



Extension Extra

ExEx 1048
Updated April 2002
Agriculture and
Biosystems
Engineering

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

Water for Emergency Use

*John Maursetter, Big Sioux Aquifer Demonstration Project,
SDSU Ag & Biosystems Engineering Department*

When a storm or other natural disaster strikes, your access to food, water, and electricity may end for days or even weeks. Having enough clean drinking water in storage can make life a lot easier in an emergency.

However, you may find yourself in a situation where safe drinking water is not available. This publication will show you how to safely store water for emergency use and how to make impure water safer to drink in an emergency.

How Much Water Is Enough?

Store at least one gallon of water per person per day. This amount generally will be enough for drinking and for basic personal hygiene. The amount needed for drinking depends upon the amount of physical activity, the weather, plus the size and physical condition of the individual. Most sources suggest two quarts per day as a minimum for drinking.

A week's supply of water (seven gallons per person) is the most often recommended amount of water to store. Do not forget to store water in your automobile. Finding yourself stranded in a vehicle and without a clean supply of drinking water is dangerous.

Choosing a Container and Preparing It for Storage

Commercial containers Containers designed for long-term water storage are available commercially. Make sure to buy FDA-approved containers. Do NOT confuse this with the term EPA approved containers. The FDA-approved containers are made of food-grade plastic, or are fiberglass or epoxy lined steel, stainless steel, aluminum, or iron containers. Water packets are preferred for storing water in automobiles. This is because of their portability and ability to withstand extremes in temperature. The packets usually contain "purified" water that may be useful for medical emergencies.

Using Your Own Containers Using your own containers to store drinking water is acceptable. However, you need to follow several guidelines to ensure that you store the water safely.

Store water in clean, plastic, non-vented containers of food grade plastic, such as the plastic one- to two-liter soda pop bottles, with the tight-fitting, screw-on lids. These bottles work well because they are made of heavier, food-grade plastic and the lids are a soft-seal type.

Non-vented containers ensure that air cannot enter the container, thus keeping out contamination. Thinner plastics can spring leaks and are less durable. Food-grade plastic ensures that the containers are to contain materials meant for human consumption.

Use colored plastic bottles to help keep out light.

Do not use plastic milk jugs, because the lids do not seal well. Milk jugs usually are made from biodegradable plastics that will break down over time, causing leaks.

Do not store water in unlined steel, stainless steel, aluminum, or iron containers as they may leach out undesirable substances into the stored water.

When reusing food or beverage containers, thoroughly wash and sanitize them. Wash the containers with warm, soapy water. Rinse, and then fill with a 100-parts-per million (100 ppm) bleach solution. You can make this solution by adding one tablespoon of non-scented liquid bleach (5.25% sodium hypochlorite) per gallon of water. Do NOT use color-safe bleaches or bleaches with other cleaning additives.

The water should be between 75 and 120F for the sanitizer to be effective. Allow this solution to sit in the container for at least 30 seconds before emptying.

Allow the container to air dry. Do not rinse.

Storing Tap Water

Fill the container using a known safe source of water. Fill the container as full as possible to leave little air in the bottle. Store water in a cool, dark place. Closets are good locations.

Store water away from items that have a scent or perfume (such as laundry soap). The water can absorb the smell and this can affect taste.

Empty and refill the water at least every six months.

Storing Commercially Bottled Water

Keep the water in its original sealed container. Use the water when the bottle is opened. Do not store partially emptied containers of water.

Shelf life of commercially bottled water is generally one year. For larger containers, such as five gallon jugs, do not store more than six months.

Keep away from sunlight and fluorescent lighting. This light can degrade the plastic, causing the container to crack or leak.

Store water away from items that have a scent or perfume (such as laundry soap). The water can absorb the smell and this can affect taste.

Other Sources of Drinking Water

In an emergency, you may find yourself in a situation where stored water is not available. Here are other sources of drinking water:

- Water in your hot water heater.
- Water in your home's plumbing system.
- Melted ice cubes.
- Water from your toilet tank (not the bowl). Be aware that this water may contain molds and should be disinfected before using. Use this water only if the tank does not contain disinfectant/bowl cleaning tablets or solutions. "Blue" water is not safe to drink.

