20. SAFE DRINKING WATER AND FOOD HYGIENE
I - SAFE DRINKING WATER

Safe drinking water is very important for health. Safe drinking water is free from soil, organic and chemical substances. They are translucent and safe. Clean water in simple language is one which is free from dirt and pollution, and is safe for human consumption. Physical properties of water like colour, smell and taste changes due to presence of polluted substances. Water is infected with human and animal wastes and is found to be contaminated by chemical compounds. Unprotected means drinking impure and polluted water leads to diseases such as amoeba, jaundice, cholera, etc. It is said that the life giving water can also be destroyer if it becomes a carrier of water borne diseases.

Water is the basic need of all the creatures. Every day human need about 20-50 litres of pure water, which they use in their daily life for the activities of daily routine such as cooking food, in form of drinking water and for other activities. It is harmful to human health if this water is unsafe. Water is contaminated due to various reasons, such as stool, urine, silt of plants, waste of humans and plants found in water.

The pesticides and fertilizers plants which came from the field in the water, chemicals from the industry contaminated the water. 97% of the available water on the earth is in the form of oceans and sea, 1.8% is in the form of ice and only 1.2% water is potable. Therefore, water is very limited for human use. Water is distributed in the following 4 parts on the basis of quality :

1. **Pure water :** There is no undesirable element in the water, this purified water also known as natural water.
2. **Safe water :** Treatment of pure water is made to make it potable, it is cured water. It does not have any kind of undesirable properties.
3. **Contaminated water :** The water in which the microbes are present is called contaminated water.
4. **Polluted water :** If the organic, inorganic radiation biological impurities are dissolved in water, the water is called polluted water.

Effect of contaminated and polluted water on human health :

Various microorganisms through the contaminated water produce many disease of digestive tract in the body.

There are many toxic substances get mixed with water coming out of industries such as fluoride, phenol, cyanide, acid, alkali, mercury etc. These substance spread many kinds of disease when entering the human body through drinking water.

The muscles and GIT become weak, central nervous system related disease occur due to consumption of lead water. High levels of fluoride in water causes stains in teeth, pain in joints and knock knees of legs. Problems of fluorosis, especially in ajmer, Jaipur, alwar, jodhpur, barmer, udaipur, nagaur, pali, bikaner district have fluoride polluted water which causes flourosis.

Drinking water should be free from any kind of unwanted substances and should be pure. United Nations Organisation (UNO) considers Universal access to pure water in the direction of basic human rights and improving quality of life around the world.

S.No.	Disease	Factors	Causes	Symptoms
1	Amoeba(from hand to mouth)	Protozoa aintamivahistolica	Flies, Stools & Unclear water	Indigestion, fatigue, loss of weight, diahorrea, flatus & fever.
2	Cholera	Bacterium Vibro-cholera	Contaminated water by bacterium vibro-cholera.	Diarrhea, vomiting, nose bleeding, high BP.
3	Dysentery	Salmonella & shigella	Salmonella & shigella microbes contaminated water	Chances of bloody dysentery &bloody vomiting
4	Typhoid	Salmonella Typhi	Water contaminated by stools	High Fever upto 140°F, sweating, diarrhea, red spots on chest and stomach, increase in size of liver, if not treated delirium or death.
5	Severe respiratory symptoms	Corona virus	Contaminated water	Fever, cough, physical procrastination,fatigue, digestion related issues
6	Jaundice	Hepatitis A virus	Contaminated food &water	Delirium headache, itching, stomach ache fever & paralysis
7	Laptospirosis	Bacterium laptospiria	Water contaminated by bacteria present in urine of animals	First stage flu, second stage meningitis, jaundice, liver and kidney failure
8	Polio	Polio virus	Water contaiminated by stools of virus career.	Headache, brain fever, paralysis.

World Health Organization and various National Organizations have set the level of fundamental properties for water. Under which chemical, biological and radiological satellites of pure drinking water are prescribed.

Standards of physical and chemical quality of water given by the Bureau of Indian Standards are given in Table 20.2.

Table 20.2 Physical and chemical properties of water

S.No.	Perameters	Maximum Limit
1	Smell	Non-objectionable
2	Taste	Non-objectionable
3	pH-Power of Hydrogen	6.5-8.5
4	Solid dissolving (mg/ltr)	500
5	Total hardness mg./ltr	200
6	Calcium (mg/ltr)	75
7	Magnisiun (Mg/ltr)	30
8	Chloride (mg/ltr)	250
9	Fluroide (mg/ltr)	1
10	Iron (mg/ltr)	0.3
11	Coliform (MPN/100)	minimum
12	Turbidity (NTU	1

Method of safe drinking water :

Pure and safe water for drinking is absolutely necessary, only then our health can be good. If we consume safe water then you can get rid of the diseases produced by contaminated water.

