

**SOME ASPECTS OF WATER QUALITY PARAMETERS OF PARDESWADI LAKE WALUJ MIDC AURANGABAD (M.S.) INDIA****Kamble V. T.^{1*} and Jawale C. A.²**¹Dept of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.²Shri Madhavrao Patil Mahavidyalaya, Murum, Tq. Omerga, Dist. Osmanabad.Article Received on
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Babasaheb Ambedkar
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Lake water is a source of drinking water and domestic use for rural and urban population of India. Water quality focuses on the various aspects of the physico-chemical parameters of water by which state of the water body can be observed. Measurements of various water quality parameters play the key role in detecting the status of pollution and suitability of particular water body for various aquatic organisms and agricultural products. The present study was conducted to measure the various physico-chemical parameters of the Pardeshwadi lake, at Ramrai Jogeshwari and Kamlapur in MIDC area, Waluj Aurangabad, Maharashtra, India. The water samples were collected from four

different sites. The present investigation deals with the study of seasonal variations of physico-chemical characteristics of water. The study was carried out during the year 2014-15 for a period of 12 months. The parameters such as atmospheric temperature, water temperature, pH, Electrical conductivity, DO, BOD, COD, chlorides, total hardness, etc were studied.

KEYWORDS: Physico-chemical parameter, Pollution and Pardeshwadi Lake**INTRODUCTION**

India is facing a serious problem of natural resource specially that of water. In the point of view of population growth and economic development, water is one of the most important natural resources. All living organisms on our earth are so intimately connected with water that life on this planet is believed to have evolved in and around water. Similarly water is equally important for the growth of plants, agricultural development and industrial uses.^[1] In early days, water was primarily used for domestic needs like drinking, washing, bathing and cooking etc. But due to industrial and urban development, requirement of water for these

activities has increased along with domestic purpose. Water of good quality is required for living organism. The quality of water is described by its physical, chemical and microbial characteristics.^[2] Water is harmed purposely all over the country by the insane intrusion of human being. Quality of water is generally refers to component of water, which to present at the optimum level suitable for growth of aquatic plant and animals. Various factors like water temperature, pH, E. C., D.O., COD and BOD, etc play an important role for the growth of plants and animals in the water. The biological oxygen demand (BOD) and the chemical oxygen demand (COD) indicates the level of pollution of a given water body. Rapid population growth, increasing living standards, wide range of human activities, industrialization and greater stress on food production have lead to increase in the pollution of aquatic ecosystem. Lakes the small aquatic ecosystems and are generally located near human civilization. Due to this reason these lakes are mostly influenced by the human activities which in turn pollute them. Most of the time all the domestic waste, agricultural runoffs, sewage is drained in these lakes which elevates the concentration of phosphates, nitrates, etc. causing pollution. Hence physico -chemical parameters of this lake were studied during year 2014-2015 with respect to pollution.

MATERIALS AND METHODS

Study Site: The Pardeswadi lake is 0.5 km from RAMRAI (PARDESWADI) village to West, 0.5 km from JOGESWARI to North,1.0 km from KAMLAPUR to East, and 1.5 km from WALUJ (Aurangbad-Pune highway) to South at about 22 km from Aurangabad city. The present study was done for the lake, which is situated in WALUJ MIDC,AURANGABAD area and its geographical coordinates are 19°54' 0" North, and 79°29' 0" East. The lake is predominantly rain fed and is used for irrigation, agriculture and fish culture etc. Water samples for the estimation of physico-chemical parameters were collected monthly from four different sites A, B, C, and D during different seasons (winter, summer and monsoon) over a period of one year from February 2014 to January 2015. Sample collection was done during morning hours between 09.00 am to 11.30 am and brought to laboratory for further analysis. Water samples were collected in plastic canes. Parameters like colour, temperature, pH, tempreture estimated on the spot while samples for dissolved oxygen(DO) and biological oxygen demand(BOD) estimation were collected in BOD bottles. DO was fixed on the spot and other parameters were analyzed in the laboratory as per standard methods prescribed by.^[2,1]

