# Self-purification (Measurement of organic in water by BOD5 method)

The organic material in water present in dissolved from or in the form of suspend product .These organic compounds are work to consumption of oxygen as a result of its dissociation, of which influencing on the fish and other watering organisms and thus predispose the condition for anaerobic dissolution processes ; which result from it unwanted properties and exhaling a toxic gases like PH3 and bad odor gases like H2S , CH3 , NH3.

The self-purification for water play oriole in the nature ; The resultant from this nature process is partial or total dissolution for organic compounds by Bacteria and Fungi ; the result from these materials are non organic compounds that help in plants growth and nutrition ; which in it's role release oxygen as a result of photosynthesis process , that leads to gain it partially or totally in water. Without this nature process the most watering materials become pollutant .Increasing in organic materials will decrease or absence the oxygen in water.

Measurement of organic materials method depending on it's oxidation:

1. Chemical Oxygen Demand method
2. Bio chemical Oxygen Demand method.

Procedure:

1. Full the bottle with oxygen.
2. Follow steps of measuring dissolved oxygen in lab. ( Winkler method ).

3.A/ if the result of measuring oxygen in step 1&2 equal to ( D.O≥ 7 ) then take other sample and full it with same sample (water) then put it in an incubator in (20±1) degree for 5 days after that take the sample from the incubator and apply on it the same steps for measurement of oxygen ; after 5 days D0 is Known as D5

$$\mathbf{D._0 - D._5 = B0D_5\ mg/l}$$

B/ if the D.0 less than 7 (D.0 < 7) probable waste product or others.

Then start by dilution process according to the dilution proposal from the table.

| series | Sample type | dilution percentage |
|---|---|---|
| 1 | Very concentrated waste product | 0.1-1 frequency of dilution depend on the amount |
| 2 | Conjugate water& precipitate materials | 1-5 of organic material in the experiment |
| 3 | Partially oxidized waste product | 5-25 |
| 4 | River water | 25-100 |

•Dilute the sample to save enough oxygen for incubation process for 5 days.

Before dilution perform testing on distilled water that should be D. 0 ≥ 7. If the result equal or more than 7 perform dilution & if the result less than 7 pump the air to distilled water or shaking the distilled water, and then full the oxygen bottle & measure D.0 and after 5 day of incubation we measure D.5.

$$\text{BOD5 mg/l} = \frac{D.0 - D.5}{\text{Dilution rate}}$$

**Sample dilution**

A/ preparation of dilution water (distilled water)

The dilution process accomplished by adding distilled water according to the percentage of pervious table and should be evaluate the amount of dissolved oxygen in water ; if it is more than or equal to 7 then preform dilution process ; while if it is less than 7 ,

then fulling the distilled water by oxygen by 2 methods:-

1. Introducing the air-by-air compression tool.
2. By shaking: shake the glass bottle or plastic bottle that filled partially by distilled water.

B/ addition of micro scoping organisms.

Add some minute organisms to some sample like sterile sample or hot sample.

$$BOD_5\ mg/l = \frac{(A1 - A2) - (B1 - B2) * C}{\text{Dilution rate}}$$

Where as :

A1 = D.0 B1= D0 after adding bacteria

A2 = D.5 B2= D5 after adding bacteria

$$C = \frac{\text{Percentage of bacteria in diluted sample}}{\text{Percentage of bacteria in diluted water}}$$