Water can be made pure and potable by using ordinary methods in the house.

1. Filtering : This method is practically used in every household. The insoluble substances present in the water can be separated by this method. But fine soil, bacteria and chemical substances that get out in water with clothing can not be separated. Thick and clean white cloth should be used for the filtration of water. Clothing should be used on one side so that the dirt trapped in the holes of the cloth does not get in the water. Plastic sieve and filter available in the market for filtering water can be used as per the instructions written on them.

2. Boiling : It is the best method of purifying water. In this method, at high temperatures (100-120) the boiling water is covered in a large vessel. At this temperature, the presence of micro-organism and their eggs are destroyed in the water as well as the temporary hardness of the water is also removed. Boiling water does not look delicious in drinking but it is a simple and effective way of purifying water. The water should be covered in the same vessel and left for cooling after boiling. The possibility of getting water contaminated by transfering in another vessel.

3. Alum : In this method, the alum is rotated in water four to five times, the water vessel is emptying another vessels in without shaking. The dust particles present in the water sediment in vessel. The alum is a cheap substance available easily.

4. Chlorine : Chlorine tablet is used to destroy the bacteria present in the water. This is an affordable and easy-to-use method. In this method, 0.5gm of chlorine tablet in 20 liters of water is disinfected. Apart from these, various types of equipment are available in the market for drinking water purification now days. Safe drinking water is prepared by UV rays and modern membrane technology.

5. Reverse osmosis method : This is a water purification technique in which water is extracted through high mean pressure, parchment membrane, by which unnecessary ions present in the water is purified by expelling molecules.

6. Ultraviolet rays : It is a technique for purifying water in which short wave length of ultraviolet rays is used to kill the bacteria present in the water or change in their DNA transformation. This is also used in the purification of food and air purification techniques.

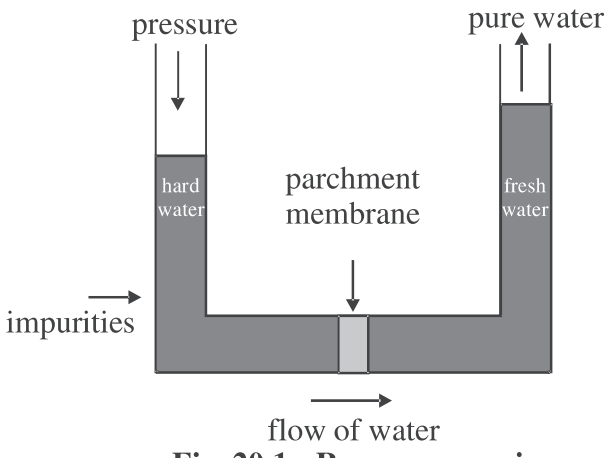

Fig. 20.1 : Reverse osmosis

The following precautions should be taken to keep the collected water safe for further use.

- Do not touch it with hands during transport and storage, Use a clean long handle to remove water or use a vessel having tap.
- Clean the pot of water storage every day with clean water or clean the utensil. Do not use the soil to clean utensils because the soil contains harmful bacteria that can pollute the water.
- Cover the vessel of water and place it high to keep away from the reach of children.

Important Point :

1. Safe drinking water is clean, odorless, transparent and free from biological and chemical substances which are hazardous health.
2. Water is polluted by several factors such as the stool-urine waste discharged by humans and animals, which are also contaminated by the availability of chemicals in water insecticides and fertilizer which coming out from factories to water. Water is also contaminated with rotten trees and plants.
3. Water is divided into four parts mainly pure water, safe water, contaminated water and polluted water
4. Various micro-organisms enter the body through contaminated water and cause many diseases of stomach and digestive tract.
5. Water can made safe by filtered, by boiling, purified by anti-bariatrial and ultraviolet rays, by chlorine tablet, by alum.
6. Water should be kept on clean platform after cleaning and hygiene is maintained uptil it is stored.