RESULTS AND DISCUSSION

Temperature

Temperature is the important factor which regulates the biological activities in aquatic environment.^[16] In the present investigation Maximum of 33.75 °C was recorded in summer and Minimum of 27 °C was recorded in winter(fig1). Temperature is basically important for its effects on a certain chemical and biological activities in the organism attributing in aquatic media. The variation in water temperature in the present investigation may be due to seasonal variation. High temperature in summer and low temperature in winter detectable changes were also noted during the observation similarly in.^[19] High temperature causes stress on aquatic biota by impacting the capacity of water in the important dissolved gases like oxygen usually during summer, which may lead to massive fish death.^[3]

pH

pH is the intensity of the acidic or basic character of a solution at a given temperature. pH is the negative logarithm of hydrogen ion concentration ($\text{pH} = -\log [\text{H}^+]$). The pH in water samples range of 7.0 to 7.85 and stated that the pH of water is important for the biotic communities as most of the plant and animal species can survive in narrow range of pH from slightly acidic to slightly alkaline condition.^[11] Most of the biological processes and biochemical reactions are pH dependent. pH is considered as an indicator of overall productivity that causes habitat diversity. In the present investigation the highest pH 9.45 was recorded at sampling station 'B' in the monsoon. The minimum pH 8.4 was found in the station 'D'(fig2). The values of pH are shown in table.1 also found the pH in alkaline trend. This indicates the water is alkaline in nature similar finding was observed by Yogita et al(2018). The higher pH values indicated the imbalance in carbonate and bicarbonate.^[19]

Electrical Conductivity

Electrical conductivity is a measure of water capacity to convey electric current. This ability depends on the presence of ions, their total concentration, ability, valance and relative concentration and on the temperature measurement. Solutions of most inorganic acids, bases, and salts are relatively good conductor. As most of the salts in the water are present in the ionic forms, capable of conducting current, therefore, conductivity is a good and rapid measure of the total dissolved solids. Conductivity of water varies directly with the temperature and is proportional to its dissolved mineral matter content. In the present investigation, the highest EC was 2.51 micro S/cm encountered on sampling station B'. The

lowest record of 1.62 micro S/cm was observed on the sampling site 'B'(fig3). The maximum reading in summer while the minimum in monsoon. During summer, a high level of conductivity indicates the pollution status as well as tropic level of the aquatic body.^[11] The seasonal variation in the conductivity may due to the increase in concentration of salt because of discharge of domestic effluents and organic matter from the nearby residential areas into the Lake.^[23] Conductivity show significant correlation with parameter.

Chloride

The chloride in drinking water originates from natural sources, sewage and industrial effluents, urban runoff containing de-icing salt and saline intrusion.^[11] The highest value recorded 25.1875 mg/l at station A. The lower value recorded 18.8 mg/l at station C (fig.4). The maximum amount of chloride in water of pardeswadi lake was recorded during summer season and minimum amount was recorded during monsoon. The maximum value recorded during summer season because the high rate of evaporation.^[11] The high chloride concentration of the lake water due to high rate of evaporation. The higher concentration of chloride during summer season associated with run off loaded with contaminated water from surrounding.^[6] the greater source of chlorides in lake water is disposal of sewage and industrial waste. Human body release very high quantity of chlorides through urine and fasses. The chloride concentration was used as an important parameter for detection of contamination by sewage.^[6]

