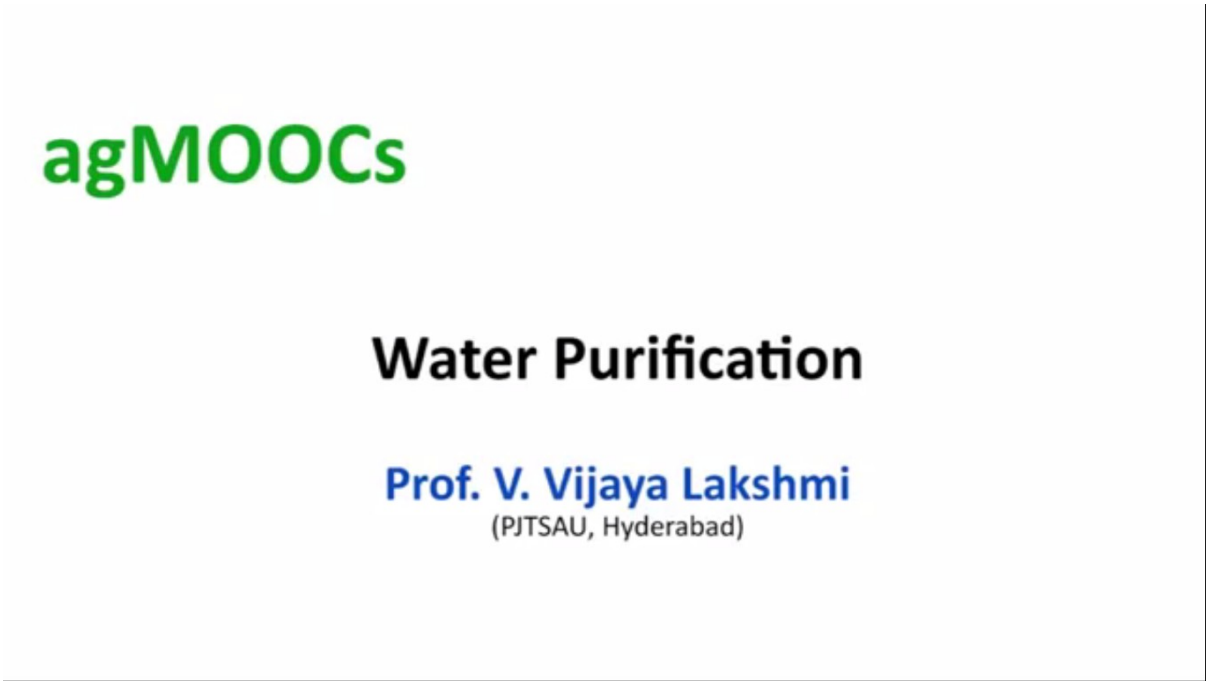
agMOOCs

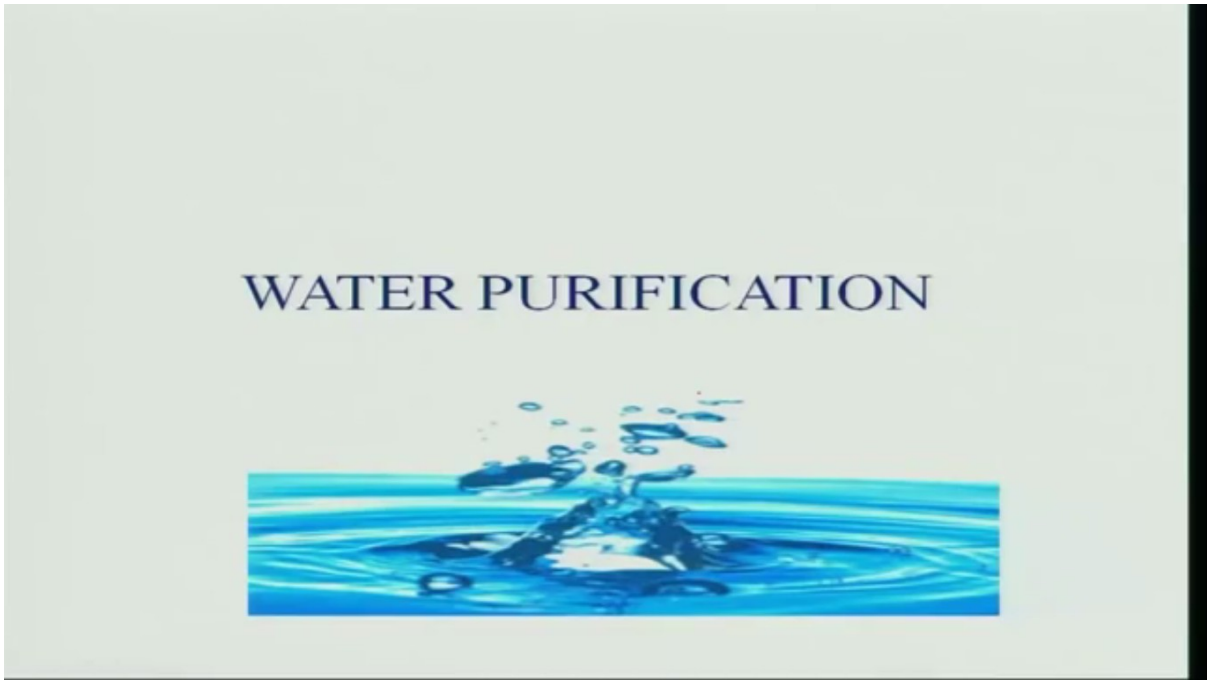
Water Purification

Prof. V. Vijaya Lakshmi
(PJTSAU, Hyderabad)

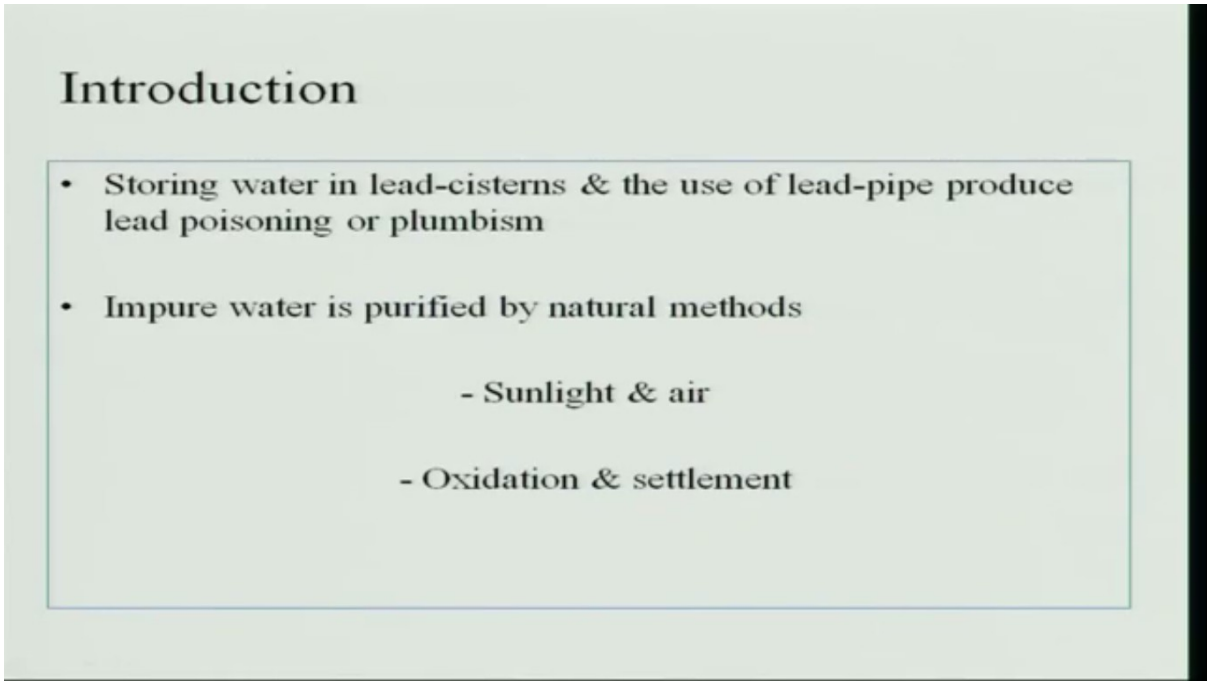


We have seen that the -- in the sanitation part of the food, portable water is very important. And we have been telling that you have to use pure water, clean water, and very good water so that because most of the waterborne infections are passed through water. So let us see how it can be purified.

