



## ANALYSIS OF WATER QUALITY USING PHYSICO-CHEMICAL PARAMETERS OF BELAR LAKE, DISTRICT SOLAPUR, (M.S.) INDIA.

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**ABSTRACT** Quality water is defined in terms of the chemical, physical and biological contents of water. Different guiding principle regarding water quality provides essential scientific information about water quality parameters and also ecologically applicable toxicological threshold standards to care for exact water uses. The present study deals with the study of water quality of Belar lake. The Belar lake is situated near the Boramani village on Pune-Hyderabad national highway, in south Solapur taluka of Solapur district. The selective physicochemical parameters such as water temperature, pH, DO, TDS and total hardness were analysed during the year 2016-17. These parameters were showed variation according to the seasonal alteration. It was also seen that water quality of Belar lake was affected due to human interference, so it is urgent need to develop awareness among the people to maintain and conserve the fresh water body.

**KEYWORDS** : Physico chemical parameters, Belar lake, variations, water quality, analysis.

**INTRODUCTION:**

Water is the most important resource for all kinds of life on Earth. It can be adversely affected by both qualitatively and quantitatively by all kinds of human activities on land, air and water. The increasing industrialization, urbanization and developmental activities and consequent pollution of water have brought a variable water crisis.

In India, rivers, estuaries, lakes and ponds are the major fresh water resource. The lakes are usually not having a huge area; they are severally distorted by environmental changes and anthropogenic activities. Water quality is defined in terms of the chemical, physical and biological contents of water. Different guiding principle regarding water quality provides essential scientific information about water quality parameters and also ecologically applicable toxicological threshold standards to care for exact water uses. Physico-chemical parameters of water bodies depend upon several factors such as place of water body, seasonal variations and localized human interference. Djukic *et al.*, (1994) have used the physicochemical properties of water to assess the water quality of Tisze reservoir. In present study selected sites of Belar lake are help to assess the water quality. The analysis of main physicochemical parameters such as water temperature, pH, DO, Total hardness, Total dissolved solid and nitrate was done during the year 2016-17. For the analysis of water quality there is a need to measure various water quality parameters routinely (Mulla 2007, Draper 1981). (Basavaraja, Simpi *et al.*, 2011) analyzed Water Quality Using Physico-Chemical Parameters Hosahalli Tank in Shimoga District, Karnataka, India.

Sr. No.	Parameter	WHO limits
1	pH	6.5-9.2
2	Temperature	40°C
4	Hardness (mg/l)	100-500
5	Alkalinity (mg/l)	250
6	DO (mg/l)	5-7

**Table 1: WHO limits of different physico-chemical parameters of potable water**

**MATERIAL AND METHODS:**

The Belar lake is situated near the Boramani village on Pune-Hyderabad national highway in south Solapur taluka of Solapur district. The Belar lake is principal freshwater body located near Boramani village of tahsil south Solapur Dist: Solapur in Maharashtra. It is situated 479 meters above sea level at 17°43'46" N latitude & 76° 2'38" E longitudes and the area of the lake is about 18 acre. Earlier the water from Belar lake is utilized for the purpose of drinking, irrigation and fishing purposes.

**Figure no.1: Belar lake**

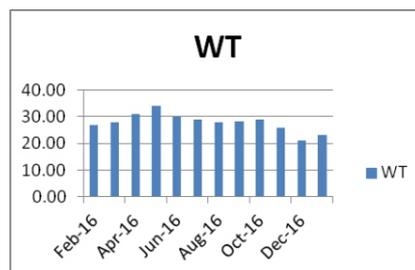
The water samples were collected early in the morning session 07.00 a.m. to 09.00 a.m. in every month for the period of 12 months i.e. from February-2016 to January-2017. The water samples were collected in two liter plastic bottles. The water temperature and pH was measured at the site. For estimation of dissolved oxygen, the oxygen was fixed at the site itself by adding Winkler's reagents. The standard methods for the investigation of water quality were referred from American Public Health Association (APHA, 2005). Standard method for the examination of water and waste water, 21st edition and Trivedi and Goel (1986).

**RESULTS AND DISCUSSION:**

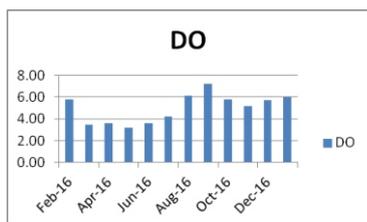
The physicochemical parameters of Belar lake water were analysed by using a standard methods of APHA (2005).

