# Pollution lab 8

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# Free Chlorine Measurement part 1

# Background information:

- Before water is used as a safe and reliable source for drinking water, it must be properly treated. Since water is a universal solvent it comes in contact with several different pathogens, some of which are potentially lethal, and inactivation is accomplished through chemical disinfection and mechanical filtration treatment this treatment consists of coarse filtration to remove large objects and per-treatment which includes disinfection using chlorine or ozone

# Background information:

- One of the first known uses of chlorine for water disinfection was in 1850 after an outbreak of cholera in London. Chlorine was first used in the USA in 1908 as a chemical disinfectant of drinking water. And the powerful disinfectant attributes come from its ability to bond with and destroy the outer surfaces of bacteria and viruses.

# Background information:

- Today chlorine is added to water as chlorine gas ($Cl_2$) sodium hypochlorite ($NaClO$) or chlorine dioxide ($ClO_2$) in two treatment stages, primary and secondary disinfection. chlorine relatively cheap and has a broad spectrum germicidal potency in the primary disinfection stage of a drinking water plant only chlorine can provide a residual or persistence in water distribution system and protects against re-growth of microorganisms and prevent water-borne diseases

# Forms of chlorine in water:

- Chlorine interacts with drinking water; it proceeds through a series of chemical reaction which described below. when chlorine is added to water some of the on chlorine reacts first with organic materials and metals in the water and is not available for disinfection (this is called the chlorine demand of the water the remaining chlorine concentration after the chlorine demand is accounted for is called total chlorine.

# Forms of chlorine in water:

Total chlorine total chlorine has two main elements:

- 1- The combined chlorine which has reacted with nitrates and is unavailable for disinfection.
- 2-The free chorine which is the chlorine available to inactivate disease causing organisms, and thus a measure to determine the degree to water is drinkable.

# Forms of chlorine in water:

Chlorine kills bacteria though a simple chemical reaction. when chlorine solution is poured into water breaks down into many different chemicals including hypochlorous acid (HClO) and hypochlorite ion ($ClO^-$) the relative amount of each is dependent on the pH and the total of (HClO) and ($ClO^-$) is defined as free chlorine to accurately measure free chlorine concentration, temperature and pH value must be taken in to account.

# Forms of chlorine in water: