

Canning Fruits And Vegetables

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Canning is one method of preserving food. All foods taste better fresh than canned and canning requires some time, labor and capital so one would not ordinarily can a food that he could use fresh or could keep by storing in a cellar, a pit, or in a freezer locker. Preserving the surplus food makes it possible to have a more varied, a more palatable, and a more nearly adequate diet the year round without increasing the grocery bill.

In canning, heat is used to destroy spoilage organisms and the food is held in air-tight containers so no spoilage organisms can enter. It is desirable to have the canned product as nearly like the freshly cooked product as possible so no extra salt, sugar or acid should be added and the temperature and time for processing should be just enough to insure keeping the product. To prevent undesirable changes in the fruits and vegetables due to the action of enzymes, bacteria, yeast and molds, the products should be handled in rather small quantities, the products should be canned as soon as possible after they are gathered, and there should be no delay in any step in the canning process. It is desirable to get ready for the canning season in advance by checking over the equipment and supplies which will be needed for canning so there will be no delay when the food is ready to can. Chemical preservatives such as salicylic acid or "canning acids or powders" are unwholesome and should be avoided in home canning.

GENERAL DIRECTIONS FOR CANNING

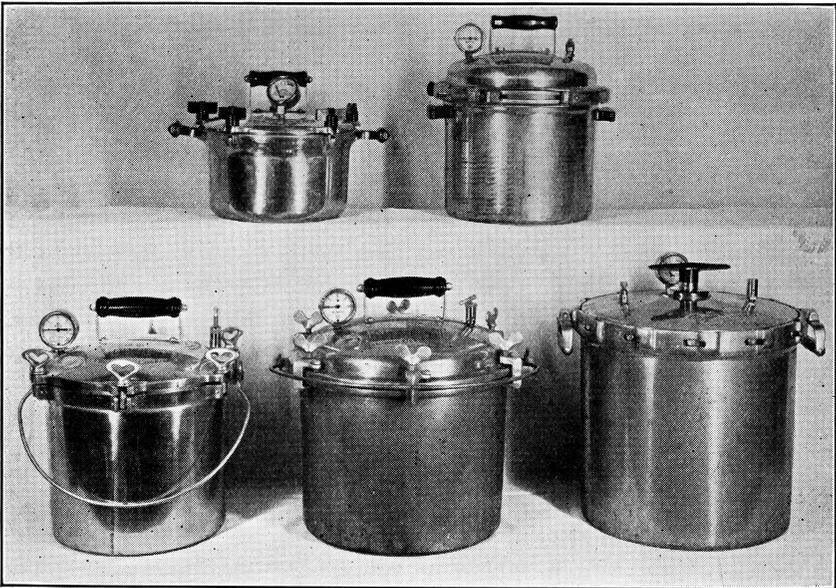
1. Select sound, well ripened fruit and grade according to size and degree of ripeness, as heat penetration is slower in green fruit. Use fresh, quickly grown vegetables that are at their best eating stage. Vegetables that have grown poorly, or are over-mature or have stood for some time after picking are more difficult to can successfully and should be processed a longer period of time than freshly gathered high quality products. Grade vegetables for size and uniform degree of maturity.

2. Gather up the equipment and supplies needed and put the water on to heat before beginning to prepare the product. Wash the tin cans or jars and the lids thoroughly and make sure that all the utensils used are clean. Do not try to use nicked or chipped jars, damaged lids, or poor quality rubbers. Use stainless steel knives for cutting and enamel or aluminum pans for heating the products. Tin, copper or iron utensils may affect the color of the food.
3. If glass jars are to be used, test all rubbers, jars and lids, except the self sealing types, and keep the proper lid and jar together. To test jars place about 1 cupful of hot water in the jar, adjust the rubber and lid, invert and note seal. If the seal is not perfect, tighten the bail, or press down the edge of the lid or change the rubber, or try a different jar lid. To test rubber rings, stretch them out and note whether they snap back without change of shape. Double and pinch them together and look for cracks and pinholes. Good rubbers are firm, pliable and free from cracks and pinholes.
4. Wash the products to be canned carefully and thoroughly. Soil bacteria are the more dangerous bacteria and the most difficult ones to kill. Wash fruit before removing caps or stems to prevent loss of juice and rapid fermentation. If the peeled fruit must stand, it is necessary in order to prevent color changes to place immediately in water containing two tablespoons salt and two tablespoons vinegar per gallon.
5. Prepare the product as for cooking and follow the directions for each product as given on the canning card under "Preparation Before Processing." Precooking fruits that are delicate in texture, form and flavor will cause them to lose some of their desirable flavor and texture. The length of time any fruit is precooked should vary with its hardness or degree of ripeness. Precooking a product removes air from the tissues, shrinks the product, facilitates packing, speeds processing, and all of the product is processed at more nearly the same temperature. When tin cans are used the product may be exhausted instead of precooked. To exhaust, pack the raw food in the container, place the filled can in a bath of boiling water deep enough to come within about two inches of top of the can. Cover the bath and heat until the product is hot through and the air is driven out of the food and the container. Seal the can while the food is steaming hot and process at once.

