



A study on dissolved oxygen content of Karadkhed dam water, in Nanded District, Maharashtra, India

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ABSTRACT

The present study was conducted to assess the Physico-chemical Parameters of Karadkhed dam water of Deglur Taluka in Nanded district Maharashtra, India, during the year June 2016 to May 2017. Analysis was performed on 03 different parameters. The monthly Variation in the physical and chemical parameters such as Dissolved oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, were investigated. All the parameter was beyond on the permissible limits. Aquatic ecosystem monitoring has been carried out in India based on either chemical or biological analysis. The result revealed that there was significant seasonal variations in some physico-chemical parameters and most of the parameters were in the normal range and indicated better qualify of dam water.

Key word : Karadkhed dam, Dissolved oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand.

INTRODUCTION

Oxygen saturation is a relative measure of the concentration of oxygen that is dissolved or carried in a given medium as a proportion of the maximum concentration that can be dissolved in that medium. It can be measured with a dissolved oxygen probe such as an oxygen sensor or an optode in liquid media, usually water (Amankwaab *et al.*, 2014). The standard unit of oxygen saturation is percent (%). The Dissolved Oxygen (DO) is one of the most important indicators of water quality. It is essential for the survival of fish and other aquatic organisms (Abery *et al.*, 2015). Oxygen dissolves in surface water due to the aerating action of winds. Oxygen is also introduced in to the water as a byproduct of aquatic plant photosynthesis (Das *et al.* 2012, Pawar, 2017a, 2017b, 2018a, 2018b, 2018c). Dissolved oxygen analysis measures the amount of gaseous oxygen (O₂) dissolved in an aqueous solution. Oxygen gets in to water by diffusion from the surrounding air, by aeration and as a waste product of photosynthesis (Caol *et al.*, 2007, Boyd, 2004, 2001). The oxygen content of water will decrease when there is an increase in nutrients and organic materials from industrial wastewater, sewage discharges and runoff from the land (Barik *et al.*, 2001, Pawar, 2017a, 2017b, 2018a, 2018b, 2018c).

Uses such as farming produce more nutrients in runoff than native forest (Gorlach *et al.* 2013, Pawar, 2017c, 2017d, 2018b, 2018c). First the solubility of oxygen decreases as temperature increases. Biological oxygen Demand (BOD) is a measure of the oxygen used by microorganisms to decompose this waste when BOD levels are high, dissolved oxygen (DO) levels decrease because the oxygen that is available in the water is being consumed by the bacteria.

Oxygen gas dissolved in water. The plants and animals which live in water use the oxygen dissolved in water for respiration. Thus, oxygen gas dissolved in water is very important for the survival of animals and plants that live in water (Pawar, 2017a, 2017b, 2017a, 2017b, 2018a, 2018b, 2018c). The present investigation was carried out to study the oxygen content of Karadkhed Dam water. The DO, BOD and COD and their co-efficient of correlation were studied. Many researchers have done studies on Physico-Chemical and Biological Characters of River and Dam Water (Amankwaab *et al.* 2014, Abery *et al.* 2015, APHA, 2012, Das *et al.* 2012, Pawar, 2017a, 2017b, 2017a, 2017b, 2018a, 2018b, 2018c, Daniel *et al.* 2005, Caol *et al.*, 2007, Boyd, 2004, 2001, Barik *et al.* 2001, Demir *et al.* 2001, Garg *et al.* 2010, Gorlach *et al.* 2013, Karmatak, 2014.

The present study was to assess the ecosystem of Karadkhed dam Taluka Deglur in Nanded District Maharashtra by estimating the various physico-chemical parameters like Dissolved oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand.

MATERIAL AND METHODS

The water samples were collected for physico-chemical analysis from dam. At the regular intervals of one month a period of one year from June 2016 to May 2017. The samples are well mixed and stored in two liter plastic cans. Sample collection was usually completed during morning hours between 6:00 a.m. to 9:00 a.m. every for further analysis. The parameters were estimated in the laboratory. Standard methods as prescribed APHA (2012), were followed for examination of various Physical and Chemical Parameters of water.

RESULT AND DISCUSSION

The seasonal variation in physico-chemical parameters are given table respectively.