If you have lost water due to a water main break, be very careful when using water from the water heater or your house's plumbing. Open a faucet or two on an upper level of the home and drain the water from the water heater or from a faucet on a lower level of the home.

Draining water without opening the additional faucets will create a suction in the broken main and possibly draw contaminated water into the home plumbing system. Opening the faucets, even if a line is not broken will make getting water out of your home's plumbing or water heater easier.

Disinfecting Water in an Emergency Situation

Contaminated water can have a bad taste or bad smell, yet water that contains harmful microorganisms can taste and smell okay. *Disinfect all water of uncertain purity before using it for drinking, cooking, or personal hygiene.*

No disinfection method is perfect in an emergency situation with limited resources. A combination of methods may be the best solution. Please note that these methods will kill most microorganisms in the water but will not necessarily remove chemical, heavy metal, or salt contaminants.

Before disinfecting water, allow suspended particles to settle out or strain them through layers of paper towels, a coffee filter, or clean cloth.

Boiling

Boiling is the cheapest, safest, and least technical way to disinfect water. Boiling for 15 to 20 minutes kills most harmful bacteria and other living organisms in the water. However, boiling uses large amounts of fuel. This can be an important factor in emergencies if fuel is hard to find.

Remember, you will lose part of the water due to the boiling process, so make sure that you allow extra water for that loss. Let the water cool before drinking.

Boiled water tastes better if you aerate it. Pour the water between two clean containers a few times. This also can improve the taste of stored water.

Bleach and other chlorine products

You can use *household bleach* to disinfect water. Use only liquid bleach that contains 5.25% sodium hypochlorite. Do not use scented bleaches, color safe bleaches, or bleaches with other cleaning additives.

Add 16 drops of bleach to each gallon of water to be disinfected. Mix thoroughly and let stand for one-half hour. If the water does not have a slight bleach (chlorine) odor, add another 16 drops of bleach and let it stand for another 15 minutes.

If the water has disagreeable chlorine taste, allow the water to stand exposed to the air for a few hours or pour it back and forth between two clean containers. Note: The shelf life for bleach (if stored for emergencies) is about 16 months.

Calcium hypochlorite (chlorine treatment) also can be used to disinfect water for drinking. Add one heaping teaspoon to two gallons of water. This chlorine solution can be added to contaminated water at the ratio of one part of solution to 100 parts water. This would be one gallon to 100 gallons of water or one pint (16 ounces) per 12.5 gallons of contaminated water. As with the bleach disinfecting, allow the water to stand for one-half hour. To remove objectionable chlorine taste in the water, use the same techniques as with bleach disinfection.

Chlorine tablets are commercially available to disinfect water and usually can be purchased from drug and sporting goods stores. Follow the directions on the packages for disinfecting water. If the directions are not available, a rule of thumb is to use one tablet for each quart of water to be disinfected.

Note: The shelf-life for chlorine tablets is approximately two years in their original sealed containers.

Iodine products

Iodine treatment is recommended if your water is from sources that may contain spores, such as springs, ponds, rivers, or lakes or if your water supply may have been contaminated due to sewage run off. Treat only small amounts of water with iodine.

Iodine "water purification" tablets are available at drug and sporting goods stores. Follow the directions on the package for proper use. If directions are unavailable, then a rule of thumb dosage is one tablet per one quart of water.

A *Tincture of Iodine (2%) solution* can be used to treat small amounts of water. Use at least 12 drops per gallon of water. Double this amount if water is cloudy. Allow the solution to stand for at least 30 minutes.

Iodine-treated water should not be ingested by pregnant or nursing women or by people who have thyroid problems.

Note: Some people cannot tolerate the peculiar taste of iodine-treated water.

This publication and others can be accessed electronically from the SDSU College of Agriculture & Biological Sciences publications page, which is at <http://agbiopubs.sdstate.edu/articles/ExEx1048.pdf>



Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA. Larry Tidemann, Director of Extension, Associate Dean, College of Agriculture & Biological Sciences, South Dakota State University, Brookings. SDSU is an Affirmative Action/Equal Opportunity Employer (Male/Female) and offers all benefits, services, and educational and employment opportunities without regard for ancestry, age, race, citizenship, color, creed, religion, gender, disability, national origin, sexual preference, or Vietnam Era veteran status.

ExEx 1048- pdf by CES. February 1999; updated April 2002.