples. Stayman, Golden Delicious, Rome and other varieties of similar quality are suitable. Peel and core apples. To prevent browning, slice apples (½-inch thick) into ascorbic acid solution. Remove from solution and drain well.
- Blanch apple slices by placing 6 cups at a time in 1 gallon of boiling water. Boil each batch 1 minute after the water returns to a boil. Drain, but keep hot in a covered bowl or pot while preparing the Clear Jel® mixture.
- In a large saucepan, combine sugar, Clear Jel®, cinnamon, water, and apple juice. Add nutmeg and food coloring, if desired. Stir and cook on medium high heat until mixture thickens and begins to bubble.
- Add lemon juice and boil 1 minute, stirring constantly.
- Immediately fold in drained apple slices and fill hot pint or quart jars with hot mixture, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 25 minutes in a boiling water canner.

Yield: About 7 quart jars or 14 pint jars. Each quart jar makes one 8 to 9-inch pie.

Nutritional Analysis (½ cup): 120 calories, 0 g fat, 31 g carbohydrate, 0 g protein

Cherry Pie Filling

Ingredients

- 6 quarts fresh or thawed sour cherries
- 7 cups sugar
- 1¾ cups Clear Jel®
- 9⅓ cups cold water
- 1 teaspoon cinnamon (optional)
- 2 teaspoons almond extract (optional)
- ¼ teaspoon red food coloring (optional)
- ½ cup bottled lemon juice

Directions

- Prepare cherries: Select fresh, very ripe, and firm sour cherries. Rinse and pit cherries. To prevent stem end browning, place cherries in ascorbic acid solution after pitting. Remove from solution and drain well. Unsweetened frozen sour cherries may be used. If sugar has been added, rinse it off while the fruit is still frozen. As the cherries thaw, collect any juice and use it for part of the cold water specified in the recipe.
- To blanch fresh cherries, place 6 cups at a time in 1 gallon boiling water. Boil each batch 1 minute after the water returns to a boil. Drain well, but keep hot in a covered bowl or pot while preparing the Clear Jel® mixture.
- In a large saucepan, combine sugar and Clear Jel®. Add cold water. Add cinnamon, almond extract, and food coloring if desired. Stir and cook over medium high heat until mixture thickens and begins to bubble.
- Add lemon juice and boil 1 minute, stirring constantly.
- Immediately fold in hot drained cherries and fill hot pint or quart jars with hot mixture, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 30 minutes in a boiling water canner.

Yield: About 7 quart jars or 14 pint jars. Each quart jar makes one 8 to 9-inch pie.

Nutritional Analysis (½ cup): 140 calories, 0 g fat, 35 g carbohydrate, 1 g protein



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Most Frequently Asked Canning Questions

Vegetables and Fruits

1. Is it safe to can food without salt?

Yes. Salt is used for flavor only and is not necessary to prevent spoilage.

2. Is it safe to can fruits without sugar?

Yes. Sugar is added to improve flavor, help stabilize color, and retain the shape of the fruit. It is not added as a preservative.

3. Can fruits and vegetables be canned without heating if aspirin is used?

No. Aspirin should not be used in canning. It cannot be relied on to prevent spoilage or to give satisfactory products. Adequate heat treatment is the only safe procedure.

4. Is it safe to can green beans in a boiling water bath if vinegar is used?

No. Recommended processing methods must be used to assure safety. Recommended processing times cannot be shortened if vinegar is used in canning fresh vegetables (this does not refer to pickled vegetables).

5. Should all vegetables be precooked before canning?

For best quality, yes. However, some vegetables can be packed raw or cold into jars before being processed in the pressure canner.

6. What vegetables expand instead shrink during processing?

Corn, peas and lima beans are starchy and expand during processing. They should be packed loosely.

7. What causes corn to turn brown after processing?

This occurs most often when too high a temperature is used causing caramelization of the sugar in the corn. It may also be caused by some minerals in the water used in canning.

8. Why is canning summer squash or zucchini not recommended?

Recommendations for canning summer squashes, including zucchini, that appeared in former editions of So Easy to Preserve or USDA bulletins have been withdrawn due to uncertainty about the determination of processing times. Squashes are low-acid vegetables and require pressure canning for a known period of time that will destroy the bacteria that cause botulism. Documentation for the previous processing times cannot be found, and reports that are available do not support the old process. Slices or cubes of cooked summer squash will get quite soft and pack tightly into the jars. The amount of squash filled into a jar will affect the heating pattern in that jar. It is best to freeze summer squashes or pickle them for canning, but they may also be dried.

9. Can I can my own salsa recipe?

Salsas are usually mixtures of acid and low-acid ingredients; they are an example of an acidified food. The specific recipe, and sometimes preparation method, will determine if a salsa can be processed in a boiling water canner or a pressure canner. A process must be scientifically determined for each recipe. To can salsa at home, use our recipes for canning salsa.

FAQ

Source: National Center for Home Food Preservation



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Home Freezing Basics

Freezing is an excellent way to preserve most fresh foods. Freshness and quality at the time of freezing affect the condition of frozen foods. If frozen at peak quality, foods emerge tasting better than foods frozen near the end of their useful life. If proper techniques and correct temperatures are used, your foods will keep most of their vitamin content, natural color, flavor, and texture. With a home freezer you can have your own fresh-tasting foods available year-round.



How Freezing Affects Foods

Freezing (0°F or below) preserves food for extended periods because it prevents the growth of microorganisms (bacteria, yeasts, and molds) that cause both food spoilage and foodborne illness. The freezing process itself does not destroy nutrients. After thawing, however, microbes that may be present can become active, multiplying under the right conditions to levels that can lead to foodborne illness. Handle thawed foods like any perishable product. Thorough cooking will kill most microorganisms. Since *Clostridium botulinum*, the microorganism that is of greatest concern in canning, does not grow and produce toxin at 0°F, freezing provides a safe and easy alternative to pressure canning low-acid foods.

Trichina and other parasites can be destroyed by sub-zero freezing temperatures. However it is not recommended to rely on home freezing to destroy trichina. Thorough cooking will destroy all parasites that may be present.

Enzymes present in animal foods, fruits, and vegetables promote chemical reactions, such as ripening. Freezing slows down enzyme activity but does not halt these reactions. Enzyme activity does not harm frozen meats or fish and is neutralized by the acids in frozen fruits. But most vegetables

that freeze well are low-acid and require a brief, partial cooking, known as blanching, to prevent deterioration.

Rancid or off-flavors can occur when fat, such as in meat, is exposed to air over a period of time. Rancidity can be controlled by using a wrapping material that does not permit air to reach the food. Remove as much air as possible from the container to reduce the food's contact with air.

Ideally, foods should be quick-frozen within two hours and stored at 0°F or lower. Freeze foods immediately after they are packaged to retain vitamin content, natural color, flavor, and texture. To freeze foods quickly, freeze 3 to 5 pounds per cubic foot at a time. Cool all foods before packaging. Allow space between the packages for air circulation. If the packages are packed in several layers, the packages in the middle may freeze too slowly to preserve peak quality. Once foods are frozen, you can store the packages close together.

Slow freezing creates large, disruptive ice crystals. During thawing, these crystals damage cell walls and dissolve emulsions. This causes meat to *drip*, or lose its juiciness. Emulsions such as mayonnaise or cream will separate and appear curdled. Rapid freezing prevents undesirable large ice crystals from forming throughout the product.

Foods That Don't Freeze Well

Certain foods may become soft and mushy, waterlogged, tough, or soggy when frozen, or they may separate. Some vegetables and some foods containing eggs, milk, or seasonings do not freeze well. These foods include:

Vegetables

- cabbage
- celery
- watercress
- cucumbers
- endive
- lettuce
- parsley
- radishes.

Foods with Eggs or Milk

- shell eggs or cooked egg whites
- meringue or icings made from egg whites
- cream or custard fillings
- milk sauces
- sour cream.

Miscellaneous Foods

- baked or boiled Irish potatoes
- cheese or crumb toppings
- mayonnaise or salad dressing
- gelatin
- fried foods, with the exception of French fries and onion rings.

Spices, Herbs, and Seasonings

When using seasoning, season lightly before freezing, and add additional seasoning when reheating or serving.

- Spices and herbs may
 - develop an off-flavor
 - get strong and bitter.
- Salt
 - loses flavor
 - tends to increase the rancidity of any food containing fat.

Containers for Freezing

When the surface of frozen foods comes in contact with the air, *freezer burn* (grayish-brown leathery spots) occurs. Freezer burn does not make food unsafe, but heavily freezer-burned foods may have to be discarded due to a loss of quality. Cut freezer-burned portions away either before or after cooking the food. Proper packaging helps maintain 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 types that are available for purchase.

Containers specially labeled “designed for freezer storage” are available in some areas. 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
- easy to seal and label.

Packaging and Labeling

To speed up freezing and to retain the natural color, flavor, and texture of food, cool all foods and syrup before packaging. Follow directions for specific foods to determine which ones need added liquid. Pack food tightly in the container to leave as little air as possible.

Most foods do require headspace between the packed food and the lid of the container to allow for expansion of the food as it freezes. A ½- to 1½-inch headspace is generally acceptable. Foods that *do not need* headspace include:

- asparagus
- broccoli

- bony pieces of meat
- tray-packed foods
- breads.

It is safe to freeze meat or poultry directly in its supermarket wrapping. Since this type of wrap is permeable to air, use the food within two months or overwrap these packages as you would any food for long-term storage, using airtight heavy-duty foil, plastic wrap, or freezer paper, or place the package inside a plastic bag.

Use low-temperature tape to seal plastic and aluminum-foil containers tightly and to label the contents of the container. Use a wax or soft lead pencil, a crayon, or a special waterproof marking ink on a low-temperature label or tape. Include on the label:

- name of the product
- date frozen
- weight or number of servings
- type of pack.

Freezer Management/Storage

Good freezer management is essential if you don't want to waste food. 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. Use up all of last year's frozen produce before the next year's crop is ready to freeze.

Color changes can occur in frozen foods. Meat usually changes from bright red at purchase to dark or pale brown, depending on its variety. This change may be due to lack of oxygen, freezer burn, or abnormally long storage. The bones of poultry and the meat near bones can become dark. Bone darkening results when pigment seeps through the porous bones of young poultry into the surrounding tissues when the meat is frozen and thawed. The dulling of color

in frozen vegetables and cooked foods is usually the result of excessive drying due to improper or abnormally long storage.

Freezing can keep most foods safe almost indefinitely. However, with time, all frozen foods will deteriorate in quality such that they are unacceptable for use. Follow recommended storage times for optimum quality results.

Thawing Foods Safely

There are only three ways to safely thaw food: in the refrigerator; in cold, frequently changed water; or in the microwave. **Do not thaw foods at room temperature or outside.** These methods may result in food that can cause foodborne illness.

Refrigerator Thawing

This is the preferred method of thawing, and it is the slowest method. Small food items may defrost overnight in the refrigerator, but most foods require a day or two. For large foods, such as a turkey, allow one day for each 5 pounds of weight.

Cold-Water Thawing

This method is faster than refrigerator thawing, but it requires more attention. Food should be placed in a leakproof plastic bag and immersed in cold water. Make sure the bag doesn't leak, as bacteria from the air or surrounding environment could be introduced into the food. Also, food tissues absorb water that would result in watery, less-than-high-quality food. Change the water frequently, but at least every 30 minutes. After thawing, refrigerate the food until ready for use, or cook it immediately.

Microwave Thawing

Use this method to defrost food only when you plan to cook it immediately. Some areas of the food may become warm and begin to cook during microwaving. Microwave



thawing does not destroy bacteria, so the food still needs to be thoroughly cooked.

Power or Equipment Failure

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, use dry ice to keep the food frozen. **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, foods stored in the great outdoors are exposed to the sun, environmental contamination, and roaming animals and birds. So, it is best to keep food indoors.

Accidentally frozen cans may not be safe to consume. If the seams have rusted or burst, throw the cans out immediately. If the cans are merely swollen, 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. **Do not taste the contents of the can upon opening.** If the contents of the can look or smell abnormal, throw the can away. If the contents look and smell normal, thoroughly cook by boiling 10 to 20 minutes immediately after opening.

Refreezing Thawed Foods

You may safely refreeze frozen foods that have thawed *if they still contain ice crystals* or if they are still cold (about 40°F) and have not been in the refrigerator for more than one day. In general, *if a food is 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

Raw or cooked meat, poultry, or casseroles can be cooked or reheated from the frozen state. It will take approximately one and a half times the usual cooking time. Discard any wrapping or absorbent paper from meat or poultry. When cooking whole poultry, remove the giblet pack from the cavity as soon as it becomes loose. Cook the giblets separately.

Freezing is one of the easiest, most convenient, and least time-consuming methods of preserving foods. By following proper procedures for freezing and thawing foods, you can enjoy high-quality, nutritious foods straight from the freezer.

Prepared by Sandra Bastin, Ph.D., R.D., Extension Specialist in Food and Nutrition

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Freezing Fresh Fruits

Freezing has advantages over other methods of preservation for fruits. Freezing keeps the natural color, fresh flavor, and nutritional value of fruits. With the exception of pears, which become mushy, most fruits freeze very well. Fruits are best frozen soon after harvesting when they are firm and ripe and at the peak of their quality. For thawed fruits with a pleasing color, texture, flavor, and maximum nutritional value, select varieties suitable for freezing, use strict sanitary procedures, and follow the guidelines in this publication.



Before Packaging

Before you begin the freezing process, gather all the ingredients and equipment you will need. Begin by washing the fruit in cold water. Wash a small quantity at a time as too much handling may bruise delicate fruits. Immediately drain the fruit thoroughly. If you allow fruits to soak in water, they lose water-soluble nutrients and flavor and become water-logged. Cut or crush larger fruits into smaller pieces. Less-than-perfect fruit is suitable for crushed or pureed packs. It is best to prepare enough fruit for only a few containers at one time, around 2 to 3 quarts.

Approximate yields of frozen fruits from fresh are listed at the end of this publication. Remember that yield will vary with the size, quality, maturity, variety, trim, and cut size of the fruit.

Types of Packs

Most fruits have a better texture and flavor if packed in sugar or syrup. Some may be packed without sweetening, as sugar is not necessary to safely freeze fruits. The method used to pack the fruit will depend on how you plan to use it. There are several ways to pack fruits for freezing: *syrup pack*, *sugar pack*, *dry pack*, or *unsweetened pack*. Whichever method you use, leave the appropriate *headspace*.

Fruits packed in a syrup are generally best for dessert use, while those packed in dry sugar or unsweetened are best for most cooking purposes because there is less liquid.

Headspace to Allow between Packed Food and Closure

Type of Pack	Container with wide top opening		Container with narrow top opening	
	Pint	Quart	Pint	Quart
Liquid Pack*	½ inch	1 inch	¾ inch***	1½ inch
Dry Pack**	½ inch	½ inch	½ inch	½ inch

* Fruit packed in juice, sugar, syrup, or water; crushed or pureed fruit; or fruit juice.

** Fruit packed without added sugar or liquid.

*** Headspace for juice should be 1½ inches.

Syrup Pack

To make syrup, dissolve sugar in lukewarm water and mix until the solution is clear. Chill the syrup before using. A 40% syrup is recommended for most fruits. To prevent masking of flavor, mild-flavored fruits may require lighter syrups. Heavier syrups may be needed for very sour fruits.

Below is a master recipe from which any of the syrups can be made. Directions for each fruit contain the percentage of syrup needed for a successful syrup pack. It takes $\frac{1}{2}$ to $\frac{3}{4}$ cup of syrup for each pint package of fruit. When packing fruit into containers, be sure the syrup covers the fruit, so that the top pieces will not change in color and flavor. To keep the fruit under the syrup, place a small piece of crumpled waxed paper or other water-resistant wrapping material on top and press fruit down into syrup before closing and sealing the containers.

Sugar Pack

Fruits such as sliced peaches, strawberries, figs, deseeded grapes, plums, and cherries will produce enough syrup to cover the fruit if the fruit is layered with sugar and allowed to stand 15 minutes. Some small whole fruits may be coated with sugar and immediately frozen. First, cut the fruit into a bowl or shallow pan. Sprinkle the quantity of sugar needed (given in the directions for each fruit on following pages) over the fruit. Mix gently until the juice is drawn out and the sugar is dissolved. Pack the fruit into a container, seal, label, and freeze.

Dry Pack

The dry pack is good for small whole fruits such as berries. Simply pack the fruit into a container, seal, label, and freeze. To make dry packing easier, spread a single layer of washed fruit on shallow trays and freeze. When the fruit is frozen, promptly package and return to the freezer.

Master Recipe for Syrup

Type of Syrup	% Syrup	Sugar (cups)	Water (cups)	Yield of Syrup (cups)
Very Light	10%	$\frac{1}{2}$	4	$4\frac{1}{2}$
Light	20%	1	4	$4\frac{3}{4}$
Medium	30%	2	4	5
Medium	35%	$2\frac{1}{2}$	4	$5\frac{1}{3}$
Heavy	40%	3	4	$5\frac{1}{2}$
Very Heavy	50%	$4\frac{3}{4}$	4	$6\frac{1}{2}$
Very Heavy	60%	7	4	$7\frac{3}{4}$
Very Heavy	65%	$8\frac{3}{4}$	4	$8\frac{2}{3}$

Dissolve sugar in lukewarm water. Chill before use. The syrup may be made a day ahead and kept cold in the refrigerator until time to use. Up to one-quarter of the sugar may be replaced by corn syrup or mild-flavored honey.

Unsweetened Pack with Liquid

Unsweetened fruit may be packed in water, unsweetened juice, or pectin syrup. However, fruits packaged without sugar do not have the plump texture and good color of those packed with sugar. Raspberries, blueberries, steamed apples, gooseberries, currants, cranberries, rhubarb, and figs freeze well without sugar.

Pectin syrup, instead of water or juice, is often used for peaches or strawberries because they retain their texture better if frozen in pectin syrup.

Pectin Syrup

Yield: 3 cups

1 package powdered pectin

2¾ cups water

Mix together pectin and 1 cup of water. Boil for 1 minute. Remove from heat and add remaining water. Cool. Add more water if a thinner syrup is desired.

Preventing Discoloration

Some fruits, such as peaches, apples, pears, and apricots, darken during freezing. They may also lose their flavor after thawing. Discoloration can be prevented or lessened with an *anti-darkening treatment*. Use the amount and type specified in the directions for freezing specific fruits because not all fruits are protected equally well by all treatments.

Ascorbic Acid

Ascorbic acid, commonly referred to as vitamin C, is the most effective treatment in preserving the natural color and flavor of fruits for freezing, and it adds nutritive value. The powdered form is available at some pharmacies or where freezing supplies are sold. Ascorbic acid tablets may be easier to find and less expensive, but they are more difficult to dissolve. Crush the tablets finely before use. Fillers in the tablets may make the syrup cloudy but are not harmful. Make only as much ascorbic acid solution as needed. One-half teaspoon of powdered ascorbic acid equals 1500 milligrams. Commercial ascorbic acid mixtures are available. Follow the manufacturer's directions when using these.

In a *syrup pack*, add dissolved ascorbic acid to the cold syrup before using. Stir gently so air is not incorporated into the syrup. All syrups should be kept in the refrigerator until used. In a *sugar pack*, sprinkle the dissolved ascorbic acid over the fruit juice before adding the sugar. In an *unsweetened pack*, sprinkle the dissolved ascorbic acid over the fruit and mix thoroughly just before packing. If fruit is *packed in water*, dissolve the ascorbic acid in the water. If fruit is *packed in fruit juices*, add the ascorbic acid directly to the juice and stir only enough to dissolve the ascorbic acid. In *crushed fruits* and *fruit purees*, add the dissolved ascorbic acid to the fruit preparation and mix gently.

Citric Acid or Lemon Juice

Citric acid or lemon juice is sometimes used in place of ascorbic acid. When used in large quantities, they mask natural fruit flavors and make the fruits too sour.

Steaming

Steaming works best for fruits that will be cooked before serving. Steam fruits just until hot.

Directions for Freezing

Sliced Apples

Apples packed in sugar or frozen unsweetened are good for pie making. A 40% syrup pack is preferred for apples to be used for fruit salad. To prevent darkening, treat each quart of syrup with ½ teaspoon of powdered ascorbic acid. Select unblemished, ripe apples that are crisp and firm, not mealy in texture. Wash, peel, and core. Slice medium apples into twelfths, large apples into sixteenths.

To syrup pack, slice apples directly into cold syrup in freezer container, starting with ½ cup of 40% syrup for each pint container. Press fruit down in containers and add enough syrup to cover. Leave headspace. Seal, label, and freeze.

To sugar pack, slice apples into a solution of 2 tablespoons of salt to 1 gal-lon of water. Soak apples in the solution no more than 15 minutes. Drain thoroughly. Sprinkle ½ cup sugar evenly over each quart of apple slices and stir. Pack apples into containers and press fruit down, leaving appropriate headspace. Seal, label, and freeze.

For an unsweetened pack, follow the directions for the sugar pack, omitting the sugar.

Applesauce

Wash apples. Peel, if desired, core, and slice. Add 1 cup water for every quart of apple slices, and cook until tender. Cool and strain if necessary. Sweeten to taste with ¼ to ¾ cup sugar for each quart of apples. Pack into containers, leaving headspace. Seal, label, and freeze.

Blackberries, Boysenberries, Dewberries, Loganberries, Raspberries, and Youngberries

A 40 or 50% syrup pack is preferred for berries to be served uncooked. Berries to be used to make pies or jam can be satisfactorily frozen using a sugar or unsweetened pack. Seedy berries are best for use in making purees or juice. Select firm, plump, ripe berries with glossy skins. Sort and remove any leaves and stems. Wash and drain.

To syrup pack, pack berries into freezer containers; cover with 40 or 50% syrup, depending on the sweetness of the fruit. Leave headspace. Seal, label, and freeze.

To sugar pack, add ¾ cup sugar to 1 quart berries. Stir until most of the sugar is dissolved. Fill containers, leaving headspace. Seal, label, and freeze.

For crushed or pureed berries, prepare as for whole berries. Then crush. To puree, press through a sieve. Add 1 cup of sugar to each quart of crushed berries or puree. Stir until sugar is dissolved. Pack into containers, leaving headspace. Seal, label, and freeze.

Blueberries, Huckleberries, and Elderberries

A 40% syrup pack is preferred for berries to be served uncooked. Unsweetened berries are satisfactory for cooking. Select full-flavored, ripe berries all about the same size, preferably with tender skins. Sort, wash, and drain. Steam for 1 minute, and cool immediately to tenderize skin.

To syrup pack, cover berries in freezer container with cold 40% syrup. Leave headspace. Seal, label, and freeze.