6. Pack the products in the containers quickly to keep the food hot. Put in enough food to have a reasonably tight pack of solid food without cramming and add hot liquid to cover. Use sufficient liquid so the food will not be too dense to prevent adequate heat penetration. Work out the air bubbles with a flexible knife or spatula. Fill jars to within $\frac{1}{2}$ inch of top, for all foods except those containing much starch as corn, lima beans and dried beans or peas. These should have a one-inch head space, for expansion. Tin cans should have from $\frac{1}{4}$ to $\frac{1}{2}$ inch of head space.
7. Carefully wipe the top of the can or jar to remove any particles of food, fat or sirup, immediately adjust the top, and partly seal. The self-sealing lids should be turned firmly tight. It is important at all times to prevent food from standing at a temperature between 100° and 150° F. as this is a most favorable temperature for the growth of spoilage bacteria.
8. Place the jars and cans in the hot canner as soon as they are sealed. The water in the pressure cooker, steam cooker, or the water bath, should be boiling or near boiling. Do not crowd the jars, but allow sufficient space for the water or steam to circulate under, over and around the containers. In the water bath the water should be over the top of the jars or cans throughout the processing period. The water level in the pressure cooker should be just to the top of the rack. Enough water should be in the steam cooker to keep it from boiling dry during the processing period. Cover the water bath with a well fitted lid. Tighten the lid of the pressure cooker, allow the air and steam to escape from the petcock for about 7 minutes, then close and let the pressure rise to the required number of pounds. See Missouri Agricultural Extension Service Leaflet 48, "Using a Pressure Cooker."
9. Process at the temperature and for the time indicated in the tables on the canning card. Do not begin counting time until the water is in a rolling boil in the water bath canner, until the steam flows steadily from the steamer or waterless cooker, or until the pressure is up the required number of pounds in the pressure cooker. Write down the time when the processing period will be completed. Keep the temperature the same throughout the processing period. Discount any time the temperature is below what it should be.
10. Remove the jars and cans from the canner as soon as the processing period is completed. Do not turn the tops of the self-sealing lids, but complete the seal of other jars. Do not invert

glass jars as the actual seal is formed by the pull of the partial vacuum in the jar during cooling. Cool jars as quickly as possible and after they are cool, invert and observe for leakage. Do not attempt to tighten jar lids after the jars are cool. Cool tin cans in cold water, preferably running water.

11. Label with the name of the product and the date canned. Remove clamps or bands from jars and self sealing lids.
12. Watch for spoilage for about one week.
13. Store all canned foods in a cool, dry, frost-proof place, protecting the glass jars from light.



Types of Pressure Cookers

SUGAR AND SIRUPS FOR CANNING FRUITS

Fruits may be canned without sugar but the shape, color and flavor of fruits are retained better when some sugar is added. Either beet or cane sugar may be used. Soft fruits with a delicate flavor have a more desirable shape and flavor if packed raw and covered with boiling sirup but less jar space is required if the fruit and sugar are heated together and then packed in the jar. Both methods are suggested under "Preparation Before Processing" on the canning card. Use the method best suited to your needs and the use of the canned product.

Sirups should be made in advance, poured over the fruit boiling hot and enough sirup should be used to cover the fruit. The amount of sirup for each jar will vary according to the size of the pieces of fruit and the tightness of the pack. One cup of water will ordinarily yield enough sirup for a quart of well-packed fruit.

