



# Quantitative Measurement of Oxygen Level in Water during Immersion Activities

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**Abstract:** Dissolved oxygen level is determined in lake water which is utilized for idol immersion activities, there are three different areas in the lake for carrying out the immersion activities, sampling is been done from this lake to quantitatively estimate the level of oxygen in water before, during and post idol immersion activities as dissolved oxygen is required and must for living organisms (aquatic flora and fauna) to survive.

**Keywords:** Lake Water, Oxygen Level, Immersion Activities

## INTRODUCTION:

In water oxygen concentration depended biological processes of water bodies. Winkler procedure has been used for estimation of amount of DO [1,2,3].

Oxygen is allowed to react with iodide ion to form iodine which is then titrated with standard sodium thiosulphate solution. Fast quantitative reaction is ensured by addition of Mn (II) salt in strongly alkaline medium.

Oxygen is required by all plants and animals for breathing and living purpose. Oxygen is present in dissolved form in water. Aquatic animal uses gills and some other tissues for respiration mechanism. The concentration of DO is more in cold water i.e. in the winter season but DO level in water is low in warm water in summer season. Higher concentration of manure and fertilizer act as a nutrients and feeding the algae growth. Disintegration of compounds in water by microorganism consumes the DO. Therefore the level of DO get decreased. This indicate the organic pollution in water.

Standard DO level by Michigan is 7.0 mg/lit or higher for cold water stream, 5.0 mg/lit or higher for warm stream of water, 3.0 mg/lit or less level of DO kill the fish. Aquatic organism require oxygen to live. Water moves in their gills and other breathing tissue. DO in the form of microscopic bubbles transferred from water to their blood. Oxygen is needed by all macrophytes and all algae and for various chemical reaction which are important to proper functioning of lake. Production of oxygen takes place during photosynthesis and utilized during respiration and decomposition [1,4,5].

## BIOCHEMICAL OXYGEN DEMAND:

Organic matters like plant remains materials, dead plants, grass, leaves, sewage, manure or even food waste is present in the water body and they are decomposed by microorganism such as bacteria. The aerobic bacteria breakdown the organic matter and for their decomposition bacteria utilizes the dissolved oxygen from the water. Oxygen concentration used by microorganism to break the chemical compounds is called as Biochemical Oxygen Demand (BOD). If there is high amount of organic matter to be decomposed then there will be large number of microorganism. This microorganism then take greater amount of oxygen. Therefore BOD level will be high. When the organic waste is dispersed or consumed through the water, BOD level will begin to decrease. BOD test also estimate the level of different ions like ferrous and sulphide ion. Reduced form of nitrogen can be oxidized by BOD unless their oxidation is prevented by inhibitor [4].

## METHODOLOGY:

Lake water sampling is done from three different sites of the lake represented by S1, S2 and S3, the site which is used to carry out immersion activities. Varal Devi Lake located in Bhiwandi city, District Thane, State Maharashtra is selected for sampling.

## BIOCHEMICAL OXYGEN DEMAND:

Biological oxygen demand is determined by Wrinkler's method using  $K_2Cr_2O_7$  as titrant .Dissolved oxygen is determined immediately after lake water sampling then it is determined after five days of incubation , difference between this two valve is used for calculation of Biological Oxygen Demand[4].

**Table.1.1.** Amount of Dissolved Oxygen ( $DO_1$ )

Periods	Dissolved Oxygen( $DO_1$ ) in ppm		
	S1	S2	S3
Before Immersion	$2.242 \pm 7.071 \times 10^{-4}$	$2.242 \pm 0.000$	$2.242 \pm 0.000$
During Immersion	$1.816 \pm 0.01077$	$1.829 \pm 0.01343$	$1.798 \pm 0.0103$
Post Immersion	$1.067 \pm 0.000$	$1.067 \pm 7.071 \times 10^{-4}$	$1.067 \pm 0.000$

**Table.1.2.** Amount of Dissolved Oxygen ( $DO_5$ )

Periods	Dissolved Oxygen( $DO_5$ ) in ppm		
	S1	S2	S3
Before Immersion	$2.167 \pm 0.000$	$2.167 \pm 0.000$	$2.167 \pm 0.000$
During Immersion	$1.579 \pm 0.0494$	$1.551 \pm 0.0488$	$1.608 \pm 0.000$
Post Immersion	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$