For crushed or pureed berries, select fully ripened berries. Sort, wash, and

drain. Crush or press berries through a fine sieve to puree. To each quart of crushed berries or puree, add 1 to 1 1/8 cups sugar. Stir until sugar is dissolved. Pack into containers, leaving headspace. Seal, label, and freeze.

Cherries, Sour

A 60 to 65% syrup pack is best for sour cherries to be served uncooked. A sugar pack is preferable for those to be used for pies or other cooked products. Select bright red, tree-ripened, red-tart cherries. Stem, sort, and wash thoroughly. Drain and pit.

To syrup pack, cover cherries in freezer containers with cold 60 to 65% syrup, depending on the tartness of the cherries. Leave headspace. Seal, label, and freeze.

To sugar pack, add ¾ cup sugar to each quart of cherries. Stir until sugar is dissolved. Pack into containers, leaving headspace. Seal, label, and freeze.

To crush cherries, prepare as for whole cherries. Crush coarsely. Add 1 to 1½ cups sugar, depending on sweetness desired to each quart of crushed fruit. Stir until sugar is dissolved. Pack into containers, leaving headspace. Seal, label, and freeze.

To puree cherries, prepare as for whole cherries. Crush cherries, heat to boiling point, cool, and press through a sieve. Add ¾ cup sugar to 1 quart puree. Pack puree into containers, leaving headspace. Seal, label, and freeze.

To juice cherries, prepare as for whole cherries. Crush cherries, heat to 165°F to start the flow of juice, and strain juice through a jelly bag. Cool and refrigerate overnight. Pour off clear juice for freezing, or juice may be packed as soon as it cools, then strained when it is thawed for serving. Add 1½ to 2 cups sugar to each quart of juice, or pack without added sugar. Pour into containers, leaving headspace. Seal, label, and freeze.

Cherries, Sweet

Sweet cherries should be prepared quickly to avoid changes in color and flavor. Dark varieties are best for freezing. Select well-colored, tree-ripened fruit with a sweet flavor. Sort, stem, wash, and drain. Remove pits, if desired—they tend to give an almond-like flavor to the fruit. Pack cherries into containers. Cover with a cold 40% syrup, to which ½ teaspoon of powdered ascorbic acid has been added to each quart. Leave headspace. Seal, label, and freeze.

Cranberries

Choose firm, deep-red cranberries with glossy skins. Stem and sort. Wash and drain. Unsweetened cranberries freeze very well.

To syrup pack, cover cranberries in freezer containers with a cold 50% syrup. Leave headspace. Seal, label, and freeze.

To puree cranberries, prepare as for freezing whole. Cook each quart of cranberries in 2 cups of water until skins crack open. Press through a sieve. Add sugar to taste, about 2 cups for each quart of puree. Pack into containers, leaving headspace. Seal, label, and freeze.

Gooseberries

Whole gooseberries may be frozen in a 50% syrup pack or without sweetening. For use in pies or preserves, the unsweetened pack is best. Choose fully ripe berries if freezing for pie filling. Choose berries a little under-ripe for jelly-making. Sort, remove stems and blossom ends, and wash. Pack into containers, leaving headspace. Seal, label, and freeze.

Grapes

Whole or halved grapes are best frozen with a 40% syrup, but grapes to be used for juice or jelly can be frozen without sweetening. Select firm-ripe grapes with tender skins and full color and flavor.

Wash and stem. Leave seedless grapes whole. Cut table grapes with seeds in half, and remove seeds.

To puree grapes, wash, stem, and crush the grapes. Bring to a boil. Drain off free juice and freeze. Cool the crushed grapes, and press through a sieve. To 1 quart of puree, add ½ cup sugar. Pack into containers, leaving headspace. Seal, label, and freeze. The puree may develop a gritty texture because of tartrate crystals, but these crystals disappear when the puree is heated.

To make juice from grapes, wash, stem, and crush grapes. Strain through a jelly bag. Let juice stand overnight in the refrigerator while any sediment sinks to the bottom. Pour off the clear juice for freezing. Pour juice into containers, leaving headspace. Seal, label, and freeze. If tartrate crystals form in frozen juice, they may be removed by straining the juice after it thaws.

Melons

Cantaloupe, Honeydew, and Watermelon

Slices, cubes, or balls of melon freeze well in a 30% syrup. Select firm-fleshed, well-colored, ripe melons. Wash melon, cut in half, remove seeds, and peel. Cut melons into slices, cubes, or balls. Pack into containers, leaving headspace. Seal, label, and freeze.

Peaches

Peaches in halves and slices have better quality when packed in 40% syrup or with sugar, but a water pack will serve if sweetening is not desired. Add ½ teaspoon of powdered ascorbic acid for each quart of syrup. Select firm, ripe peaches with no green color in the skins. Sort, wash, pit, and peel. Halve or slice if desired.

To sugar pack, add ⅔ cup sugar to each quart of prepared fruit and mix well. Sprinkle ¼ teaspoon of powdered ascorbic acid dissolved in ¼ cup cold water

to each quart of fruit over the peaches before adding sugar. Pack into containers, leaving headspace. Seal, label, and freeze.

To water pack, cover peaches with cold water containing 1 teaspoon of powdered ascorbic acid to each quart of water in freezer containers. Leave headspace. Seal, label, and freeze.

To crush or puree peaches, dip peaches in boiling water for ½ to 1 minute to loosen skins. Cool in cold water, remove skins, and pit. Crush peaches coarsely. To puree, press through a sieve, or heat pitted peaches 4 minutes in just enough water to prevent scorching, and then press through a sieve. Mix 1 cup of sugar with each quart of crushed or pureed peaches. For better quality, add 1/8 teaspoon of powdered ascorbic acid to each quart of fruit. Pack into containers, leaving headspace. Seal, label, and freeze.

Pears

Select pears that are well-ripened and firm but not hard. Wash, peel, cut in halves or quarters, and remove cores. Heat pears in boiling 40% syrup for 1 to 2 minutes, depending on size of pieces. Drain and cool.

Pack pears into freezer containers and cover with cold 40% syrup. For a better product, add ¾ teaspoon of powdered ascorbic acid to each quart of cold syrup. Leave headspace. Seal, label, and freeze.

Plums

Frozen plums are very good for use in pies and jams or in salads and desserts. The unsweetened pack is preferred for plums to be used for jams. Choose firm, tree-ripened fruit of deep color. Sort and wash.

To syrup pack, pack whole or cut fruit into freezer containers. Cover fruit with cold 40 or 50% syrup, depending on tartness of fruit. For improved quality, add ½ teaspoon powdered ascorbic acid to each quart of syrup. Leave headspace. Seal, label, and freeze.

To puree, cut plums in half and remove pits. Puree may be prepared from unheated or heated fruit, depending on the softness of the fruit. To prepare puree from unheated fruit, press raw fruit through a sieve. For better quality, add $\frac{1}{4}$ to $\frac{1}{2}$ teaspoon powdered citric acid to each quart of puree. To prepare puree from heated fruit, add 1 cup of water for each 4 quarts of fruit. Bring to boil, cook 2 minutes, cool, and press through a sieve. Mix $\frac{1}{2}$ to 1 cup of sugar with each quart of puree, depending on tartness of fruit. Pack into containers, leaving headspace. Seal, label, and freeze.

To make juice from plums, wash plums, then simmer until soft in enough water to barely cover. Strain through a jelly bag. Cool. If desired, sweeten with 1 to 2 cups of sugar for each quart of juice, depending on tartness of fruit. Pour into containers, leaving headspace. Seal, label, and freeze.

Rhubarb

Rhubarb pieces are best either unsweetened or packed in a 40% syrup. Wash, trim, and cut into 1- to 2-inch pieces or in lengths to fit the package. Heating rhubarb in boiling water for 1 minute and cooling promptly in cold water helps retain color and flavor. Choose firm, tender, well-colored stalks with good flavor and few fibers.

To puree rhubarb, add 1 cup of water to $1\frac{1}{2}$ quarts of washed rhubarb and boil 2 minutes. Cool and press through a sieve. Mix $\frac{2}{3}$ cup sugar with 1 quart of puree. Pack into containers, leaving headspace. Seal, label, and freeze.

To make juice from rhubarb, wash, trim, and cut into pieces 4 to 6 inches long. Add 1 quart water to 4 quarts rhubarb and bring to a boil. Press through a jelly bag. Cool. Sweeten, if desired, using $\frac{1}{2}$ cup sugar to each quart of juice. Pour into containers, leaving headspace. Seal, label, and freeze.

Strawberries

Whole or sliced strawberries freeze well in a 50% syrup or with added sugar. Large berries are better sliced or crushed. Sort berries, wash them in cold water, drain well, and remove caps. Choose firm, ripe, red berries, preferably with a slightly tart flavor.

To sugar pack, add $\frac{3}{4}$ cup sugar and $\frac{1}{2}$ teaspoon powdered ascorbic acid to 1 quart of strawberries and mix thoroughly. Put into containers, leaving headspace. Seal, label, and freeze.

To slice or crush, prepare as for whole strawberries. Then slice or crush partially or completely. Add $\frac{3}{4}$ cup sugar to 1 quart of strawberries and mix thoroughly. Pack into containers, leaving headspace. Seal, label, and freeze.

To puree, prepare as for whole strawberries. Press berries through a sieve. Add $\frac{2}{3}$ cup sugar to 1 quart of puree and mix well. Put into containers, leaving headspace. Seal, label, and freeze.

To make juice, choose fully ripe strawberries. Sort and wash them in cold water. Drain well and remove caps. Crush strawberries and strain juice through a jelly bag. Sweeten with $\frac{2}{3}$ to 1 cup sugar to each quart of juice or leave unsweetened. Pour into containers, leaving headspace. Seal, label, and freeze.

Table of Fruit Yields

Fruit	Fresh	Frozen
Apples	1 bu (48 lb)	32 to 40 pt
Berries	1 crate (16 qt)	20 to 24 pt
Cherries	1 bu (56 lb)	36 to 44 pt
Cranberries	1 box (25 lb)	50 pt
Melons	1 dozen (28 lb)	22 pt
Peaches	1 bu (48 lb)	32 to 48 pt
Pears	1 bu (50 lb)	40 to 50 pt
Plums	1 bu (56 lb)	38 to 56 pt
Raspberries	1 crate (24 pt)	24 pt
Rhubarb	15 lb	15 to 22 pt
Strawberries	1 crate (16 qt)	24 to 28 pt

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Freezing Vegetables

Most vegetables freeze very well. Fresh, tender vegetables right from the garden are best for freezing. Among the products easily frozen are some that are the most difficult to can—corn, peas, and green lima beans.

Tomatoes lose their firm texture and become soft and flabby, as do salad vegetables, such as celery, lettuce, green onions, and radishes. Tomato juice can be frozen satisfactorily but is so easy to can that you probably won't want to use premium freezer space for it.

Vegetables high in starch content, such as potatoes and mature lima beans, do not freeze well. Over-mature vegetables do not freeze well either.

Washing and Sorting

Washing is the first step in preparing most vegetables for freezing. Wash them thoroughly in cold water. *Lift* them out of the water because grit settles to the bottom of the pan. Sort vegetables according to size for heating and packing unless they are to be cut into pieces of uniform size. Broccoli and cauliflower may be soaked for 30 minutes in 1 tablespoon of salt per gallon of water to remove insects before blanching.

Heating before Packing

Vegetables for freezing must be blanched before packaging. With the exception of green pepper, vegetables maintain a better quality in frozen storage if they are heated before packaging.

Blanching slows or stops the action of enzymes that help vegetables grow and mature. After maturity, enzymes cause loss of flavor and color. If vegetables are

not heated enough, the enzymes continue to be active during frozen storage. Then the vegetables may develop off-flavors, discolor or toughen, and lose nutritional value. Heating also wilts or softens vegetables and makes them easier to pack. Heating time varies with the vegetable and size of pieces.

The most satisfactory way to blanch most vegetables is in boiling water. Use a blancher, which has a blanching basket and cover, or fit a wire basket into a large kettle and add the cover. Using at least 1 gallon of boiling water for each pound of prepared vegetables, follow the blanching directions given for the vegetable you are freezing.

Broccoli, pumpkin, sweet potatoes, and winter squash can be either boiled or steamed. To steam, use a kettle with a tight lid and a rack that holds a steaming basket at least 3 inches above the bottom of the kettle. Put 1 or 2 inches of water in the kettle and bring the water to a boil. Put the vegetables in the basket in a single layer so that steam reaches all parts quickly. Cover the kettle and keep the heat high. Follow the directions given for the vegetable you are freezing.



Recommended Blanching Times

Vegetable	Cut/Size	Blanching Time
Asparagus	Small stalks	2 minutes
	Medium stalks	3 minutes
	Large stalks	4 minutes
Beans, green or wax	Regular cut	3 minutes
	French cut	2 minutes
Beans, lima	Small	2 minutes
	Medium	3 minutes
	Large or Fordhook	4 minutes
Beets	Small	25-30 minutes
	Medium	45-50 minutes
Broccoli	Uniform stalk	3 minutes
Brussels sprouts	Small heads	3 minutes
	Medium heads	4 minutes
	Large heads	5 minutes
Cabbage or Chinese cabbage	Medium wedges	1½ minutes
Carrots	Diced or sliced	2 minutes
	Small whole	5 minutes
Cauliflower	1-inch pieces	3 minutes
Corn, whole kernel		4 minutes
Corn-on-the-cob	Small ears	7 minutes
	Medium ears	9 minutes
	Large ears	11 minutes
Greens (beet, chard, kale, and mustard)		2 minutes
Greens (collards and spinach)		3 minutes
	Tender leaves	1½ minutes
Okra	Small pods	3 minutes
	Large pods	4 minutes
Peas, green	Plump	1½ minutes
Peas, sugar snap and snow	Small pods	1½ minutes
	Large pods	2 minutes
Pepper, green		Blanching optional

Cooling

After vegetables are heated, they should be cooled quickly and thoroughly to stop the cooking. Plunge the basket of vegetables immediately into a large quantity of cold water (60°F or below). Change the water frequently, or use cold running

water or ice water. If ice is used, you'll need about 1 pound of ice for each pound of vegetables. It will take as long to cool the food as it does to heat it. When the vegetables are cool, remove them from the water and drain thoroughly.

Vegetable Yields

The number of pints of frozen vegetables from a given quantity of fresh vegetables depends on the quality, condition, maturity, variety, trim, and cut size. Yields given in the following table are approximate.

Packaging

Package vegetables in suitable freezer containers. Vegetables that package loosely, such as asparagus, Brussels sprouts, cauliflower, corn-on-the-cob, and hot peppers, need no headspace. Tomato juice and sections, as well as sweet potatoes, need a 1-inch headspace. All other vegetables need a ½-inch headspace. Seal, label, and freeze immediately.

Vegetable Yields

Vegetable	Fresh	Frozen
Asparagus	1 crate (12 2-lb bunches)	15 to 22 pt
Beans, lima (in pods)	1 bu (32 lb)	12 to 16 pt
Beans, green and wax	1 bu (30 lb)	30 to 45 pt
Beet greens	15 lb	10 to 15 pt
Beets (without tops)	1 bu (52 lb)	35 to 42 pt
Broccoli	1 crate (25 lb)	24 pt
Brussels sprouts	4 qt boxes	6 pt
Carrots (without tops)	1 bu (50 lb)	32 to 40 pt
Cauliflower	2 medium heads	3 pt
Chard	1 bu (12 lb)	8 to 12 pt
Collards	1 bu (12 lb)	8 to 12 pt
Corn, sweet (in husks)	1 bu (35 lb)	14 to 17 pt
Kale	1 bu (18 lb)	12 to 18 pt
Mustard greens	1 bu (12 lb)	8 to 12 pt
Peas	1 bu (30 lb)	12 to 15 pt
Peppers, green	⅔ lb (3 peppers)	1 pt
Pumpkin	3 lb	2 pt
Spinach	1 bu (18 lb)	12 to 18 pt
Squash, summer	1 bu (40 lb)	32 to 40 pt
Squash, winter	3 lb	2 pt
Sweet potatoes	⅔ lb	1 pt

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Most Frequently Asked Canning Questions

Freezing

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°F or less) and not just a freezing compartment. A better quality product will be maintained at 0°F or less. If a 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, 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°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 two to four 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 compressor, to help hold the cold.

5. Can food be refrozen if it has thawed?

Foods can be refrozen if at least one of these two conditions are met: 1) Foods have only partially thawed and still have ice crystals in the package; 2) The freezer temperature has remained at 40°F or below. Before using, check to see that color and odor of the food are good. Quality of the food will be lower.

6. What is freezer burn?

It is dehydration or drying that occurs on the surface of a frozen product if it is improperly wrapped. The food is safe to eat but poorer quality. To prevent freezer burn, the package must be free of air and sealed airtight.

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 bacteria, yeasts and molds present in food, but it does prevent their multiplication if the food is held at 0°F or less. When thawed, the surviving organisms can multiply again.

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

Add only the amount that will freeze within 24 hours, which is usually two or three pounds of food per cubic foot of storage space. Overloading slows down the freezing rate. Also, foods that freeze too slowly may lose quality.

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

Food may not spoil but the quality (color, flavor, and texture) will decrease. The higher the temperature, the faster quality will diminish.

11. Will food spoil if it stays frozen longer than the recommended storage time?

No. The recommended storage time is the time in which food should be used to insure maximum quality. Food stored longer than recommended time is safe but flavor, color and texture will continue to deteriorate.

FAQ

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

Purchase a freezer thermometer, 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 saving. To make the best use of it, (1) keep the freezer full, (2) use and replace the food, do not 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 usually more economical to operate.

FAQ

Packaging Materials

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

Packaging materials must be moisture-vapor resistant; durable and leak-proof; not become brittle and crack at low temperatures; resistant to oil, grease or water; protect foods from absorption of off-flavors or odors; 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 resistant wraps; and laminated papers made specially 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. Light weight (household) aluminum foil is not satisfactory for home freezing.

17. Is wax paper a suitable freezer wrap?

No. Wax paper is not moisture-vapor resistant.

18. Can bread wrappers be used for freezing?

No. Bread wrappers are not sufficiently moisture-vapor resistant to be used for freezing. A freezer-weight polyethylene bag should be used.

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

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

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

Cardboard cartons for cottage cheese, ice cream or milk are not sufficiently moisture-vapor resistant 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 have been tempered to withstand extremes in temperatures. If standard canning jars (those with narrow mouths) are used, leave extra headspace in liquid packs (3/4-inch for pints; 1 1/2-inches for quarts) to allow for expansion of food during freezing and completely thaw food before removing it. Do not use regular canning jars for foods packed in water.

Fruits

22. Is it safe to freeze fruits without sugar?

Yes; sugar is not used as a preservative but only to maintain flavor, color and texture.

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

Sugar substitutes can be used in place of sugar. Labels on the products give the equivalents to a standard amount of sugar. Follow the directions to determine the amount of sweetener needed. Artificial sweeteners give a sweet flavor but do not furnish beneficial effects of sugar, like thickness of syrup and color protection.

24. How do you prevent fruit from browning 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 sometimes be used but are not as effective as ascorbic acid. Some fruits which are to be cooked before serving may also 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 at -10°F and serve just as ice crystals are disappearing.

Vegetables

26. What is blanching?

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. Blanching slows or stops the action of enzymes which cause loss of flavor, color and texture. Blanching cleanses the surface of dirt and organisms, 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 covered saucepan, or fit a wire basket into a large kettle with fitted lid. Use one gallon of water per pound of prepared vegetable. Put vegetable in blanching basket and lower it into vigorously boiling water. Place lid on blancher and start counting blanching time as soon as the water returns to a boil. (The water should return to boiling within 1 minute, or you are using too much vegetable for the amount of water). Keep heat high for total blanching time.

29. Is it necessary to cool vegetables after blanching?

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

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°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?

Microwave blanching may not be as effective as other methods, since research has shown that some enzymes may not be inactivated. This could result in off flavors and loss of texture and color. Those wishing to run the risk of low quality vegetables by microwave blanching should be sure to work in small quantities, using the directions for their specific microwave oven. Microwave blanching will 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. Under-blanching stimulates the activity of enzymes 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 poorer than that of vegetables which have been blanched. Blanching slows or stops the action of enzymes which 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, no. You get a fresher tasting product if it has not been thawed. 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. Large frozen roasts can take as much as 1 1/2 times as long to cook as unfrozen cuts of the same weight and shape. Small roasts and thin cuts such as steaks and chops require less time.

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

No, 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 for food thawed at room temperature. Thaw meat and poultry in the refrigerator in the original wrappings. To speed thawing, loosen the wrapping. To keep other foods safe, put the thawing meat and poultry in a pan on the bottom shelf. For a quicker method, immerse meat or poultry in a watertight bag into cold water. Thaw until it is pliable. Meat and poultry can also be thawed quickly and safely in the microwave oven, followed by immediate cooking, either in the microwave oven or by some other method. Because microwave ovens vary, check your manufacturer's instructions for information on how to safely thaw in your microwave oven. 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 put under refrigeration (32 - 36°F) immediately 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 may also occur if carcasses are not properly chilled. Chill pork, lamb or veal 24 hours; beef 5 to 7 days.

41. Can stuffed turkey be frozen?

Stuffing should be frozen separately from the turkey. With any food, the time needed for freezing to take place in the center of the item is the critical factor.

FAQ



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Drying Food at Home

Drying food at home has several advantages. It can help you save money, gain control over what's in your food, and preserve the bounty of summer gardens and orchards for your family's year-round enjoyment.

People have been preserving food by drying for thousands of years. In ancient times, drying was carried out naturally by the sun and wind. Today, the use of electric food dehydrators has made home food drying quicker, simpler, and much less dependent on the weather.

Drying preserves food by removing the moisture that bacteria, yeasts, and molds need to grow. It slows the action of enzymes so that color, texture, and quality do not degrade as quickly as in fresh foods. Drying is aided by warm temperatures, low humidity, and increased air flow to carry the moisture away from the food. With much of their moisture removed, dried foods are lighter, smaller, and do not need refrigeration, making them favorites for hikers and campers. They are also gaining popularity as healthier snack alternatives to candy and chips. Because much of the moisture is removed, flavors are concentrated. Some dried foods (such as fruits and jerky) can be eaten dry; others (most vegetables) require rehydrating before use. Dried herbs are often used in cooking.

To ensure the safety of dried food and prevent the growth of molds and other spoilage microorganisms, each type of food must be dried to the proper moisture level, as indicated under each food category on the following pages.