(Refer Slide Time: 00:22)



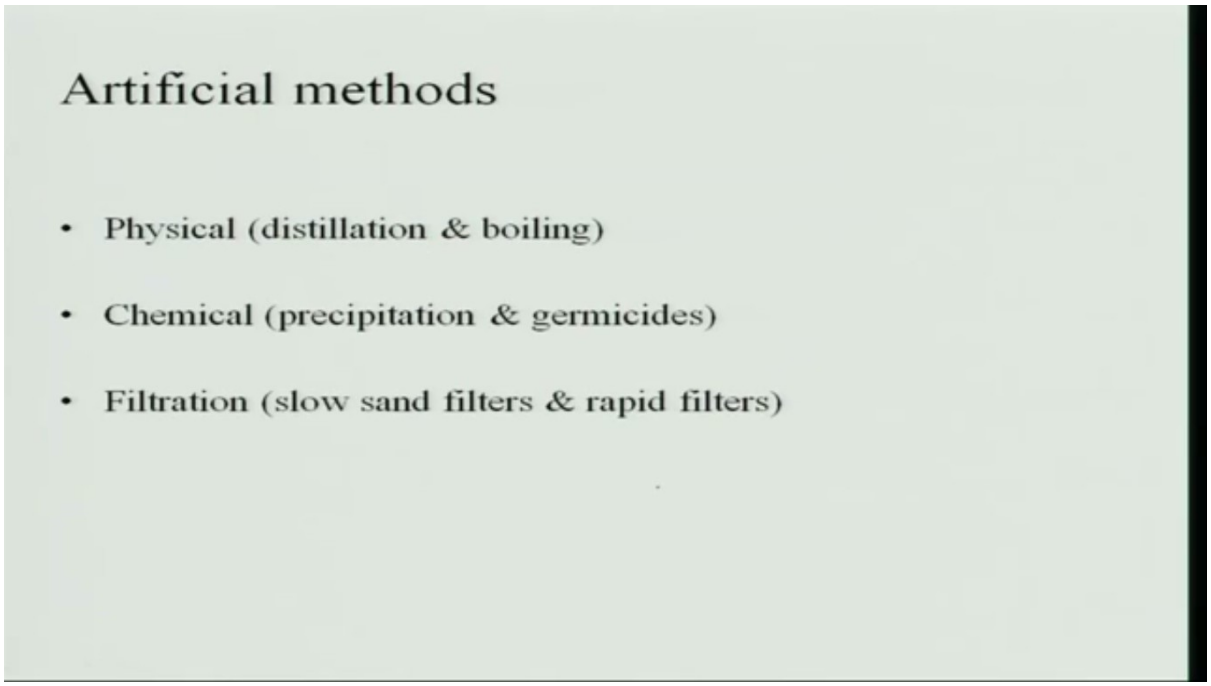
(Refer Slide Time: 00:24)



Storing water in lead-containers. I mean, water is always got through the lead pipes. So these produce a disease called lead poisoning or a plumbism. Plumbism is the lead poisoning that is caused because of water.

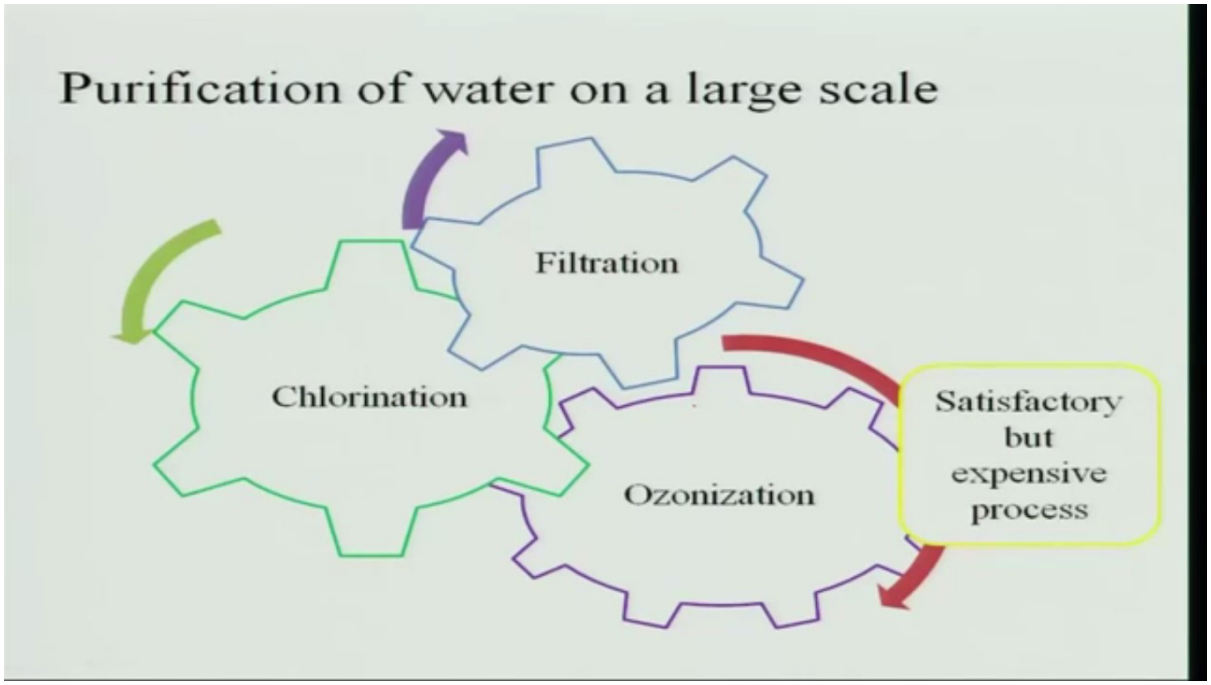
Now impure water is purified by natural methods. Generally, the water that is present in the ponds and the rivers is clean because of sunlight and air where oxidation and settlement occurs.

