



FactSheet

Extension

Ohio State University Extension Fact Sheet

Family and Consumer Sciences

1787 Neil Ave., Columbus, Ohio 43210

Preserving Beverages: Water, Juice, and Milk

HYG-5354-99

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Like food, you may need to occasionally preserve a beverage for long term storage. Here are several common beverages that are safe to preserve at home.

Storing Water for Unexpected Emergencies

In times of natural disasters, floods, and unexpected water outages, having a safe water supply for your family is crucial. Each person in a family needs a minimum of 2 quarts of water per day (more in warmer climates). Additional clean water is needed for food preparation. If you have been warned ahead of time, fill large pots and pans, sinks, and bathtubs with water. To store water for long term use, follow the guidelines below.

Store water for approximately six months. Follow the same rules as for canned goods: first in, first out, and rotate your product. Water needs to be stored in clean containers. Two-liter beverage containers are a good size to use. Wash thoroughly, fill with water, and secure the lid tightly. Store in a dark cool place. A good way to store water is to put the containers in a freezer when you do not have a full load of frozen food.

If the power is interrupted, the frozen bottles of water will help maintain the frozen food (be sure to leave enough head space). If needed, water can be purified by boiling or by chemical treatment.

Boiling Water

Boil water at a rolling boil for 10 minutes to kill any disease causing bacteria in the water. Add a pinch of salt to each quart of boiled water to improve the taste.

Chemical Treatment of Water

Two chemicals commonly found in the home will purify water.

1. Chlorine bleach such as Clorox or Purex. Household bleach is a good disinfectant for water. However, check the label to be sure that the active ingredient, sodium hypochlorite, is 5.25 percent. Do not use bleach that contains detergents or fragrance.

Mix bleach thoroughly into the water. Let it stand for 30 minutes. The water should have a slight chlorine odor. If it does not, repeat the dose and let the water stand for an additional 15 minutes. Use the chart below to determine how much chlorine bleach to use.

Amount of Water	Amount of 5.25% Bleach
1 quart	4 drops
1/2 gallon (about 2 liter)	8 drops or 1/8 teaspoon
1 gallon	16 drops or 1/4 teaspoon

2. **Iodine.** Household iodine from the medicine chest or first aid kit will purify water. The iodine should be 2 percent United States Pharmacopoeia (U.S.P.) strength. Add 20 drops per gallon of clear water, and 40 drops per gallon of cloudy water. Seal the container and let it stand for 30 minutes. The water supply will be safe for an indefinite period.

Canning Water

Boil the water for approximately 10 minutes. Let the water cool to 125 to 150 degrees F. Decant (pour off without disturbing the sediment) into another pan. Fill the jars to within 1/4 inch head space. Adjust the lids (lids should be prepared according to manufacturer's directions). Process in a boiling water bath for 10 minutes for quarts or pints.

The water is boiled to precipitate the temporary hardness (calcium) out that would otherwise settle to the bottom, and to get rid of dissolved oxygen and many off-odors.

Shake the jars well before drinking to enhance the flavor. Minerals settle to the bottom of the jar. Shaking helps to re-distribute the minerals and puts some of the air back into the water so that it does not taste flat.

Home Pasteurization of Milk

Most of the bacteria found in milk from healthy cows and goats are harmless if the milk is kept in clean surroundings. However, even with careful production, contamination of milk with disease-producing microorganisms is possible from infected animals, polluted water or soil, and other sources. Outbreaks of food poisoning, gastro-enteritis, typhoid fever, diphtheria, septic sore throat, dysentery, and Q-fever have been traced to raw milk. Diseases such as tuberculosis and undulant fever have been transmitted from infected cows to humans through raw milk.

Many states, including Ohio, have laws requiring milk sold directly to the consumer to be pasteurized. The purpose of such laws is to protect the health of the consumer. Dairy farm families and others milking cows or goats should pasteurize all other dairy products and milk used as an ingredient in foods that do not require cooking or baking.

Benefits of Pasteurization: Pasteurization destroys all disease-producing organisms that may be present, making milk safe to drink. Pasteurization reduces the number of harmless bacteria in milk that can produce off-flavors. The process also eliminates bacteria that can produce off-flavors and gas during the manufacture and storage of cheese and other cultured dairy products.

Raw Milk Quality: Pasteurization helps preserve the quality of milk, but it does not improve the quality. All raw milk contains microorganisms. Raw milk to be pasteurized must have a low microbial count to get the best flavor and keep quality and other desirable characteristics of milk and milk products. This low microbial count raw milk is possible if cows and goats are clean and healthy and if you use sanitary procedures. Utensils and equipment must be clean and properly sanitized.

Pasteurization Methods: Methods for pasteurizing milk are based on time-temperature relationships that ensure the complete destruction of any disease-producing organisms. The higher the temperature, the less time it takes to destroy the disease-producing organism.

Several time-temperature combinations are used for the commercial pasteurization of milk. There are practical methods for pasteurizing milk in the home. One is the batch method, which requires that every particle of milk, including the foam, be heated to a minimum of 145 degrees F and held at that temperature for no less than 30 minutes.

