WATER ANALYSIS IN MAJAGAON LAKE OF BELAGAVI (KARNATAKA)

YASHWANTHRAO. B. DALVI

Abstract: Physico- chemical parameters of Majagaon Lake revealed that the pH ranges from 6.9 to 9.0, electrical conductivity ranges from 610 µS/cm to 880 µS/cm, dissolved oxygen 4.4to 5.9 mg/L, total hardness 135 mg/L to 300 mg/L, calcium hardness 80 mg/L to 130 mg/L, Temperature 21°C to 26°C, Iron 0.0 mg/L to 1.0 mg/L, phosphate 0.1 mg/L to 1.0 mg/L, nitrite 0.0 mg/L to 0.3 mg/L, nitrate 0.0 mg/L to 10.0 mg/L, chloride 110 mg/L to 260 mg/L, residual chlorine 0.0 mg/L to 0.1 mg/L ,ammonium 0.1mg/L to 3.0 mg/L, fluoride 0.0 mg/L, turbidity 0.27 m to 0.63 m and total alkalinity 90 mg/L to 140 mg/L. Based on the investigation we conclude that Majagaon Lake revealed high pH, Iron, calcium, Chloride content and coli form test revealed presence of pathogenic bacteria. Majagaon Lake is unfit for drinking, fish rearing, domestic use and for irrigation.

Keywords: Belagavi, Water, analysis, Majagaon Lake.

Introduction: Belagavi city is situated in foot hills of Western Ghats. It is 784 m above sea level with average rainfall of 1200 mm. But due to change in climate there is drastic change in rainfall. The people during summer season facing problem of water scarcity. Many lakes of Belagavi are perennial lakes. Lakes are best source of water to overcome the problem of water scarcity during summer. The quality of the water depends up on the organic and inorganic substances present. Lakes are utilized by humans for ground recharge, drinking, domestic use, Irrigation, Industries, fish rearing and for recreational activities. Physical and chemical composition of water changes mainly due to mud, silt, and human activities [**1**]. Based on the physical and chemical composition of water one can assess the quality of water. Growth of algae and its diversity is dependent on the changing Physico-chemical properties of water [**2&3**]. Anthropogenic activities of human beings have led to pollution of water, unfit for use and thereby reduce the biodiversity. Lake Water is not much utilized by humans in Belagavi as it is not yet tested. By studying the Physico-chemical parameters we can assess the quality of water, severity of pollution [**4**] and can be categorized as drinking, fish rearing ,for irrigation, industries and recreational activities**[5]**. Since during summer there is scarcity of water and hence to overcome the problem lakes can be used to fulfill the needs. Since no work is reported on Physico-chemical parameters in Majagaon Lake and hence the present study.

Materials And Methods :

Sampling Area: The study was conducted in Majagaon Lake (**Fig 1& 2)** of Belagavi city with latitude of 15° 51', Longitude 74° 31', approximate depth of water is 2-7 ft and area approximately 600 m. A Brahma Dev temple is situated in the bank of water body and is surrounded by agriculture field. The temple waste is dumped in water and cattle are bathed in the water body.

Figure 1: Photo of Majagaon Lake.

Figure 2: Map Showing Majagaon Lake.

Water Analysis of Lake: Physico-chemical parameters like alkalinity, total hardness, calcium hardness, chloride, residual chlorine, nitrate, nitrite, ammonium, pH, electric conductivity, fluoride, phosphate, iron test were conducted in the laboratory (Nice kits). Temperature, Dissolved oxygen and Turbidity were recorded at the sampling station. Temperature measured by thermometer, turbidity was measured using secchi disk. Coli form bacteria test was done in the laboratory by Nice Kits.

Results And Discussion: Physical property of the lake revealed the water is dark green due to rich

growth of algae leading to eutrophication. Dumping of temple waste, wind driven sediment &Agriculture runoff has led to eutrophication (**6**). Turbidity high in winter i.e. 0.27 m due to algal bloom, pH high during winter 9.0 (**Table 1**), high pH not safe for drinking water as per drinking water standards, pH range for plant growth is 6.5 to 7.5. Dissolved oxygen was 4.4 to 5.9 mg/L highest during winter which is within the limits, dissolved oxygen for fisheries are set at 7.5 mg/L between 6 and 7.5[**7**] , highest temperature was 26ºC , total hardness was 300 mg/L high during winter permissible for drinking BIS (IS:10500:1991), fluoride was absent ,calcium hardness was high during monsoon 130 mg/L due to runoff water from surrounding area of agriculture not permissible for drinking, iron was 1.0 mg/L not permissible for drinking, More important, wastewater and storm-water discharges have already been the first source of iron in freshwater lakes because of anthropogenic influences [**8**]. Phosphate was high in start of monsoon i.e. 1.0mg/L due to agriculture runoff water, permissible for drinking, nitrate was 10.0mg/L high in monsoon due to agricultural runoff water permissible for drinking, nitrite was 0.3 mg/L permissible for drinking, Ammonium was high in summer i.e. 3.0 mg/L due to cattle bathed, chloride was 260 mg/L ,high during start of monsoon due to agricultural runoff not desirable for drinking, residual chlorine was 0.1 mg/L, total alkalinity was 140 mg/L, electric conductivity of water was 880µS/cm high in winter. Coli form bacteria test revealed water is infected by pathogenic bacteria and is unfit for drinking [**9**].