Total Hardness

In the investigation the highest value recorded 440.00 mg/l at station B. The lower value recorded 18.8 mg/l at station C (fig6). The maximum amount of total hardness in water of pardeswadi lake was recorded during summer season and minimum amount was recorded during monsoon The higher values were recorded during summer season and low values of hardness were recorded during monsoon. The total hardness is contribution of calcium and magnesium salt dissolved in water. The higher concentration increases hardness, high value of hardness in summer and low in monsoon show that the water may be suitable for the growth of fish.^[21] Hardness is more than 20 mg/l is satisfactory for the aquatic productivity and help to protect fishes against harmful effect of pH fluctuations, high values in summer and lower value in monsoon. Similar observation were recorded by.^[14] Although the total mass of organism is greater in hard water lakes while medium lakes hold a greater variety of living organism.^[12]

Dissolved Oxygen

Dissolved oxygen is one of the important parameter in water quality assessment and reflects the physical and biological processes prevailing in the water. Its presence is essential to maintain the higher form of biological life in the water and the effect of waste discharge in a water body is largely determined by the dissolved oxygen. DO is an important aquatic parameter whose measurement is important in the context of culture of any aquatic animal as oxygen plays important role in its life processes.^[10] Oxygen balance of the system non-polluted surface water is normally saturated with dissolved oxygen. The maximum dissolved oxygen was found 6.4 mg /lit. at station C. Minimum during the monsoon.3.35 mg /lit at station D (Fig5) during summer. The high temperature and low dissolved oxygen during summer. Lower dissolved oxygen in summer was due to high temperature and low solubility of oxygen in water.^[16] According to WHO standards, the dissolved oxygen required to sustain life is 3mg/l. The DO was found to be high in the range described by WHO.

COD Chemical Oxygen Demand

In the present study, the maximum COD values were obtained 267.75mg/l at station D maximum value recorded in summer season. while 74.75 values at D station(Fig7). minimum value were recorded during winter.COD is the oxygen required by organic substances in water to oxidize them by a strong chemical oxidant.^[2] The high COD values are found mainly in water, which may be due to the mixing of domestic and industrial waste. The level of COD seems to be the appropriate indices for assessing the pollution level of the water bodies.^[17]

Biochemical Oxygen Demand

Biochemical oxygen demand is measure of organic material contamination in water specified in mg/l. BOD is the amount of dissolved oxygen required for the biochemical decomposition of organic compound and the oxidation of certain inorganic materials.^[8] The total amount of oxygen used by microbes to breakdown the organic material in aquatic ecosystem is called biochemical oxygen demand. The biochemical oxygen demand values showed a very little fluctuation throughout the year. In the present is observed that minimum of BOD 28.25mg/l at C was recoarded during monsoon. In the present investigation the higher BOD values were obtained 111 mg/l at station D during summer.

Table. 1: Seasonal Variation of Physico-chemical parameters of PARDESWADI Lake in the year 2014-2015.

Site	Parameter	TEMP °C	PH	E C mS/cm	Chloride Mg/l	T H Mg/l	DO Mg/l	COD Mg/l	BOD Mg/l
	Season								
A	Summer	33.75	8.55	2.405	24.70	341.26	5	154.50	44.25
	Monsoon	29.75	9.15	2.158	22.50	218.75	5.2	201.75	51.25
	Winter	27.0	8.525	2.005	25.1875	257.00	6.25	187.00	52.75
B	Summer	33.75	8.525	2.51	24.10	440.00	4.95	136.50	39.50
	Monsoon	29.75	9.45	1.62	21.80	245.00	5.05	218.00	67.00
	Winter	27	9.012	1.89	22.655	264.00	6.255	186.25	60.00
C	Summer	33.75	8.7	2.223	19.20	274.75	5	190.00	53.25
	Monsoon	29.75	8.55	2.01	18.80	235.25	6.475	91.50	28.25
	Winter	27.0	8.525	2.165	18.973	161.75	5.15	92.25	42.25
D	Summer	33.75	8.463	2.508	22.20	354.00	3.35	267.75	110.00
	Monsoon	29.75	8.825	2.138	22.22	176.00	5.325	142.75	43.25
	Winter	27.0	8.975	1.953	20.62	244.75	4.675	74.75	48.25