(Refer Slide Time: 00:54)



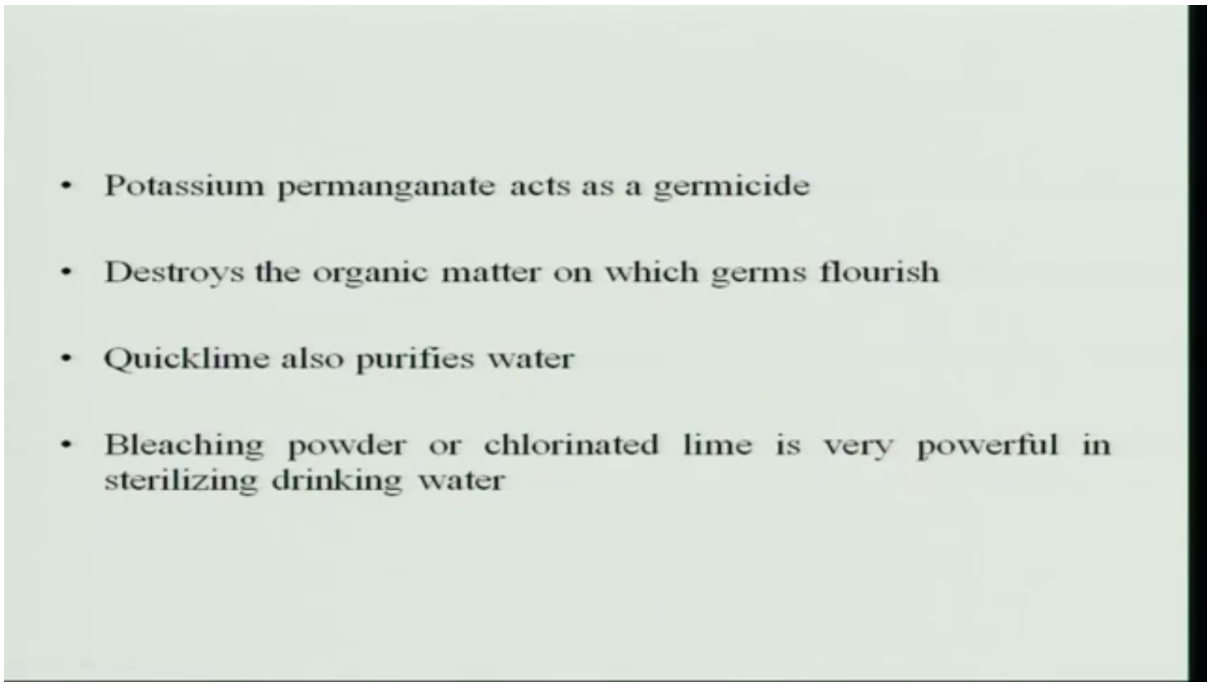
Then artificial methods of purification of water are one is physical methods, which we follow at home, that is boiling, distillation etc., and chemical methods by precipitation and using some germicides, and filtration we have two methods, that is slow sand filter and rapid sand filter.

(Refer Slide Time: 01:16)



Now purification on a large scale is done by three ways. One is by filtration, then ozonization where oxidation will occur, and then chlorination. So, but this is a very satisfactory process because you get a very pure water, but at the same time it is an expensive process. Therefore, it cannot be followed.

