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**INTRODUCTION**

**Need for water**

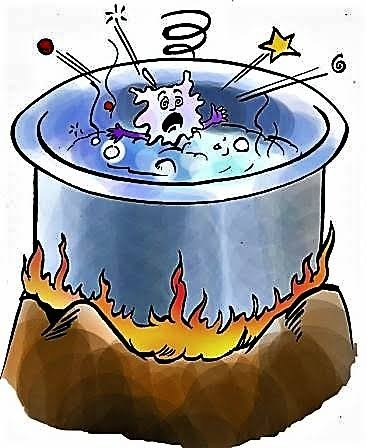
Water is an important and essential ingredient in our quest for survival on this planet. It is very essential for carrying out various metabolic processes in our body and also to carry out hemoglobin throughout the body.

In order to fulfill a huge demand of water, it needs to be Purified and supplied in an orderly and systematic way.

But with the increasing world population, the demand for drinking water has also increased dramatically and therefore it is very essential to identify resources of water from which can use water for drinking purpose. Many available resources of water do not have it in drinkable form. Either the water contains excess of calcium or magnesium salts or any other organic impurity or it simply contains foreign particles which make it unfit and unsafe for drinking

**STERILIZATION OF DISINFECTIONS OF**

**WATER**



* The process of killing the harmful germs and bacteria is known as sterilization of disinfection of water.
* These bacteria causes disease like cholera, thyroid etc.

**Purification of water**

These are many methods for the purification of water. Some of them are

* Boiling
* Filtration
* Bleaching powder treatment

Boiling is perhaps the most commonly used water purification technique in use today. While in normal households it is an efficient technique; it cannot be used for industrial and large scale purpose. It is because in normal households, the water to be purified is very small in quantity and hence the water loss due to evaporation is almost negligible. But in industrial or large scale purification of water the water loss due to evaporation will be quite high and the amount of purified water obtained will be very less

Filtration is also used for removing foreign particles from water. One major drawback of this purification process is that it cannot be used for removing foreign chemicals and impurities that are miscible of water.

**THEORY**

**PREPARATION OF BLEACHING POWDER:-**

It is prepared by either calcium process or sodium process. Calcium process: calcium hypochlorite, also known as chloride of Lime, is made by reacting chlorine with calcium hydroxide.

**2Ca(OH)2 + 2Cl2 → Ca(CH)2 + CaCl2 + 2H2O**

Sodium process: calcium hypochlorite is made by reacting chlorine with sodium hydroxide:

2Ca(OH)2 + 3Cl2  + 2NaOH

→Ca(OCl)2 + CaCl2 + 2H2O +NaCl

Bleaching powder is actually a mixture of calcium

Hypochlorite Ca(OCl)2 and the basic chloride CaCl2 ,

2Ca(OH)2 , H2O with some slaked lime, Ca(OH)2

**EXPERIMENT:-**

**AIM:-**

To determine the dosage of the bleaching powder required for sterilization or disinfection of different sample of water.

**REQUIREMENTS:-**

Burette, titration flask,100 ml graduated cylinder, 250 ml measuring flask, weight box, glazed tile, glass wool. Bleaching powder, glass wool, 0.1 N

Na2S2O3 solution, 10% KI solution, different samples of water, starch solution.

**PRE-REQUISITE KNOWLEDGE:-**

* A known mass of the given sample of bleaching powder is dissolved in water to prepare a solution of known concentration. This solution contains dissolved chlorine, Liberated by the action of bleaching powder with water.

**CaCl2 + H2O→ Ca(OH)2 + Cl2**

* The amount of chlorine present in the above solution is determined by treating a known concentration. This solution with excess of 10% potassium iodide solution, when equivalent amount of iodine is liberated
* The iodine, thus liberated is then estimated by titrating it against a standard solution of sodium thiosulphate, using starch solution as indicator.

**Cl2 + 2KI → 2KCl + I2**

**I2 + 2Na2S2O3 → 2NaI + Na2S4O6**

* A known volume of one of the given samples of water is treated with a known volume of bleaching powder solution. The amount of residual chlorine is determined by adding excess potassium iodide solution and then titrating against standard sodium thiosulphate solution.
* From the readings in 2 and 3, then amount of chlorine and hence bleaching powder required for the disinfection of a given volume of the given sample of water can be calculated.

**PROCEDURE:-**

* Preparation of bleaching powder solution. Weigh accurately 2.59 of the given sample of bleaching powder and transfer it to a 250ml conical flask. Add about 100-150ml of distilled water. Stopper the flask and shake it vigorously. The suspension thus obtained is filtered through glass wool and the filtrate is diluted with water (in a measuring flask) to make the volume 250ml. The solution obtained is 1% bleaching powder solution.
* Take 20ml of bleaching powder solution in a stoppered conical flask and add it to 20ml of 10% KI solution. Stopper the flask and shake it vigorously. Titrate this solution against 0.1 N Na2S2O3 solution taken in the burette. When the solution in the conical flask becomes light yellow in colour, add about 2ml starch solution. The solution now becomes blue in colour. Continue titrating till the blue colour just disappears. Repeat the titration to get a set of three concordant readings.
* Take 100ml of the water sample in a 250ml stoppered conical flask and add it to 10ml of bleaching powder solution. Then add 20ml of KI solution and stopper the flask. Shake vigorously and titrate against 0.1N Na2S2O3 solution using starch solution as indicator as described in step 2.
* Repeat the step 3 with other sample of water and record the observations.

**OBSERVATION**

Burette solution: sodium thiosulphate

Titrated solution: 20ml (bleaching powder solution) +20ml KI +100ml water sample)

Indicator: Starch

End point: Blue colour to colourless solution

Titration: 1

* Volume of distilled water taken 100ml
* Volume of bleaching powder sol. taken 20ml
* Volume of KI solution added 20ml

Burette reading:

|  |  |  |  |
| --- | --- | --- | --- |
| S. no | Initial  (in ml) | Final  (in ml) | Final vol. of o.1N Na2S2O3  Sol. used (in ml) |
| 1. | 0.0 | 6.5 | 6.5 |
| 2. | 6.50 | 13.0 | 6.5 |

Concordant reading:6.5ml

**Titration:2**

* Volume of water sample 1 taken 100ml
* Volume of bleaching powder sol. Added 20ml
* Volume of KI solution added 20ml

Burette reading:

|  |  |  |  |
| --- | --- | --- | --- |
| S. no | Initial (in ml) | Final  (in ml) | Final vol. of 0.2N Na2S2O3 Sol. used (in ml) |
| 1. | 0.0 | 5.8 | 5.8 |
| 2. | 5.8 | 11.6 | 5.8 |

Concordant reading:5.8ml

**Result:-**

Amount of the given sample of bleaching powder required to disinfect one liter of water.

Sample 1= 0.215gm

Sample 2= 1.077gm

Thus we get amount of required for disinfection and if bleaching powder is taken less than this amount water will remain impure and if it taken in excess than this will also be harmful as it will contain chlorine.

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