The nutritional value of foods is affected by the drying process, with some loss of vitamins A, B, and C. Less vitamin C is lost if fruits and vegetables are dried quickly, away from sunlight, using lower temperatures as drying nears completion. Blanching vegetables before drying causes the loss of the water-soluble vitamins B and C, as well as some minerals, but helps to preserve vitamins A, B, and C during drying and storage. Ounce-for-ounce, dried fruits and vegetables contain more calories and fiber than their fresh counterparts, since nutrients are concentrated as water is removed from the drying food. Nutritional value, as well as quality, is best preserved by proper storage of dried foods, away from heat, light, and moisture.

Outdoor Drying Methods

Sun drying relies on hot, dry, breezy weather to remove the moisture from foods. A minimum temperature of 86°F with humidity below 60 percent is best. In Kentucky, our typically humid summer weather makes sun drying difficult. Even under ideal conditions, sun drying takes several days and should only be used for fruits, whose high sugar and acid content help fight spoilage and ensure safety. Vegetables and meats are best dried indoors, where temperature and humidity can be controlled.

Racks used for drying fruits outdoors must be made of food safe materials such as stainless steel, Teflon-coated fiberglass, or plastic. Avoid screens made from "hardware cloth" or other galvanized metal, which may leave harmful residues on the

food. Aluminum screens may discolor and corrode. Placing the racks on raised blocks on a concrete, aluminum or tin surface will allow for better air circulation, aid in reflection of the sun, and help keep the drying food away from ground moisture. Covering the fruit with a second screen or cheesecloth during drying will help protect it from birds and insects. The drying racks need to be covered or brought indoors at night to keep moisture from the cool night air from settling back onto the food and slowing the drying process.

Solar dryers use the sun as a heat source but are designed to concentrate the sun's rays to increase temperature and air flow and speed up the drying process. They are covered to prevent rain or condensation from reaching the food and have screen-covered vents to keep insects and birds out. They may require turning or tilting during the day to capture the full heat of the sun. Plans or kits for building solar dryers are available online. Check with your local county Extension office for more information.

Vine drying can be used for mature beans and peas, including lima, kidney, and pinto beans, lentils, and black-eyed peas. The bean pods are simply left on the vines in the garden until the vines and pods are shriveled and the beans inside rattle when shaken. No pretreatment is necessary. To test for dryness, pick and shell a few beans. Properly dried beans should shatter when hit with a hammer. If the test beans are not dry enough, leave the rest on the vine for further drying. If necessary, drying can be completed in the sun or indoors in an oven or dehydrator. If not thoroughly dried, the beans will mold.

Pasteurization

All foods that are dried outdoors in the sun or on the vine must be pasteurized to kill any insects or eggs that may be present. Foods can be pasteurized in the freezer or in the oven. To pasteurize by freezing, seal the dried food in

plastic freezer bags and place in a freezer set at 0°F or lower for at least 48 hours. To pasteurize in the oven, place the dried food in single layers in shallow pans or cookie sheets and place in a preheated 160°F oven for 30 minutes. At the end of that time, spread the food out on a clean and sanitized surface to cool; package as soon as the food is cool.

Indoor Drying Methods

Electric food dehydrators offer the simplest, quickest way to dry most foods indoors. Electric elements provide heat; fans and vents provide air circulation. They are designed to efficiently dry foods at temperatures of 100 to 145°F, depending on the food. They can be used for fruits, vegetables, meats, herbs, and leathers. Both horizontal air flow and vertical air flow designs are available. For some models, additional drying trays can be added later, increasing drying space. Twelve square feet of drying space will dry about a half-bushel of produce.

When shopping for a dehydrator, look for the following features:

- the UL (Underwriters Laboratories) seal of approval
- double wall construction of metal or high-grade plastic
- enclosed heating elements
- fan or blower for air circulation
- thermostat and dial for regulating drying temperature
- four to ten open mesh trays
- warranty and service information or technical assistance

When using a dehydrator, preheat the appliance to 10°F higher than the recommended drying temperature and spray the trays with a nonstick cooking spray to prevent sticking. Mesh screens placed on the drying trays will prevent small

pieces of dried foods such as berries, herbs, peas, or corn from falling through the trays. Once the food is placed in the preheated dehydrator, decrease the temperature to the recommended drying temperature for the food being dried. This is usually in the range of 130 to 145°F and should be specified in the manufacturer's instructions for each model of dehydrator.

Oven drying is slower and less efficient than using a dehydrator because most ovens do not have a built-in fan for air circulation. Drying foods in an oven takes more energy and two to three times longer than drying in a dehydrator. To increase air circulation, the oven door should be propped open a few inches and a fan placed outside the oven near the door so that the air flows through the oven and out the other side.

For an oven to be used in drying food, it must maintain a temperature of 140°F. (At higher temperatures, the food will cook instead of dry.) To determine whether your oven can maintain a low enough temperature, place an oven thermometer in the rear of the oven and arrange the door and fan as described above. Set the oven to its lowest heat setting and monitor the temperature on the oven thermometer. If the temperature inside the oven is higher than 160°F, the oven cannot be used for drying. If your oven is suitable for drying, the trays used should have at least 1½ inches of clearance on all sides and oven racks should be placed 2 to 3 inches apart to allow proper air circulation. Rotate the drying foods occasionally to increase moisture loss and prevent sticking.

Caution: Oven drying is not a safe practice for a home with small children.

Room drying takes place indoors in a warm, well-ventilated room, attic, or screened-in porch. It is most commonly used for herbs, hot peppers, and nuts in-the-shell. Herbs and peppers can be strung on a string or tied in small bunches and

hung from the ceiling or racks until dry. Enclosing them in paper bags with holes punched for air circulation protects them from dust and catches any leaves and seeds that fall off. Nuts are spread on parchment paper a single layer thick.

Microwave oven drying is not suitable for fruits, vegetables, or meats because there is no way to create enough air flow in the microwave oven. However, if allowed by the manufacturer, it can be a quick method for drying herbs when only small quantities are needed. Be sure to follow the microwave oven manufacturer's instructions to avoid damaging your microwave oven.

Drying Fruit

To dry or not to dry? Not all fruits are suitable for drying. Refer to Table 1 to see which fruits are recommended for drying or using in leathers. Some fruits are better enjoyed fresh, canned, or frozen.

When drying, start with good quality fruit. To minimize the loss of nutrients, dry as soon as possible after picking. Wash well and drain; core, if needed. Some fruits are best cut in half or sliced before drying. Thin, peeled uniform slices dry the fastest. Smaller fruits such as blueberries, grapes, and cherries can be left whole, but the skins need to be "checked" or cracked to speed drying. For more information on cutting fruits and vegetables see Kentucky Cooperative Extension publications *How to Hold a Knife* (FN-SSB.902A) and *How to Slice and Dice* (FN-SSB.902C).

Checking Skins

To check the skins of berries, grapes, or cherries that are dried whole, dip the fruit in briskly boiling water for 15 to 30 seconds or until skins crack and then immediately immerse in ice cold water for a few seconds to stop the cooking action. Drain on paper towels. No additional pretreatment is needed.

Pretreating Fruit

Pretreating fruit before drying is not required, but is advisable for most fruits to prevent darkening and to help maintain quality during storage. Following are several options for pretreating fruit.

Sulfuring is an old method in which sulfur is burned in an enclosed box with the fruit. Because of the health hazards presented, this method is no longer recommended.

- **Sulfite dips** can provide the same anti-darkening effect as sulfuring, but are safer, quicker, and easier to use. Only food grade (USP) or pure (reagent grade) sulfites should be used. These are available from some drugstores or stores that sell wine-making supplies. Dissolve sulfites in water at the following measurements per quart.
 - » sodium bisulfite: $\frac{3}{4}$ to $1\frac{1}{2}$ teaspoons
 - » sodium sulfite: $1\frac{1}{2}$ to 3 teaspoons
 - » sodium meta-bisulfite: 1 to 2 tablespoons per quart
- » Soak prepared fruit slices for 5 minutes; halves for 15 minutes. Rinse treated fruit lightly under cold water and place on drying trays. The sulfite solution can be used only once. The next batch of fruit requires a new sulfite solution. For long-term storage of dried fruit, sulfite pretreatment is more effective than the other options listed below. However, since sulfites have been found to cause reactions in people with asthma, you may wish to avoid their use. If dried foods are eaten within a short time, the shorter-term pretreatments listed below may be just as effective.
- **Ascorbic acid** (vitamin C) mixed with water is a safe way to prevent browning, but the effects are not as long-lasting as those of sulfite dips. Ascorbic acid is available in powdered or tablet form. One teaspoon of the powder is equal to

3,000 mg in tablet form. Mix 1 teaspoon ascorbic acid powder (or 3,000 mg in tablet form, crushed) in 2 cups water. Soak prepared fruit for 3 to 5 minutes. Remove, drain well, and place on drying trays. After this solution has been used twice, add more ascorbic acid.

- **Ascorbic acid mixtures** are used to prevent browning in fresh fruits, canning, and freezing. An example is Ball® Fruit-Fresh®. These mixtures contain ascorbic acid and sugar and are generally not as effective as pure ascorbic acid in preventing darkening in dried fruits. To use, follow the directions on the product label.
- **Fruit juice dips** can help prevent darkening, although they may not be as effective as pure ascorbic acid. Choose a pure fruit juice high in vitamin C, such as orange, lemon, pineapple, grape, or cranberry. Apple juice fortified with vitamin C can also be used. Each fruit juice will add its own color and flavor to the dried fruit. Cover prepared fruit with juice and soak for 3 to 5 minutes, drain well, and place on drying trays. Fruit juice can be used twice for soaking. The used juice is suitable for drinking.
- **Honey dip** adds flavor and calories to dried fruit. To make the dip, mix $\frac{1}{2}$ cup sugar with $1\frac{1}{2}$ cups boiling water. Cool to lukewarm and add $\frac{1}{2}$ cup honey. Soak prepared fruit for 3 to 5 minutes, drain well, and place on drying trays.
- **Syrup blanching** helps fruit keep its color fairly well during drying and storage and yields a product similar to candied fruit. It also adds calories. Fruits that can be syrup blanched include apples, apricots, bananas, nectarines, peaches, pears, persimmons, and sour cherries. To blanch fruit in syrup, combine 1 cup sugar, 1 cup light corn syrup, and 2 cups water in a saucepan. Bring to a boil. Add 1 pound of prepared fruit and simmer 10 minutes. Remove from heat and let stand for 30 minutes. Lift fruit out of syrup, rinse lightly in cold water, drain on paper towels, and place on drying trays.

- **Steam blanching** helps dried fruit keep its color, but changes the flavor and texture. To steam blanch, place several inches of water in a large saucepan with a tight-fitting lid. Heat to boiling. Place fruit, no more than 2 inches deep, in a steamer basket over the boiling water. Cover tightly with the lid, begin timing immediately and steam for the length of time specified in Table 2 for each fruit. Check for even blanching halfway through; stir if needed. Remove excess moisture with paper towels and place fruit on drying trays.

Drying the Prepared Fruit

When you are ready to dry the prepared fruit, spray the drying trays lightly with nonstick cooking spray to prevent sticking. Place the fruit pieces in a single layer on each tray, without touching or overlapping. Follow the directions for the drying method you are using. Most fruits should be dried at 135 to 140°F. After the fruit dries for 1 to 2 hours, lift and turn each piece gently with a spatula. Approximate drying times are given in Table 2. Food dries much more quickly near the end of its drying time, so be sure to watch it closely to prevent excessive drying or sticking.

Most fruits should have about 20 percent (20%) moisture content when dried. To test for dryness, cut several cooled pieces of fruit in half. There should be no visible moisture and you should not be able to squeeze out any wetness. The fruit may be pliable, but should not be sticky. If folded in half, it should not stick to itself. Berries should rattle when shaken.

After drying, cool the fruit for 30 to 60 minutes before packaging. Packaging warm fruit can cause sweating and moisture buildup, but letting the cooled fruit sit for too long before packaging can allow it to reabsorb moisture from the air.

Conditioning Dried Fruit

The moisture content of most fruits should be about 20 percent (20%) when dried. When the fruit is taken from the dryer, some pieces may be under-dried and some may be over-dried because of their size, shape, or position on the drying tray. Conditioning the dried fruit evens out the moisture level and reduces the risk of mold growth.

To condition the dried fruit, pack the cooled fruit loosely into plastic or glass jars. Close the jars and let them sit for 7 to 10 days; shake daily to mix and separate the pieces and check for condensation. The excess moisture in some pieces will be absorbed by the drier pieces. If condensation develops in the jar, return the fruit to the dehydrator for more drying. After conditioning, package and store the dried fruit as directed in this publication.

Fruit Leathers

Fruit leathers are made by puréeing fruit and spreading it onto a flat surface for drying. When dried, the fruit is shiny, chewy, and has the texture of leather. It can be rolled or cut into bite-size pieces for eating. Homemade fruit leather is a healthy choice for snacking or desserts, especially when made without added sugar.

Most fruits can be made into leathers, either on their own or in combination with other fruits or vegetables. Table 3 lists some common fruits and their suitability for use in leathers. Leathers can be made from fresh, frozen, or drained canned fruit. Applesauce or pear purée can be dried alone or added to any fresh fruit purée to extend the fruit, decrease tartness, and make the leather more smooth and pliable.

For fresh fruit, select ripe or slightly over-ripe fruit. Wash in cool water. Remove peel, seeds, and stems. Cut fruit into chunks. Thaw frozen fruit before use. Drain canned fruit and reserve the liquid.

Use 2 cups of fruit for each fruit leather (13-inch by 15-inch rectangle or 14-inch round). Purée fruit until smooth, using a blender, food processor, or food mill. For canned fruit, some of the reserved liquid can be added if the purée is too thick. For light-colored fruit, add 2 teaspoons lemon juice or ⅛ teaspoon ascorbic acid to prevent darkening. If desired, ¼ to ½ cup of corn syrup, honey, or sugar may be added for additional sweetness. Corn syrup or honey is best for longer storage of the fruit leather because it prevents the formation of crystals. Sugar is fine for leathers that will be eaten immediately or stored for shorter periods of time.

If desired, small amounts of spices or flavorings can be added to the purée before drying. Spices to consider include allspice, cinnamon, cloves, ginger, mint, nutmeg, or pumpkin pie spice. For flavorings, try almond, orange, or vanilla extract; lemon, lime, or orange juice; or lemon, lime, or orange peel. Use spices or flavorings sparingly; start with ⅛ teaspoon for each 2 cups of purée. Other possible additions are shredded coconut, chopped dried fruits, granola, chopped nuts, or poppy, sesame, or sunflower seeds. Be aware that some leathers intensify in flavor with longer storage times, so adjustments may be needed for amounts of sugar or spices and flavorings to meet your taste expectations.

To dry fruit leather in an electric dehydrator, use specially designed solid trays that fit into the dehydrator racks or line the racks with plastic wrap or parchment paper; be careful not to allow leakage. For oven drying, 13-inch by 15-inch cookie sheets are ideal. These can be lined with silicone non-stick baking mats. Lightly spray trays, plastic wrap, or cookie sheets with cooking spray before use to prevent sticking.

Pour the fruit purée into the prepared trays, spreading it ⅛ inch to ¼ inch thick. The edges of the leather should be slightly thicker than the center because they will dry more quickly. Dry

fruit leathers at 140°F. Approximate drying times are 6 to 8 hours in a dehydrator or up to 18 hours in an oven. To test for dryness, touch the center of the leather; no indentation should remain. The leather will be slightly sticky. While warm, peel the dried leather from the tray. It can be rolled for cooling or cut into pieces. Cookie cutters can be used to cut shapes that children will enjoy. When cool, wrap in plastic or store in air-tight containers. Fruit leathers will keep for up to one month at room temperature or up to one year in the freezer, tightly wrapped.

Drying Vegetables

When drying vegetables, start with fresh, crisp vegetables and dry as soon as possible after harvesting to minimize the loss of nutrients. Wash well in cool water, then trim, peel, cut, slice, or shred according to the instructions given in Table 4. Remove all decayed and bruised areas and woody portions. As much as possible, cut pieces the same size so they will dry at the same rate. To preserve quality and nutrients, prepare only as many vegetables as can be dried at one time.

As with fruits, some vegetables are more suitable for drying than others. Table 3 lists some common vegetables and their suitability for drying.

Pretreating Vegetables

Before drying, most vegetables should be pretreated by blanching. Blanching inactivates the enzymes that cause loss of color and flavor during drying and storage. It also helps destroy microorganisms, sets the color, and reduces drying time by relaxing tissues so that moisture can escape more quickly. Not all vegetables need to be blanched before drying. Refer to the instructions given in Table 4 for each vegetable.

- **Steam blanching** minimizes the loss of water-soluble nutrients, but takes longer than water blanching. Use a deep pot with a close-fitting lid and a wire basket, rack or colander to hold

the vegetables and allow the free circulation of steam around them. Add water to the pot and bring to a rolling boil. Place vegetables loosely in the basket, no more than two inches deep. Place the basket in the pot, making sure that the vegetables are above the water. Cover and steam for the time specified in Table 4.

- **Water blanching** is quicker than steam blanching, but usually results in a greater loss of nutrients. Fill a large saucepan two-thirds full of water, cover and bring to a rolling boil. Place the prepared vegetables in a colander or wire basket and submerge in the water. Cover and return to a boil. Start timing as soon as the water returns to a boil and blanch for the length of time recommended in Table 4. If it takes longer than one minute for the water to return to a boil, too many vegetables were added. Reduce the amount for the next batch.

Cooling and Drying the Prepared Vegetables

After blanching, dip the vegetables briefly in cold water, just long enough to stop the cooking action. Do not cool them to room temperature. When they feel just slightly hot to the touch, drain them by pouring them directly onto the drying tray held over a sink. Wipe excess water from the bottom of the tray, arrange the vegetables in a single layer and pat them dry. Place the tray with the warm vegetables immediately into the preheated dehydrator or oven. This will help the drying process to begin more quickly.

Most vegetables should be dried at 130 to 140°F. Approximate drying times are given in Table 4. Vegetables dry much more quickly at the end of the drying period, so watch them closely to avoid excessive drying or sticking. Strong smelling vegetables like onions, garlic, or horseradish may produce strong odors during drying. Avoid drying these vegetables with other foods because the flavors will blend. Provide adequate ventilation.

Most vegetables should be dried until they are brittle or crisp (e.g., asparagus, beans, beets, broccoli, celery, corn, greens, onions, peas, potatoes). Some will shatter when hit with a hammer. Others will be leathery (e.g., carrots, cauliflower, mushrooms, okra, peppers, pumpkin, tomatoes, zucchini). When dried, vegetables should contain about 10 percent moisture. Because they are so dry, most vegetables do not need to be conditioned. However, vegetables that are pliable when dried should be conditioned to even out the moisture level. See the instructions for conditioning dried fruit earlier in this publication.

After drying, cool the vegetables for 30 to 60 minutes before packaging. Packaging warm vegetables can cause sweating and moisture buildup, but letting the cooled vegetables sit for too long before packaging can allow them to reabsorb moisture from the air.

Vegetable Leathers

Vegetable leathers are made in the same way as fruit leathers. The vegetables are cooked, puréed, and strained if needed. Spices can be added for flavor. Dry vegetable leathers at 140°F.

For mixed vegetable leather, combine 2 cups cored, chopped tomatoes, 1 small chopped onion, ¼ cup chopped celery and salt to taste. Cook in a covered saucepan 15 to 20 minutes. Purée or force through a sieve or colander. Return to saucepan and cook until thickened. Pour into a prepared tray for drying.

For pumpkin leather, combine 2 cups canned pumpkin (or 2 cups fresh pumpkin, cooked and puréed) with ½ cup honey, ¼ teaspoon cinnamon, ⅛ teaspoon nutmeg, and ⅛ teaspoon ground cloves. Mix well. Pour into a prepared tray for drying. Sweet potatoes or any winter squash can be substituted for the pumpkin.

Drying Herbs

Harvest herbs for drying just before the flowers are ready to open. To minimize wilting, the best time to harvest is in the morning, just after the dew has evaporated. Avoid bruising the leaves. Rinse herbs in cool water and gently shake off excess water. Lay the herbs on paper towels to absorb excess moisture. Discard any dirty, bruised, or imperfect leaves and stems.

Drying Herbs in Electric Dehydrator

Herbs are delicate and should be dried at 95°F to 115°F. Check your dehydrator's manual for specific instructions. Place the herbs in single layers on the dehydrator trays. Drying times may range from 1 to 4 hours. Check for dryness periodically. Herbs are dry when they crumble between your fingers and their stems break when bent.

Air Drying Herbs

Sturdy herbs such as rosemary, sage, thyme, summer savory, and parsley are the easiest to air dry. Tie them into small bundles and hang in a warm, dry, well-ventilated area. Avoid direct sunlight for best color and flavor retention.

Tender herbs (such as basil, oregano, tarragon, lemon balm, and mint) or those with seeds can be dried hanging in paper bags to catch any leaves or seeds that fall off. Use small bunches to allow fast drying and prevent molding. Tear or punch holes in the sides of the bag to allow air currents to circulate. Close the top of the bag with a rubber band and hang in a warm, dry, well-ventilated area.

Oven Drying Herbs

For some herbs (especially mint, sage, or bay leaves), the leaves can be dried separately using an oven. Remove the best leaves from the stems and lay the leaves on a paper towel, without allowing the leaves to touch. Cover with another paper towel and another layer of leaves. Five lay-

ers of leaves can be dried in this way at one time. Allow to dry overnight in a very cool oven. The oven light of an electric range or the pilot light of a gas range will provide enough heat. Leaves dried this way dry flat and retain good color.

Drying Herbs in a Microwave Oven

It may be possible to dry small amounts of herbs quickly in a microwave oven. Be sure to follow the microwave oven manufacturer's instructions, to avoid damaging your microwave oven.

Drying Meats

Jerky is dried meat or poultry. Making jerky at home requires proper safe food preparations. Guidelines for making jerky can be found in Kentucky Cooperative Extension publication *Jerky Safety* (FCS3-594).

Packaging and Storing Dried Foods

Allow dried foods to cool completely before packaging them, to prevent sweating and possible mold growth. However, once they have cooled package them promptly so that they do not reabsorb moisture from the air.

Use clean, dry containers that will seal out air, moisture, and insects. Glass jars, plastic freezer containers with tight-fitting lids, or plastic freezer bags work well. Vacuum packaging is another good option. Label each package with the contents and date.

Package dried foods in amounts that will be used in one sitting. Each time a package of dried food is opened, the food inside is exposed to air and moisture that will reduce its quality and may cause spoilage. To reduce the amount of air in the container when packaging, pack dried foods as tightly as possible without crushing. After several days of storage, check each package for moisture. If any moisture has built up, the food should be

returned to the dehydrator for a short time to complete drying.