February-2016 to January-2017						
Seasons	Months	Physicochemical parameters				
		Water temp. (°C)	Dissolved oxygen (mg/lit)	pH	Total dissolved solids(mg/lit)	Total hardness (mg/lit)
Summer	February	27	5.8	8	300	150
	March	28	3.5	8	320	130
	April	31	3.6	7	420	160
	May	34	3.2	8	450	165
Monsoon	June	30	3.6	8	350	143
	July	29	4.2	8	180	118
	August	28	6.1	6	200	121
	September	28.4	7.2	8	170	120
Winter	October	28.8	5.8	8	155	114
	November	25.8	5.2	8	145	205
	December	21	5.7	8	125	192
	January	23	6	8	150	115

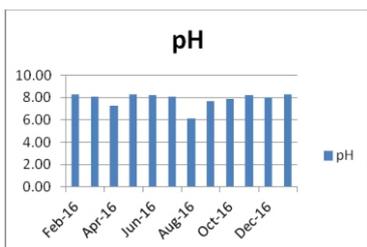
**Table 2: Summary of different physico chemical parameters studied at Belar lake**



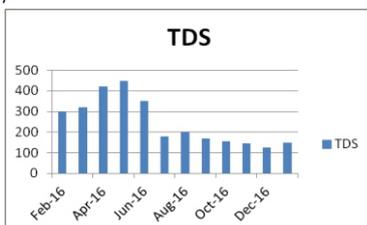
**Graph No.1: Monthly variations in water temperature at Belar lake during the year 2016-17**



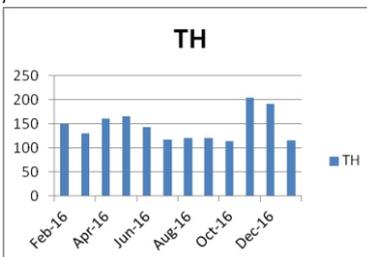
**Graph No.2: Monthly variations in DO at Belar lake during the year 2016-17**



**Graph No.3: Monthly variations in pH at Belar lake during the year 2016-17**



**Graph No.4: Monthly variations in TDS at Belar lake during the year 2016-17**



**Graph No.5: Monthly variations in Total hardness at Belar lake during the year 2016-17**

#### Water temperature (WT):-

The most important source of heat for fresh water is generally the sun, although temperature can also be affected by water inputs (such as precipitation, surface runoff, groundwater, and water from upstream tributaries), heat exchanges with the air, and heat lost or gained by evaporation or condensation (<http://www.ramp-alberta.org>). In the study period minimum water temperature recorded as 21°C in December-2016 while maximum water temperature recorded as 34°C in May-2016. The water temperature was higher during summer season and lower during winter season and it may be a due to the seasonal variation. Decreased values of temperature during winter days are due to low ambient temperature (Gyananath *et al.*, 2000).

#### Dissolved oxygen (DO):-

Surface water receives sufficient light for photosynthesis; it is generally saturated or even supersaturated with oxygen. Dissolved oxygen is essential for a healthy aquatic ecosystem (<http://www.ramp-alberta.org>). In the study period minimum DO recorded as 3.20mg/lit in May-2016 while maximum DO recorded as 7.20mg/lit in September-2016. The DO of lake was lower during summer season and higher during monsoon season and it may be a due to the environmental change to dissolve the atmospheric oxygen into water as well as other microorganism's growth. Dissolved oxygen correlation with water body shows direct and indirect information e.g. bacterial activity, photosynthesis, availability of nutrients, stratification etc. (Premalata and Vikal 2009).

#### pH:-

pH is a measurement of the hydrogen ion ( $H^+$ ) concentration in water, and is commonly used to describe the acid/base balance of water (<http://www.ramp-alberta.org>). In the study period minimum pH recorded as 6.10 in August-2016 while maximum pH recorded as 8.30 in the months of February, May, and January-2017. The pH value showed variation may be a due to most of fresh water bodies are alkaline in nature. During winter, low pH values recorded, which may be due to decomposition of organic matter (Butterfield, 1948).

#### Total dissolved solid (TDS):-

The concentration of total dissolved solids (TDS) is a measure of the amount of dissolved material in water. TDS includes solutes such as sodium, calcium, magnesium, bicarbonate, chloride and others that remain as a solid residue after evaporation of water from the sample. In the study period minimum TDS recorded as 125mg/lit in December-2016 while maximum TDS recorded as 450mg/lit in May-2016. The TDS of lake showed variation may be a due disposal of sewage into lake. TDS analysis is the significant association for monitoring the quality of water (Rajankar, 2013).

#### Total hardness (TH):-

The total hardness expressed as the sum of the calcium and magnesium salt concentrations present in water. In the study period minimum total hardness recorded as 114mg/lit in October-2016 while maximum total hardness recorded as 205mg/lit in November-2016. Total hardness of water showed variations and it may be a due to the winter season the sewage and other agriculture waste enter collected as it is into lake. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water (Mahananda *et al.*, 2010).

#### CONCLUSION :

All the physico-chemical parameters of Belar lake for all seasons were within the desirable limit or maximum permissible limit prescribed by WHO. From present investigations we concluded that the quality of the water samples under study were suitable for drinking purpose. The results indicate that the tank is Non-polluted and can be used for Domestic, Irrigation and Fisheries.

During the investigation it was noticed that the influence of sewage from domestic and agriculture area decrease the quality of Belar lake, so it is urgent need to develop awareness among the human being, to maintain and conserve the fresh water resource.

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