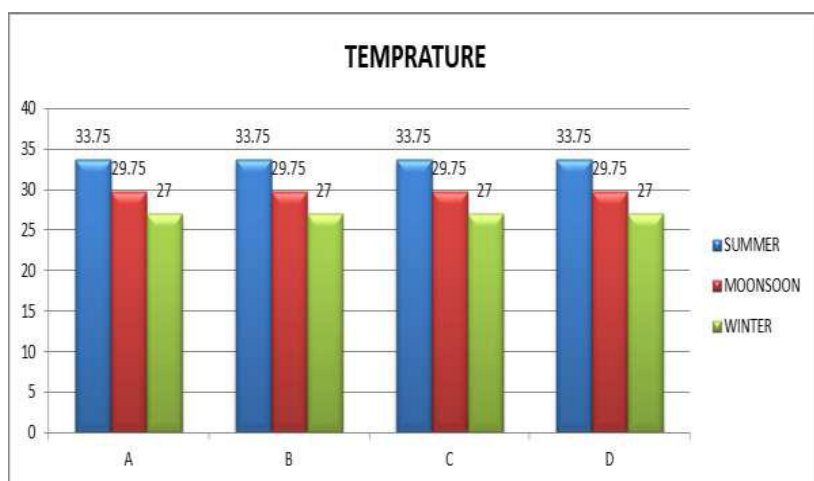


Fig. 1: Seasonal variation in temperature °C at a different sampling stations during Feb14-Jan15.

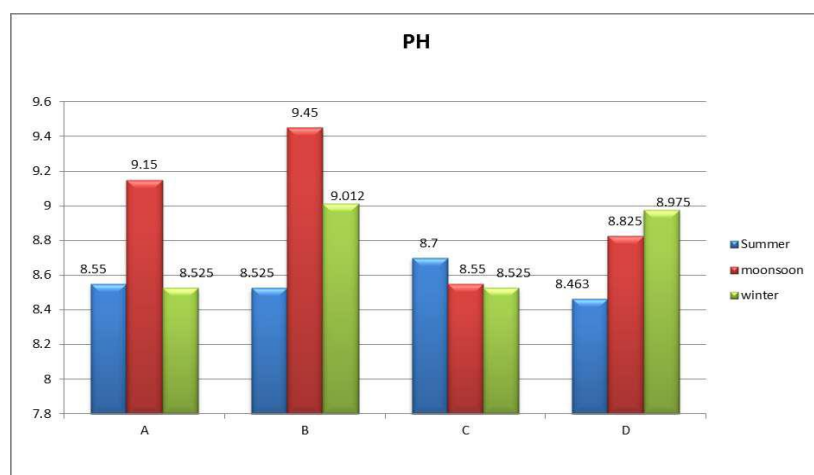


Fig. 2: Seasonal variation in PH a different sampling stations during Feb14-Jan15.

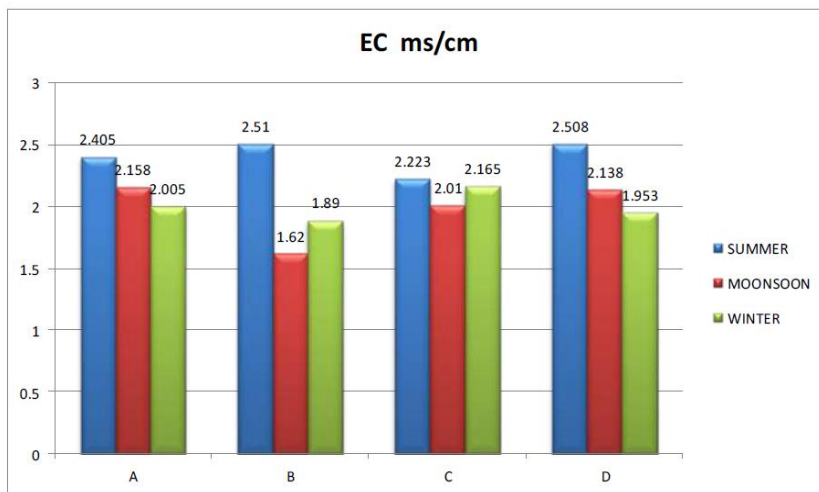


Fig. 3: Seasonal variation in EC ms/cm a different sampling stations during feb14-Jan15.