Home Pasteurization: Milk can be pasteurized in the home in a double boiler, in canning jars or glass milk bottles, or in a batch type home pasteurizer. General procedures for pasteurizing milk are as follows:

Double Boiler

1. Place the milk in the top and water in the bottom of the double boiler.
2. Place an accurate, metal-stem thermometer and spoon in the milk during the entire pasteurization process. A metal-stem thermometer is preferred over glass because it will not break.
3. Heat the milk, while stirring constantly, to 165 degrees F and hold it at that temperature for no less than 15 seconds. Constant stirring is important for obtaining even distribution of the heat and to ensure that all the milk is heated to 165 degrees F.
4. At the end of the 15-second holding time, place the top portion of the double boiler containing the milk in a pan of cold water. Continue stirring the milk to achieve rapid cooling.
5. When the milk temperature is below 130 degrees F, replace the cooling water with ice water and continue to cool the milk, with occasional stirring, until the temperature is 40 degrees F or below.
6. Pour the cooled milk into clean containers, cover, and store in the refrigerator at 40 degrees F or colder until used.

Bottles and Canning Jars

1. Place milk in glass milk bottles or canning jars. Fill only four-fifths full to allow for expansion of milk when heated.
2. Place the bottles or jars on a rack inside a large canner. Fill the canner with warm water until the water level is slightly above the milk level in the jars.
3. Start heating. Stir the milk in each container with a long-handled spoon to achieve uniform distribution of the heat. Monitor the temperature with an accurate, metal-stem thermometer. As the temperature approaches 145 degrees F, stop stirring, and loosely cover all jars but one with lids. (Milk bottles can be covered with aluminum foil.) Cover the remaining jar with aluminum foil. Punch a hole in the center of the foil and insert the thermometer.
4. Continue heating until the temperature is 145 degrees F or slightly above. Adjust the heat to maintain the temperature at 145 degrees F for 30 minutes. If at any time the temperature drops below 145 degrees F, reheat and hold at 145 degrees F or above for 30 minutes.
5. After 30 minutes, gradually replace the hot water with cold water to cool the milk. If this is not done gradually, the bottles or jars may break.

6. Continue cooling until the milk temperature is 80 degrees F or less. At this temperature, ice water can be used for cooling. Cool milk to 40 degrees F or colder. Tighten the covers and store in the refrigerator at 40 degrees F or colder until used.

Batch-Type Electric Home Pasteurizer

Electrically operated batch-type home pasteurizers are available from major department stores and by mail order. Units are available that automatically control the pasteurization time and temperature and will pasteurize from two quarts to two gallons of milk. Such units make it possible to easily pasteurize milk with minimum attention.

Table 1. Recommended process times for grape juice and apple cider in a boiling-water canner.					
			Process Time at Altitudes of		
	Style of Pack	Jar Size	0-1,000 ft.	1,001-6,000 ft.	Above 6,000 ft.
Grape Juice	Hot	Pints or Quarts	5 minutes	10 minutes	15 minutes
		Half Gallons	10 minutes	15 minutes	20 minutes
Apple Cider	Hot	Pints or Quarts	30 minutes		

Microwave Oven

It is possible to pasteurize with a microwave oven, but this is not recommended for home pasteurization. It is difficult to achieve the uniform distribution of heat that ensures that all of the milk has been heated to 161 degrees F for at least 15 seconds. These or longer microwave heating conditions also adversely affect the flavor and other properties of milk.

Selecting, Preparing, and Canning Grape Juice and Apple Cider

For Grape Juice

Quantity: An average of 24-1/2 pounds is needed per canner load of 7 quarts; an average of 16 pounds per canner load of 9 pints. A lug weighs 26 pounds and yields 7 to 9 quarts of juice--an average of 3-1/2 pounds per quart.

Quality: Select sweet, well-colored, firm, mature fruit of ideal quality for eating fresh or cooking.

Procedure: Wash and stem grapes. Place grapes in a saucepan and add boiling water to cover grapes. Heat and simmer slowly until skin is soft. Strain through a damp jelly bag or double layers of cheesecloth. Refrigerate juice for 24 to 48 hours. Without mixing, carefully pour off clear liquid and save; discard sediment. If desired, strain through a paper coffee filter for a clearer juice. Add juice to a saucepan and sweeten to taste. Heat and stir until sugar is dissolved. Continue heating with occasional stirring until juice begins to boil. Pour into jars immediately, leaving 1/4-inch head space. Adjust lids and process according to the recommendations in Table 1.

For Apple Cider

Get cider fresh from the mill and process it without delay (though it can be held in a refrigerator in sterilized covered containers for 12 hours, if necessary). To prepare, strain it through a clean, dampened jelly bag, and in a large kettle bring it to a good simmer at 200 degrees F (93 degrees C), but do not boil. Pack hot.

Hot pack only, in jar. Pour strained fresh cider into hot jars, leaving 1/2 inch of head room; adjust lids. Process in a hot-water bath at 190 degrees F (88 degrees C) for 30 minutes for either pints or quarts. Remove jars; complete seals if necessary.

Hot pack only, in cans (R-enamel suggested). Fill to the top with strained fresh cider leaving no head room. Exhaust to 170 degrees F (77 degrees C) for approximately 10 minutes; seal. Process in a hot-water bath at 190 degrees F (88 degrees C) for 30 minutes for either No. 303 or No. 401 cans. Remove cans; cool quickly.

Sources

Ball Corporation, 1988.

North Carolina Cooperative Extension Service (1997).

The Notebook of Food and Food Safety Information, Raleigh, North Carolina. United States Department of Agriculture, Extension Service.

Grade "A" Pasteurized Milk Ordinance, Public Health Services/Food and Drug Administration (1993).

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