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Research Paper

Studies of Physico-chemical Parameters of Garia Dam Jhansi

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Abstract: Water quality is an index of health and being of a society. Physico-chemical parameters are important criteria for determining the suitability of water for irrigation and drinking purpose. The study area selected was the Garia dam (Railway dam) Jhansi District. Garia dam have been studied through monthly survey in six month from January 2017 to June 2017. The water remain moderately Air temperature (31.28^{o}C) and Water temperature (27.03^{o}C), Transparency (123.8 cm), pH (7.5) while Electrical Conductivity of water (0.395 mS/cm), TDS (237.5 mg/l), Chloride (176 mg/l) and Alkalinity (207.16 mg/l) showed main value. Average Dissolve Oxygen (DO) level were 5.75 mg/l while average Nitrates and Phosphates level were 3.70 mg/l and 2.79 mg/l respectively. On the basis of water quality parameters in general Garia dam was found to be eutrophic.
Keywords: Physico-chemical Parameters, Eutrophic, Garia dam.

INTRODUCTION

Water is a most common at the most precious resources on earth without which there would be no life on earth. Water is an important natural source which is abundant in nature and cover about 2/3 of earth surface. However only 1% of water resource is available as fresh water (such as surface water, rivers, lakes, streams and ground water) for human consumption and other activities. Life in aquatic environment is largely governed by physico-chemical characteristic and their stability. These characteristics have enabled biota to develop many adaptations that improve sustained productivity and regulate dam/reservoir metabolism.

The healthy aquatic ecosystem is dependent on the physico-chemical and biological characteristic (Venkatesharaju *et. al.,* 2010). In last two decades there has been a growing necessity for conversation our resources especially water. Water quality monitoring is of immense important in the conversation of water resources for fisheries water supply and other activities; it involves the assessment of physico-chemical parameters of water bodies. Impacted changes in the quality of water are reflected in the biotic community structure with the vulnerable

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dying, while the most sensitive species act as indicator of water qualities. Discharge of pollutants from agriculture and industries and also sewage disposal are major causes of pollution of water reservoir.

In India's studies of physico-chemical characteristics of water have been carried out by various workers. Hussain (1965), Iqbal *et. al.* (1984), Prasad *et. al.* (1985), Das and Kalita (1990), Iqbal *et. al.* (2002), Magrade *et. al.* (2006), Magrade *et. al.* (2011), Sharma *et. al.* (2011) and Kumar *et. al.* (2016). The study area selected were Garia dam (Railway dam) Jhansi district. The Garia dam water is an important source of potable water supply for drinking in railway colonies, railway station, railway workshop, railway hospital, DRM office, PuliaNo.9, Nagra, Gariagaon etc.

MATERIALS AND METHODS

During the study, water sample were collected at monthly interval during January 2017 to June 2017 using variables in the laboratory from preselected place of the Garia dam. Monthly sampling was done in the first week of every month. Sampling was done between 07.00 hrs. and 10.00 hrs. a field kit containing standard glass wares, reagents, water samplers, secchi disc, century water analyser kit (ck 710) manufactured by "Century Instrument Pvt. Ltd., Chandigarh. The water quality parameters such as air and water temperature, pH, depth of visibility (transparency), alkalinity, and dissolve oxygen were measured in the field itself. LCD Portable digital multistem thermometer of -50^{o}C to 150^{o}C range was used to measure air and water temperature, digital pH meter HANNA pHep was used for measuring hydrogen ion concentration (pH), depth of visibility was measured by a standard secchi disc of 20 cm diameter, TDS (Total Dissolve Solids) were measure by digital (Hold) TDS meter and results are expressed in mg/l. However, for the electrical conductivity, nitrate and orthophosphate samples were brought to laboratory in bottle of 500ml capacity and analysed within 24 hours. These physico-chemical parameters were analysed following standard method (APHA, 2005).

RESULTS AND DISCUSSION

Temperature is a primary environmental factor that effects and governs the biological activities and solubility of gasses in water. Owing to the gasses in air, humidity, dust and other colloidal particles, the air temperature is always higher than the water temperature. Air temperature varied between 22.1^{o}C in February 2017 to 38.3^{o}C in June 2017 (Table 1). Water temperature was observed to be highest in May 2017 (33.1^{o}C) and lowest January 2017 (18^{o}C). The overall average value of air and water temperature was 31.28^{o}C and 27.3^{o}C respectively. A good synchronization between temperature and dissolve oxygen was seen. Temperature show significant inverse relationship dissolve oxygen such an inverse relationship has also been observed (Pandey and Sharma 2003, Naz *et. al*. 2006, Sumitra *et. al*. 2007, Sharma *et. al*. 2011 and Kumar *et. al*. 2016).

