RESEARCH FRONT

ISSN
(Print) 2320 – 6446, (Online) 2320 – 8341

WATER QUALITY STATUS OF DUMKE LAKE FROM PALUS TEHSIL OF DISTRICT SANGLI. (MS).

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ABSTRACT:

Physico-chemical characteristics of Dumke Lake from Palus Tehsil was studied for a period of twelve months from January 2014 to December 2014. The present investigation is focused on the determination of water quality parameter such as Temperature, Turbidity, Total Dissolved Solids, pH, Dissolved Oxygen, Free Carbon dioxide, Total Hardness, Chlorides, Alkalinity and Nitrates. All Parameters were within the Permissible limits. The result of the proposed study will establish some facts about the use of water for various purposes like domestic agriculture purposes and for aquaculture practices. The analysis of various physico-chemical parameters of Dumke Lake of Palus, were carried out as per standard methods of APHA (1995) and Trivedy and Goel (1986) .

KEYWORD: Physico-chemical characteristics, Dumke lake and water quality status.

INTRODUCTION:

Water is an essential element for life. Freshwater comprises 3%of the total water on earth. Only a small percentage (0.01%) of this freshwater is available for human use. The ponds, lakes and river basins is economically more important. It is medium that serves the members of a community who use it. The perennial lakes play an important role for domestic, agriculture and aquaculture as a valuable water resource. The lentic ecosystems have long attracted attention of ecologists, both for their importance as a source of drinking water and the development of fisheries (Beckerman, 2014).In the ecosystem water is considered to be the most important component for the life but day by day the quality of water become degraded. There are several factors which are responsible for deterioration of water bodies such as increased human population, industrialization, use of excess fertilizers in the agriculture and other man-made activities etc. Few researchers (Kiran, 2010; Raut et al., 2011; Naik et al., 2012; Bahekar and There, 2013; Mahajan and Tank, 2013) have been studied the physico-chemical parameters of the various water bodies in different regions of India. The present investigation was carried out for qualitative analysis of physic-chemical parameters of study area.

MATERIALS AND METHODS:

Study area: The Dumke lake is located at latitude 17^0 90N and longitude 74^0 28 E .The surface area of the lake is approximately 10 hector/ acer**.** in Palus tehsil.

Collection of samples: The water samples were collected in the polyethylene bottles. Initially, the prewashed bottles were rinsed with sample water. The closed bottle was dipped in the lake at the depth of 0.5 m, and then a bottle was opened inside and was closed again to bring it out at the surface.

Methodology: Water samples were collected for physico-chemical analysis from sampling stations at the Dumke Lake. Samples were taken once every month from January 2014 to December 2014. Water samples were collected in five liter plastic bottles and collection was

ISSN
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usually completed during morning hours between 6:00 a.m. to 10:00 a.m.and brought to laboratory for further analysis. For each sampling event, temperature, pH and dissolved oxygen were monitored at the sampling sites while Chloride, Conductivity, TDS, Hardness, Calcium, BOD, Total Alkalinity, Nitrates were analyzed in the laboratory in accordance with APHA (1989); Trivedy & Goel (1986).

RESULT AND DISCUSSION:

pH : pH is measured in scales of 0-14 pH. pH value ranges from 7.5to 8.4 which shows its alkaline nature. The maximum pH value 9.2 was recorded in the month of April (Summer) and minimum 8.6 in month of September. The highest pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico-chemical condition. (Karanth, 1987)

Temperature: The temperature plays an important role for controlling the physico-chemical and biological parameters of water. The highest temperature was recorded 30°C in summer due to high solar radiation, low water level, clear atmosphere and high atmospheric temperature. The lowest temperature was reported as 23°C . (Swarnalatha N, Narasingrao A 1998).

Electrical Conductivity: Electrical conductivity is an estimation of the total amount of dissolved ions in water. It is a useful tool to evaluate the purity of water (Acharya et al., 2008). Water becomes a conductor of electrical current when substances are dissolved in it and the conductivity is proportional to the amount of dissolved substance. The source of EC may be an abundance of dissolved salts due to poor irrigation management, minerals from rain water runoff or other discharges. Maximum electrical conductivity was recorded from 215 µmhos/cm and minimum 145 µmhos /cm in the lake.