For **thin** sirups-----Boil together 1 part of sugar and 3 parts of water
For **medium** sirup----Boil together 1 part of sugar and 2 parts of water
For **thick** sirup-----Boil together 1 part of sugar and 1 part of water

CANNING FRUIT JUICES

Fruit juices may well be canned for the making of delicious and wholesome fruit drinks, for sherbets, ices, gelatin desserts, fruit sauces, puddings and for the making of jelly. To extract the maximum amount of juice from a fruit it is necessary to heat the fruit. A low temperature should be used, since boiling temperature (212° F.) will cause undesirable changes in the color and flavor of the juice. At no stage in the process of making or canning should the fruit or the fruit juice be allowed to reach a higher temperature than 200° F., unless the juice is to be used for making jelly later. If it is to be used for jelly, let the fruit boil a few minutes to extract the pectin. Do not add sugar to this juice. For all other fruit juice pick over the fruit carefully, wash it thoroughly, place in a kettle, cut up or mash, heat slowly until the framework of the fruit is broken down, and strain through a jelly bag. Add sugar in the proportion of 1 cup to a gallon of juice. The sugar helps to retain the color and flavor of the fruit. Reheat the juice to the simmering point (185° F.) Pour into hot, sterilized cans or bottles. Fill bottles to within 1 inch of top if crown caps are used for sealing and 2 inches if corks are used. Seal, place in a hot water bath, being sure the hot water is well over all the containers. Heat to the simmering point (185° F.) and pasteurize or hold at this temperature for 10 minutes. Remove at once, cool, label and store in a cool, dark, dry place.

Approximate Yield of Canned Products From Raw Products

Vegetable	Quantity—Raw	Yield
Asparagus -----	2-3 lbs.	1 quart
Beans—String -----	30 lbs. or 1 bu.	16-20 quarts
Baby beets -----	52 lbs. or 1 bu.	16-20 quarts
Corn—Golden Bantam Type -----	8-10 ears	1 pint
Corn—Country Gentleman Type --	4-5 ears	1 pint
Lima Beans—Shelled -----	1 lb.	1 pint
Peas in Pod -----	30 lbs. or 1 bu.	10-14 pints
Spinach or other Greens -----	18 lbs. or 1 bu.	3-5 quarts
Tomatoes -----	53 lbs. or 1 bu.	16-18 quarts
Fruits		
Apples (2-6 per lb.) -----	48 lbs. or 1 bu.	18-20 quarts
Black or Raspberries -----	1 crate or 6 gallons	14-16 quarts
Cherries -----	1 gallon with seeds	3-4 quarts
Gooseberries -----	1 gallon	3-4 quarts
Grapes -----	48 lbs. or 1 bu.	12-16 quarts
Peaches (5-8 per lb.) -----	48 lbs. or 1 bu.	18-20 quarts
Pears (3-4 per lb.) -----	50 lbs. or 1 bu.	25-30 quarts
Plums (15-20 per lb.) -----	56 lbs. or 1 bu.	28-30 quarts
Strawberries -----	1 crate or 6 gallons	11-12 quarts

STORAGE OF CANNED FRUITS

Well-planned storage space for canned foods will make for less spoilage and breakage and for greater convenience in storing, and later in using the canned foods. For convenience, the shelves should be movable as to distance apart and the lowest shelf should be at least nine inches from the floor and the highest not more than 72 inches from the floor. Twelve-inch boards will accommodate two rows of jars which is an economical use of shelf space and is also convenient for selecting jars and for checking in spoilage. Twenty running feet will accommodate 100 jars, stored two rows on the shelf while nine feet will hold 100 tin cans stacked two deep and two rows to the shelf.

Canned food should be grouped according to use or variety as they are stored and the shelves so labeled. A suggested grouping is as follows:—Tomatoes and tomato juice; leafy, dark green and yellow vegetables; other vegetables; soup mixtures; meat stock and meats; small fruits; apples, pears, peaches; fruit juices; preserves; jellies, jams, conserves, butters, pickles and relishes; hospitality shelf; baby shelf.

EXAMINATION OF CANNED FOODS

All canned products should be examined before opening. There should be no corrosion or a bulging of ends, lids or rubbers, or any unusual deposits or signs of leakage. When the container is opened there should be a sucking-in of air but no outburst of air or sputtering of liquid. The odor should be characteristic of the product.

Any different odor would probably indicate spoilage. Canned products should not be tasted to discover spoilage.

All home canned non-acid foods should be boiled ten minutes before tasting. There is always the possibility that home-canned non-acid foods may contain bacteria whose growth would cause serious illness even if only a taste of the food were eaten. These bacteria grow only in non-acid foods and the poisons resulting from their growth are destroyed by boiling the food.

CAN ACCORDING TO A PLAN

The average family will have a greater variety and a better quality of canned foods if they can according to a plan, than if they just can all they can. In making a canning plan or budget consider the number, sex and age of the persons in the family; the number of weeks that fresh foods are not available; the surplus foods that might well be canned rather than preserved by other methods; the amount of money one has to spend for food; the canning equipment available and the time and skill of the person to do the canning.

