Determination of Biological(Biochemical) Oxygen demand in water

BOD is the quantity of dissolved oxygen which is able to oxidize the organic components in the water with the assistance of microorganisms under defined experimental conditions. The rate of oxygen consumption in surface water is affected by a number of variables such as temperature, the presence of certain kinds of microorganisms and the type of organic and inorganic material in water, also Storm water runoff can contribute large amounts of BOD to surface water systems. The amount of dissolved oxygen directly affects BOD in surface waters. The greater BOD more rapidly oxygen is depleted, resulting in less oxygen available to higher forms of aquatic life. The high level of the BOD indicates that the water is polluted by the presence of greater organic matter (nutrient such as nitrogen and phosphorus).

BOD is important water quality parameter because it provides index to assess the effect discharge wastewater will have on receiving environment and it indicates strength of wastewater (more BOD meaning more waste in water).

Reagents:

Manganese sulfate, Alkali-iodide-azide, Concentrated sulfuric acid
Starch solution, Sodium thiosulfate.

Procedure

1.Carefully fill a 300-mL glass Winkler stoppered bottle with sample water.
2.Immediately add 1mL of manganese sulfate to the collection bottle by inserting the calibrated pipette just below the surface of the liquid.
3.Add 1 mL of alkali-iodide-azide reagent in the same manner.
4.Stopper the bottle with care to be sure no air is introduced. Mix the sample by inverting several times. Let the sample stand for 10 minutes.

5.Add 1 mL of concentrated sulfuric acid via a pipette held just above the surface of the sample. Carefully stopper and invert several times to dissolve the floc. At this point, the sample is "fixed" and can be stored for up to 8 hours if kept in a cool, dark place.

6.In a glass flask, titrate 201 mL of the sample with sodium thiosulfate to a pale straw color. Titrate by slowly dropping titrant solution from a calibrated pipette into the flask and continually stirring or swirling the sample water.

7.Add 1 mL of starch solution so a blue color forms.

8.Continue slowly titrating until the sample turns clear. As this experiment reaches the endpoint, it will take only one drop of the titrant to eliminate the blue color.

9.The concentration of dissolved oxygen in the sample is equivalent to the number of milliliters of titrant used. Each mL of sodium thiosulfate added in steps 6 and 8 equals 1 mg/L dissolved oxygen.

Dissolved oxygen was determined in initial for original sample and other sample from origin was kept in incubator for five days at 20 ± 10C. Results were expressed as mg BOD5l-1 by equation below:

BOD5 as mgl-1 = DO_0– DO_5as mg O_2l^{-1}

Where:BOD_5 = Five days Biological Oxygen Demand.

DO_0 = Dissolved Oxygen in the first time of the original sample.

DO_5 = Dissolved Oxygen after five days incubation.