Dried foods should be stored in a cool, dark, dry area. The shelf life will depend on the specific food and the storage conditions. Food quality is affected by heat. Most dried fruits can be stored for 1 year at 60°F, but only 6 months at 80°F. The shelf life for dried vegetables is about half that of dried fruits. Even under ideal conditions, there will be a gradual loss of color, flavor, and nutritive value of dried foods over time.

Using Dried Foods

Dried fruits make delicious snacks. They can be rehydrated by soaking in water for 30 to 90 minutes. See Table 5 for directions for rehydrating specific fruits. Oversoaking may cause a loss of flavor and mushy texture. To cook rehydrated fruit, simmer covered, in the soaking water. Rehydrated fruit may also be used in favorite recipes. Any liquid remaining after soaking can be used as part of the liquid in the recipe.

Some dried vegetables make tasty snacks too, especially when thinly sliced and dried into vegetable chips. These can be served with dips as a nutritious, lower-calorie alternative to commercial potato chips. Good vegetables to try are carrot, tomato, parsnip, turnip, beet, or zucchini chips.

Most dried vegetables, however, are rehydrated before use. The simplest way is to do this is to add them directly to soups or stews during cooking. Make sure there is enough liquid to keep them covered and simmer until tender. Dried vegetables can also be rehydrated by covering with boiling liquid and soaking for 30 to 90 minutes. The liquid can be water or, for additional flavor, bouillon or vegetable juice. See Table 5 for directions for rehydrating specific vegetables. If cold water is used, longer soaking times will be needed. If the vegetables are soaked for longer than 2 hours,

they should be refrigerated. Once rehydrated, the vegetables can be used in place of fresh vegetables in favorite recipes. The soaking liquid can be used in cooking.

Vegetable flakes can be made by crushing dried vegetables with a wooden mallet, rolling pin, or clean dry hands. Finer vegetable powders can be made by grinding dried vegetables in a food mill, food processor, or blender. Both can be used in cooking.

Dried herbs are used in cooking. Their flavor is about three to four times stronger than that of fresh herbs. If substituting dried herbs for fresh herbs in a recipe, use only $\frac{1}{4}$ to $\frac{1}{3}$ of the fresh herb amount.

Recipes

Vegetable Soup

4 cups water

$\frac{3}{4}$ to 1 cup dried vegetables (green beans, corn, peas, tomatoes, onions, etc.)

2 teaspoons bouillon granules or 2 cubes

Seasonings to taste (herbs, spices or soy sauce)

- Bring water to a boil. Add dried vegetables, bouillon and seasonings.
- Simmer about 20 minutes or until vegetables are tender.
- Remember to refrigerate leftovers.

Yield: 6 servings

Variations: Vegetable, chicken or beef broth may be used in place of the water and bouillon. Rice, noodles, lentils or barley ($\frac{1}{2}$ cup) may be added with the other ingredients.

Nutritional Analysis: Will depend on specific ingredients chosen.

Recipe from Swanson, M.A. (1995). *Drying Fruits & Vegetables* (PNW 397). Pacific Northwest Extension Publications. Used with permission for educational purposes only.

Dried Apple Pies

4 cups dried apple slices

3½ cups water

1½ cups sugar

½ teaspoon cinnamon

½ teaspoon nutmeg

¼ cup low-fat margarine, melted

- Combine apples and water in a large saucepan. Bring to a boil, cover, reduce heat and simmer 30 minutes or until tender. Stir in sugar and spices.
- Roll any pie crust mixture into approximately 6-inch circles. Fill each circle with a large tablespoon of filling. Moisten one edge with water, fold crust to form a half-moon shape and press with a fork to seal. Brush very lightly with melted margarine and place on a cookie sheet.
- Bake at 350°F until golden brown.

Yield: 30 pies

Variation: Canned biscuit dough also makes a good crust.

Nutritional Analysis: (1 pie): 161 calories, 6 g fat, 27 g carbohydrate, 2 g protein, 315 mg sodium

Recipe from Bastin, S.S. (2010). *Kentucky Favorites: The Low-fat Way* (FN-SSB.142). Lexington: Cooperative Extension Service, University of Kentucky.

Terrific Trail Mix

1 cup dried fruit (choose ¼ cup of favorites such as apricots, peaches, apples, cherries, prunes)

½ cup raisins (and/or dried cranberries)

1½ cups unsalted sunflower kernels

1 cup unsalted dry roasted nuts (choose ¼ cup of favorites such as peanuts, honey roasted peanuts, almonds, chopped walnuts, pecan halves)

- Combine ingredients in a bowl and mix. Store in an airtight container or resealable plastic bag for up to 2 weeks.

Yield: 4 cups (8 servings)

Nutritional Analysis: 308 calories, 20g fat, 27g carbohydrate, 8g protein, 6g fiber, 31mg sodium

Recipe from Allrecipes.com (2004).

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Table 1. Fruits: Suitability for Drying

Fruit	Suitability for Drying	Suitability for Fruit Leather
Apples	Excellent	Excellent
Apricots	Excellent	Excellent
Bananas	Good	Fair to good
Berries with seeds (e.g. blackberries, raspberries)	Not recommended ¹	Excellent
Blueberries	Fair	Poor unless in combination
Cherries	Excellent	Excellent
Citrus fruits	Not recommended ²	Only in combination
Citrus peel	Excellent	Only in combination
Crabapples	Not recommended ³	Only in combination
Cranberries	Poor	Only in combination
Currants	Good	Not recommended
Figs	Excellent	Only in combination
Grapes	Excellent	Fair to good
Melons	Poor	Not recommended
Nectarines	Excellent	Excellent
Peaches	Excellent	Excellent
Pears	Excellent	Excellent
Persimmons	Fair	Not recommended
Pineapples	Excellent	Excellent
Plums	Good	Good
Prune plums	Excellent	Excellent
Quince	Not recommended ⁴	Only in combination
Rhubarb ⁵	Good	Fair
Strawberries	Fair to good	Excellent

¹ High seed content and slow rate of drying.

² Too juicy; pulp lacks firm texture.

³ Too small and tart.

⁴ Hard flesh and strongly acidic flavor.

⁵ Never consume rhubarb leaves. They contain toxic salts of oxalic acid.

Table adapted from Andress and Harrison. Used with permission for educational purposes only.

Table 2. Guide to Drying Fruits

Fruit	Preparation¹	Pretreatment (Choose One)	Estimated Drying Time in Dehydrator (Hours)²
Apples	Peel (if desired) and core. Cut into slices or rings 1/8 to 1/4 inch thick.	Sulfite dip Ascorbic acid solution Ascorbic acid mixture Fruit juice dip Steam blanch 3 to 5 minutes Syrup blanch 10 minutes	6 to 12
Apricots	Pit and halve. May slice if desired.	Sulfite dip Ascorbic acid solution Ascorbic acid mixture Fruit juice dip Steam blanch 3 to 4 minutes Syrup blanch 10 minutes	24 to 36 ³
Bananas	Use solid yellow or slightly brown-flecked fruit. Peel and slice 1/4 to 3/8 inch thick, crosswise or lengthwise.	Sulfite dip Ascorbic acid solution Ascorbic acid mixture Fruit juice dip Honey dip Steam blanch 3 to 4 minutes Syrup blanch 10 minutes	8 to 10 ³
Berries, firm with waxy coating (blueberries, cranberries, currants, gooseberries)		"Check" skins	24 to 36
Berries, soft (strawberries, boysenberries)	May slice if desired.	No treatment necessary	24 to 36
Cherries	Use fully ripe fruit. Stem and pit. Cut in half, chop or leave whole.	Whole: "Check" skins Cut and pitted: No treatment necessary Sour: Syrup blanch 10 minutes	24 to 36 ³
Citrus peel	Remove outer 1/16 to 1/8 inch of peel. Avoid bitter white inner pith.	No treatment necessary	8 to 12
Grapes, seedless	Leave whole.	"Check" skins	12 to 20
Grapes, with seeds	Cut in half and remove seeds.	No treatment necessary	12 to 20
Nectarines and peaches	Pit and halve. Peel if desired. For steam and syrup blanching, leave whole, then pit and halve. May slice or quarter.	Sulfite dip Ascorbic acid solution Ascorbic acid mixture Fruit juice dip Steam blanch 8 minutes Syrup blanch 10 minutes	36 to 48 ³
Pears	Cut in half and core. Peeling preferred. May slice or quarter.	Sulfite dip Ascorbic acid solution Ascorbic acid mixture Fruit juice dip Steam blanch 6 minutes (halves) Syrup blanch 10 minutes	24 to 36 ³

Table 2. Guide to Drying Fruits *(continued)*

Fruit	Preparation¹	Pretreatment (Choose One)	Estimated Drying Time in Dehydrator (Hours)²
Persimmons	Use firm fruit of long, soft varieties or fully ripe fruit of round drier varieties. Peel and slice using stainless steel knife.	No treatment necessary May syrup blanch	12 to 15 ³
Plums	Leave whole.	Rinse in hot tap water	24 to 36

¹ Wash all fruits thoroughly before preparing.

² Drying times vary depending on the initial moisture content of the fruit and the particular dehydrator being used. Drying times in an oven could be up to twice as long, depending on air circulation. Drying times for sun drying could range from 2 to 6 days, depending on temperature and humidity.

³ Drying times are shorter for slices and other cuts of fruit.

Table adapted from Andress and Harrison. Used with permission for educational purposes only.

Table 3. Vegetables: Suitability for Drying

Vegetable	Suitability for Drying	Vegetable	Suitability for Drying
Artichokes	Fair	Okra	Fair to good
Asparagus	Poor to fair	Onions	Good to excellent
Beans, green	Fair to good	Parsley	Good
Beans, lima	Fair	Parsnips	Good
Beets	Fair to good	Peas	Fair to good
Broccoli	Not recommended	Peppers, green or red	Good
Brussels sprouts	Poor ¹	Peppers, chili	Excellent
Cabbage	Fair ²	Popcorn	Good
Carrots	Good	Potatoes	Good
Cauliflower	Poor	Pumpkins	Fair to good
Celery	Poor	Radishes	Not recommended ⁶
Corn, sweet	Good	Rutabagas	Fair to good
Cucumbers	Poor	Squash, summer	Poor to fair
Eggplant	Poor to fair	Squash, winter	Not recommended
Garlic	Good	Sweet potatoes	Fair
Greens ³	Poor	Tomatoes	Fair to good ⁷
Horseradish	Good ⁴	Turnips	Fair to good
Kohlrabi	Fair	Yams	Fair
Lettuce	Not recommended ⁵	Zucchini	Poor to fair
Mushrooms	Good		

¹ Difficult to dry because of small size and layered leaves; strong flavor.

² Readily absorbs moisture from the air. Keeps well only if stored at very cold temperature.

³ Collard, kale, mustard, spinach, Swiss chard, turnip greens.

⁴ Odor extremely strong during processing; use adequate ventilation.

⁵ High water content; product will be undesirable for use.

⁶ Product would be of low quality.

⁷ Re-absorb moisture readily causing undesirable color and flavor changes, shortened shelf life. Package tightly. Black color can develop because of oxidation.

Table adapted from Andress and Harrison. Used with permission for educational purposes only.

Table 4. Guide to Drying Vegetables

Vegetable	Preparation¹	Pretreatment (Choose One)	Estimated Drying Time in Dehydrator (Hours)²
Asparagus	Cut large tips in half.	Steam blanch 4 to 5 minutes Water blanch 3½ to 4½ minutes	4 to 6
Beans, green	String, if necessary. Cut in short pieces or lengthwise. ³	Steam blanch 2½ minutes Water blanch 2 minutes	8 to 14
Beets	Cook as usual. Cool; peel. Cut into shoestring strips ⅛ inch thick.	No further blanching required	10 to 12
Broccoli	Trim; cut as for serving. Quarter stalks lengthwise.	Steam blanch 3 to 3½ minutes Water blanch 2 minutes	12 to 15
Brussels sprouts	Cut in half lengthwise through stem.	Steam blanch 6 to 7 minutes Water blanch 4½ to 5½ minutes	12 to 18
Cabbage	Remove outer leaves; quarter and core. Cut into strips ⅛ inch thick.	Steam blanch 2½ to 3 minutes ⁴ Water blanch 1½ to 2 minutes	10 to 12
Carrots	Use only crisp, tender carrots. Cut off roots and tops; preferably peel. Cut in slices or strips ⅛ inch thick.	Steam blanch 3 to 3½ minutes Water blanch 3½ minutes	10 to 12
Cauliflower	Prepare as for serving.	Steam blanch 4 to 5 minutes Water blanch 3 to 4 minutes	12 to 15
Celery	Trim stalks; slice.	Steam blanch 2 minutes Water blanch 2 minutes	10 to 16
Corn, cut	Select tender, mature, sweet corn. Husk and trim. Blanch until milk is set. Cut kernels from cob after blanching.	Steam blanch 2 to 2½ minutes Water blanch 1½ minutes	6 to 8
Garlic	Peel and finely chop bulbs. Odor is pungent	None	6 to 8
Greens (chard, kale, spinach, turnip)	Use only young, tender leaves. Wash and trim very thoroughly.	Steam blanch 2 to 2½ minutes Water blanch 1½ minutes	8 to 10
Horseradish ⁵	Remove small rootlets and stubs. Peel or scrape roots. Grate.	None	4 to 10
Mushrooms (SEE WARNING ⁶)	Scrub thoroughly. Discard any tough, woody stalks. Cut tender stalks into short sections. Peel large mushrooms. Slice.	None	8 to 10
Okra	Trim; slice crosswise in ⅛- to ¼-inch disks.	None	8 to 10
Onions	Remove outer “paper” skins, tops and root ends. Slice ⅛ to ¼ inch thick.	None	3 to 9
Parsley	Separate clusters. Discard long or tough stems.	None	1 to 2
Peas, green	Shell.	Steam blanch 3 minutes Water blanch 2 minutes	8 to 10
Peppers and pimientos	Stem, core and remove partitions. Cut into disks about ¾ inch by ¾ inch.	None	8 to 12

Table 4. Guide to Drying Vegetables (continued)

Vegetable	Preparation¹	Pretreatment (Choose One)	Estimated Drying Time in Dehydrator (Hours)²
Potatoes, sweet and white	Peel. Cut into shoestring strips 1/4 inch thick or slices 1/8 inch thick.	Steam blanch 6 to 8 minutes Water blanch 5 to 6 minutes	8 to 12
Pumpkin and hubbard squash	Cut or break into pieces. Remove seeds and cavity pulp. Cut into 1-inch strips. Peel rind. Cut strips crosswise into pieces about 1/8 inch thick.	Steam blanch 2½ to 3 minutes Water blanch 1 minute	10 to 16
Squash, summer and zucchini	Trim. Cut into 1/4-inch slices.	Steam blanch 2½ to 3 minutes Water blanch 1/2 minute	10 to 12
Tomatoes, for stewing	Blanch to loosen skins. Chill in cold water. Peel. Cut into sections about ¾ inch wide or slice. Cut small pear or plum tomatoes in half.	Steam blanch 3 minutes Water blanch 1 minute	10 to 18
Tomatoes, sliced	Remove cores. No peeling or blanching is necessary. Cut crosswise into ¼- to ¾-inch slices. ⁷	None	6 to 12

¹ Wash all vegetables thoroughly before preparing.

² Drying times vary depending on the initial moisture content of the vegetable and the particular dehydrator being used. Drying times in an oven could be up to twice as long, depending on air circulation.

³ For a texture more similar to canned green beans, after blanching freeze beans in a single layer for 30 to 40 minutes before drying.

⁴ Steam until wilted.

⁵ Odor extremely strong during processing; use adequate ventilation.

⁶ WARNING: The toxins of poisonous varieties of mushrooms are not destroyed by drying or cooking. Only an expert can differentiate between poisonous and edible varieties.

⁷ Slices may be lightly sprinkled with crumbled dry oregano or other dry herb of your choice prior to drying.

Table adapted from Andress and Harrison. Used with permission for educational purposes only.

Table 5. Rehydrating Dried Fruits and Vegetables

Dried Food	Water to Add to 1 Cup of Dried Food (Cups)	Minimum Soaking Time (Hours)
Fruits¹		
Apples	1½	½
Pears	1¾	1¼
Peaches	2	1¼
Vegetables²		
Asparagus	2¼	1½
Beans, lima	2½	1½
Beans, green	2½	1
Beets	2¾	1½
Carrots	2¼	1
Cabbage	3	1
Corn	2¼	½
Greens (turnip, other)	1	¾
Okra	3	½
Onions	2	¾
Peas	2½	½
Pumpkin	3	1
Squash	1¾	1
Spinach	1	½
Sweet potatoes	1½	½

¹ For fruits, water is at room temperature.

² For vegetables, boiling water is used. If cold water is used, longer soaking times will be needed.

Table adapted from Andress and Harrison. Used with permission for educational purposes only.

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Most Frequently Asked Canning Questions

Drying

1. How can I tell when fruit leather is dry?

Touch it; it should not be sticky. If it peels from the plastic and maintains its shape, it is dry.

2. My banana chips don't taste like the ones in stores. What can I do?

There are a variety of banana chips available. Read the ingredients on the label. Some bananas are dipped in honey; some are dipped in granulated sugar, brown sugar or flavored gelatin. Be sure bananas are ripe. Some commercial banana chips have been treated to make them crisp. This cannot be done in the home.

3. Where can I buy sodium bisulfite?

Food grade sodium bisulfite is available from drugstores or hobby stores that have wine making ingredients. If you are unable to find a source, ask your county Extension agent.

4. The fruit sticks to the trays. How can I prevent this?

Fruits or thinly sliced vegetables may stick to plastic trays. To help prevent this, spray trays with vegetable cooking spray. Also, gently lift food with a spatula after one hour of drying.

5. What are other uses of a food dehydrator?

Besides being used during peak season to preserve food, a food dehydrator can be used for proofing breads, making yogurt or cheese, drying seeds, curing nuts, and de-crystallizing honey.

6. Will heating meat to 160°F before or after I dry jerky guarantee me that I will not get sick?

It is never possible to guarantee 100% safety in any situation. However, heating the meat to 160°F will certainly decrease the risk of getting a foodborne illness from the product.

FAQ

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Home Canning Pickled and Fermented Foods

The home canning of pickles, relishes, and fermented foods allows you to enjoy the bounty of your summer garden or local farmers market year-round. It may also save you money and give you some control over what's in your food. To ensure safe, high quality home-canned products, always follow research-based recommendations when canning.

Pickles are considered a high-acid food. The acid may be added, most often as vinegar, or in the case of fermented products form naturally during the fermentation process. For all pickled and fermented foods, the acidity level is important for safety, as well as for taste and texture. Acid prevents the growth of *Clostridium botulinum* (the bacteria that causes botulism) and allows these products to be safely processed in a boiling water canner.

Types of Pickled and Fermented Foods

Quick-process pickles or pickled vegetables are covered with boiling pickling liquid, usually made up of vinegar, spices, and seasonings. Sometimes

the vegetables are brined (in salt water) for several hours and then drained before being covered by the pickling liquid. Brining removes some of the excess liquid found in vegetables, allowing for easier packing of jars for home canning. Many pickled products have a better flavor if allowed to stand for several weeks after processing to allow the spices and seasonings to fully develop.

Fermented pickles and sauerkraut are cured in a salt and water solution for three to six weeks. During this time, colors, flavors and textures change, and the acidity increases through fermentation. The lactic acid formed in the fermentation process helps to preserve the food.

Relishes are made from chopped vegetables and fruits that are cooked with vinegar and seasonings. They may or may not be sweet.

Fruit pickles are made from whole or sliced fruits that are simmered in a sweet-and-sour syrup made with sugar, seasonings, and vinegar or lemon juice.


Chutneys are relish-type condiments, usually made with fruit, vegetables, sugar, vinegar, and spices and simmered until thick.



Ingredients

Select fresh, firm fruits and vegetables with no signs of spoilage. Wash them well, especially around the stems. A pickling variety of cucumber instead of table or slicing cucumbers will make for better quality pickles. Be sure to remove and discard a $\frac{1}{16}$ -inch slice from the blossom end of vegetables. The blossoms contain enzymes that can cause product softening.

Use only commercial vinegar that is at least 5% acidity in home canning. White distilled vinegar or cider vinegar may be used, depending on the flavor desired. Do not use homemade vinegar, since the acidity level is unknown. Do not dilute the vinegar unless the recipe specifies, because the acidity is needed for a safe product. If a less sour taste is desired, add sugar rather than decrease the vinegar.

 Use canning or pickling salt. Table salt contains non-caking agents that may make the brine cloudy. Do not change the salt concentrations in fermented pickles or sauerkraut, because proper fermentation depends on correct proportions of salt and other ingredients. In these products, the salt is necessary for safety. In quick-process pickles made with vinegar, the amount of salt can be safely reduced. However, the quality may be lower, with both flavor and texture different than expected. You may want to make a small quantity first to determine whether you like the result. Salt substitutes contain potassium chloride and may develop a bitter tasting product.

Use white sugar unless the recipe calls for brown. Sugar substitutes are not usually recommended for pickling because heat and storage may cause bitterness or loss of flavor. An alternative is to use a pickle recipe that does not call for sugar, and add the sugar substitute before serving. If you plan to use a sugar substitute in pickling, follow recipes that were developed for the specific sugar substitute.

Use fresh whole spices for best quality and flavor. Ground spices may cause the pickles to darken and become cloudy. Pickles will darken less if the whole spices are tied in a spice bag and then removed from the brine before packing the jars.

If good quality ingredients and up-to-date recipes are used, firming agents are not needed for crisp pickles. Soaking cucumbers in ice water for four to five hours before pickling is a safer method. The use of alum is no longer recommended. Food grade pickling lime does improve pickle firmness and can be used to soak cucumbers before pickling. However, the excess lime must be removed by repeated soaking and rinsing with fresh water. Failure to reduce the lime may increase the risk of botulism because of the change in acidity. For quick-process pickles, calcium chloride products such as Pickle Crisp® may be added to the filled jars before applying the lids, following the manufacturer's instructions.

Equipment

A stainless steel saucepan should be used when ingredients such as vinegar, lemon juice, or acid foods are part of the recipe. This prevents leaching of metals into the food and pitting of the pan, which might occur with other metals such as aluminum and cast iron.

When fermenting fresh vegetables, a one-gallon container is needed for each five pounds of vegetables. A five-gallon stone crock is ideal for fermenting 25 pounds of fresh cabbage or cucumbers. A glass or food-grade plastic container can be substituted for a stone crock. Other one- to three-gallon non-food-grade plastic containers may be used, if lined with a clean food-grade plastic bag. **Be sure that foods contact only food-grade plastics. Do not use garbage bags or trash liners.**

Vegetables must be kept one to two inches under the brine when fermenting. To weigh the vegetables down, use a dinner plate or glass pie plate that will just fit inside the container. Weigh the plate down with two or three sealed quart jars filled with water, or a large, sealed plastic bag containing three quarts of water and four and one-half tablespoons of salt. Cover the container with a clean, heavy towel to help prevent contamination from insects and molds while the vegetables are fermenting. All equipment must be washed in hot soapy water and rinsed well with very hot water before use.