Questions :

1. Choose the correct answers for the following questions :

(i) Safe drinking water can often lead to..... diseases :
(a) Skin (b) Stomach
(c) Hair (d) Eye nose and ears

(ii) Amoebiosis is caused by pathogens
(a) Corona Virus
(b) Antamoeba Histolytica
(c) Salmonella Typhi
(d) Bacterium Bibers

(iii) PH value of water is
(a) 3.5 -5.8 (b) 9-10
(c) 6.5-8.5 (d) none of the above

(iv) If the microbes and pathogens are present in water it is called :
(a) Contaminated (b) Polluted
(c) Unsafe (d) all of the above

(v) Which method is adopted to destroy germs in water :
(a) Ultraviolet rays (b) Chlorine
(c) Boiling (d) All of the above

2. What do you mean by safe drinking water? Explain.
3. Write the main reasons for water being contaminated and polluted ?
4. Describe the methods of preparing safe drinking water at home?
5. Explain the side effects of contaminated water on the human body?

Answer :

1. (i) b (ii) b (iii) c (iv) a (v) c

II - FOOD HYGIENE

Food is an important basic need of human being. It nourishes the body through balanced, nutritious, tasty and clean food, and the person is healthy. The consumption of unhygienic and contaminated food causes cholera vomiting, diarrhea, jaundice, typhoid, and other diseases. It is not only harm to the body but sometime it is fatal.

Food hygiene refers to the production of such food items that are safe for the consumer, they can be stored for a long time and remain productive during storage to keep foods clean, avoid them being contaminated.

Foods can be contaminated due to the unhygiene of the individual and the environment in which they are present like dust mites, germicides, food items, and the storage of food items. Rusted equipment may be unhygienic or contaminated due to stagnant foods. It is therefore necessary to avoid harming them so that the physical, biological and chemical reactions of food contamination affect the food and the time it takes for the food to be distorted on the basis of the amount of water present in them. In the food contamination chapter, we have read in detail, so in this lesson we will get to know how to keep food clean.

1. Buy fresh, clean disinfected foods from the market, do not buy rotten and contaminated foods.
2. Clean foods before cooking or storage. For example, wash and dry the perishable fruits and vegetables and store in the refrigerator at the appropriate temperature. Semi perishable food items like potato. Remove the dirt from the surface and keep it in a well ventilated basket and filter out the essential food like wheat, rice, pulses etc. and collect it in clean box.
3. The place where food items are cooked and the utensil and other equipment are used for cooking can be cleaned, so it is necessary that:
   (a) The location of the cookig, serving & storage is neat and the place should be cleaned from time to time.
   (b) Kitchen utensils and equipment used for serving and collecting food should be clean. Food cooked, stored and served in dirty equipment may contaminate food.
   (c) After serving food, after consuming equipment and utensils, wash as soon as possible with ash or washing powder and wash with clean water.
   (d) Always cover the food, cook at proper temperature. Always take fresh food. The temperature of food contamination is 5 degrees to 7 degrees. If food is stored for more than 4 hours, in this circumtances at this temperature may contaminated. It is not suitable for eating.
   (e) Wash the clothes used for kitchen work with soap.
   (f) Put the lid of the kitchen waste into the dustbin and do the regular cleaning of the dustbin
4. Physical cleanliness of the person doing cooking food etc. is very necessary so that:

(a) The cook itself should be clean and healthy

(b) Cover the hair and nails of the cook and cover the open hair with clean clothes.

5. There should not be any skin disease nor the boils and lesions on the hand and legs. Otherwise food can be contaminated by this.
6. Avoid smoking while using food material.
7. Person suffering from cough, cold , TB or any other infectious disease should not cook or serve the food because sneezing and cough can contaminate the food.

Important Points :

1. Clean food means the production of such foods which consumer can store safely for long period and quality of food is maintained during storage.
2. Buy clean safe and non contaminated food from the market.
3. Cooking utensils and serving material and storage place should be clean. Always store food at appropriate temperature.
4. Physical cleanliness for the person who is cooking serving and storing food is necessary.

Questions :

1. Fill in the blanks:

(i) It is necessary to save them from …… to keep food clean.

(ii) Keep wheat, rice and pearls in a dry container after ……. and …… .

(iii) Food should always be kept……..

(iv) The temperature range for contaminating food is…….

(v) Cook himself should be ……. and ……..

2. Explain food hygiene.
3. How food can be contaminated.
4. How food can be kept clean? Explain with example.

Answers :

1. (i) contamination (ii) sieve, clean (iii) covered (iv) 5°c – 6°c (v) clean, healthy