Sodium

For normal, healthy persons, the amount of sodium in drinking water is a minor contribution to their total dietary intake of sodium. However, for those people who must restrict their salt intake to control certain medical conditions, sodium in drinking water can be a major concern. The U.S. Environmental Protection Agency has proposed a recommended concentration of 20 milligrams per liter (mg/1).

CAUSES:

Every natural water supply contains some sodium. The amount depends on its contact with soluble sodium compounds in the earth and air. In coastal areas, salt spray and the intrusion of salt water into underground fresh water supplies can also affect the sodium concentration.

Human sewage and household washing products contain high concentrations of sodium. If a sudden salty taste is noticed in a well water normally low in sodium, it may indicate sewage contamination.

Some chemicals and processes used to treat water will increase the sodium content. This is especially true of soda ash (sodium carbonate), used in neutralizing acidic water, and water softeners. Water softeners work by exchanging sodium for the calcium and magnesium that cause hardness. For every mg/l of hardness removed, a softener will increase the sodium concentration 0.5 mg/1.

EFFECTS:

Excessive sodium in drinking water can produce an increase in blood pressure as a person ages. This can eventually lead to the development of hypertension in people with a family history of the disease.

Sodium restricted diets are used to control disease conditions in approximately 3 percent of the population. A sodium concentration in drinking water of 20 mg/l is considered to be compatible with a 500 mg sodium per day diet. The average person, consuming two liters of water per day containing 20 mg /l sodium, would add 40 mg of sodium to their daily intake. By comparison, one cup of whole milk adds 122 mg of sodium; one slice of white bread, 114 mg; and a large fast food hamburger, about 990 mg.

Sodium levels above 250 mg/l will affect the taste of the water. If high amounts of both sodium and chlorides are present, the water may taste salty; elevated sulfates and sodium will produce a bitter taste.

TREATMENT:

Sodium compounds dissolve very easily in water. Once dissolved, they are very difficult and expensive to remove.

Because sodium has little effect on other domestic uses, it is usually necessary to treat only the water used for drinking and cooking.

The methods described below are available as point of-use devices. These are small treatment units which produce up to 15 gallons of water per day for drinking and cooking. The device is usually located near the kitchen sink.

Where treatment is not desirable or practical, bottled water that is sodium-free or distilled may be used as an alternative.

1. **Reverse Osmosis (RO):** RO units remove dissolved minerals by forcing the water, under pressure, through a synthetic membrane. The membrane contains microscopic pores which will allow only molecules of a certain size to pass through. Since the molecules of dissolved minerals are large in comparison to water molecules, the water will squeeze through the membrane leaving the minerals behind. A properly operated RO unit is capable of removing about 80 percent of the dissolved sodium from a water supply.

2. **Distillation:** Distillation units are better known as "stills." They are made of either heat-resistant glass or stainless steel. Stills work by heating small amounts (less than 2 gallons) of water to produce steam. The steam is then collected and condensed back into water. The dissolved sodium and other minerals will not vaporize and are left behind in the heating chamber.

   Stills require frequent, rigorous cleaning to remove the baked-on mineral salts. The "flat" taste from boiling the water can be reduced by pouring the water back and forth between two containers to aerate it.

3. **Deionization (DI):** Deionization units are available as small, wall-mounted cartridges containing ion exchange resins. When water passes through the cartridge, the dissolved sodium and other mineral salts are retained in the resin, producing a mineral-free water. The DI cartridges usually show a color change in the resin to indicate when they should be replaced.

4. **Combination Point-of-Use Devices:** These are multistep systems which use a pre-filter, RO membrane or DI cartridge, and a carbon polishing filter. They treat up to 15 gallons of water per day. The treated water is stored in a small pressure tank and piped to a special faucet on the kitchen sink.