

Original Research Paper

Zoology

PHYSICO CHEMICAL PARAMETERS OF EKRUKH WATER RESERVOIR OF NORTH SOLAPUR TAHSIL SOLAPUR DISTRICT (M.S.)

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ABSTRACT Ekrukh water reservoir is one of the man made water bodies located close to Solapur city in North Solapur Tahasil. It is constructed in British reigning. Its total storage capacity is 3330 M.Cu.Ft. This reservoir commands a gross area of 17.152 acres. The water from Ekrukh water tank is currently used for irrigation and drinking. This water body contains a diverge assemblage of resident and migratory birds.

During the investigation an attempt is made to study the physico chemical parameters of the Ekrukh wetland over the period of 12 months. i.e. from May 2016 to April 2017. The water of the Ekrukh was analyzed for temperature, pH, total hardness, total alkalinity and dissolved oxygen. It was found that all the parameters were below the permissible limits defined by WHO. The results indicate that the tank is Non-polluted and can be used for domestic, irrigation and p-pisciculture.

KEYWORDS : physico chemical parameters, total hardness, total alkalinity and dissolved oxygen.

INTRODUCTION

Water is life. Water is the most important resource for all kinds of life on earth. All we know that water bodies plays a vital role in the growth and development of society. Every organism needs clean, fresh water to drink. Water has some unique properties. It is a superb solvent; many of the substances regularly and easily dissolve into it. This allows water to carry nutrients to cells, and carry waste away from them. Water takes part in many chemical reactions. The thermal properties of water are well-suited to support life. Water should be clean, fresh and should be free from microorganisms and unwanted chemicals (APHA, 2004).

Many researchers contributed to study the physico chemical parameters of different reservoirs. Gaikwad R.L. (2015) studied water analysis frequency of different parameters in Akluj region. Gantaloo U. S. (2012) studied physico chemical parameter and aquatic biodiversity of Tarangwadi and Bijwadi lake of Indapur Taluka, Dist. Pune. Jadhav R.R., et. al. (2013) studied on algal flora and physico chemical parameters of Sai reservoir, Dist. Latur (M.S.) India. Pathan D.M. et. al. (2014) studied Assessment of bio-contamination of Koregaon tank, Omerga (M.S.) India. Patil R. et. al. (2014) studied urban sewage of Bori river near Naldurg, Dist. Osmanabad. Kamble A.H. et. al. (2012) studied the physico chemical parameters of some water bodies at Ashti, Dist. Beed (M.S.), India. Kamble S.P. et. al. (2013) studied seasonal variations of water quality in water body of Sangli, Maharashtra. Karikari A.Y. et. al. (2013) studied Assessment of water quality and primary productivity characteristics of Volta Lake in Ghana. Khabade S.A. et. al. (2013) studied some physical parameters of Panchganga river water near Ichalkaranji city, Maharashtra.

MATERIALS AND METHODS

The Ekrukh water reservoir is located at Tale Hipparaga village close to Solapur city. It is located eight km away from Solapur towards north east. The Ekrukh water reservoir is the largest lake in the Bombay Presidency. This is one of the historical man made water reservoirs. It is an earth fill dam on Adela river and has a total capacity of 3,330 M.Cu.Ft. This reservoir commands a gross area of 17,152 acres. Earlier the water from Ekrukh water reservoir is utilized for the purpose of irrigation, but the water of Ekrukh water reservoir is now supplied to Solapur city for drinking as well as for industrial purposes. The water body contains a diverse assemblage of resident and migratory birds. Also this lake also provides employment to many people for fishery.

In the present research paper, physico chemical parameters of the Ekrukh water reservoir are studied for one year i.e. from May 2016 to April 2017. The water samples from Ekrukh water reservoir were collected in the morning hours between 07 a.m. to 10 a.m. in polythene bottle regularly for every month. The physical

parameters pH, surface water temperature, physical appearance and odour were recorded at study site itself. The water samples were immediately brought in to laboratory for the estimation of various physico-chemical parameters. The laboratory analysis of samples was done using standard methods (APHA, 2004). Titrimetric methods were used for the determination of total alkalinity, EDTA titrimetric method used for estimation of total hardness. Winkler's modified azide method is used for dissolved oxygen. Surface water temperature is recorded by inserting the mercury thermometer. pH of the water was recorded by standard, portable, pocket pen type of pH meter. All the physico-chemical analysis of water samples was performed as per the standard methods mentioned in APHA (2004), Kodarkar et.al (1998), Trivedy & Goel (1986).