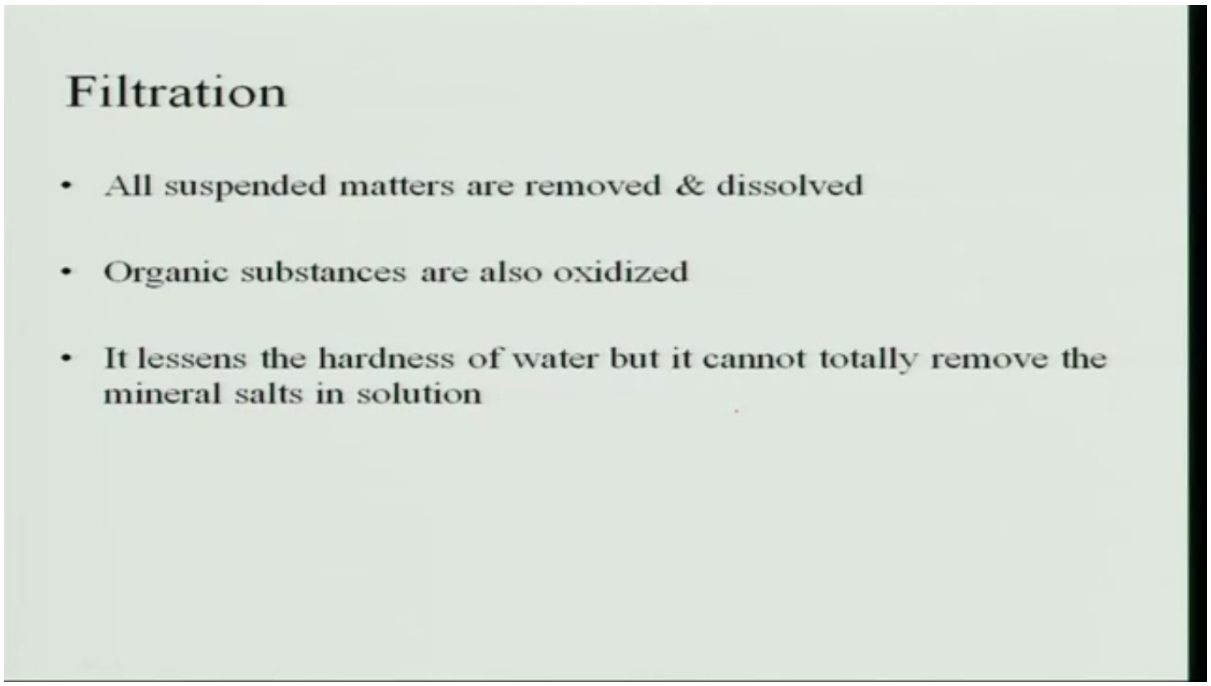
(Refer Slide Time: 01:40)



Now Potassium permanganate acts as a germicide. If you add Potassium permanganate to water and leave it for two or three days, then the water becomes free of germs, and it destroys the organic matter on which the germs flourish.

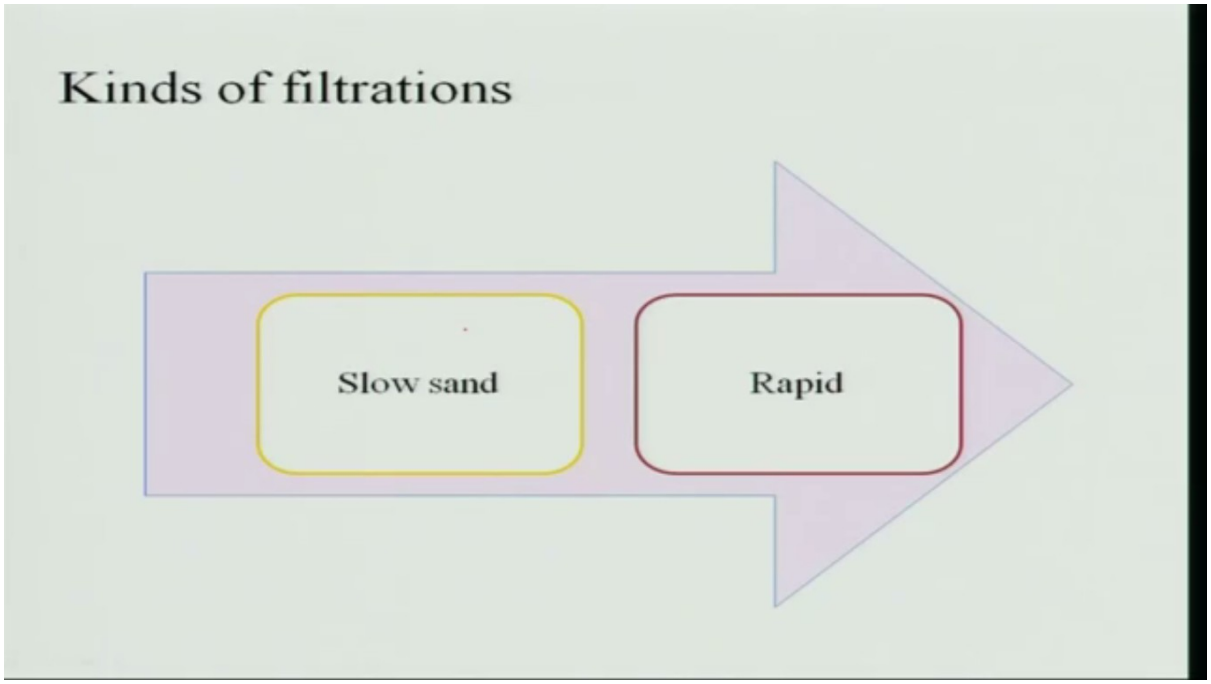
Then quicklime is another material which can be used for purification of water, and bleaching powder or chlorinated lime, it's a very powerful agent for sterilizing drinking water.