**Table.1.3.** Amount of BOD

Periods	BOD in ppm		
	S1	S2	S3
Before Immersion	0.075	0.075	0.075
During Immersion	0.237	0.278	0.19
Post Immersion	1.067	1.067	1.067

RESULT AND DISCUSSION:

Biological Oxygen Demand (BOD)

Table.1.4. Amount of BOD

Periods	Total BOD $\mu\text{g/ml}$			WHO $\mu\text{g/ml}$	USPH $\mu\text{g/ml}$
	S1	S2	S3		
Before Immersion	0.075	0.075	0.075	6.0	5.0
During Immersion	0.237	0.278	0.19		
Post Immersion	1.067	1.067	1.067		

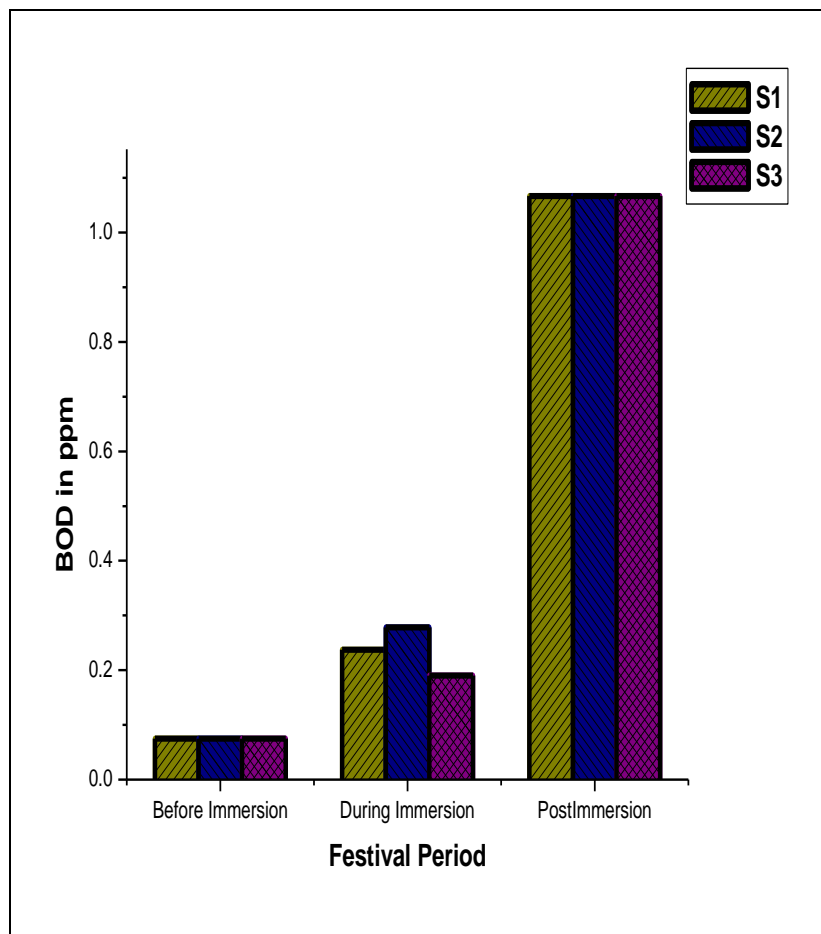


Figure.1. Graph of BOD in ppm Vs Festival Periods

CONCLUSION:

BOD values varied significantly among the ponds and lakes. The highest value after immersion activity is 1.067ppm at all three stations of sample collection of lake water and the least value is 0.075 mg/l. All these values lie below the FEPA standard( Federal Environmental Protection Agency,Nigeria,1919) of 30 mg/l. The permissible limits set by APHA (1992)



is 4 mg/l whereas the permissible limits set by BIS is 3.0ppm. This is significantly different from the highest value of 1.067 mg/l obtained from this study. Accumulation of low BOD result in organism being stressed and suffocated (APHA,1992)

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