Nitrates: The maximum concentration of nitrates was observed 36.4mg/l in month of July (Monsoon) and minimum 5.1mg/l in the month of September.(winter). Nitrates are one of the major inorganic salts regulating the productivity of phytoplankton.

Alkalinity: Total alkalinity ranges from 55.7 to 87.6mg/l. The maximum value 87.6mg/l was recorded in the month of May and minimum value 55.7mg/l in the month of December. The alkalinity was maximum in May due to increase in bicarbonates ions and high photosynthetic rate in the water. Similar results were also reported by (Hujare M.S.2008).

Hardness: Total hardness (Calcium and Magnesium) is important parameters in the detection of water pollution. This shows highly significant seasonal variations. Maximum value of hardness was recorded 240 mg/l in summer season and minimum value 240 mg/l was noticed during winter.

Calcium : Calcium is one of the most abundant substances of the natural water. In aquatic environment calcium serves as one of the micronutrients for most of the organisms (Shah and Shah, 2013). Calcium concentration in Dumke Lake was maximum 62.11mg/l in May. Calcium is essential element for various enzymatic transformations within the cell especially in the transphosphorylation in algal, fungal and bacterial cell.

Dissolved oxygen: The value of DO fluctuates between 7.9 mg/l to 14.5mg/l . The maximum values 14.5mg/l were recorded in month of May and minimum values 7.9 mg/l in the month of November of winter season. The high DO in summer is due to the increased temperature. The high temperature and intense sunlight is important to accelerate photosynthetic activity.

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BOD (Biological oxygen demand): The biological oxygen demand values ranged from minimum 0.8 mg/l to maximum values of 3.89 mg/l. Table 1 shows the variation in biological oxygen demand values of lake water. The BOD value is a presence of organic materials in water which can support increasing of microbe organisms in the lake.

Free carbon dioxide: The value of free CO_2 ranges from o.3mg/l to 19.2mg/l. The maximum value (19.2mg/l) was recorded in the month of December and minimum value (0.3mg/l) in the month of March. This may be depends upon alkalinity and hardness of water body. High value of CO_2 in December this could be related to the high rate of decomposition.

Total dissolved solids (TDS) : Total dissolved solids (TDS) denote mainly the various kinds of minerals like sodium, carbonates, sulphate, chloride, nitrates, phosphate etc. present in water. There is no gas and colloids in TDS. TDS ranged from 267-1000 mg/l. Maximum TDS was observed 267mg/l whereas minimum was recorded in 100 mg/l. Rao et al. (2003), Kirubavathy et al. (2005), Garg et al.(2006) also reported the similar results.

Table-1: physic-chemical parameters of Dumke lake, of Palus, From January-2014 to December-2014.

Parameters	Units	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
pH	-	8.7	8.6	8.8	9.2	8.9	9.1	9.1	9.0	8.6	8.8	9.0	9.1
Temperature	0^C	25	24	26	28	30	23	22	24	24	23	23	24
Conductivity	mhos	182	166	176	196	215	189	178	169	159	155	146	176
Total Hardness	mg/L	87.2	98.1	187	230	240	158	102	116	103	110	95.2	85.6
Calcium	ppm	33.6	36.2	46.4	51.6	62.11	54.3	49.6	36.66	48.0	45.7	38.4	46.1
Chloride	mg/L	149	167	188	210	213	170	167	188	169	158	185	179
BOD	mg/L	0.9	0.8	1.6	1.9	3.89	2.5	2.1	2.0	1.9	2.33	2.1	1.8
Alkalinity	mg/L	66.8	67.7	78.6	76.1	87.6	77.9	71.1	80.1	79.0	80. 2	76.6	55.7
TDS	mg/L	100	245	240	255	267	177	166	153	140	135	120	109
DO	ppm	9.6	10.1	12.55	14.0	14.5	11.20	12.2	9.06	8.76	9.5	7.1	8.21
Nitrates	mg/L	9.40	12.2	13.2	26.60	35.45	14.22	36.4	11.4	6.2	5.40	5.1	5.26
Free CO_2	mg/L	-	0.4	0.3	3.4	4.8	8.2	8.8	5.6	15.8	10.2	12.6	19.2

CONCLUSION:

Water quality is a critical factor in well-being of any area. The various parameters studied are within the permissible limits as per WHO (Table No.1). So the water from Dumke lake is suitable for domestic, agriculture purposes and aquaculture practises.

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