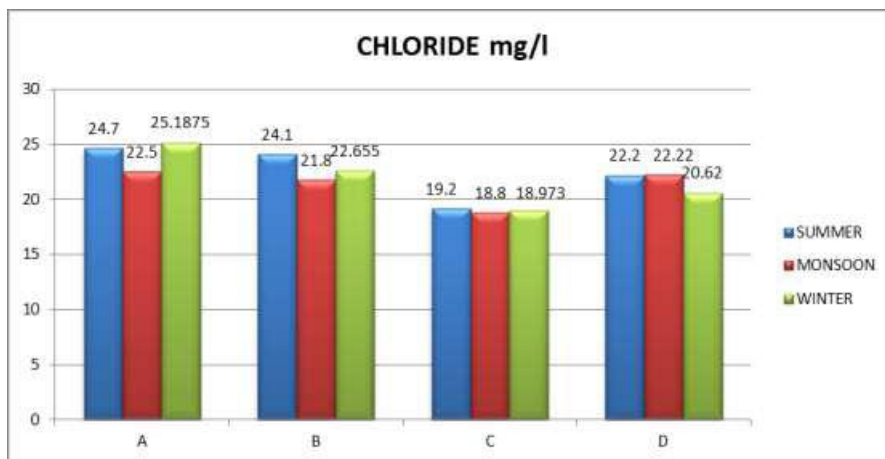


Fig. 4: Seasonal variation in CHLORIDE mg/l a different sampling stations during Feb14-Jan15.

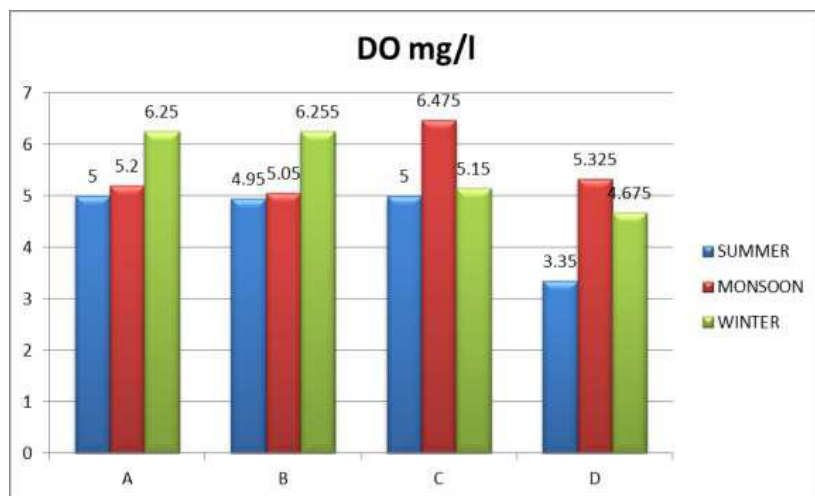


Fig. 5: Seasonal variation in DO mg/l a different sampling stations during Feb14-Jan15.