Safety

When home canning pickles and fermented foods, use only research-based, tested recipes. Do not change the proportions of vinegar, water, vegetables, or fruit given in a recipe. All pickles and fermented foods must be processed to destroy yeasts, molds, and spoilage bacteria. Processing also inactivates enzymes that could affect the color, flavor, and texture of the final product.

Altitude affects processing times and pressures. The processing times given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, please consult the website for the National Center for Home Food Preservation located at <http://nchfp.uga.edu>.

For more information on safe home canning, please see *Home Canning Basics* (FCS3-578).

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Step-By-Step Canning

1. Assemble all equipment and utensils.
2. Visually examine jars, lids, and bands for defects. Wash jars and two-piece caps in hot, soapy water and rinse well. Place lids, bands, and jars in simmering water. Remove pan from heat and allow the lids and jars to remain in the hot water until needed. Do not boil the lids. Dry the bands and set aside.
3. Fill the boiling water canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. Begin preparing the recipe while the water is preheating. It will take about 20 to 30 minutes for the water to begin to boil.
4. Use top-quality ingredients; wash fresh produce well. Prepare the recipe, following the directions given.
5. Fill the hot jars, leaving the headspace specified in the recipe. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
6. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Add boiling water to cover the jars by 1 to 2 inches. Turn the heat up so the water boils vigorously and place the lid on the canner.
7. Begin timing the process when the water has reached a full boil. Set a timer for the total number of minutes indicated in the recipe. The water must remain at a boil for the whole processing time. Add boiling water, if necessary, to keep the water level at least 1 inch above the jar tops.
8. When the processing time specified in the recipe is complete, turn off the heat and remove the canner lid. Wait 5 minutes before removing jars.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years.
12. Enjoy your very own pickled products.

Recipes for Beginners

Kosher-Style Dills

Ingredients

- 30 to 36 pickling cucumbers, 3 to 4 inches long, blossom ends removed, ¼ inch of stem left attached
- 3 cups vinegar
- 3 cups water
- 6 tablespoons canning or pickling salt
- 7 heads fresh or dried dill
- 4 to 7 garlic cloves, sliced
- 3½ teaspoons mustard seed

Directions

- Combine vinegar, water, and salt in a large saucepan. Bring to a boil.
- Place ½ head of dill, ½ to 1 clove sliced garlic, and ½ teaspoon mustard seed in the bottom of each hot pint jar.
- Pack cucumbers into hot jars. When the jars are half-filled with cucumbers, add remaining ½ head dill to each jar. Finish packing cucumbers into the jars, leaving ½-inch headspace.
- Ladle boiling brine over cucumbers, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.
- Pickles will shrivel after processing. They will later plump in sealed jar.

Yield: about 6 to 7 pint jars

Nutritional Analysis (½ cup): 35 Calories, 0 g fat, 6 g carbohydrate, 2 g protein

Recipe adapted from So Easy to Preserve. Used with permission for educational purposes only.



Recipes for Beginners

Bread and Butter Pickles

Ingredients

- 6 pounds 4- to 5-inch pickling cucumbers, blossom ends removed, cut into 3/16-inch slices
- 8 cups thinly sliced onions (about 3 pounds)
- ½ cup canning or pickling salt
- 4 cups vinegar
- 4½ cups sugar
- 2 tablespoons mustard seed
- 1½ tablespoons celery seed
- 1 tablespoon ground turmeric

Directions

- Combine cucumber and onion slices in a large bowl. Add salt. Cover with 2 inches crushed or cubed ice. Refrigerate 3 to 4 hours, adding more ice as needed. Drain.
- Combine remaining ingredients in a large saucepan. Boil 10 minutes.
- Add drained cucumbers and onions and slowly reheat to boiling.
- Pack hot pickles and liquid into hot pint or quart jars, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 10 minutes in a boiling water canner.
- After processing and cooling, jars should be stored 4 to 5 weeks to develop ideal flavor.

Yield: about 8 pint jars or 4 quart jars

Nutritional Analysis (½ cup): 130 Calories, 0 g fat, 33 g carbohydrate, 1 g protein

Recipe adapted from USDA Complete Guide to Home Canning. Used with permission for educational purposes only.



Recipes for Beginners

Okra Dill Pickles

Ingredients

- 7 pounds small okra pods, trimmed
- 8 or 9 garlic cloves
- 2/3 cup canning or pickling salt
- 4 teaspoons dill seed
- 6 small hot peppers, whole
- 6 cups water
- 6 cups vinegar

Directions

- Fill hot pint jars firmly with whole okra, leaving ½-inch headspace. Place 1 garlic clove in each jar.
- Combine salt, dill seed, hot peppers, water, and vinegar in a large saucepan and bring to a boil.
- Pour hot liquid over okra, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.

Yield: about 8 or 9 pint jars

Nutritional Analysis (½ cup): 40 Calories, 0 g fat, 8 g carbohydrate, 2 g protein

Recipe adapted from So Easy to Preserve. Used with permission for educational purposes only.



Recipes for Beginners

Spicy Pickles

Ingredients

- 9-11 pounds pickling cucumbers (about 50 3 to 4-inches), blossom ends removed, whole, spears, or sliced
- 3 ½ cups vinegar
- 7 ½ cups water
- 1 pouch Spicy Pickles Mix Packet

Directions

- Combine vinegar, water and Mrs. Wages mix in a large saucepan. Bring to a boil over medium heat stirring constantly until mixture dissolves. Remove from heat.
- Pack cucumbers into hot jars, leaving ½-inch headspace.
- Ladle hot liquid over cucumbers, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal lids.
- Process pint jars 10 minutes, quart jars 15 minutes in a boiling water bath canner.

Yield: about 14 pint jars or 7 quart jars

Nutritional Analysis (1/2 cup): 15 calories, 0 g fat, 3 g carbohydrate, 2 g protein

Recipe from Mrs. Wages Spicy Pickles



Intermediate Recipes

Pickle Relish

Ingredients

- 3 quarts chopped cucumbers
- 3 cups chopped sweet green peppers
- 3 cups chopped sweet red peppers
- 1 cup chopped onions
- $\frac{3}{4}$ cup canning or pickling salt
- 4 cups ice
- 8 cups water
- 2 cups sugar
- 4 teaspoons mustard seed
- 4 teaspoons ground turmeric
- 4 teaspoons whole allspice
- 4 teaspoons whole cloves
- 6 cups vinegar

Directions

- Combine ice and water in a large bowl. Add cucumbers, peppers, onions, and salt. Let stand 4 hours. Drain. Cover vegetables with fresh ice water and let stand for another hour. Drain again.
- Combine sugar and vinegar in a large saucepan. Tie spices in a spice bag and add to saucepan. Heat to boiling and pour mixture over vegetables. Cover and refrigerate mixture 24 hours.
- Heat relish mixture to boiling.
- Pack hot relish into hot pint or half-pint jars, leaving $\frac{1}{2}$ -inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or half-pint jars 10 minutes in a boiling water canner.

Yield: about 9 pint jars or 18 half-pint jars

Nutritional Analysis (1 tablespoon): 10 Calories, 0 g fat, 2 g carbohydrate, 0 g protein

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Intermediate Recipes

Sweet Pickle Rings

Ingredients

4 pounds 3- to 4-inch cucumbers (almost 3 quarts), 1/8-inch slice removed from each end, cut into 1/4-inch slices

Canning syrup:

3 cups vinegar

4 cups sugar

1 tablespoon whole allspice

1 tablespoon celery seed

Brining solution:

1 quart vinegar

1/2 cup sugar

3 tablespoons canning or pickling salt

1 tablespoon mustard seed

3 cinnamon sticks

Directions

- Combine all ingredients for canning syrup in a large saucepan and heat just to boiling. Keep syrup hot until used.
- In another large saucepan, mix the ingredients for the brining solution. Add the sliced cucumbers, cover, and simmer until the cucumbers change color from bright to dull green (about 5 to 7 minutes). Cucumbers should not get soft. Drain the cucumber slices and discard the brining solution.
- Pack hot cucumber slices into hot pint jars, leaving 1/2-inch headspace. Cover with hot canning syrup, leaving 1/2-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.

Yield: about 5 to 6 pint jars

Nutritional Analysis (1/2 cup): 100 Calories, 0 g fat, 28 g carbohydrate, 1 g protein

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Intermediate Recipes

Pickled Beets

Ingredients

- 7 pounds 2- to 2½-inch diameter beets
- 4 cups vinegar
- 1½ teaspoons canning or pickling salt
- 2 cups sugar
- 2 cups water
- 2 cinnamon sticks
- 12 whole cloves
- 4 to 6 onions (2- to 2½-inch diameter), thinly sliced (optional)

Variation: For pickled whole baby beets, follow above directions but use beets that are no more than 1 to 1½ inches in diameter. Pack whole after cooking, trimming, and peeling; do not slice. Onions may be omitted.

Directions

- Trim off beet tops, leaving 1 inch of stem and roots to prevent bleeding of color. Sort for size. Cover similar sizes together with boiling water and cook until tender (about 25 to 30 minutes). Caution: Drain and discard cooking liquid. Cool beets. Trim off roots and stems and slip off skins. Slice into ¼-inch slices.
- Combine vinegar, salt, sugar, and fresh water in a large saucepan. Tie cinnamon sticks and cloves in spice bag and add to vinegar mixture. Bring to a boil. Add beets and onions. Simmer 5 minutes. Remove spice bag.
- Fill hot pint or quart jars with hot beets and onions, leaving ½-inch headspace. Ladle hot vinegar solution over beets and onions, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 30 minutes in a boiling water canner.

Yield: about 8 pint jars or 4 quart jars

Nutritional Analysis (½ cup): 70 Calories, 0 g fat, 17 g carbohydrate, 1 g protein

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Intermediate Recipes

Spiced Apple Rings

Ingredients

- 12 pounds firm tart apples (maximum diameter, 2½ inches)
- 12 cups sugar
- 6 cups water
- 1¼ cups vinegar
- 3 tablespoons whole cloves
- ¾ cup red hot cinnamon candies, or 8 cinnamon sticks plus 1 teaspoon red food coloring (optional)
- ascorbic acid for anti-darkening solution (1 teaspoon or 3000 mg per gallon of water; or as directed on package for commercial mixture)

Directions

- Prepare apples: To prevent discoloration, peel and core one apple at a time. Immediately cut crosswise into ½-inch rings and immerse in anti-darkening solution.
- Combine sugar, water, vinegar, cloves, and cinnamon candies (or cinnamon sticks and food coloring) in a large saucepan. Heat to boiling, stirring constantly. Simmer 3 minutes.
- Remove apples from anti-darkening solution and drain well. Add to hot syrup and cook 5 minutes.
- Fill hot pint or half-pint jars (preferably wide-mouth) with hot apple rings, leaving ½-inch headspace. Ladle hot syrup over apples, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or half-pint jars 10 minutes in a boiling water canner.

Yield: about 8 or 9 pint jars or 16 to 18 half-pint jars

Nutritional Analysis (½ cup): 250 Calories, 0 g fat, 71 g carbohydrate, 0 g protein

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Intermediate Recipes

Tomato-Apple Chutney

Ingredients

- 3 quarts peeled, chopped tomatoes (about 6 pounds)
- 3 quarts peeled, cored, chopped apples (about 5 pounds)
- 2 cups seedless white raisins
- 2 cups chopped onion
- 1 cup chopped green bell pepper
- 2 pounds brown sugar
- 1 quart vinegar
- 4 teaspoons canning or pickling salt
- 1 teaspoon ground ginger
- ¼ cup whole mixed pickling spice, tied in spice bag

Directions

- Combine all ingredients in a large saucepan. Bring to a boil. Boil gently, stirring frequently, until mixture is thickened and reduced about one half in volume (about 1 hour). Remove spice bag.
- Ladle boiling hot chutney into hot pint jars, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.

Yield: about 7 or 8 pint jars

Nutritional Analysis (1 tablespoon): 25 Calories, 0 g fat, 6 g carbohydrate, 0 g protein

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Intermediate Recipes

Dilly Beans

Ingredients

- 2 pounds green beans, washed, ends trimmed
- ¼ cup canning or pickling salt
- 2 ½ cups vinegar
- 2 ½ cups water
- 1 teaspoon cayenne pepper, divided
- 4 cloves garlic
- 4 heads fresh dill or ¼ cup dill seed
- Ball Pickle Crisp (optional)

Directions

- Combine vinegar, water and salt in a large saucepan and bring to a boil. Reduce heat; simmer 10 minutes.
- Pack green beans lengthwise into hot jars, leaving ½-inch headspace. Add ¼ teaspoon cayenne pepper, 1 clove garlic, and 1 head dill or 2 teaspoons dill seed to each pint jar. Add ⅛ teaspoon Pickle Crisp to each pint jar if desired.
- Ladle hot liquid over green beans, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal lids.
- Process pint or quart jars 10 minutes in a boiling water bath canner.

Yield: about 4 pint or 2 quart jars

Nutritional Analysis (1/2 cup): 40 calories, 0.5 g fat, 9g carbohydrate, 2g protein

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Advanced Recipes

Pickled Peppers

Ingredients

- 4 pounds hot long red, green, or yellow peppers (Hungarian, banana, chili, or jalapeño)
- 3 pounds sweet red and green peppers, mixed
- 5 cups vinegar
- 1 cup water
- 4 teaspoons canning or pickling salt
- 2 tablespoons sugar
- 2 cloves garlic

Directions

- Prepare hot and sweet peppers: If small peppers are left whole, slash 2 to 4 slits in each. To remove the skins of tough-skinned peppers, blanch in boiling water or blister in order to peel. To blister, place peppers in a hot oven (400°F) or broiler for 6 to 8 minutes or until skins blister. Allow to cool. Place in a pan and cover with a damp cloth. After several minutes, peel peppers. Quarter large peppers. Flatten small peppers if left whole.
- Combine remaining ingredients in a large saucepan. Bring to a boil. Reduce heat and simmer 10 minutes. Remove garlic cloves.
- Pack peppers into hot pint or half-pint jars, leaving ½-inch headspace.
- Ladle hot liquid over peppers, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or half-pint jars 10 minutes in a boiling water canner.

Yield: about 9 pint jars or 18 half-pint jars

Nutritional Analysis (½ cup): 35 Calories, 0 g fat, 6 g carbohydrate, 1 g protein

Caution: When cutting or seeding hot peppers, wear plastic or rubber gloves to prevent hands from being burned. Do not touch your face or eyes.

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Recipe adapted from So Easy to Preserve. Used with permission for educational purposes only.

Advanced Recipes

Chow-Chow

Ingredients

- 2 cups sliced cucumbers
- 2 cups chopped sweet peppers
- 2 cups chopped cabbage
- 2 cups sliced onions
- 2 cups chopped green tomatoes
- 2 cups fresh lima beans
- 2 cups cut green beans
- 2 cups sliced carrots
- 1½ cups salt
- 2½ quarts water, divided
- 1 quart vinegar
- 4 cups sugar
- 2 tablespoons celery seed
- 4 tablespoons mustard seed
- 4 teaspoons turmeric

Directions

- Soak cucumbers, peppers, cabbage, onions, and tomatoes in salt water (1½ cups salt to 2 quarts water) overnight in refrigerator. Drain well.
- Cook lima beans, green beans, and carrots until tender. Drain well.
- Combine drained vegetables with 2 cups water and remaining ingredients in a large saucepan. Boil 10 minutes.
- Pack hot mixture into hot pint jars, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.

Yield: about 4 pint jars

Nutritional Analysis (1 tablespoon): 25 Calories, 0 g fat, 6 g carbohydrate, 0 g protein

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Advanced Recipes

Fermented Dill Pickles

Ingredients

Use the following for each gallon capacity of your fermentation container:

- 4 pounds 4-inch pickling cucumbers
- 2 tablespoons dill seed or 4 to 5 heads fresh or dry dill weed
- 2 cloves garlic (optional)
- 2 dried red peppers (optional)
- 2 teaspoons whole mixed pickling spices (optional)
- ½ cup canning or pickling salt
- ¼ cup vinegar
- 8 cups water

Directions

- Cut 1/16-inch slice off blossom ends of cucumbers and discard. Leave ¼ inch of stems attached.
- Place half of dill and spices on bottom of a clean, suitable container. Add cucumbers, remaining dill, and spices.
- Dissolve salt in vinegar and water and pour over cucumbers. Add suitable cover and weight.
- Store where temperature is between 70° and 75°F for about 3 to 4 weeks while fermenting. Temperatures of 55° to 65°F are acceptable, but the fermentation will take 5 to 6 weeks. Avoid temperatures above 80°F, or pickles will become too soft during fermentation.
- Fermenting pickles cure slowly. Check the container several times a week and promptly remove surface scum or mold. **Caution: If the pickles become soft, slimy, or develop a disagreeable odor, discard them. Fermentation is complete when bubbling ceases.**
- Fully fermented pickles may be stored in the original container for about 4 to 6 months, provided they are refrigerated and surface scum and mold are removed regularly.
- Canning fully fermented pickles is a better way to store them. To can them, pour the brine into a saucepan, heat slowly to a boil, and simmer 5 minutes. Filter brine through paper coffee filters to reduce cloudiness, if desired. Fill hot pint or quart jars with pickles and hot brine, leaving ½-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps. Process pint jars for 10 minutes or quart jars for 15 minutes in a boiling water canner.

Yield: about 4 pint jars or 2 quart jars

Nutritional Analysis (½ cup): 15 Calories, 0 g fat, 3 g carbohydrate, 1 g protein

Recipe adapted from USDA Complete Guide to Home Canning. Used with permission for educational purposes only.



Advanced Recipes

Sauerkraut

Ingredients

- 25 pounds cabbage
- $\frac{3}{4}$ cup canning or pickling salt

Directions

- Work with about 5 pounds of cabbage at a time. Discard outer leaves. Rinse heads under cold running water and drain. Cut heads in quarters and remove cores. Shred or slice to a thickness of a quarter. Put cabbage in a suitable fermentation container and add 3 tablespoons of salt. Mix thoroughly, using clean hands. Pack firmly until salt draws juices from cabbage.
- Repeat shredding, salting, and packing until all cabbage is in the container. Be sure the container is deep enough so that its rim is at least 4 or 5 inches above the cabbage.
- If juice does not cover cabbage, add boiled and cooled brine (1½ tablespoons of salt per quart of water).
- Add plate and weights; cover container with a clean bath towel. Store at 70° to 75°F while fermenting. At temperatures between 70° and 75°F, sauerkraut will be fully fermented in about 3 to 4 weeks. At 60° to 65°F, fermentation may take 5 to 6 weeks. At temperatures lower than 60°F, sauerkraut may not ferment. Above 75°F, sauerkraut may become soft.
- If you weigh the cabbage down with a brine-filled bag, do not disturb the crock until normal fermentation is completed (when bubbling ceases). If you use jars as weight, you will have to check the kraut two to three times each week and remove scum if it forms.
- Fully fermented sauerkraut may be kept tightly covered in the refrigerator for several months, or it may be canned as follows.
- To can using a hot pack: Bring sauerkraut and liquid slowly to a boil in a large kettle, stirring frequently. Remove from heat and fill hot pint or quart jars firmly with sauerkraut and juices, leaving $\frac{1}{2}$ -inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps. Process pint jars for 10 minutes or quart jars for 15 minutes in a boiling water canner.
- To can using a raw pack: Fill hot pint or quart jars firmly with sauerkraut and cover with juices, leaving $\frac{1}{2}$ -inch headspace. Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps. Process pint jars for 20 minutes or quart jars for 25 minutes in a boiling water canner.

Quality: For the best sauerkraut, use firm heads of fresh cabbage. Shred cabbage and start fermentation between 24 and 48 hours after harvest.

Yield: about 18 pint jars or 9 quart jars

Nutritional Analysis ($\frac{1}{2}$ cup): 40 Calories, 0 g fat, 9 g carbohydrate, 2 g protein

Recipe adapted from USDA Complete Guide to Home Canning. Used with permission for educational purposes only.

Recipes for Special Diets

No Sugar Added Pickled Beets

Ingredients

- 7 pounds 2- to 2½-inch diameter beets
- 6 cups vinegar
- 1½ teaspoons canning or pickling salt
- 2 cups Splenda®
- 3 cups water
- 2 cinnamon sticks
- 12 whole cloves
- 4 to 6 onions (2- to 2½-inch diameter), thinly sliced (optional)

Variation: For pickled whole baby beets, follow above directions but use beets that are no more than 1 to 1½ inches in diameter. Pack whole after cooking, trimming, and peeling; do not slice. Onions may be omitted.

Directions

- Trim off beet tops, leaving 1 inch of stem and roots to prevent bleeding of color. Cover similar sizes together with boiling water and cook until tender (about 25 to 30 minutes). Caution: Drain and discard cooking liquid. Cool beets. Trim off roots and stems and slip off skins. Slice into ¼-inch slices.
- Combine vinegar, salt, Splenda®, and fresh water in a large saucepan. Tie cinnamon sticks and cloves in spice bag and add to vinegar mixture. Bring to a boil. Add beets and onions. Simmer 5 minutes. Remove spice bag.
- Fill hot pint jars with beets and onions, leaving ½-inch headspace. Ladle boiling vinegar solution over beets and onions, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 30 minutes in a boiling water canner.

Yield: about 8 pint jars

Nutritional Analysis (½ cup): 60 Calories, 0 g fat, 13 g carbohydrate, 2 g protein

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Recipes for Special Diets

No Sugar Added Sweet Pickle Cucumber Slices

Ingredients

- 3½ pounds pickling cucumbers, blossom ends removed, cut into ¼-inch slices
- boiling water to cover sliced cucumbers
- 4 cups cider vinegar
- 1 cup water
- 3 cups Splenda®
- 1 tablespoon canning or pickling salt
- 1 tablespoon mustard seed
- 1 tablespoon whole allspice
- 1 tablespoon celery seed
- 4 1-inch cinnamon sticks (optional)

Directions

- Pour boiling water over cucumber slices and let stand 5 to 10 minutes. Drain off hot water and pour cold water over cucumbers. Let cold water run continuously over cucumber slices, or change water frequently until cucumbers are cooled. Drain slices well.
- Combine vinegar, 1 cup water, Splenda®, salt, and spices in a large saucepan. Bring to a boil. Add drained cucumber slices carefully to the boiling liquid and return to a boil.
- Place one cinnamon stick in each hot pint jar, if desired. Pack hot pickle slices into hot jars, leaving ½-inch headspace. Cover with boiling liquid, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.