(Refer Slide Time: 02:12)



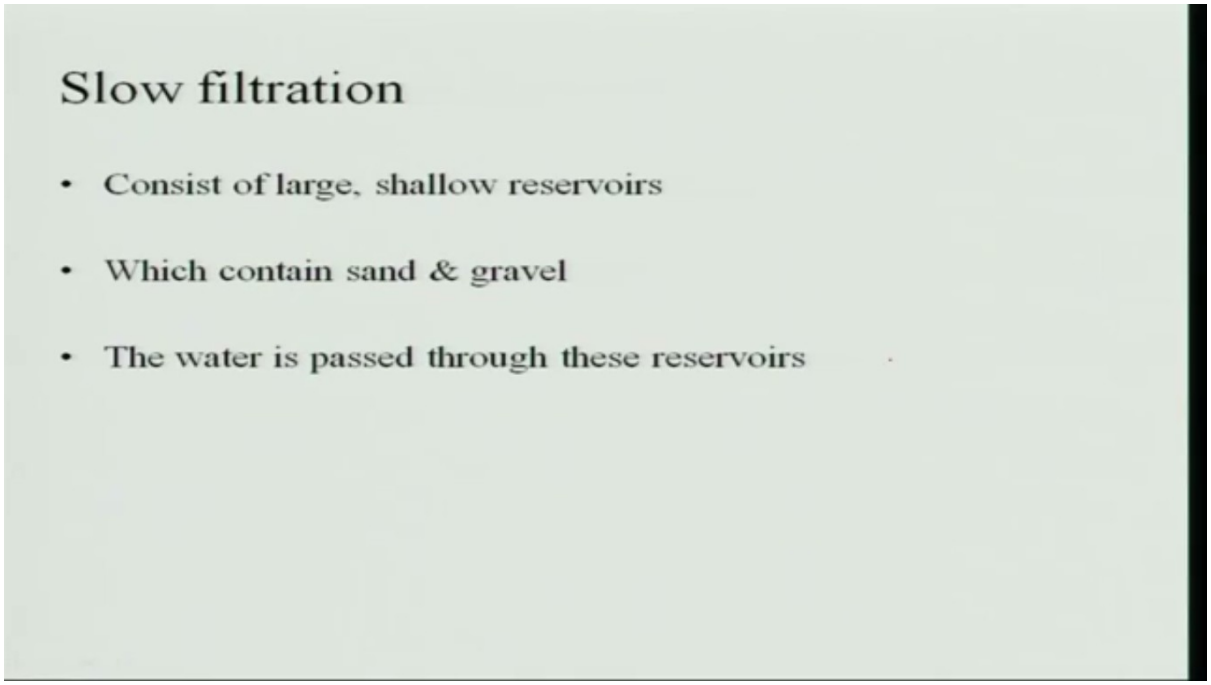
Now filtration is one of the method of purification of water. Here when we filter the water, all the suspended matters that are present in the water are removed and dissolved. So organic substances are also oxidized, and it also lessens the hardness of water, but total hardness cannot be removed, because hardness is created because of the mineral salts that are present in water.

(Refer Slide Time: 02:41)