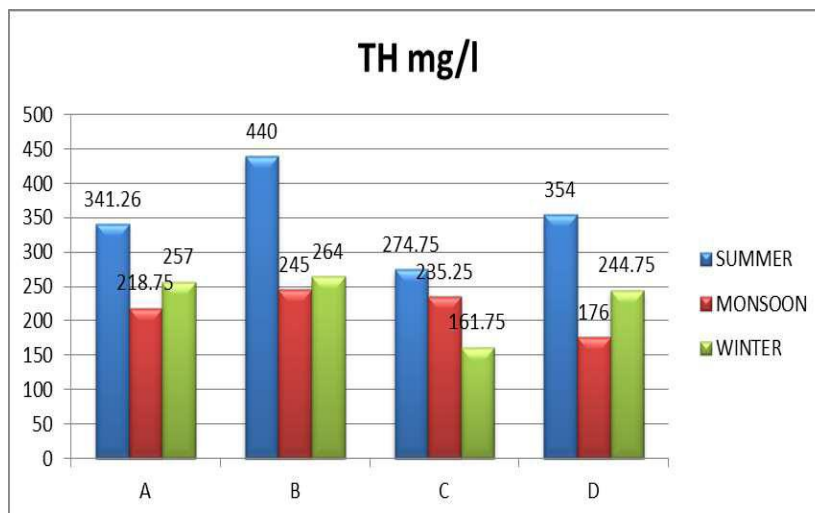


Fig. 6: Seasonal variation in TH mg/l a different sampling stations during feb14-Jan15.

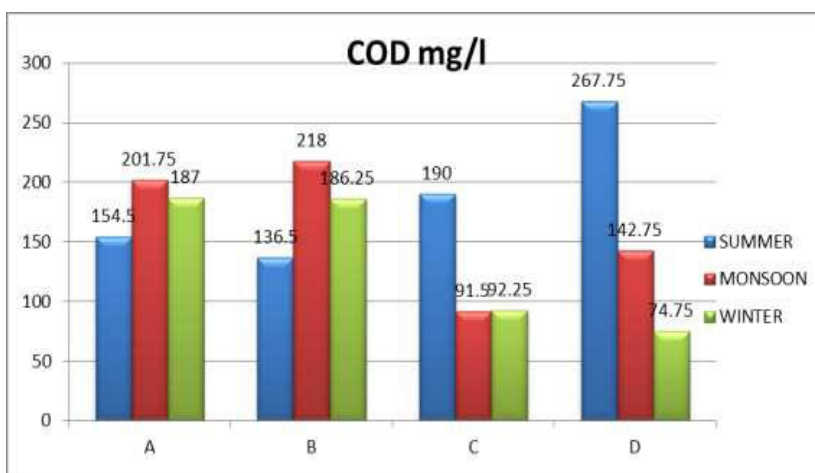


Fig. 7: Seasonal variation in Chemical Oxygen Demand mg/l a different sampling stations during feb14-Jan15.

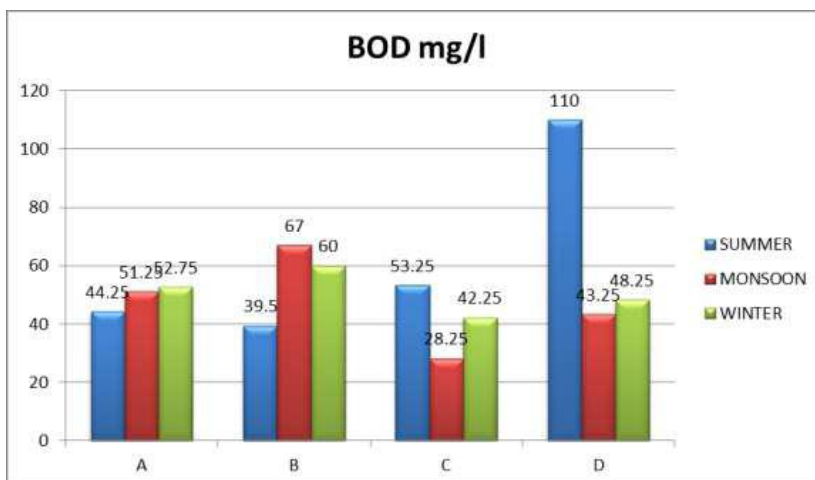


Fig. 8: Seasonal variation in Biological Oxygen Demand mg/l a different sampling stations during feb14-Jan15.

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