



## Assesment of Physico –Chemical and Biological Characteristics of Kapileshwar (Ashti) Lake in Wardha District (Maharastra) India.

V. D. Dorlikar and S. S. Nimhare

Hutatma Rashtriya Arts and Science College Ashti, District Wardha .  
 vaishali.dorlikar1985@gmail.com

### Abstract:-

The present study was aimed to estimate current status of physico -chemical characteristics of Kapileshwar (Ashti) lake in Wardha District, Maharashtra. Monthly changes in physico-chemical parameters such as water temperature, PH, transparency, total dissolved solids, total hardness, chlorides, phosphate, dissolved oxygen, biological oxygen demand were analysed for a period of one year from July-2015 to June 2016 . The results indicated that physico-chemical parameters of the water are within the permissible limits and the water can be used for domestic, irrigation and other purposes.

### Introduction :-

Water is extremely essential for survival of all living organisms. It is biggest necessity for life and in developing countries like India, groundwater is the most important source for drinking, irrigation and industrial purpose. Water resources are of critical importance to both natural ecosystem and human development.

The healthy aquatic ecosystem is dependent on the physico-chemical and biological characteristics (Venkatesharaju et al, 2010). The quality of water in any ecosystem provides significant information about the available resources for supporting life in that ecosystem. Good quality of water resources depends on a large number of physico-chemical parameters and biological characteristics. To assess that monitoring of these parameters is essential to identify magnitude and source of any pollution load. Many researches are being carried out till present (Diwan and Kodarkar, 2000; Rajesh et al., 2002; Jakher and Rawt, 2003; Sharma and Gupta, 2004; Rajasekar et al., 2005; Sridhar et al., 2006; Anilakurmary et al., 2007; Raju et al., 2008; Fule et al., 2009; Damotharan

et al., 2010; Prasanna and Ranjan, 2010; Ingale and Ambekar, 2013.) In order to assess water quality index, we have carried out the physico-chemical analysis of water in Kapileshwar (Ashti) lake. However, very little information is available in relation to physico-chemical characteristics of water in Kapileshwar (Ashti) lake at Ashti. Hence, the present study was undertaken to study the physico – chemical and biological characteristics of water in the Kapileshwar (Ashti) lake for a period of 1 year from July 2015 to June 2016 .

### Materials And Method

#### Study Area :-

To evaluate the water quality an effort was made to investigate the water in Kapileshwar (Ashti) lake in Wardha District, (Maharashtra) India. Ashti lake is located 1 Km away from Ashti city. It has catchment area of 6.68 sq.km. with storage capacity of 1.720 million cu.mt. The average rainfall of this study area is 1033.00 mm<sup>3</sup>. The place gets most of its increased rainfall from June to September during the monsoon. The water of this lake is used for agriculture, drinking and also for fish culture.

Site II



**Figure 1** : Area showing the different sampling sites of Kapileshwar (Ashti) lake.

### Collection Of Sample :-

In order to determine the quality index three sites were chosen for sample collection from the lake during July-2015 to June-2016 in the last week of every month. The sampling locations are shown in figure 1. Some of the results were recorded at the sampling sites whereas the others were recorded in the laboratory, according APHA 2005, and Kodarkar et al, 2008.

#### **Results And Discussion :-**

Mean values of physico-chemical parameters are presented in Table 1.

##### **Water Temperature :-**

Temperature of lake water ranged from 20.9°C to 29.3°C in different seasons. High seasonal variations were observed at all three sides. Water temperature was high due to low water level, high air temperature and clean atmosphere. Sharma et al (2000) observed that water temperature fluctuate between 21°C to 29°C during limnological studies of Udaipur lakes.

##### **pH :-**

pH is a term used universally to express the intensity of the acid or alkaline condition of a solution. During present study water pH values were found 7.03 to 7.61. It is indicating alkalinity nature throughout the study period. pH value is very important for plankton growth (Chisty, 2002). According to Umavathi et al (2007) pH is ranged 5 to 8.5 is best for plankton growth.