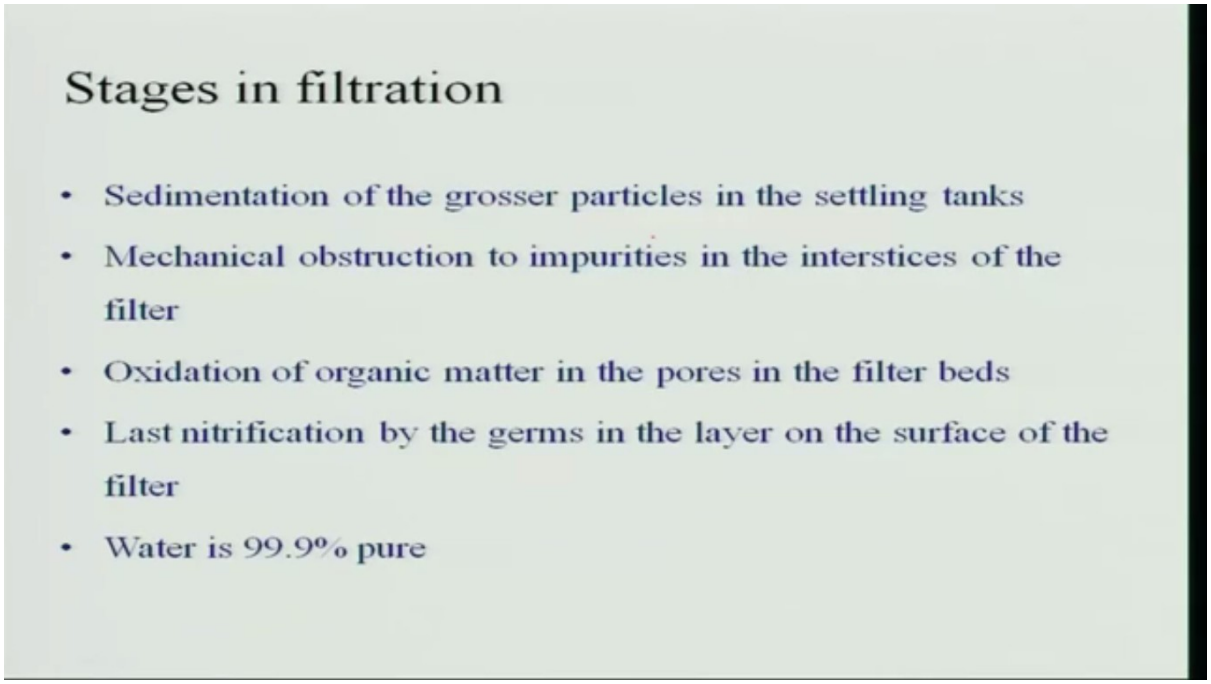
Now we have two kinds of filtration. One is the slow sand filtration and the rapid sand filtration.

(Refer Slide Time: 02:50)



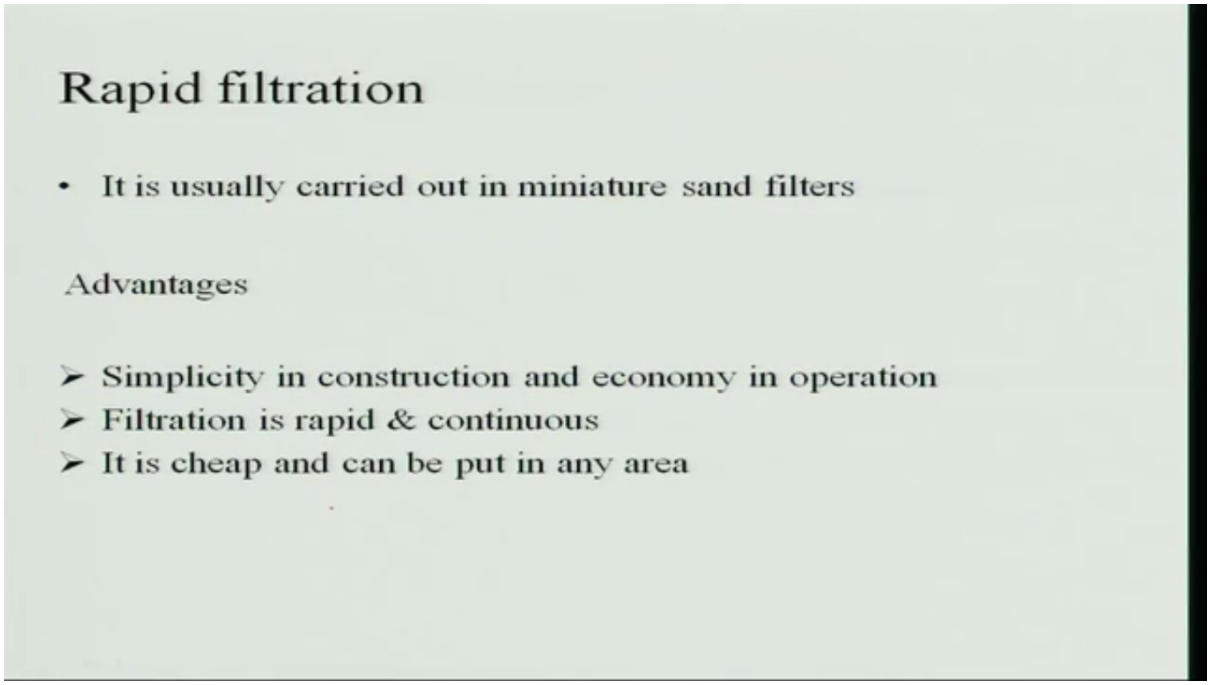
So slow filtration is it consists of large, shallow reservoirs. So this contains layers of sand and gravel, and water is passed through these reservoirs.