RESULT AND DISCUSSION

In the current research study the water of Ekrukh reservoir was analyzed for different physico chemical parameters like temperature, pH, total hardness, total alkalinity and dissolved oxygen.

Temperature is the most important physical factors, which control much natural process within the ecosystem. All the organisms possess the well defined limits of temperature tolerance. Different species are adapted for different temperatures to survive best in the nature. Measurement of temperature is very essential as it affects the chemical and biochemical functions of the organisms. Many important metabolic activities are smoothly carried out at suitable temperature range.

It was observed that the water temperature was minimum in winter and maximum during summer. The minimum water temperature was 14.5C in December 2016 and maximum water temperature was 26.5C in May 2017.

pH or potentia hydrogenii is one of the important physical parameter which is the measure of intensity of acidity or basicity of water. pH is the negative logarithm of hydrogen ion concentration in water. According to Welch, (1952), pH is an index and limiting factor of environmental conditions. pH ranges between 0.0 to 14.0. Different organisms are adapted to survive in ranges of pH. A little change in the value of pH may hamper the aquatic flora and fauna.

pH is the concentration of hydrogen ions. The minimum pH value was 7.4 observed in March. The maximum pH $\,$ 9.1 was observed December.

Dissolved oxygen is the most important parameter in water quality assessment. It reflects the physical and biological processes existing in water (Trivedy & Goel, 1986). Presence of dissolved oxygen is essential for existence of aquatic flora and fauna. Low oxygen can

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kill fishes and other organisms present in water. Demand of oxygen can be different to species to species. Non polluted surface water is normally saturated with dissolved oxygen. Oxygen saturated water has pleasant taste. Concentration of DO can be used to understand contamination of water bodies. Minimum dissolved oxygen was observed in summer and maximum dissolved oxygen was observed in winter. Minimum D.O 5.5 mg/lit was observed in April and maximum D.O. 8.7 mg/lit was observed in November.

Alkalinity of water is the quantitative capacity to neutralize the strong acids. It is the ability to accept protons. Alkalinity secures the water body by buffering rapid changes in pH because of acid rain and other acid wastes. Hence protects the aquatic life by maintaining the pH constant. It is stoichiometric sum of the bases present in the solution. It is described by presence of all hydroxyl ions that are able of combining with hydrogen ions. Total alkalinity was ranged between 124 mg/lit in November to 151 mg/lit May.

Hardness of water is the concentration of alkaline earth metals compounds especially calcium and magnesium dissolved in water. Total alkalinity is the total of soluble calcium and magnesium salts in water expressed as CaCO3 equivalent (Jhingran, 1982). It is the property of water which prevents the lather formation with soap and increases the boiling point of water (Trivedy & Goel, 1986). Total hardness values were ranged between 173 mg/lit in January to 238 mg/lit October.

Table 1: WHO limits of different physico-chemical parameters of potable water

Sr. No.	Parameter	WHO limits		
1	рН	6.5-9.2		
2	Temperature	40°C		
4	Hardness (mg/l)	100-500		
5	Alkalinity (mg/l)	250		
6	DO (mg/l)	5-7		

Table	2:	Summary	of	different	physico	chemical	parameters
studie	ed a	at Ekrukh w	ate	er reservoi	r.		

Month	Physical parameters						
	Water temperature (°C)	рН	Total alkalinity (mg/lit)	Total hardness (mg/lit)	Dissolved oxygen (mg/lit)		
May-16	26.5	8.1	151	196	5.6		
June -16	25.1	7.8	143	177	6.4		
July-16	22.2	7.9	138	215	6.9		
Aug-16	22.3	8.3	138	231	7.2		
Sept-16	20.2	8.7	136	227	7.9		
Oct-16	21.4	8.8	132	238	7.8		
Nov-16	16.5	8.9	124	210	8.7		
Dec-16	14.5	9.1	131	197	8.2		
Jan-17	15.2	8.1	136	173	7.7		
Feb-17	15.6	7.8	138	179	7.6		
Mar-17	19.1	7.4	138	196	7.7		
Apr-17	26.3	8.3	139	207	5.5		







CONCLUSION

All the physico-chemical parameters of Ekrukh water reservoir for all seasons were within the desirable limit or maximum permissible limit prescribed by WHO. From present investigations we concluded that the quality of the water samples under study were suitable for drinking purpose. The results indicate that the tank is non-polluted and can be used for domestic, irrigation and fisheries.

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