



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

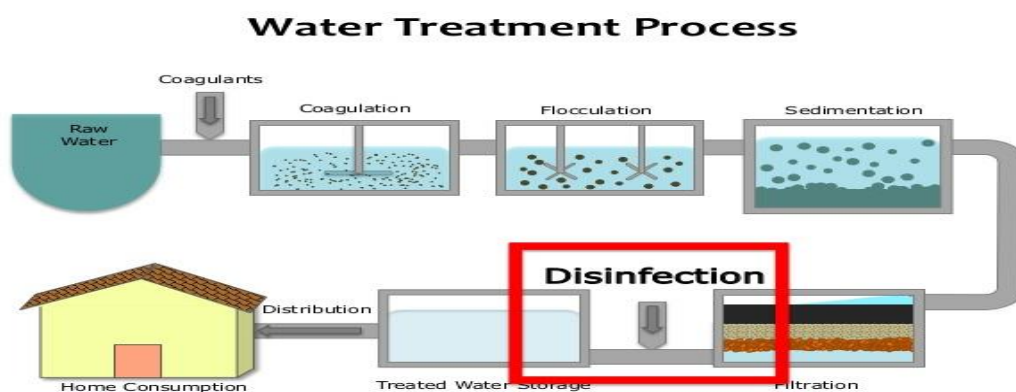


Municipal water treatment:

Water treatment for domestic purpose: The water obtained from natural sources like rivers, lakes and ponds will have impurities. Water for drinking and other domestic uses should be free from disease producing bacteria, chemicals or other substances. Hence water is treated before using for drinking or other domestic purpose. There are mainly two stages involved in water treatment for domestic purpose:

- Removal of suspended impurities.
- Disinfection or Sterilisation.

The various stages of water treatment are as follows



Screening

The process of removing floating matter from the water is known as screening. In this process, water is passed through a screen, having large number of holes, which retains the floating matter and allows the water to pass

Skimming

The process of removing floating matters like, oil, fat, soap, grease etc by using oil skimmers.

Aeration

The process of mixing water with air is known as aeration. The main purpose of aeration is

- To remove gases like CO_2 , H_2S and other volatile impurities causing bad taste and odour to water.
- To remove ferrous and manganous salts as insoluble ferric and manganic salts

Sedimentation:



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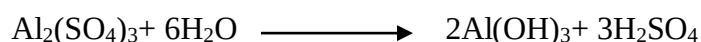


This is the process of removing big sized suspended solid particles by allowing the water to stand undisturbed for 2-6 hours in a big tank. Most of the suspended particles settled at the bottom, due to forces of gravity, and they are removed. Sedimentation removes only 75% of the suspended impurities.

Coagulation:

Finely divided clay silica particles do not settle down easily and hence cannot be removed by sedimentation. This is the process of removal of suspended colloidal impurities by using coagulants like alum, ferrous sulphate etc

When a coagulant is added to water, it gets hydrolysed to form a gelatinous white precipitate of $\text{Al}(\text{OH})_3$ which can gather tiny particles together to form bigger particles and settle down quickly.



Filtration:

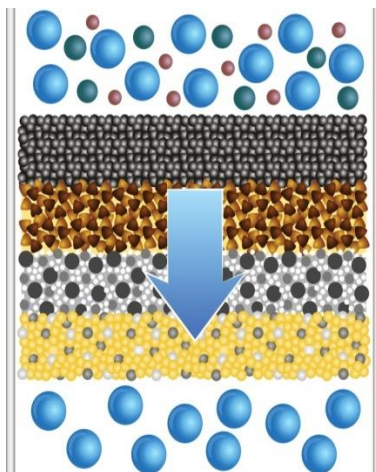
This process helps in removal of the colloidal and suspended impurities not removed by sedimentation. Usually the water is passed through filter bed or sand filter containing fine sand, coarse sand and gravels to remove the suspended impurities and some microorganisms.

The sand filter consists of a tank containing a thick top layer of fine sand followed by coarse sand, fine gravel and coarse gravel. When the water passes through the filtering medium, it flows through the various beds slowly. The rate of filtration decreases slowly due to the clogging of impurities in the pores of the sand bed. When the rate of filtration is stopped, the thick top layer of fine sand is scrapped off and replaced with clean sand. Bacteria are also partly removed by this process.



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Sterilisation

a. Disinfection: _

The process of destroying/killing the disease producing bacteria, micro organisms, etc, from the water and making it safe are, is called Disinfection.

b. Boiling:

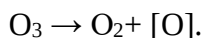
Water is boiled for 10 -15 min, all the disease producing bacteria are killed and water become safe for use.

Disadvantages

- 1) Boiling alters the taste of drinking water.
- 2) It is impossible to employ it in municipal water works.

b). Ozonisation:

Ozone is powerful disinfectant and is readily dissolved in water. Ozone being unstable decomposes by giving nascent oxygen which is capable of destroying the Bacteria. This nascent oxygen removes the colour and taste of water and oxidizes the organic matter present in water.



Disadvantages

- 1) This process is costly and cannot be used in large scale
- 2) Ozone is unstable and cannot be stored for long time

c) By using ultraviolet radiation



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UV rays are produced by passing electric current through mercury vapour lamp. This is particularly useful for sterilizing water in swimming pool.

Disadvantages

- 1) It is costly
- 2) Turbid water cannot be treated.

By Chlorination

The process of adding chlorine to water is called chlorination. Chlorination can be done by the following methods

a) By adding chlorine gas

Chlorine gas can be bubbled in the water as a very good disinfectant.

b) By adding bleaching powder

It is used to purify the drinking water from micro organisms. The purification process is achieved by dissolving 1 kg of bleaching powder in 1000 kilo litres of water. This dissolved water solution is left undisturbed for many hours when bleaching powder is mixed with water, the result of chemical reaction produces a powerful Germicide called Hypochlorous acid.



$\text{HOCl} + \text{germs} \rightarrow \text{germs are killed} \rightarrow \text{water purified.}$