Yield: about 4 or 5 pint jars

Nutritional Analysis (½ cup): 40 Calories, 0 g fat, 8 g carbohydrate, 1 g protein

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Recipes for Special Diets

Reduced-Sodium Sliced Dill Pickles

Ingredients

- 4 pounds 3- to 5-inch pickling cucumbers, blossom ends removed, cut into ¼-inch slices
- 6 cups vinegar
- 6 cups sugar
- 2 tablespoons canning or pickling salt
- 1½ teaspoons celery seed
- 1½ teaspoons mustard seed
- 2 large onions, thinly sliced
- 8 heads fresh dill

Directions

- Combine vinegar, sugar, salt, celery seed, and mustard seed in a large saucepan. Bring to a boil.
- Place 2 slices of onion and ½ dill head on bottom of each hot pint jar. Pack cucumber slices into hot pint jars, leaving ½-inch headspace. Add 1 slice of onion and ½ dill head on top. Ladle hot liquid over cucumbers, leaving ¼-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 15 minutes in a boiling water canner.

Yield: about 8 pint jars

Nutritional Analysis (½ cup): 110 Calories, 0 g fat, 30 g carbohydrate, 0 g protein

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Recipes for Special Diets

Reduced-Sodium Sliced Sweet Pickles

Ingredients

4 pounds 3- to 4-inch pickling cucumbers, blossom ends removed, cut into ¼-inch slices

Canning syrup:

12/3 cups vinegar

3 cups sugar

1 tablespoon whole allspice

2¼ teaspoons celery seed

Brining solution:

1 quart vinegar

1 tablespoon canning or pickling salt

1 tablespoon mustard seed

½ cup sugar

Directions

- Combine all ingredients for canning syrup in a large saucepan and bring to a boil. Keep syrup hot until used.
- In another large saucepan, mix the ingredients for the brining solution. Add the sliced cucumbers, cover, and simmer until the cucumbers change color from bright to dull green (about 5 to 7 minutes). Drain the cucumber slices and discard the brining solution.
- Pack hot cucumber slices into hot pint jars, leaving ½-inch headspace. Cover with hot canning syrup, leaving ½-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 10 minutes in a boiling water canner.

Yield: about 4 to 5 pint jars

Nutritional Analysis (½ cup): 90 Calories, 0 g fat, 26 g carbohydrate, 1 g protein

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Most Frequently Asked Canning Questions

Pickles

1. Can I use flaked salt for pickling?

Most recipes call for granulated pickling or canning salt. Flake salt varies in density and is not recommended for pickling.

When making quick process pickles, can I store any leftover pickling solution for future use?

If the pickling solution is fresh and has not been used to make pickles, cover it and store it in the refrigerator for later use. If the pickling solution has been used, it can be stored in the refrigerator and reused in 1 or 2 days for barbecue sauce, coleslaw dressing or a marinade. If mold growth occurs, throw it out.

3. Why did the liquid in my dill pickles turn pink?

Using overmature dill may cause this. If so, the product is still safe. However, yeast growth could also cause this. If yeast growth is evident, discard the pickles. Yeast growth may also make pickles cloudy or slimy.

4. I don't have the type of dill my recipe calls for. How can I substitute what I have?

For each quart try 3 heads of fresh dill or 1 to 2 tablespoons dill seed (dill weed = 2T).

5. Can I use burpless cucumbers for pickling?

Burpless cucumbers are not recommended for use in fermented pickles. This is because at their normal mature size, they produce a softening enzyme that causes the pickles to soften during fermentation. However, if smaller burpless cucumbers (those with small seeds) are used, they may be suitable for making fresh pack pickles. The skins on burpless cucumbers may be tough.

6. I have an old recipe that calls for adding a grape leaf to each jar of pickles. Why?

Grape leaves contain a substance that inhibits the enzymes that make pickles soft. However, removing the blossom ends (the source of undesirable enzymes) will make the addition of grape leaves unnecessary.

7. Why did the garlic cloves in my pickles turn green or bluish green?

This reaction may be due to iron, tin or aluminum in your cooking pot, water or water pipes reacting with the pigments in the garlic. Or, the garlic may naturally have more bluish pigment and it is more evident after pickling. Immature bulbs should be cured 2-4 weeks at 70°F. The pickles are safe to eat.

8. I accidentally limed my pickles in an aluminum pan. Will they be safe to eat?

Aluminum is not recommended for use with lime because the lime can "pit" the container, increasing the aluminum content of the finished product. This is not a procedure that you would want to do each time you made pickles and then use the product. However, one batch of pickles should not cause health problems. If the container, however, is badly pitted, the best option would be to discard the product.

9. I would like to make sweet pickles, but I am diabetic. Can I use artificial sweetener?

The best approach is to take dill pickle slices, rinse to remove the salty flavor, and sprinkle with artificial sweetener. Allow these to sit in the refrigerator at least 30 minutes before use. Substituting artificial sweeteners for the sugar in sweet pickle recipes is not recommended.

FAQ



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Home Canning Jams, Jellies, and Other Soft Spreads

Home canning jams, jellies, and other soft spreads is fun and satisfying. Soft spreads all contain four main ingredients (fruit, sugar, pectin, and acid), and they differ only in their consistency. The formation of a gel depends on the right amount of each of the main ingredients. If you understand the science of gelling, all your soft spreads will be a success.

Soft Spreads

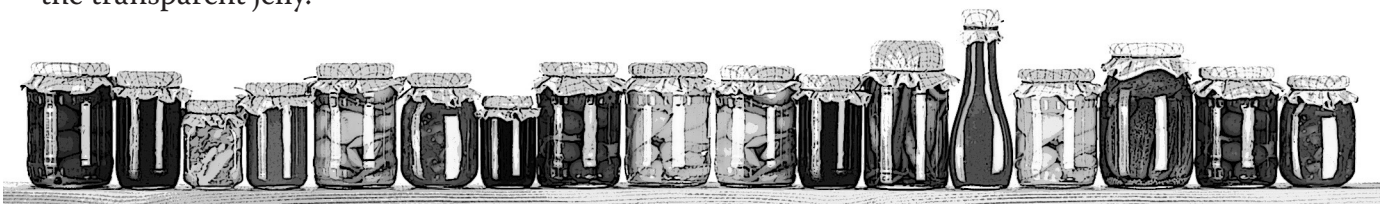
- **Jams** are made by cooking crushed or chopped fruits with sugar until the mixture will round up on a spoon. Jams do not hold their shape and are spreadable.
- **Jellies** are made from the strained juice of fruit. Jelly should be crystal clear and shimmering. Jelly should hold its shape but be soft enough to spread.
- **Butters** are made by cooking fruit pulp and sugar to a thick consistency that will spread easily. Spices may be added, depending on personal taste.
- **Marmalades** are soft-fruit jellies containing small pieces of fruit or peel evenly suspended in the transparent jelly.

- **Conserves** are jamlike and made by cooking two or more fruits with sugar until the mixture will either round up on a spoon like jam or flake from it like jelly. A true conserve contains nuts and raisins.
- **Preserves** are whole or large pieces of fruit preserved with a thickened sugar syrup so that the fruit retains its shape. Preserves are clear, shiny, tender, and plump.

Pectin and Fruit

Pectin is a carbohydrate found in fruits. When sugar is added, the pectin in fruit or commercial pectin precipitates out and forms insoluble fibers. An acid, such as lemon juice or citric acid, aids in the process. The insoluble fibers produce a mesh-like structure that traps the fruit juice or other liquid much like a sponge absorbs water. This process enables a gel to form.

Recipes without added pectin use the natural pectin in the fruit to form the gel. Tart apples, sour blackberries, cranberries, currants, gooseberries, Concord grapes, soft plums, and quinces work well in recipes without added pectin.



Altitude affects processing times and pressures. The processing times given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, please consult the website for the National Center for Home Food Preservation located at <http://nchfp.uga.edu>.

Slightly under-ripe fruit contains more pectin than ripe fruit. Overripe fruit may not contain enough pectin to form a gel. A general guideline is to use one part under-ripe fruit to two parts fully ripe fruit for the best gel and flavor. The USDA canning guide recommends at least one fourth of the fruit to be under-ripe.

Other fruits, such as apricots, blueberries, cherries, peaches, pineapple, rhubarb, and strawberries, are low in pectin. To form a gel, they must be combined with one of the higher pectin fruits or used with a commercial pectin product. Use of commercial pectin decreases cooking time.

The pectin in fruit becomes water soluble when it is heated, so for gelling to occur, the fruit must be heated. Too high of a temperature or cooking for too long can destroy the pectin, resulting in a poor gel. Doubling the recipe changes the length of time needed for boiling and can result in a soft gel.

Commercial pectin can be used with any fruit, even those high in pectin. Too much pectin will give the jam or jelly a tough, rubbery consistency, making it difficult to spread. Following the recipe guide that comes with the pectin will help eliminate this problem.

There are two types of pectin: liquid (usually made from apples) and powdered (from citrus fruits or apples). Powdered and liquid pectin are not interchangeable. The type of pectin called for in the recipe must be used. Powdered pectin can be stored in the freezer from one season to the next. Freezing will destroy the gel-producing

qualities of liquid pectin, but liquid pectin will keep for two years in a cool, dry place.

There are several products on the market that allow you to make jams and jellies that are lower in calories. These low- or no-sugar pectin products allow you to make jams and jellies with less sugar but they will not be quite as thick or glossy.

Acid

The acidity level is also important to gelling. The gel will not set if there is too little acid. Too much acid will cause the gel to lose liquid or weep. For fruits low in acid, add lemon juice or other acid source as instructed.

Sugar

Sugar is necessary for the gel to form. It also acts as a preserving agent and contributes flavor. Do not attempt to reduce the amount of sugar in regular jam and jelly recipes because a syrupy gel will form. When using low- or no-sugar pectin products, use the recipes provided in the package.

Remaking Jams or Jellies

If jam or jelly does not set up after cooling, it can be remade. There are different directions depending on the type of commercial pectin that you used. Detailed instructions for remaking cooked jam or jelly can be found on the National Center for Home Food Preservation website at http://nchfp.uga.edu/how/can_07/remake_soft_jelly.html or in the *Ball Blue Book Guide to Preserving* (p. 122).

Possible reasons that a jam or jelly may be too soft include overripe fruit, fruit lacking the proper acidity, too much or not enough sugar, trying to increase the recipe, not using a full rolling boil, use of old pectin, or a mistake in measurement.

For more information on safe home canning, please see *Home Canning Basics*, publication FCS3-578.

Step-By-Step Canning

Boiling Water Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. If the processing time will be less than 10 minutes, sterilize the jars by placing in boiling water for 10 minutes. The sterilized jars can remain in the hot water until they are ready to be filled. If jars will be processed for 10 minutes or longer, it is not necessary to sterilize them before use. Just place the clean jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Fill the canner half full of clean warm water. Center the canner over the burner and preheat the water to 180°F. Begin preparing the recipe while the water is preheating. It will take about 20 to 30 minutes for the water to begin to boil.
4. Use top-quality fruits; wash well. Prepare only one recipe at a time and follow the directions. After cooking, remove spread from heat and skim foam if necessary.
5. Immediately pour hot spread into hot jars, leaving the headspace specified in the recipe. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
6. Load filled jars into the canner one at a time, using a jar lifter, or by placing the jars on a canning rack and lowering the full rack into the hot water. Keep jars upright at all times. Add boiling water to cover the jars by one to two inches. Turn the heat up so the water boils vigorously and place the lid on the canner.
7. Begin timing the process when the water has reached a full boil. Set a timer for the total number of minutes indicated in the recipe. Most recipes call for at least five minutes processing. The water must remain at a boil for the whole processing time.
8. When the processing time specified in the recipe is complete, turn off the heat and remove the canner lid. Wait five minutes before removing jars.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place.
12. Enjoy your very own spreads.



Recipes for Beginners

Strawberry Jam

(with liquid pectin)

Ingredients

- 4 cups crushed strawberries (about 2 quart boxes strawberries)
- 7 cups sugar
- 1 pouch (3 ounces) liquid pectin

Directions

- Sort and wash fully ripe strawberries; remove stems and caps. Crush berries.
- Measure crushed berries into a large saucepan. Add sugar and stir well. Place on high heat and, stirring constantly, bring quickly to a full boil with bubbles over the entire surface. Boil hard for one minute, stirring constantly.
- Remove from heat and stir in pectin. Skim off foam.
- Ladle hot jam immediately into hot half-pint jars, leaving $\frac{1}{4}$ -inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.

Yield: about 8 or 9 half-pint jars

Nutritional Analysis (1 tablespoon): 40 calories, 0 g fat, 10 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.



Recipes for Beginners

Spiced Tomato Jam

(with powdered pectin)

Ingredients

- 3 cups cooked tomatoes (about 2¼ pounds tomatoes)
- 1½ teaspoons grated lemon rind
- ½ teaspoon ground allspice
- ½ teaspoon ground cinnamon
- ¼ teaspoon ground cloves
- ¼ cup lemon juice
- 4½ cups sugar
- 1 package (1.75 ounces) powdered pectin

Directions

- Wash firm ripe tomatoes; scald, peel, and chop. Scalding is a quick way to remove the skin of tomatoes. To scald the tomatoes, drop into boiling water. As the tomato skin heats up, the tomato will begin to peel (about one minute for medium tomatoes). At this point, remove the tomatoes from the boiling water and place in ice water to prevent further cooking. The skins will slip off easily.
- Place chopped tomatoes in a large saucepan and heat slowly to simmering, stirring constantly to prevent sticking and burning. Cover and simmer 10 minutes, stirring occasionally.
- Measure 3 cups of the cooked tomatoes into a large saucepan. Add lemon rind, allspice, cinnamon, cloves, and lemon juice.
- Measure sugar and set aside.
- Stir powdered pectin into tomato mixture. Bring to a boil over high heat, stirring constantly.
- At once, stir in sugar. Stir and bring to a full rolling boil that cannot be stirred down. Then boil hard for one minute, stirring constantly.
- Remove from heat. Skim off foam.
- Pour hot jam into hot half-pint jars, leaving ¼-inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.

Yield: about 5 half-pint jars

Nutritional Analysis (1 tablespoon): 45 calories, 0 g fat, 12 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.



Recipes for Beginners

Grape Jelly (with liquid pectin)

Ingredients

- 6½ cups sugar
- 2½ cups water
- 2 pouches liquid pectin (3 ounces each)
- 3 six-ounce cans (2¼ cups) frozen concentrated grape juice, thawed

Directions

- In a large saucepan, combine sugar and water. Place on high heat and, stirring constantly, bring quickly to a full rolling boil that cannot be stirred down. Stir in liquid pectin. Add thawed concentrated grape juice and mix well. Boil hard for 1 minute. Remove from heat.
- Ladle hot jelly immediately into hot pint or half-pint jars, leaving ¼-inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process pint or half-pint jars 10 minutes in a boiling water canner.

Yield: about 5 pint jars or 10 half-pint jars

Nutritional Analysis (1 tablespoon): 35 Calories, 0 g fat, 9 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.



Intermediate Recipes

Blackberry Jelly (with powdered pectin)

Ingredients

- 3½ cups blackberry juice (about 3 quart boxes berries)
- 1 package (1.75 ounces) powdered pectin
- 4½ cups sugar

Directions

- Prepare juice: Sort and carefully wash fully ripe berries; remove any stems or caps. Place berries into a flat-bottomed saucepan and add just enough cold water to prevent scorching. Crush berries to start the flow of juice. Bring to a boil over high heat. Stir to prevent scorching. Reduce heat and cook until soft (10 minutes or less). Do not overcook; excess boiling will destroy pectin, flavor and color. Strain mixture through a damp jelly bag to extract juice. The clearest jelly comes from juice that has dripped through a jelly bag without pressing or squeezing.
- Measure juice into a large saucepan. Add pectin and stir well. Place on high heat and, stirring constantly, bring quickly to a full rolling boil that cannot be stirred down.
- Add sugar, continue stirring, and heat again to a full rolling boil. Boil hard for one minute.
- Remove from heat; skim off foam quickly.
- Pour hot jelly immediately into hot half-pint jars, leaving ¼-inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.

Yield: about 5 or 6 half-pint jars

Nutritional Analysis (1 tablespoon): 40 calories, 0 g fat, 11 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.



Intermediate Recipes

Golden Pepper Jelly

(with liquid pectin)

Food Safety: The addition of vinegar to the low-acid sweet and hot peppers makes this recipe safe for processing using the boiling water canning method. Do not reduce the amount of vinegar. The exact amounts of vinegar and sugar are also necessary to provide the conditions required to form a gel with the added pectin.

Caution: Wear plastic gloves when handling hot peppers and hot pepper purée or wash hands thoroughly with soap and water before touching your face.

Ingredients

- 5 cups chopped yellow bell peppers (about 4 large peppers as purchased)
- ½ cup chopped Serrano chili peppers (about 5 peppers as purchased)
- 1½ cups white distilled 5 percent vinegar
- 5 cups sugar
- 1 pouch (3 ounces) liquid pectin

Directions

- Wash all peppers thoroughly; remove stems and seeds. Do not remove the membrane from the hot peppers; the remaining capsaicin is located there.
- Place sweet and hot peppers in a blender or food processor. Add enough vinegar to purée the peppers, then purée.
- Combine the pepper-vinegar purée and remaining vinegar in a large stainless steel or glass saucepan. Heat to a boil; then boil 10 minutes to extract flavors and color.
- Remove from heat and strain through a jelly bag into a bowl. (The jelly bag is preferred; several layers of cheesecloth may also be used.)
- Add 2¼ cups of the strained pepper-vinegar juice back to the saucepan. Stir in sugar until dissolved and return to a boil.
- Add pectin, return to a full rolling boil, and boil hard for one minute while constantly stirring. The jelly will not become thick at this point, so it is not necessary to boil for longer than one minute.
- Remove from heat and ladle hot jelly into hot half-pint jars, leaving ¼-inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.
- Let cool, undisturbed, for 12 to 24 hours and check for seals.

Yield: about 7 half-pint jars

Nutritional Analysis (1 tablespoon): 35 calories, 0 g fat, 9 g carbohydrate, 0 g protein

Notes

- Sealed jars can be stored at room temperature in a cool, dark place. Once opened, the jelly must be kept refrigerated and will keep for up to several weeks.
- The use of yellow peppers gives this jelly a light golden color. Other color sweet peppers may be substituted but will provide a different jelly color. Other hot peppers may also be substituted. Each hot pepper variety has a different heat index. It is best to start with a mild hot pepper flavor and increase it according to personal taste.



Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.

Intermediate Recipes

Orange Marmalade

Ingredients

- 4 cups thinly sliced orange peel (from about 6 large oranges)
- 4 cups chopped orange pulp (about 6 large oranges, peeled and seeded)
- 1 cup thinly sliced and seeded lemon (about 2 medium)
- 6 cups water
- 6 cups sugar (approximate)

Directions

- Combine orange peel, orange pulp, lemon slices, and water in a large saucepan. Heat to simmer and simmer 5 minutes.
- Cover and let stand 12 to 18 hours in refrigerator.
- Return to heat; cook over medium heat until peel is tender, about 1 hour.
- Measure fruit and liquid into a large saucepan. Add 1 cup sugar for each cup of fruit mixture. Bring slowly to boiling, stirring until the sugar dissolves. Cook rapidly to the gelling point, about 25 minutes, stirring frequently.
- Ladle hot marmalade into hot half-pint jars, leaving $\frac{1}{4}$ -inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.

Yield: about 7 half-pint jars

Nutritional Analysis (1 tablespoon): 50 calories, 0 g fat, 13 g carbohydrate, 0 g protein

Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.

Notes

- When peeling the oranges, be sure to include some of the white membrane found just under the skin. This is where most of the pectin is found.
- Information on gelling point and how to do a gelling test can be found on the website of the National Center for Home Food Presentation at http://nchfp.uga.edu/how/can_07/jelly_point.html or in the Ball Blue Book Guide to Preserving (p. 29).



Advanced Recipes

Apple Butter

Ingredients

- 8 pounds apples, cored and quartered
- 2 cups cider
- 2 cups vinegar
- 2¼ cups white sugar
- 2¼ cups packed brown sugar
- 2 tablespoons ground cinnamon
- 1 tablespoon ground cloves

Directions

- Combine apples, cider and vinegar in a large saucepan. Simmer until apples are soft.
- Press cooked apples through a colander, food mill, or strainer.
- In a large saucepan, combine apple pulp with sugar and spices. Cook, stirring frequently, until thickened. To test for doneness, remove a spoonful and hold it away from the steam for 2 minutes. It is done if the butter stays mounded on the spoon.
- Ladle hot butter into hot pint jars, leaving ¼-inch headspace. Remove air bubbles. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.

Yield: about 5 pint jars

Nutritional Analysis (1 tablespoon): 35 calories, 0 g fat, 9 g carbohydrate, 0 g protein

Recipe adapted from So Easy to Preserve. Used with permission for educational purposes only.

Note

- Use Jonathan, Winesap, Stayman, Golden Delicious, Macintosh, or other tasty apple varieties for good results.

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Advanced Recipes

Pear Preserves

Ingredients

- 3 cups sugar, divided
- 2½ cups water
- 6 medium cored, pared, hard, ripe pears, cut in halves or quarters (about 2 pounds)
- 1 thinly sliced lemon

Directions

- Combine 1½ cups sugar and water in a large saucepan; cook rapidly for two minutes.
- Add pears and boil gently for 15 minutes.
- Add remaining sugar and lemon, stirring until sugar dissolves. Cook rapidly until fruit is clear, about 25 minutes.
- Cover and let stand 12 to 24 hours in refrigerator.
- Heat fruit and syrup to boiling.
- Pack fruit into hot half-pint jars, leaving ¼-inch headspace.
- Cook syrup three to five minutes, or longer if too thin.
- Pour hot syrup over fruit, leaving ¼-inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 10 minutes in a boiling water canner.

Yield: about 5 half-pint jars

Nutritional Analysis (1 tablespoon): 35 calories, 0 g fat, 9 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.

Notes

- Small pears may be preserved whole with stem intact; peel pears and wash stem well.
- For best flavor, Kiefer pear preserves should be stored in a cool, dry place from three to five weeks after processing before using.
- A piece of preserved ginger may be added to each jar for a different flavor.