##### **Transparency :-**

In the present study water transparency values ranged from 27.3 to 48.32 cm. which indicates productive nature of this water on the basis of clarity values as proposed by Sharma and Durve (1991). Khan and Chowdhury (1994) reported that higher transparency occurred during winter and summer due to absence of rain, runoff and flood water as well as gradual settling of suspended particles. Kadam et al (2007) also reported similar observation from Masoli reservoir of Parbhani district, Maharashtra.

##### **Total Dissolved Solids :-**

Total dissolved solids value ranged from 198.25 to 354.03 mg/l in different seasons. Similar finding have been reported by Rao et al (2003), Kirubavathy et al (2005), Garg et al (2006b). Water containing more than 500 mg/l of TDS is

not considered desirable for drinking water supplies.

##### **Total Hardness :-**

In the present study total hardness ranged from 115.75 mg/l to 158.03 mg/l in different seasons. The increase in hardness can be attributed to the decrease in water volume and increase in the rate of evaporation at high temperature. Hujare (2008) reported that total hardness was high during summer than rainy season and winter season. High values may be due to the addition of calcium and magnesium salts.

##### **Chloride :-**

Chloride found high during the study ranged from 22.55 mg/l to 36.45 mg/l. The chloride concentration serves as an indicator of pollution by sewage. Similar results were reported by Swarnalatha and Nasingrao (1998). Umavathi et al (2007) showed that higher concentration of chloride is associated with increased level of pollution.

##### **Phosphate :-**

The phosphate content in the study area was found in the range of 0.23 mg/l to 0.53 mg/l in different seasons. It is one of the most important nutrient and limiting factor in the maintenance of lake fertility.

##### **Nitrate :-**

During the study nitrate fluctuated between 0.235 mg/l to 0.542 mg/l. These values are much lower than the Chisty (2002) and Rani et al (2004). High concentration of nitrate in drinking water is toxic (Umavathi et al., 2007).

##### **Dissolved Oxygen :-**

Dissolved oxygen is important aquatic parameter, it plays crucial role in life processes of animals. In the present study the DO values found from 5.30 mg/l to 9.35 mg/l.

##### **Biological Oxygen Demand (BOD):-**

Biological oxygen demand is an important parameter to the oxygen required to degradation of organic matter. In present study BOD recorded from 4.86 to 9.75 mg/l. which is within the permissible range. Devaraju et al (2005) has made similar observation in Maddur lake. High BOD value is unfavourable for zooplankton.

**Table-1:** Showing seasonal mean of water from Kapileshwar (Ashti) Lake during July-2015 June-2016

S.No.	Parameter	Seasonal Mean								
		Rainy			Winter			Summer		
		Site I	Site II	Site III	Site I	Site II	Site III	Site I	Site II	Site III
1	WT	24.3	24.8	23.6	21.3	21.5	20.9	28.5	29.3	28.7
2	pH	7.07	7.03	7.2	7.08	7.5	7.45	7.34	7.42	7.61
3	TR	29.5	27.3	28.5	35.23	37.5	33.3	48.32	45.5	46.42
4	TDS	203.02	265.3	232.5	301.45	354.03	298.5	198.25	205.3	275.32
5	TH	120.3	115.75	123.3	140.3	138.52	136.2	123.6	147.3	158.03
6	Cl	24.54	27.32	25.2	22.55	23.3	32.6	34.5	33.6	36.45
7	P	0.25	0.23	0.31	0.34	0.38	0.41	0.53	0.48	0.44
8	N	0.257	0.342	0.285	0.235	0.462	0.521	0.542	0.520	0.498
9	DO	5.30	6.70	7.30	8.40	8.30	9.20	9.35	9.10	8.75
10	BOD	8.92	5.45	4.86	4.96	5.03	7.05	9.05	9.75	8.95

WT= Water temperature, pH, TR= Transparency, TDS= Total dissolved solids, TH= Total hardness, Cl= chloride, P= Phosphate, N= Nitrate, DO = Dissolved oxygen, BOD = Biological oxygen demand .

**Conclusion :-**

The results of present study indicate that all the physical and chemical properties of Kapileshwar (Ashti) lake water were within desirable limits. The results obtained from the present investigation shall be useful in future management of the lake. The physico-chemical characteristics of lake water suggest that the water is not harmful to irrigation, drinking purpose and pisciculture.

