



ASSESSMENT OF WATER QUALITY USING SOME PHYSICO-CHEMICAL PARAMETERS FROM ZILPI LAKE, NEAR HINGNA CITY, DISTRICT NAGPUR, MAHARASHTRA.

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ABSTRACT:

The present study was aimed to estimate current status of physico-chemical characteristic of Zilpi Lake, District Nagpur, Maharashtra (M.S.) Six monthly changes in Physico- Chemical parameters such as water temperature, pH, turbidity, transparency, total dissolved Solids, total hardness, chlorides, phosphate, nitrates, dissolved oxygen and biological oxygen Demand were analyzed and compared with the standard values prescribed by ICMR, WHO and APHA. For a period from July 2018 to December 2018. The results indicated that physico-chemical parameters of the water were within the permissible limits and can be used for domestic, irrigation. The present investigation revealed that the quality of water of a source varies from season to season and some of the water samples are unfit for drinking and utility purpose.

Key words :- Zilpi Lake, Physico-chemical parameters, DO, BOD, Irrigation

INTRODUCTION:

Water is the most essential commodity for all living creatures. Living things cannot survive without water. Water is one of the most essential constituents of the human environment. Man needs it, in the first place for his physiological existence. It is widely used for many purposes e.g. industrial water supply, irrigation, drinking, propagation of fish, human existence, other aquatic systems, generation of fish and hydro-powers. Water is the source of energy and governs the evolution and functions of the universe on the earth. Water, the most vital necessity of life, is in abundance 97.3% of the world's water i.e. 1.45 billion cubic Kms, Ocean water is salty and cannot be used for agricultural, domestic and industrial purposes. The healthy aquatic ecosystem is depended 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. To asses that monitoring of these parameters is essential to identify magnitude and source of any pollution load. These characteristics

can identify certain condition for the ecology of living organisms and suggest appropriate conservation and management strategies. Many researches are being carried out till present. In order to assess water quality index (WQI) we have carried out the physico-chemical analysis of water in Zilpi Lake, District Nagpur, Maharashtra (M.S.). The aim of the study is to reveal out the pollution status of Lake in terms of physico-chemical characteristics of water. However, very little information is available in relation to physicochemical characteristics of water in the Zilpi Lake, Nagpur. Hence, the present study was conducted to study the physico-chemical properties of water in the Zilpi Lake, District Nagpur for a period of six months from July 2018 to December 2018.

MATERIAL AND METHODS :-

Zilpi Lake (Fig. 1 & 2)

Zilpi Dam irrigation Project is popularly known as Zilpi Lake or Zilpi Talav which was constructed as a part of irrigation project by Government of Maharashtra in the year 1974. Zilpi Lake is

situated near Hingna city in Nagpur District and was constructed on a local nallah. It is located between 21°3'49"N Latitude and 78°52'5"E Longitude. This dam is an Earth fill Dam. The Length of dam is 409 m (11341.86 ft) and the Height of the dam above lowest foundation is 18.85 m (62.1719 feet). Maximum / Gross storage capacity is 1.559 MCM. Live storage capacity is 1.51 MCM. Now a day's almost all the water bodies make for good picnic spots. Zilpi Lake is also a popular Tourist attraction for its scenic beauty. "Maitriban" an old age home is established on Western shore.

Owing to the geographical location and physical features, the climate of the district can be classified as a tropical hot climate with a high range of temperature throughout the year. Primarily there are two prominent seasons in the district - the very hot summer and moderate winter. The summer months are very hot and prolonged while winter is short and mild. The monsoon season starts immediately after summer and lasts until late September. The southwest monsoons bring a lot of rainfall during rainy season and there is no drought-prone area in the district. The water samples were collected from the site of Zilpi Lake, District Nagpur, Maharashtra (M.S.) from July 2018 to December 2018. The samples were then collected and processed for the analysis of Physico-chemical analysis and characteristics. All the samples were collected from morning hours i.e., between 8.00 am to 10.00 am. The temperature and pH parameters were recorded on the site. Samples were collected in cleaned acid washed plastic bottles and sterilized plastic bags and stored at 40°C. The water samples were analyzed for various parameters as pH, lime, organic matter etc. as per the standard methods of APHA (2005).