Advanced Recipes

Cranberry Conserve

Ingredients

- 1 unpeeled, finely chopped, seeded orange
- 1 cup water
- 3 cups sugar
- 1 quart cranberries, washed
- ½ cup seedless raisins
- ½ cup chopped nuts

Directions

- Combine orange and water in a large saucepan; cook rapidly until peel is tender (about 20 minutes).
- Add cranberries, sugar, and raisins. Bring slowly to boiling, stirring occasionally until sugar dissolves. Cook rapidly, almost to the gelling point of 220°F (about eight minutes). As mixture thickens, stir frequently to prevent sticking. Add nuts during the last five minutes of cooking.
- Pour hot conserve into hot half-pint jars, leaving ¼-inch headspace. Wipe jar rims with a dampened clean paper towel; adjust two-piece metal caps.
- Process 15 minutes in a boiling water canner.

Yield: about 4 half-pint jars

Nutritional Analysis (1 tablespoon): 50 calories, 0.5 g fat, 11 g carbohydrate, 0 g protein

Recipe adapted from the National Center for Home Food Preservation website. Used with permission for educational purposes only.

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Most Frequently Asked Canning Questions

Jellied Fruit

1. Why should cooked jelly be made in small batches?

If a larger quantity of juice is used, it will be necessary to boil it longer thus causing loss of flavor, darkening of jelly, and toughening of jelly.

2. Should jelly be boiled slowly or rapidly?

It should be boiled rapidly since long, slow boiling destroys the pectin in the fruit juice.

3. What do I do if there's mold on jellied fruit product?

Discard jams and jellies with mold on them. The mold could be producing a mycotoxin

(poisonous substance that can make you sick). USDA and microbiologists recommend against scooping out the mold and using the remaining jam or jelly.

4. Why did my jellied fruit product ferment, and what do I do?

Jellied fruit products may ferment because of yeast growth. This can occur if the product is improperly processed and sealed, or if the sugar content is low. Fermented fruit products have a disagreeable taste. Discard them.

FAQ

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Home Canning Soups, Stocks, and Stews

Canning homemade soups, stocks or stews can help you save money, gain control over what's in your food, and save time in meal preparation. To ensure safe, high quality home-canned products, always follow research-based recipes when canning. Safe, tested recipes for home-canned soups and stews are based on laboratory measurements of pH and heat penetration into the jars during processing, which are specific to the recipe being tested. **Untested recipes from the Internet, books, or grandma's recipe stash should not be canned, since safe processing times for those recipes can't be determined.** Instead, enjoy those soups and stews fresh, or frozen for longer storage.

The recipes included in this publication are research-based for safe home canning. The thickness of the soup or stew affects processing time by changing the rate of heat penetration into the food. **Do not modify recipes, change the amounts of ingredients used, or add any extra ingredients, unless options are given in the recipe.**

Soups, stocks and stews made with meat and/or vegetables are low-acid foods. **To prevent the risk of botulism, they must be processed in a pressure canner.** There are no safe options for processing these foods in a boiling water canner.

Ingredients

Start with fresh, good quality meats and vegetables. Trim meats, discarding gristle, bruised spots and excess fat. Keep refrigerated (at 40°F or lower) until you are ready to can. If holding for longer than a few days, freeze (at 0°F or lower) for storage. Thaw in the refrigerator before use.

Wash vegetables well, whether or not they will be peeled before cooking. Soil may contain many bacteria, including the spores of *Clostridium botulinum*. For even cooking, cut vegetables into uniformly-sized pieces.

If dried beans or peas are included, they must be fully rehydrated by soaking and boiling before adding to the mixture.

Salt is optional in canning soups, stocks and stews. It is used only for seasoning and does not help to preserve the food.

Caution: Do not add noodles, other types of pasta, rice, flour, cream, milk, or other thickening agents to soups and stews before canning. Anything that makes the soup or stew thicker will slow down the heat penetration into the jars and interfere with safe processing. If desired, these ingredients can be safely added to the home-canned products at serving time.



Filling Jars

Two methods can be used for filling the jars in home canning—raw pack and hot pack. Raw pack means putting raw, unheated food into the jars. Hot pack involves cooking or heating the food for a specified length of time before putting it into the jars. For soups, stocks and stews, the hot pack method is used.

The size of the jar will affect the rate of heat penetration into the food. To ensure that all of the food in the jar receives the full heat treatment needed to destroy spores of harmful bacteria that may be present, use only the jar sizes specified in the recipe and the processing time given for each jar size. Do not use jars that are larger than those specified in the recipe. It is safe to use jars that are smaller than those specified in the recipe, but the processing time cannot be reduced for the smaller jars and the quality of the final product may suffer.

Processing: Why Do I Need to Use a Pressure Canner?

High-acid foods (those with a pH of 4.6 or lower) contain enough acid to help control the

growth of harmful bacteria and can be safely processed in a boiling water canner. However, all meats and vegetables are low-acid foods, with pH levels ranging from 4.9 to 7.3. They do not contain enough acid to prevent the growth of the bacterium *Clostridium botulinum*, which produces the toxin that causes botulism. For these foods, and the soups and stews made from them, the high temperatures reached in a pressure canner (240°F to 250°F at 10 to 15 pounds of pressure) are necessary to destroy any spores of *Clostridium botulinum* that might be present. This method prevents the spores from growing into bacterial cells in the canned product and producing the deadly botulism toxin. The high temperature must be maintained for a specified length of time, depending on the food being canned, the way it is prepared and packed into the jar, and the size of the jar. It is important to always use the full processing time and pressure specified in each recipe.

For more information on safe home canning and the pressure canner method, please see Home Canning Basics, publication FCS3-578.

Caution! Altitude Adjustments

Altitude affects processing times and pressures. The processing times and pressures given in this publication are based on canning at or below 1,000 feet above sea level. If you live at an altitude greater than 1,000 feet, pressure canner processing times stay the same, but the processing pressures are adjusted as shown in Table 1.

Table 1. Processing pressure.

Gauge	0-1,000 feet	1,001-2,000 feet	2,001-4,000 feet
Dial gauge	11 pounds	11 pounds	12 pounds
Weighted gauge	10 pounds	15 pounds	15 pounds

If you live at an altitude greater than 4,000 feet, please consult the website for the National Center for Home Food Preservation, <http://nchfp.uga.edu/>.

Step-By-Step Canning

Pressure Canner Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Use fresh, top-quality ingredients. Prepare the recipe, following the directions given.
4. Fill the hot jars, leaving the headspace specified in the recipe. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
5. Following your manufacturer's instructions, place one to two inches of hot water in the pressure canner. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Fasten the canner lid securely. Leave the weight off the vent port or open the petcock.
6. To vent the canner, heat on high until the water boils and generates steam that can be seen escaping in a funnel shape through the open vent port or petcock. Set a timer for 10 minutes. After 10 minutes of continuous steam, close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner. The canner should pressurize within three to ten minutes.
7. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the manufacturer describes. Regulate the heat under the canner to maintain a steady pressure at, or slightly above, the correct gauge pressure for the whole processing time.
8. When the processing time specified in the recipe is complete, turn off the heat to allow the canner to cool naturally and return to zero pressure. After the canner is completely depressurized, remove the weight from the vent port or open the petcock. At this point, the canner and its contents will still be hot. Wait 10 minutes, then unfasten the lid and remove it carefully, with the underside away from you so that the steam coming out of the canner does not burn your face.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years.
12. Enjoy your very own home-canned soup, stock, or stew.



Recipes

Beef Stock (Broth)

Ingredients

- trimmed beef bones (with meat removed)
- 2 onions, quartered (optional)
- 2 carrots, sliced (optional)
- 2 stalks celery, sliced (optional)
- 2 bay leaves (optional)
- water to cover
- salt (optional)

Directions

- Prepare bones: Saw or crack fresh trimmed beef bones to enhance extraction of flavor. Rinse bones.
- Place bones, vegetables and bay leaves (if using) in a large stockpot; add water to cover. Cover pot and simmer 3 to 4 hours. Remove bones and discard. Strain stock; discard vegetables and bay leaves. Cool broth; skim off and discard fat. Add salt to taste, if desired.
- Reheat broth to boiling.
- Fill hot pint or quart jars with hot broth, leaving 1-inch headspace.
- Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 20 minutes, quart jars 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.

Chicken or Turkey Stock (Broth)

Ingredients

- chicken or turkey carcass bones (with meat removed)
- 2 onions, quartered (optional)
- 2 stalks celery, sliced (optional)
- 2 bay leaves (optional)
- water to cover
- salt (optional)

Directions

- Place bones, vegetables and bay leaves (if using) in a large stockpot; add water to cover. Cover pot and simmer until any remaining tidbits of meat fall easily off the bones, about 30 to 45 minutes. Remove bones and discard. Strain stock; discard vegetables and bay leaves. Cool broth; skim off and discard fat. Add salt to taste, if desired.
- Reheat broth to boiling.
- Fill hot pint or quart jars with hot broth, leaving 1-inch headspace.
- Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 20 minutes, quart jars 25 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.



Vegetable Soup

Ingredients

- 8 cups peeled, cored, chopped tomatoes
- 6 cups peeled, cubed potatoes
- 6 cups $\frac{3}{4}$ -inch sliced carrots
- 4 cups green lima beans
- 4 cups uncooked corn kernels
- 2 cups 1-inch sliced celery
- 2 cups chopped onions
- 6 cups water
- salt (optional)
- pepper (optional)

Directions

- Combine all vegetables in a large saucepot. Add water. Bring to a boil. Reduce heat and simmer 5 minutes. Season with salt and pepper, if desired.
- Ladle hot soup into hot pint or quart jars, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 55 minutes, quart jars 85 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: about 14 pint jars or 7 quart jars

Nutritional Analysis: (1 cup) 100 calories, 1 g fat, 21 g carbohydrate, 4 g protein

Recipe courtesy of Ball® Canning and Recipes at www.freshpreserving.com. Used with permission for educational purposes only.

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Chicken Soup

Ingredients

- 16 cups chicken stock
- 3 cups diced chicken
- 1½ cups diced celery
- 1½ cups sliced carrots
- 1 cup diced onion
- 3 chicken bouillon cubes (optional)
- salt (optional)
- pepper (optional)

Directions

- Combine chicken stock, chicken, celery, carrots and onion in a large saucepot. Bring mixture to a boil. Reduce heat and simmer 30 minutes. Season to taste with salt and pepper, if desired. Add bouillon cubes, if desired. Cook until bouillon cubes are dissolved.
- Ladle hot soup into hot pint or quart jars, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes, quart jars 90 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: about 8 pint jars or 4 quart jars

Nutritional Analysis: (1 cup): 140 calories, 4 g fat, 11 g carbohydrate, 14 g protein

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Vegetable Soup Your Way

Ingredients

meat or poultry of your choice (optional)
fresh vegetables of your choice
dried beans or peas (optional)
water, broth or tomato juice
salt (optional)

Vegetable Soup Your Way, with Seafood

Cooked seafood can be used in place of meat or poultry in this recipe, but processing times must be increased to ensure safety. If seafood is used, process pint or quart jars for 100 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Directions

- Prepare meat or poultry, if using: Cover with water; simmer until tender. Cool; remove bones and excess fat. Cut meat or poultry into small pieces. Reserve broth, if desired.
- Prepare vegetables: Wash, trim and prepare each vegetable as you would for a hot pack in canning. Preparation directions for selected vegetables are given below. For information on preparing other vegetables, please visit the National Center for Home Food Preservation website at http://nchfp.uga.edu/how/can4_vegetable.html.
 - » Green beans: Cut into 1-inch pieces. Cover with boiling water; boil 5 minutes; drain.
 - » Carrots: Peel and re-wash; slice or dice. Cover with water and bring to a boil; simmer 5 minutes; drain.
 - » Corn: Blanch ears 3 minutes in boiling water. Cut corn from cob at about three-fourths the depth of a kernel; do not scrape cob. Add 1 cup boiling water to each 4 cups of corn and bring to a boil; simmer 5 minutes; drain.
 - » Okra: Cut into 1-inch pieces. Cover with hot water; boil 2 minutes; drain.
 - » Peas (green): Shell. Cover peas with water; bring to a rolling boil; boil 2 minutes; drain.
 - » Potatoes: Peel; cut into ½-inch cubes. Cover with boiling water; boil 2 minutes; drain.
 - » Tomatoes: Dip in boiling water for 30 to 60 seconds; dip in cold water; slip off skins; remove cores; cut into pieces. Heat to boiling; simmer 5 minutes.
- Prepare dried beans or peas, if using: For each cup of dried beans or peas, add 3 cups of water; boil 2 minutes. Remove from heat; soak 1 hour. Heat again to boiling; drain.
- Combine cooked ingredients with enough hot water, broth or tomato juice to cover. Boil 5 minutes. *Caution:* Do not thicken or add milk, cream, flour, rice, noodles or other pasta. If thickening or additional ingredients are desired, the soup should be canned as directed here and the additions made when the jar is opened for serving.
- Add salt to taste, if desired.
- Using a slotted spoon, fill hot pint or quart jars halfway with the hot meat and vegetable solids. *Caution:* Do not fill jars more than halfway full with solids. Ladle hot cooking liquid over solids, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 60 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Recipe adapted from National Center for Home Food Preservation website. Used with permission for educational purposes only.

Beef Stew

Ingredients

- 4 to 5 pounds beef stew meat, cut into 1½-inch cubes
- 1 tablespoon vegetable oil
- 12 cups peeled, cubed potatoes
- 8 cups sliced carrots
- 3 cups chopped celery
- 3 cups chopped onion
- 1½ tablespoons salt
- 1 teaspoon thyme
- ½ teaspoon pepper
- water to cover

Directions

- Brown meat in oil in a large saucepot. Add vegetables and seasonings to browned meat. Cover with boiling water. Bring stew to a boil. Remove from heat.
- Ladle hot stew into hot pint or quart jars, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes, quart jars 90 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: about 14 pint jars or 7 quart jars

Nutritional Analysis: 180 calories, 4 g fat, 19 g carbohydrate, 18 g protein

Recipe courtesy of Ball® Canning and Recipes at www.freshpreserving.com. Used with permission for educational purposes only.



Hearty Chili

Ingredients

- 4 pounds boneless beef chuck, cut into ½-inch cubes, excess fat removed.
- ¼ cup vegetable oil
- 3 cups diced onion
- 2 cloves garlic, minced
- 5 tablespoons chili powder
- 2 teaspoons cumin seed
- 2 teaspoons salt
- 1 teaspoon oregano
- ½ teaspoon pepper
- ½ teaspoon coriander
- ½ teaspoon crushed red pepper
- 6 cups diced canned tomatoes, undrained (about 4 14.5-ounce cans)

Directions

- Lightly brown meat in hot oil. Add onions and garlic; cook until soft but not brown. Add remaining spices and cook for 5 minutes. Stir in tomatoes. Bring to a boil. Reduce heat and simmer for 45 to 60 minutes, stirring occasionally.
- Ladle hot chili into hot pint or quart jars, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint or quart jars 90 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: about 6 pint jars or 3 quart jars

Nutritional Analysis: (1 cup) 290 calories, 12 g fat, 12 g carbohydrate, 35 g protein

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Chili Con Carne

Ingredients

- 3 cups dried pinto or red kidney beans
- 5½ cups water
- 5 teaspoons salt (divided)
- 3 pounds ground beef or venison, or a combination
- 1½ cups chopped onion
- 1 cup chopped peppers (optional)
- 1 teaspoon black pepper
- 3 to 6 tablespoons chili powder
- 8 cups crushed or whole tomatoes

Directions

- Soak beans: Wash beans thoroughly and place in a 2-quart saucepan. Add cold water to a level of 2 to 3 inches above the beans. Cover and place in refrigerator to soak 12 to 18 hours. Drain and discard water.
- Combine beans with 5½ cups of fresh water and 2 teaspoons salt. Bring to a boil. Reduce heat and simmer 30 minutes. Drain and discard water.
- Brown ground meat, chopped onions and peppers (if desired) in a skillet. Drain off fat. Add 3 teaspoons salt, black pepper, chili powder, tomatoes and drained cooked beans. Bring to a simmer and simmer 5 minutes. *Caution:* Do not thicken.
- Ladle hot chili into hot pint jars, leaving 1-inch headspace. Do not use quart jars for this recipe.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Yield: about 9 pint jars

Nutritional Analysis: (1 cup) 310 calories, 12 g fat, 28 g carbohydrate, 24 g protein

Recipe adapted from *So Easy to Preserve*. Used with permission for educational purposes only.



Beans with Tomato Sauce

Ingredients

- dried beans
- 1 quart tomato juice
- 3 tablespoons sugar
- 2 teaspoons salt
- 1 tablespoon chopped onion
- ¼ teaspoon each of ground cloves, allspice, mace and cayenne
- ¾-inch cubes of pork, ham, or bacon (optional)

Directions

- Prepare beans: Wash beans. Add 3 cups water for each cup of dried beans. Boil 2 minutes and remove from heat. Soak 1 hour; drain; discard liquid. Cover beans with fresh water and heat to boiling; drain, discard liquid.
- Prepare tomato sauce: Combine tomato juice, sugar, salt, onion and spices. Heat to boiling.
- Fill hot pint or quart jars $\frac{3}{4}$ full with hot drained beans. Add one cube of pork, ham or bacon to each jar, if desired. *Caution:* Do not add any more meat or bacon. Ladle hot tomato sauce over beans, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 65 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Baked Beans with Molasses Sauce

Ingredients

- dried beans
- 1 quart water or cooking liquid from beans
- 3 tablespoons dark molasses
- 1 tablespoon vinegar
- 2 teaspoons salt
- 1 $\frac{3}{4}$ teaspoons powdered dry mustard
- 7 cubes ($\frac{3}{4}$ -inch) of pork, ham or bacon (optional)

Directions

- Prepare beans: Wash beans. Add 3 cups water for each cup of dried beans. Boil 2 minutes and remove from heat. Soak 1 hour; drain, discarding liquid. Cover beans with fresh water and heat to boiling; drain, reserving liquid for use in molasses sauce.
- Prepare molasses sauce: Combine 1 quart water or cooking liquid from beans, molasses, vinegar, salt and dry mustard. Heat to boiling.
- Place pork, ham or bacon cubes in a large casserole or pan. Add beans and enough molasses sauce to cover the beans. Cover pan and bake at 350°F for 4 to 5 hours. Check each hour and add more liquid if needed.
- Ladle hot beans and sauce into hot pint or quart jars, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 65 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Home Canning Meat, Poultry, Wild Game, and Fish

Home canning your own meat, poultry, wild game or fish can help you save money, gain control over what's in your food, and save time in meal preparation. To ensure safe, high quality home-canned products, always follow research-based recommendations when canning.

All meats, poultry, wild game and fish are low-acid foods. **To prevent the risk of botulism, they must be processed in a pressure canner.** No safe options exist for processing these foods in a boiling water canner.

Ingredients

Use only good quality meat, poultry, game or fish for canning. Trim away gristle, bruised spots and excess fat. Keep refrigerated (at 40°F or lower) until you are ready to can. If holding for longer than a few days, freeze (at 0°F or lower) for storage. Thaw in the refrigerator before canning and follow the directions given for each type of meat, poultry, game or fish.

Be sure to trim away excess fat before canning. Fat will melt and rise up the sides of the jar during processing. If it reaches the sealing edge of the lid, the jar may not seal. Too much fat may also cause strong flavors to develop.

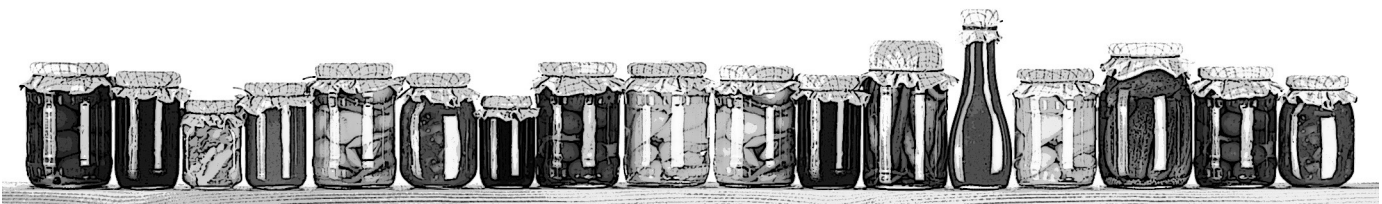
Salt is optional in canning meat, poultry, game and fish. It is used only for seasoning and does not help to preserve the food.

Broth, meat juices, tomato juice or water may be added to the filled jars before processing. Tomato juice is a good choice for use with wild game. To make your own broth, place bony pieces of meat or poultry in a saucepan and cover with cold water. Simmer until the meat is tender. Strain broth, cool quickly and skim off fat. Heat broth to boiling before adding to jars. Do not thicken the broth before use.

Filling Jars

There are two methods that can be used for packing food into the jars – raw pack and hot pack. Raw pack means putting raw, unheated food into the jars. Hot pack involves cooking or heating the food for a specified length of time before packing it into the jars and covering it with a hot liquid.

For most meats, the hot pack method yields the best product quality during storage. Natural fat and juices released during processing are usually not enough to cover the meat in raw packs.



Some recipes have directions for both raw and hot packs. Others specify one or the other, depending on which method is most suitable for the specific meat, poultry, game or fish being canned. Always use the type of pack and full processing time specified in the recipe.

The size of the jar will affect the rate of heat penetration into the food. To ensure that all of the food in the jar receives the full heat treatment needed to destroy spores of harmful bacteria that may be present, use only the jar sizes specified in the recipe and the processing time given for each jar size. Do not use jars that are larger than those specified in the recipe. It is safe to use jars that are smaller than those specified in the recipe, but the processing time cannot be reduced for the smaller jars.

Processing: Why Do I Need to Use a Pressure Canner?

High-acid foods (those with a pH of 4.6 or lower) contain enough acid to help control the growth of harmful bacteria and can be safely processed in a boiling water canner. However, all

meats, poultry, game and fish are low-acid foods, with pH levels ranging from 5.1 to 7.3. They do not contain enough acid to prevent the growth of the bacterium *Clostridium botulinum*, which produces the toxin that causes botulism. For these foods, the high temperatures reached in a pressure canner (240°F to 250°F at 10 to 15 pounds of pressure) are necessary to destroy any spores of *Clostridium botulinum* that might be present. Destroying the spores prevents them from growing into bacterial cells in the canned product and producing the deadly botulism toxin. The high temperature reached in the canner under pressure must be maintained for a specified length of time, depending on the food being canned, the way it is prepared and packed into the jar, and the size of the jar. It is important to always use the full processing time and pressure specified in each recipe.

For more information on safe home canning and the pressure canner method, please see Home Canning Basics, publication FCS3-578.



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Weighted gauge	10 pounds	15 pounds	15 pounds

If you live at an altitude greater than 4,000 feet, please consult the website for the National Center for Home Food Preservation, <http://nchfp.uga.edu/>.