**References :-**

APHA (2005) Standard methods for the examination of water and waste water. 21st Edn., Washington, D.C.

Chisty .N.,(2002) Studies on Biodiversity of Freshwater Zooplankton in Relation to Toxicity of selected Heavy Metals. Ph. D. Thesis submitted to M.L. Sukhadia University Udaipur.

Devaraju TM, Venkatesha MG. Singh S.,(2005), Studies on physico-chemical parameters of Muddur lake with reference to suitability for aquaculture. Nat.Environment and pollution technology, 4,pp 287-290.

Fule,V.W., Nimagar,S.S., Telkhede, P.M., Zade, S.B., and Dahegaonkar, N.R.,(2009), . A preliminary Study on Biodiversity in Nal-Damayanti (Simbora) Dam, Morshi, Amravati. Environment Conserv.Journey,10(3).pp 41-44.

Hujare,M.S.,(2008), Seasonal variation of physico-chemical parameters in the perennial tank of Talsande,Maharashtra, Ecotoxicology and Environmental Monitoring,18(3),pp 233-242.

Ingale,D.S., and Ambekar, S.V., (2013), :Biodiversity of Phytoplankton and Zooplankton from Sangam lake of Buldhana city. AILSPF-(2013), pp 247-249.

Jayaraman PR, Ganga DT, Vasudevan NT., (2003), Water Quality Studies on Karamana River, Thiruvananthapuram District, South Kerala, India, Pollution research,22(I),pp 89-100.

Kadam,M.S. Pampatwar D.V. and Mali R.P., (2007), Seasonal variations in different physico-chemical characteristics in Mosoli reservoir of Parbhani district, Maharashtra, Journal of aquatic biology,22(I),pp 110-112.

Khan, M.A. G and Choudhary S.H., (1994), Physical and chemical limnology of lake Kaptai: Bangladesh, Tropical Ecology, 35(I), pp 35-51.

Kodarkar, M.S., A.D. Diwan, N. Murugan , K.M. Kulkarni and Anuradha Remesh., (1998), Methodological water analysis (physico-chemical,biological and microbiological)I.A.A.B. Publication,Hyderabad.

Pradhan UK, Shirodkar PV, Sahu BK., (2009) Physico-chemical evaluation of its seasonal changes using chemometric techniques, Current Science, 96(9),pp1203-1209.

Prasanna M, Ranjan P.C.,(2010). Physico-chemical properties of water collected from Dhamra estuary, International Journal of Environmental Science, I(3),pp 334-342.

Rani,R., Gupta, B.K. and Srivastava, K.B.L., (2004), Studies on water quality assessment in Satna city (M.P.): Seasonal parametric variations, Nature environment and pollution technology, 3(4), pp 563-565.

Sharma MR, Gupta AB., (2004), Seasonal variation of physico-chemical parameters of Hathli stream in outer Himalayas, Pollution research, 23(2), pp 265-270.

Sharma, L.L and Darve, V.S., (1991), water quality of 26 waters of Rajasthan in relation

- to phytoplankton. In Proc.of the second Asian fisheries Forum. Asian fisheries society Manila,Philippines, pp 915-918.
- Sharma, M.S. Liyaquat,F., Barbar, D. and Chisty, N., (2000), Biodiversity of freshwater zooplankton in relation to heavy metal pollution. Poll. Res., 19 (I). pp 147-157.
- Shrivastava N, Harit G, Srivastava R., (2009), A study of physico-chemical characteristics lakes around Jaipur, India. Journal of environmental biology, 30 (5), pp 889-894.
- Umavathi, S., Longakumar,K and Subhashini, (2007), Studies on the nutrient content of Sulur pond in Coimbatore, Tamil Nadu, Journal of ecology and environmental conservation, 13(5), pp 501-504.
- Venkatesharaju K., Ravikumar,P., Somashekar.R.K., Prakash.K.L., (2010), Physico-chemical and Bacteriological Investigation on the river Cauvery of Kollegal Stretch in Karnataka, Journal of science Engineering and technology, 6(1), pp50-59.