(Refer Slide Time: 03:03)



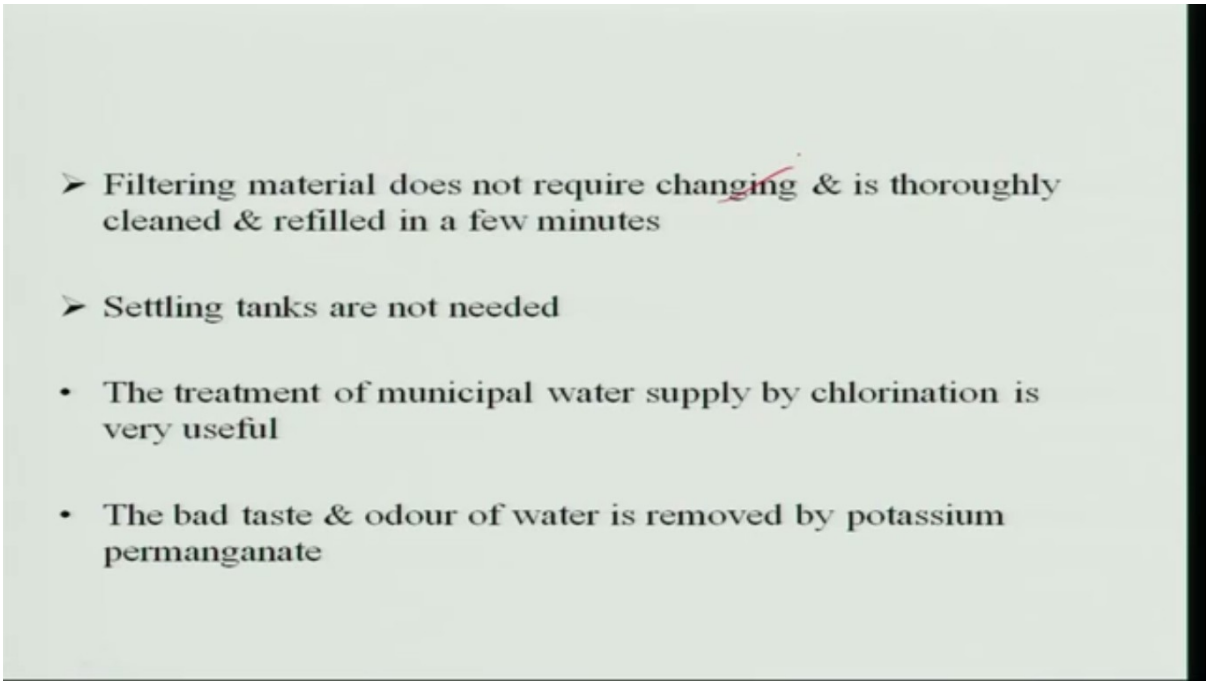
So because of the water that is passed through the reservoirs, there is sedimentation of the grosser particles on the settling tanks. Then mechanical obstruction of impurities and other substances are filtered, and oxidation of organic matter in the pores of the filter bed occurs. Then nitrification by the germs in the layer and on the surface of filter occurs. So in this kind of water filtration, water becomes 99.9% free of bacteria.

(Refer Slide Time: 03:39)



Then rapid filtration, it is used to carry out in miniature sand filters. So advantages is it is simple in construction, the operation is economical, then the filtration is rapid and continuous. You get pure water very fast, and it is cheap and can be put in any area, because for slow sand filters, you will require large areas to make the sand beds.

(Refer Slide Time: 04:07)



Then filtering material does not require changing and it is thoroughly cleaned, refilled in few minutes. Then settling tanks are not needed. And the treatment of all the municipal water supply is done by chlorification and which is very useful to clear the water. The bad taste and odour of water is removed by using potassium permanganate.

(Refer Slide Time: 04:33)

And domestic filtration also is done by the -- using the different filters. One is the Pasture-chambered filter, and Berkfeld filter. These two are very effective in using the equipment for filtering the water and making the water very clear. And this is a useful method for using the portable water. Instead of drinking the water directly from the river or from the whatever source of water, it is better to filter them or if nothing is available, boiling of water is also makes it clear of impurities. So boiling and leaving it for settling will give you pure water for drinking.

So this is how water is purified in many ways, and in villages when you see and also in the towns, we have large beds of sand filters which where the water is filtered slowly and you get a very pure water, but you have the cleaning process of the sand filter is very difficult. Therefore, rapid sand filters are very useful and they are used to get water very fast.

Thank you.