Collection of sample

In order to determine the water quality of Zilpi Lake, District Nagpur, Maharashtra (M.S.) from July 2018 to December 2018 in the first week of every month. The sampling locations are shown in

a figure-1 & 2. Some of the results were recorded at the sampling station whereas the others were recorded in the laboratory, according APHA, 2005, (Kodarkar et al, 2008).

RESULT & DISCUSSION:

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

pH

From the data gleaned, it is observed that the pH ranges from 7.0 to 8.4. The pH of the water sample indicates that the water is alkaline in nature. For the growth of diverse bacterial population a pH value near neutral is suggested and is suitable for them. The most appropriate range for bioremediation has been suggested to be 6-8 (Saxena, 1990 & Mane et al, 2006).

Alkalinity:

The values of alkalinity showed that there is highest value during the month of October which ranges from 121 to 241 mg/l. The increase in the alkalinity may be due to the death and decomposition of micro-organisms (Sarkar and Haldar, 2010). The alkalinity of the water is due to the carbonates, bicarbonates and hydroxyl ions.

Phosphate:

The values of phosphate ranges from 0.09 to 0.56 mg / l, which is lower during rainy season and highest during winter season, Tukura et al., (2005) and Ekeanyanwu et al., (2011) also observed the same ranges with the discharged and subsequent sedimentation of Phosphate and Nitrogen fertilizers and domestic wastages discharged into the river as a result of rainfall might have also resulted in the increase in sediment phosphate contents.

Nitrate:

The nitrate content of the water sample ranges from 0.018 to 0.044 mg/l. which shows that the nitrate value is higher in rainy season and declines during winter due to heavy wash off the organic

matter from the catchments. The nitrogen exists in the water and is transformed from one form to another very easily. (Bobdey, 2014).

Chloride:

The chloride has the highest concentration and this may be attributed to human activities. The chloride content ranges from 30.1 to 96.0 mg/l. The decrease in the chloride content during rainy season may be due to the dilution of water and subsequent increase in the volume of water.

Organic matter:

Analysis of organic matter shows that the value ranges from 0.10 to 0.55 mg/l. It was observed that the value was lowest during rainy season i.e., 0.10 mg/l which may be due to intensive agricultural practices that intensify organic carbon oxidation (Wakene and Herf, 2003). High values in winter i.e., 0.55 mg/l which is due to high rate of sedimentation and decomposition of foliage and other vegetative remains in sediment (Bobdey A. D., 2014; Sarvanakumar et al., 2008).

CONCLUSION :

Above study infers that pH, chloride, organic matter and phosphate increased during winter and declines during rainy season. The increased pH and alkalinity increases the alkaline nature of the water due to which the life of benthic organisms is adversely affected. All the physical and chemical properties of Zilpi Lake, District Nagpur, and Maharashtra (M.S.) water were within desirable limits. The results obtained from the present investigation shall be useful in future management of lake. The physico-chemical characteristics of reservoir water suggested that there was no harm to fish rearing, irrigation and drinking water

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Parameters						
Months	pH	Alkalinity	Phosphate	Nitrate	Chloride	Organic matter
July	7.0	121	0.12	0.023	30.1	0.10
August	7.2	127	0.09	0.044	41.6	0.16
September	7.2	230	0.15	0.032	55.0	0.34
October	8.0	241	0.31	0.025	66.3	0.55
November	8.4	227	0.44	0.028	60.0	0.41
December	8.0	129	0.56	0.018	96.0	0.32

Table. 1- Monthly variation in Physico-Chemical Properties of water (mg/l) near Zilpi Lake, District Nagpur, Maharashtra (M.S.) during June 2018 to December 2018.
(Values are expressed in Mg/L)