

DISINFECTION

- The Purpose of disinfection drinking water is to destroy organisms that cause diseases in human beings.
- Most pathogenic bacteria are removed from water in varying degrees during the different treatment processes.
(Coagulation, Sedimentation etc)

Suitability of the disinfectant

1. Disinfectant shall be effective in killing the bacteria which cause disease
2. Should be cheap and easily available
3. Should be safe to handle and easy to apply
4. It should have ability to persist in residual state

Disinfection →

The process of killing of pathogenic bacteria from water is called disinfection.

Disinfectant →

Chemical which is used for disinfection is called disinfectant.

Method of disinfection

1. Boiling

2. High pH (Excess lime)

3. Silver treatment

4. Potassium permanganate ($KMnO_4$)

5. Chlorination

6. Ozonation

7. UV radiation

1. Boiling \Rightarrow
- water shall be boiled at least for 3 to 4 min.
 - most effective.
 - Kill bacterial and viruses
 - it is very costly for large scale used.
 - it is used only for domestic purposes

2. High pH (Excess lime) \rightarrow

- Lime can destroy bacteria at high pH.
- higher removal of viruses was obtained with higher pH
- optimum pH in the range of 11.2 to 11.3
- Contact time 1.5 to 3 hr

3. Potassium Permanganate ($KMnO_4$) →

- it is commonly used in rural areas
- Purification of open well water supplies
- $KMnO_4$ is dissolved in bucket and added in well water
- water should not be used during first 48 hr. after $KMnO_4$ addition.

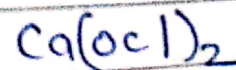
4. chlorination →

- effective at low concentration
- cheap
- forms residual (Residual) if applied in sufficient dosages.

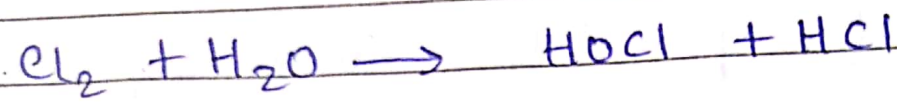
Form of application of chlorine

Gas (most effective)

Hypochlorite
(Bleaching powder)

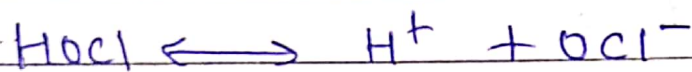


- when Cl_2 is added in water, it react to water and forms following



$\text{HOCl} \rightarrow$ Hypochlorous acid

$\text{HCl} \rightarrow$ Hydrochloric acid



(Hypochlorous acid dissociate to hypochlorite)

- Hypochlorous acid is more effective disinfectant than hypochlorite ions.

Now,

chlorine will appear in water in three forms

(i) Elemental chlorine (Cl_2)

(ii) HOCl

(iii) OCl^-