Step-By-Step Canning

Pressure Canner Method

1. Assemble all equipment and utensils.
2. Visually examine jars, lids and bands for defects. Wash in hot, soapy water and rinse well. Place the jars in simmering water to keep hot until filled. Dry the bands and set aside. Follow the manufacturer's instructions for preparing the lids. Many no longer require preheating before use. Do not boil the lids.
3. Use fresh, top-quality ingredients. Prepare the recipe, following the directions given.
4. Fill the hot jars, leaving the headspace specified in the recipe. Remove air bubbles and adjust headspace, if necessary. Wipe jar rims with a dampened clean paper towel. Center lids on jars and apply bands fingertip tight. Do not over tighten.
5. Following your manufacturer's instructions, place one to two inches of hot water in the pressure canner. Load filled jars into the canner, using a jar lifter. Keep jars upright at all times. Fasten the canner lid securely. Leave the weight off the vent port or open the petcock.
6. To vent the canner, heat on high until the water boils and generates steam that can be seen escaping in a funnel shape through the open vent port or petcock. Set a timer for 10 minutes. After 10 minutes of continuous steam, close the petcock or place the counterweight or weighted gauge over the vent port to begin building pressure in the canner. The canner should pressurize within three to ten minutes.
7. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the manufacturer describes. Regulate the heat under the canner to maintain a steady pressure at, or slightly above, the correct gauge pressure for the whole processing time.
8. When the processing time specified in the recipe is complete, turn off the heat to allow the canner to cool naturally and return to zero pressure. After the canner is completely depressurized, remove the weight from the vent port or open the petcock. At this point, the canner and its contents will still be hot. Wait 10 minutes, then unfasten the lid and remove it carefully, with the underside away from you so that the steam coming out of the canner does not burn your face.
9. Remove jars from canner, keeping them upright. Carefully place them onto a towel, leaving a one-inch space between the jars for proper cooling.
10. After 12 to 24 hours, test seals and remove bands.
11. Wash outside of jars and lid surfaces. Label and store sealed jars in a cool, dark, dry place for up to two years.
12. Enjoy your very own canned meat, poultry, game or fish.



Recipes

Meat—Strips, Cubes or Chunks (bear, beef, lamb, pork, veal, venison)

The hot pack method is preferred for best liquid cover and quality during storage.

Ingredients

meat, trimmed

½ teaspoon salt per pint (optional)

boiling broth, meat juices, tomato juice or water to cover (for hot pack)

Directions

Hot Pack

- Prepare meat: Choose high quality, chilled meat. Remove excess fat. Soak strongly flavored wild meats for 1 hour in a brine made from 1 tablespoon salt per quart of water. Rinse. Cut meat into 1-inch wide strips, cubes or chunks.
- Pre-cook meat to the rare stage by roasting, stewing or browning in a small amount of fat.
- Pack hot meat loosely into hot pint or quart jars, leaving 1-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired.
- Ladle boiling broth, meat juices, tomato juice or water over meat pieces, leaving 1-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes, quart jars 90 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare meat: Choose high quality, chilled meat. Remove excess fat. Soak strongly flavored wild meats for 1 hour in a brine made from 1 tablespoon salt per quart of water. Rinse. Cut meat into 1-inch wide strips, cubes or chunks.
- Add ½ teaspoon salt to each hot pint jar or 1 teaspoon salt to each hot quart jar, if desired.
- Pack raw meat pieces into hot jars, leaving 1-inch headspace. Do not add liquid.
- Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes, quart jars 90 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Meat—Ground or Chopped (bear, beef, lamb, mutton, pork, sausage, veal, venison)

Ground or chopped meat may be safely canned. However, freezing gives a much higher quality product.

Ingredients

ground or chopped meat or sausage

½ teaspoon salt per pint (optional)

boiling meat broth, tomato juice or water to cover

Directions

Hot Pack

- Prepare meat: Choose fresh, chilled meat. For venison, add one part high-quality pork fat to three or four parts venison before grinding. For sausage, use freshly made sausage, seasoned with salt and cayenne pepper (sage may cause a bitter off-flavor when canned). Cut cased sausage into 3- to 4-inch links. Shape ground meat into patties or balls, or leave unshaped.
- Cook meat until lightly browned. Remove excess fat.
- Pack hot meat loosely into hot pint or quart jars, leaving 1-inch headspace.
- Ladle boiling meat broth, tomato juice or water over meat, leaving 1-inch headspace.
- Add ½ teaspoon salt to each hot pint jar or 1 teaspoon salt to each hot quart jar, if desired.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- Process pint jars 75 minutes, quart jars 90 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Poultry (chicken, duck, goose, turkey or game birds)

The hot pack method is preferred for best liquid cover and quality during storage.

Ingredients

poultry or game birds

½ teaspoon salt per pint (optional)

hot broth to cover (for hot pack)

Directions

Hot Pack

- Prepare meat: Choose freshly killed and dressed poultry or game birds. Large chickens are more flavorful than fryers. Dressed poultry should be chilled for 6 to 12 hours before canning. Strongly flavored game birds (especially water fowl) can be soaked for 1 hour in a brine made from 1 tablespoon salt per quart of water. Rinse poultry or game birds, remove excess fat, and cut meat into suitable sizes for canning. The meat may be canned with or without bones; be sure to use the appropriate processing time for each.
- Boil, steam or bake meat until about two-thirds done.
- Pack hot meat pieces into hot pint or quart jars, leaving 1¼-inch headspace.
- Add ½ teaspoon salt to each pint jar or 1 teaspoon salt to each quart jar, if desired. *Note:* If you have soaked game birds in salt water, don't add salt when filling the jars.
- Ladle hot broth over meat pieces, leaving 1¼-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- *For meat with bones:* Process pint jars 65 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner
- *For meat without bones:* Process pint jars 75 minutes, quart jars 90 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare meat: Choose freshly killed and dressed poultry or game birds, chilled for 6 to 12 hours before canning. Strongly flavored game birds (especially water fowl) can be soaked for 1 hour in a brine made from 1 tablespoon salt per quart of water. Rinse poultry or game birds, remove excess fat, and cut meat into suitable sizes for canning. The meat may be canned with or without bones; be sure to use the appropriate processing time for each.
- Add ½ teaspoon salt to each hot pint jar or 1 teaspoon salt to each hot quart jar, if desired. *Note:* If you have soaked game birds in salt water, don't add salt when filling the jars.
- Pack raw meat pieces loosely into hot jars, leaving 1¼-inch headspace. Do not add liquid.
- Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- *For meat with bones:* Process pint jars 65 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner
- *For meat without bones:* Process pint jars 75 minutes, quart jars 90 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Rabbit or Squirrel

The hot pack method is preferred for best liquid cover and quality during storage.

Ingredients

rabbit or squirrel

hot broth to cover (for hot pack)

Directions

Hot Pack

- Prepare meat: Choose freshly killed and dressed, healthy animals. Soak meat for 1 hour in a brine made from 1 tablespoon salt per quart of water. Rinse. Remove excess fat and cut meat into suitable sizes for canning. The meat may be canned with or without bones; be sure to use the appropriate processing time for each.
- Boil, steam or bake meat until about two-thirds done.
- Pack hot meat pieces into hot pint or quart jars, leaving 1¼-inch headspace.
- Ladle hot broth over meat pieces, leaving 1¼-inch headspace.
- Remove air bubbles and adjust headspace if needed. Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- *For meat with bones:* Process pint jars 65 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner
- *For meat without bones:* Process pint jars 75 minutes, quart jars 90 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Raw Pack

- Prepare meat: Choose freshly killed and dressed, healthy animals. Soak meat for 1 hour in a brine made from 1 tablespoon salt per quart of water. Rinse. Remove excess fat and cut meat into suitable sizes for canning. The meat may be canned with or without bones; be sure to use the appropriate processing time for each.
- Pack raw meat pieces loosely into hot pint or quart jars, leaving 1¼-inch headspace. Do not add liquid.
- Wipe jar rims with a dampened clean paper towel; apply two-piece metal caps.
- *For meat with bones:* Process pint jars 65 minutes, quart jars 75 minutes, at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner
- *For meat without bones:* Process pint jars 75 minutes, quart jars 90 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

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Fish (catfish, northern pike, salmon, smelt, trout and other fatty fish except tuna)

For best results, freeze (rather than can) panfish such as crappies, perch and bass.

Caution: Bleed and eviscerate fish immediately after catching, never more than 2 hours after they are caught. Keep cleaned fish on ice until ready to can.

Ingredients

fish, cleaned

1 teaspoon salt per pint (optional)

Directions

Raw Pack

- Prepare fish: If fish is frozen, thaw it in the refrigerator before canning. Rinse the fish in cold water. You can add vinegar to the water (2 tablespoons per quart) to help remove slime. Remove head, tail, fins and scales. It is not necessary to remove the skin or bones. In most fish, the bones become very soft during processing and are a good source of calcium. Split fish lengthwise, if desired. Cut into 3½-inch lengths. Refrigerate until you are ready to pack in jars.
- Pack fish pieces into hot pint jars, leaving 1-inch headspace. If the skin has been left on the fish, pack pieces skin side out for a nicer appearance, or skin side in for easier jar cleaning.
- Add 1 teaspoon salt to each pint jar, if desired. Do not add liquid.
- Carefully wipe jar rims with a dampened clean paper towel; wipe with a dry paper towel to remove any fish oil. Apply two-piece metal caps.
- Process pint jars 100 minutes at 10 pounds pressure in a weighted-gauge pressure canner or at 11 pounds pressure in a dial-gauge pressure canner.

Note: This recipe is for canning fish in pint jars. To safely can fish in quart jars, different operating instructions must be followed and the processing time is much longer. For directions for canning fish in quart jars, please visit the National Center for Home Food Preservation website at http://nchfp.uga.edu/how/can5_meat.html.

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Jerky Safety

Jerky is meat or poultry that has been dried until most of the moisture is removed. Because of its very low moisture content, it is shelf stable and can be stored without refrigeration. The drying process leaves a nutrient dense, portable and light-weight snack. But drying meat or poultry at home requires proper safe food preparations. USDA recommends that all meat be pre-heated before the drying process to ensure that any bacteria present is destroyed. A pound of meat or poultry weighs about 4 ounces after being made into jerky.

Drying is the most common method of food preservation. By removing moisture, bacteria, fungi or naturally occurring enzymes found in raw food cannot cause tissue damage or spoilage.

A warm oven or a food dehydrator should be used to dehydrate meat or poultry. USDA currently recommends heating meat to 160°F and poultry to 165°F before the dehydrating process begins to make jerky. Research indicates pre-cooking meat to the correct temperature prior to drying, minimizes safety concerns related to foodborne illness-causing bacteria, such as *Salmonella* or *Escherichia coli* 0157:H7.

A dehydrator gives you more temperature control than the use of an oven. After heating the meat to 160°F or poultry to 165°F, the dehydrator temperature should remain between 130° and 140°F during the drying process. This temperature is fast enough to dry food before it spoils by removing enough water so that bacteria are unable to grow in the finished jerky. The dehydrator instructions should indicate that your equipment reaches the appropriate temperature during the drying process. Because sun or shade drying occurs in open air without the addition of heat, these methods are not suitable for the drying of meat or poultry for jerky.

Safe handling and preparation methods must always be used when preparing any type of jerky.

- Always wash hands with soap and water before and after working with meat products.
- Use clean equipment and utensils.
- Keep meat and poultry refrigerated at 40°F or below and use or freeze ground beef and poultry within 2 days; use or freeze whole red meats within 3 to 5 days.
- Defrost meat or poultry in the refrigerator.
- Marinades can be used to tenderize and flavor jerky before dehydrating it. Marinating foods should be done in the refrigerator. Do not re-use the marinade.
- Use a meat thermometer for accuracy to pre-cook meat to 160°F and poultry to 165°F before dehydrating it.
- Use a food dehydrator that will maintain a temperature of at least 130° to 140°F throughout the meat drying process.

Commercially made jerky is monitored in federally inspected plants by inspectors of the U.S. Department of Agriculture's Food Safety and Inspection Service. Dried commercial products may be cured or uncured, smoked or unsmoked and air or oven dried. Commercially packaged jerky should be stored in a cool, dry place for up to 12 months. Home-dried jerky should be consumed within 1 to 2 months.

References

- USDA, FSIS. *Jerky and Food Safety*, 2016.

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Most Frequently Asked Canning Questions

Meats

1. Should giblets of chicken be canned in the same jar with chicken?

No. Their flavor may permeate other pieces of chicken in the jar.

2. Is it safe to can meat and poultry without salt?

Yes. Salt is used for flavor only and is not necessary for safe processing.

3. Why is it necessary to remove as much fat from meats as possible before canning?

Any fat that gets on the rim of the canning jar can prevent an airtight seal. Excess fat in jars makes it easier for the fat to climb the sides of the jar and contaminate the seal.

4. Can I get directions for canning my Brunswick stew at home?

Recommendations for canning Brunswick stews at home have not been scientifically determined. These are low-acid mixtures which could support the growth of bacteria that cause botulism, so a process cannot be estimated or made up. It must be a tested process known to kill these bacteria in this product. In addition, the recipes for Brunswick stew vary and a process would have to be developed through scientific testing for each variation. No directions for this product are available at this time. It is best to freeze Brunswick stews.

FAQ

Safe Home Canning: Altitude Adjustments

For safe home canning, it's important to know your altitude (or elevation), since altitude affects processing times and pressures. The processing times and pressures given in University of Kentucky Cooperative Extension home canning publications are based on canning at or below 1,000 feet above sea level. While much of Kentucky lies below 1,000 feet in elevation, some portions of the state, particularly in the southeast, are above 1,000 feet. The highest point in Kentucky is Black Mountain in Harlan County, at 4,145 feet above sea level; the lowest point is at the Mississippi River in Fulton County, at 257 feet above sea level. All towns and communities in Kentucky are below 2,000 feet. You can usually find your altitude at your local zoning office, on your town or city's webpage, or from your local County Extension office. If you live at an altitude greater than 1,000 feet, you may need to adjust processing times or pressures to ensure the safety of your home-canned foods.

Why are Altitude Adjustments Needed?

Air pressure decreases as altitude or elevation increases. Because of decreased air pressure, the boiling point of water decreases as altitude

increases. At sea level (altitude 0 feet), water boils at 212°F; at 1,000 feet, it boils at 210°F; at 2,000 feet, it boils at 208°F. Lower boiling water temperatures are less effective at killing bacteria so, for safe home canning, adjustments must be made when canning at altitudes above 1,000 feet.

In boiling water canning, altitude adjustments take the form of longer processing times at higher altitudes. The longer processing times are needed to compensate for the lower temperature of the boiling water in the canner.

In pressure canning, processing times do not change, but the canner pressure must be increased at higher altitudes. The increased pressure ensures that the steam inside the canner reaches a temperature high enough to kill any spores of *Clostridium botulinum* (the bacterium that causes botulism) that might be present.

Altitude Adjustments for Boiling Water Canning

For boiling water canning, the amount of extra processing time needed at altitudes greater than 1,000 feet depends on the length of the recommended process at 0-1,000 feet.



For recipes processed for **less than 20 minutes** at 0-1,000 feet, boiling water processing times for most foods are adjusted for altitude as shown in Table 1.

Table 1. Boiling water processing for less than 20 minutes.

Altitude (ft)	Processing time
0-1,000	as specified in recipe
1,001-6,000	add 5 minutes to time specified in recipe

For recipes processed for **20 minutes or longer** at 0-1,000 feet, boiling water processing times for most foods are adjusted for altitude as shown in Table 2.

Table 2. Boiling water processing for 20 minutes or longer.

Altitude (ft)	Processing time
0-1,000	as specified in recipe
1,001-3,000	add 5 minutes to time specified in recipe
3,001-6,000	add 10 minutes to time specified in recipe

An exception to the above tables is in the processing of **jellied fruit products** (jams, jellies and preserves). For those lower-risk foods, boiling water processing time is increased by 1 minute for each 1,000 feet of additional altitude above 1,000 feet.

Altitude Adjustments for Pressure Canning

For pressure canning, the canner pressure must be increased at altitudes greater than 1,000 feet. However, the processing times do not change. Canner pressures are adjusted for altitude as shown in Table 3.

Table 3. Pressure canner processing.

Altitude (ft)	Processing pressure	
	Weighted gauge	Dial gauge
0-1,000	10 pounds	11 pounds
1,001-2,000	15 pounds	11 pounds
2,001-4,000	15 pounds	12 pounds
4,001-6,000	15 pounds	13 pounds

Detailed information on altitude adjustments for canning specific foods is available on the National Center for Home Food Preservation website at <http://nchfp.uga.edu/>.

For more information on safe home canning, please see *Home Canning Basics*, publication FCS3-578, or contact your local Extension office.

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Colorful Eating

Color-code your shopping and be on your way to better health. Each color group of produce offers different phytochemicals, antioxidants and nutrients that help you stay healthy in a variety of ways.



Get the blues (and purples)

Brain/memory, healthy aging, urinary tract

Fruits

- Blackberries
- Blueberries
- Grapes
- Plums

Vegetables

- Eggplant
- Kohlrabi
- Purple asparagus
- Purple cabbage
- Purple carrots
- Purple peppers

Great greens

Vision, bones, teeth

Fruits

- Apples
- Grapes
- Paw paws
- Pears

Vegetables

- Asparagus
- Beans
- Broccoli
- Brussel sprouts
- Cabbage
- Cucumbers
- Kohlrabi
- Leafy greens
- Lettuce
- Okra
- Onions (green)
- Peas
- Peppers
- Zucchini

Wonderful whites

Heart, maintain healthy cholesterol

Fruits

- Pears (brown)
- White peaches

Vegetables

- Cauliflower
- Kohlrabi
- Onions
- Potatoes
- White corn

Outstanding oranges (and yellows)

Vision, immune system, heart

Fruits

- Cantaloupe
- Peaches
- Yellow apples
- Yellow pears
- Yellow watermelon

Vegetables

- Carrots
- Corn
- Golden potatoes
- Peppers
- Pumpkins
- Squash
- Sweet potatoes
- Yellow tomatoes

Radiant reds

Heart, urinary tract, brain/memory

Fruits

- Apples
- Grapes
- Pears
- Raspberries
- Strawberries
- Watermelons

Vegetables

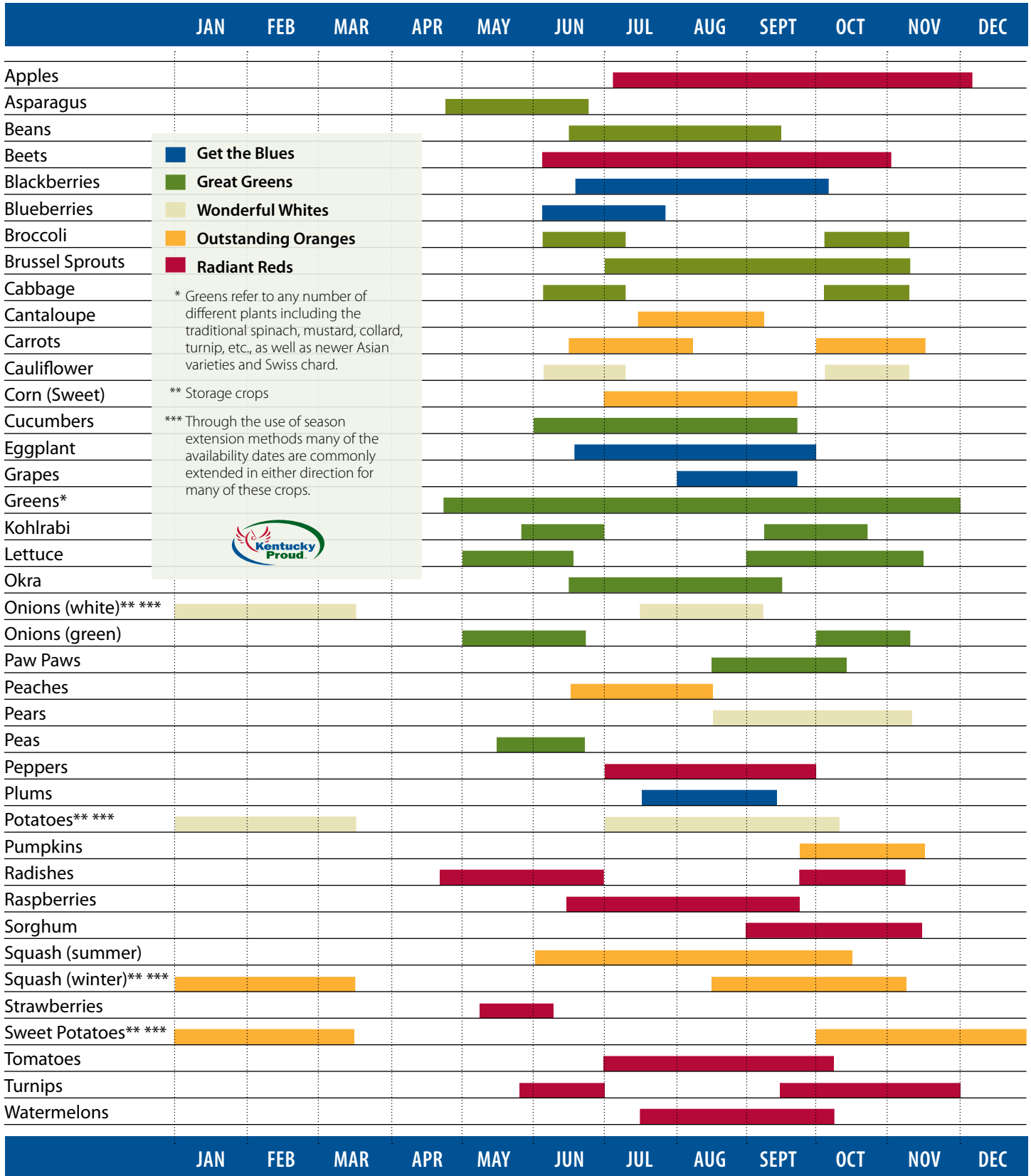
- Beets
- Radishes
- Red peppers
- Sorghum
- Tomatoes
- Turnips





Kentucky Proud Produce Availability

Buying Kentucky Proud is easy. Look for the label at your grocery store, farmers' market, or roadside stand. Our secret ingredient is the hard work and dedication of Kentucky's farm families. Find out why "Nothing else is close."



- Get the Blues
- Great Greens
- Wonderful Whites
- Outstanding Oranges
- Radiant Reds

* Greens refer to any number of different plants including the traditional spinach, mustard, collard, turnip, etc., as well as newer Asian varieties and Swiss chard.

** Storage crops

*** Through the use of season extension methods many of the availability dates are commonly extended in either direction for many of these crops.