Most farm families need to make a definite food production plan as well as a food preservation plan if they are to have the two fruits, potatoes, and two other vegetables in the diet every day throughout the year. A good garden with 20 to 25 different vegetables and some provision for 8 to 12 different fruits would afford a desirable variety of these foods. An abundant supply of high quality fruits and vegetables the year round would make for palatable meals and better than average nutrition for the family.

The following amounts of preserved fruits and vegetables would meet the needs of one person for the 32 to 38 weeks when, in Missouri, one would ordinarily need to supplement the fresh foods from the garden and orchard with canned, stored or purchased foods:

- 35 to 45 quarts of canned fruits;
- 35 to 45 quarts of canned vegetables, about $\frac{1}{2}$ of these tomatoes;
- 2 to 3 bushels of potatoes—Irish and Sweet;
- 5 to 10 heads of cabbage;
- 50 to 60 pounds of other vegetables stored.
- 60 to 80 pounds of stored fruits;
- 5 to 10 pounds of dried fruits and vegetables.

WORK SHEET—A FRUIT AND VEGETABLE PRESERVATION BUDGET

To determine the approximate amount of fruits and vegetables to can, store and dry for your family, multiply the amount suggested for 1 adult by the number of persons in your family. If some food listed is not desirable for your family, write a desirable one over it or distribute the amount suggested for that food among the other products.

Amount to Can			Amount to Store		
Vegetables	For 1 Adult	For My Family	Vegetables	For 1 Adult	For My Family
Tomatoes	15 qts.	-----	Potatoes—Irish	2 to 3 bu.	-----
Tomato juice	5 qts.	-----	Potatoes—sweet	1 to 2 pecks	-----
Greens	2 qts.	-----	Cabbage	5 to 7 heads	-----
Green beans	5 qts.	-----	Chinese cabbage	2 to 4 heads	-----
Carrots	1 qt.	-----	Carrots	1 to 2 pecks	-----
Asparagus	2 pts.	-----	Turnips	5 to 7 lbs.	-----
Lima beans	2 pts.	-----	Beets	3 to 5 lbs.	-----
Peas	4 pts.	-----	Onions	5 to 7 lbs.	-----
Baby beets	1 qt.	-----	Parsnips	3 to 5 lbs.	-----
Corn	2 pts.	-----	Salsify	3 to 5 lbs.	-----
Sauerkraut	1 qt.	-----	Rutabaga	3 to 5 lbs.	-----
Soup mixture	5 qts.	-----	Squash	3 to 5 lbs.	-----
Pickles	1 qt.	-----			
Relishes	3 pts.	-----			
Fruits			Dried		
Apples	5 qts.	-----	Corn	1 to 2 lbs.	-----
Apple sauce	1 qt.	-----	Beans—mature	1 to 2 lbs.	-----
Blackberries	3 qts.	-----			
Raspberries	2 qts.	-----	Fruits		
Gooseberries	2 qts.	-----	Apples	1 to 2 bu.	-----
Strawberries	2 qts.	-----	Pears	1 to 2 pks.	-----
Cherries	2 qts.	-----			
Rhubarb	3 qts.	-----	Dried		
Plums	3 qts.	-----	Apples	1 to 3 lbs.	-----
Peaches	5 qts.	-----	Pears	1 to 2 lbs.	-----
Pears	5 qts.	-----	Peaches	1 to 2 lbs.	-----
Grape juice	2 qts.	-----	Others	1 to 3 lbs.	-----
Other fruit juices	5 qts.	-----			
			Preserves	3 to 5 pts.	-----
			Jellies & jams	2 to 5 pts.	-----

To use the preserved foods to the best advantage it is suggested that one write down by each different fruit and vegetable the quantity preserved and the number of times a week or month it can be served during the out-of-season times. Plan the meals according to this card and as the fruits and vegetables are brought up into the kitchen to use, check them off on this record card. A card for keeping a record of the food as it is canned and a card for keeping a record of the canned food as it is used may be obtained by writing to the Agricultural Extension Service, College of Agriculture, Columbia, Missouri.

Digitization Information Page

Local identifier C421-1940

Source information

Format Book
Content type Text /Text with images
Source ID Gift copy not added to collection
Notes

Capture information

Date captured November 2019
Scanner manufacturer Fujitsu
Scanner model fi-7460
Scanning system software ScandAll Pro v. 2.1.5 Premium
Optical resolution 600 dpi
Color settings 8 bit grayscale
File types tiff

Derivatives - Access copy

Compression Tiff: LZW compression
Editing software Adobe Photoshop CC
Resolution 600 dpi
Color grayscale
File types pdf created from tiffs
Notes Images cropped, straightened, and brightened
Canvas size: 6 x 9