Table 1: Physico-Chemical Parameters of Majagaon Water Body.

Parameters	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Color	Light black	Light Green	Light Green	Light Green	Dark Green	Dark Green	Green	Green	Light Black	Dark green	Light Black	Light Black
Turbidity (m)	0.27	0.30	0.30	0.33	0.40	0.45	0.50	0.58	0.63	0.48	0.45	0.43
pH	8.2	9.0	8.5	8.9	8.5	8.5	7.3	7.5	7.2	7.5	7.2	6.9
Temperature (Celsius)	22	21	23	23	**26**	23	23	23	25	22	21	22
Conductivity (µS/cm)	880	830	870	660	730	710	695	610	630	740	850	865
Total alkalinity (mg/L)	105	140	90	110	105	120	105	115	125	90	120	110
Total hardness (mg/L)	140	135	140	195	200	220	260	245	250	275	300	245
Calcium hard(mg/L)	85	80	90	110	115	125	120	125	130	70	130	85
Dissolved oxygen (mg/L)	5.2	4.5	4.4	4.7	4.8	5.8	5.9	5.6	5.5	5.1	5.4	5.7
Iron (mg/L)	1.0	1.0	0.5	0.5	1.0	0.3	0.0	0.1	0.3	0.1	0.1	0.1
Phosphate (mg/L)	0.5	1.0	0.5	1.0	1.0	1.0	0.5	0.5	0.5	0.2	0.3	0.1
Nitrite(mg/L)	0.3	0.0	0.1	0.1	0.2	0.3	0.1	0.1	0.0	0.1	0.2	0.2
Nitrate (mg/L)	0.0	0.0	0.1	0.1	0.0	5.0	8.0	10.0	10.0	8.0	5.0	5.0
Ammonium (mg/L)	0.1	0.5	1.0	2.00	3.00	0.50	0.10	0.10	0.10	0.10	0.10	0.10
Chloride (mg/L)	160	150	190	250	260	180	115	120	110	150	160	130
Residual chlorine (mg/L)	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Fluoride (mg/L)	0.0	0.0	0.0	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coli form test	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present	Pathogenic bacteria present

Conclusions: The study revealed that the water consists of high Chloride, calcium, Iron, pH and electric conductivity. The water rich in algal growth unfit for drinking due high calcium, iron, chloride because of disposal of temple waste, agriculture runoff and wind runoff. Lake is infected by pathogenic bacteria hence unfit for drinking. The lake should be protected from dumping of temple waste, Cattle bathed, Washing clothes and agriculture runoff water should be prevented.

References:

1. N Jeeji bai and D.lakshmi,"On the phytoplankton flora of few temple tanks in madras and their unique phycobicoenoses". In:M.k. Durgaprasad and P.Sankara Pitchaiah (Eds) Inland water resources-India Discovery publicashing house. New delhi, 1999, pp.185-199.
2. D.F Charles and J.P. Smol . "Long term chemical changes in lakes: Quantitative Inference using biotic remains in the sediment record". Advances in chemistry. 1994,237, pp.1-57.
3. S.S. Dixit, J.P. Smol, J.C. Kingston and D.F. Charles. Diatoms: "Powerful indicators of environmental change". Environmental Science and Technology. 1992, 26, 23-33.
4. Palmer, "C.M.Algal and water pollution". Castle House, Publication Ltd.England. 1980.
5. Y.B. Dalvi, L. Rajanna,"Studies on Physico-chemical parameters and
6. biodiversity of freshwater algae in kanbargi Lake of Belagavi(Karnataka)". Research and Reviews: Journal of Botany. 2015, 4 [1].
7. Wu, Q.L., Y. Chen, K. Xu, Z. Liu and M.W. Hahn, "intra-habitat heterogeneity of microbial food web structure under the regime of eutrofication and sediment resuspension in large subtropical shallow lake Taihu, China", hydrobiologia, 2007, 194:241- 254.
8. S.P. Hosmani and T.B. Mruthunjaya, "impact of plankton diversity on the water quality index in a lake at thirumakudal narisapura mysore district" International Journal of Innovative Research in Science, Engineering and Technology. 2013, 2 (5):1434-1441.
9. Xing, W., Huang, W.M., Shen, Y.W., Li, D.H., Li, G.B. and Liu, Y.D. "Changes in the concentrations of size- fractionated iron and related environmental factors in northeastern part of Lake Dianchi (China)". Fresenius Environmental Bulletin, 2006, 15, 563-570.
10. Y.B.Dalvi and L. Rajanna, "water Quality assessment and biodiversity study of Phytoplanktons in angol water body of Belagavi(Karnataka)".Research and Reviews:journal of botany.2015;4(3):29-36p.

***

Yashwanthrao. B. Dalvi
Assistant Professor, Govindram Seksaria Science College, Belagavi, Karnataka-, India