Dissolved Oxygen:-

The dissolved oxygen was varied from 3.7 to 9.8 mg/l. during study. The dissolved oxygen was found to be maximum in the month of December and minimum in the month of May. Dissolved oxygen in water at a given temperature depends on factors like temperature of water. The dissolved oxygen almost all plants and animals need for respiration. Dissolved Oxygen is an index of physical and biological processes going on in water. It is essential to maintain the metabolic processes responsible for the production of energy for reproduction and growth. DO content shows the ability of the stream to purify itself through biological processes. Higher values of DO indicate organic pollution. When the DO level is below 2 ppm, the fishes disappears and the environment shifts towards anaerobic species. DO is an important parameter in aquatic system. Bahura (1998) reported an inverse relationship of DO with temperature. While comparing the DO data of the present study with the earlier ones by the above authors, DO has inverse relationship not only with temperature but also with free CO₂.

Biochemical Oxygen Demand :-

The Biochemical Oxygen Demand was varied from 3.19 to 22.61 mg/l. During study. The Biochemical Oxygen Demand was found to be maximum in the month of December and minimum in the month of May. The Biochemical Oxygen Demand in water at a given temperature depends on factors like temperature of water. Due to its rapidity in determination COD is important in the management and design of treatment plant. COD is more scientific than BOD. The maximum values during summer months might be due to the increase in temperature while low values during winter month might be due to the low temperature that may retards the rate of reproduction of phytoplankton. DO and BOD are inversely related to each other. The BOD has high degree of positive correlation with COD at ABC Station, while fairly high degree of positive correlation with COD at D Station, observed the positive correlation between BOD and COD. The biodegradation of organic materials exerts oxygen tension in the water and increase the biochemical oxygen demand (Abida 2008).

Chemical Oxygen Demand :-

The Chemical Oxygen Demand was varied from 62 to 148 mg/l during study. The Chemical Oxygen Demand was found to be maximum in the month of December and minimum in the month of May. The Chemical Oxygen Demand in water at a give temperature depends

Table 1: A Study on Dissolved Oxygen Content of Karadkhed Dam Water during the year 2016-2017.

Period	Dissolved oxygen mg/l				Biochemical Oxygen Demand mg/l				Chemical Oxygen Demand mg/l			
	A	B	C	D	A	B	C	D	A	B	C	D
June	4.2	4.1	3.9	3.8	20.13	20.33	20.61	20.82	133	137	138	135
July	4.8	4.3	4.7	4.6	18.05	18.35	18.45	18.71	121	125	126	130
August	5.9	5.7	5.6	5.4	16.09	16.15	16.41	16.68	110	122	128	118
September	6.4	6.5	6.8	7.1	13.12	13.60	13.85	13.95	93	96	99	102
October	7.3	7.1	7.5	7.9	10.21	10.24	10.56	10.91	82	86	89	84
November	8.4	8.6	7.9	7.7	5.17	6.09	6.21	7.11	71	73	78	75
December	9.8	9.7	9.5	9.4	3.19	3.40	3.65	3.75	62	64	66	68
January	8.4	8.6	8.9	9.2	5.17	5.60	5.85	6.10	70	72	78	81
February	7.5	7.7	7.9	8.1	8.15	8.65	8.90	9.10	80	84	90	86
March	6.8	6.7	7.2	7.3	13.13	14.21	13.70	13.95	99	103	105	110
April	4.6	4.8	5.2	5.5	17.11	18.23	19.02	18.41	117	122	131	128
May	3.7	3.9	4.1	4.3	22.41	22.49	22.53	22.61	140	143	148	142

on factors like temperature water. The high values of COD may be due to the high temperature and rapid evaporation of water. COD is defined as the oxygen required by the organic substances in water system to oxidize them by a strong oxidizing agent. It is an index of organic content of water. It is also used in determining the degree of pollution in water and its self-purification capacity. Due to its rapidity in determination, COD is important in the management and design of treatment plant. COD is more scientific than BOD. The Chemical Oxygen Demand determines the amount of oxygen required for chemical oxidation of organic matter using a strong chemical oxidant, such as potassium under reflux conditions. Chemical Oxygen Demand is an indicator of organic in the water, usually used in conjunction with biological Oxygen Demand. Thus the COD is a reliable parameter for judging the extent of pollution in water. The measure of COD determines the quantities of organic matter found in water. This makes COD useful as an indicator of organic pollution in surface water (King *et al.* 2003 and faith 2006).

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