In the present study, average depth of visibility was average 123.8 cm with maximum of 148.5 cm in March 2017 and minimum of 87.2 cm in June 2017 (Table 1). These varying trends reveal that during June rainy water was turbid, pH fluctuated 6.8 to 8.2 and average pH was recorded in June 2017 which was mainly attributed to rain water after a long dry period and maximum pH was recorded in February 2017. Similar result observed by Negi *et. al*. (2006) and Sharma *et. al.* (2011). The high value may be due sewage discharge from agricultural

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fields and higher temperature. pH values were important for plankton growth.

Table 1: Physico-chemical parameters of Garia Reservoir (Railway dam) Jhansi, from January 2017-June 2017.

S. No.	Parameters	January 2017	February 2017	March 2017	April 2017	May 2017	June 2017	Average	Standard deviation
1.	Air temperature (^{o}C)	24.4	22.1	30.1	35.2	37.3	38.3	31.23	31.23 ± 6.839
2.	Water temperature(^{o}C)	18	19.6	29.1	29.6	33.1	32.8	27.03	27.03 ± 6.599
3.	Depth of visibility (cm)	140.50	131.40	148.5	137.1	98.2	87.2	123.81	123.81 ± 24.974
4.	pH	7	8.2	8.1	7.3	7.6	6.8	7.50	7.5 ± 0.572
5.	Dissolved oxygen (mg/l)	6	7	5.8	5.7	5.1	4.9	5.75	5.75 ± 0.744
6.	Alkalinity (mg/l)	153	207	191	196	251	245	207.16	207.16 ± 36.531
7.	TDS (mg/l)	209	230	226	216	279	265	237.50	237.50 ± 28.076
8.	Conductivity (mS/cm)	0.34	0.39	0.37	0.36	0.47	0.43	0.393	0.393 ± 0.048
9.	Chloride (mg/l)	161	151	138	170	216	220	176	176 ± 34.25
10.	Nitrates (mg/l)	3.75	3.88	2.75	3.01	4.35	4.46	3.70	3.70 ± 0.694
11.	Phosphates (mg/l)	2.85	2.75	2.10	2.09	3.45	3.54	2.79	2.79 ± 0.627

Dissolve oxygen is a most important aquatic parameter, it is vital aquatic fauna. It plays an important role in the respiration process. Adequate dissolve oxygen is necessary for good water quality. According to the study, Garia dam characterize by low level of dissolve oxygen 4.9 mg/l. The highest oxygen value of 7 mg/l was observe in the February 2017. The peak value in winter was also observe (Kolekar 2006; Upadhayaya and Dwevedi 2006; Sharma *et. al*. 2011 and Kumar *et. al*. 2016). Dissolve oxygen show a significant negative relation with temperature, Alkalinity, Total Hardness, Electrical Conductivity, Nitrates, Phosphates and chloride. The observed high value of dissolve oxygen in February due to the high solubility at low temperature and less degradation of organic matter. Alkalinity of natural water is due to the salt of carbonates, bicarbonates, silicates, phosphates along with hydroxyl ions. In the present study highest value of alkalinity was 251 mg/l in May 2017 and lowest value 153 mg/l was observe in Jan. 2017. The total alkalinity shows a positive relationship with Temperature, Depth of visibility (transparency), pH, Total dissolve solids, Electrical conductivity, Chlorides, Nitrates and Phosphates.

Total Dissolve Solids (TDS) are important in drinking water and other water quality standards. Water probability depends on the Total dissolve solids. Total dissolve solids

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value ranged from 209 mg/l to 279 mg/l in different months. This observation was supported by the study of Sumitra *et. al.* (2007). Higher concentration of TDS also due to the discharge sewage and organic matter by the interference of human. The electrical conductivity show highest value of 0.47 mS/cm and lowest value of 0.35 mS/cm was observed in May 2017 and January 2017. According to Sumitra *et. al.* (2007) monthly variation in the conductivity may be due to the increase concentration of salt because of discharge influent of organic matter.

Chloride plays a very important role to determine the water quality in water body indicate the presence of high organic matter. Chlorides occur in most fresh water as the salt of sodium or calcium. Chloride ions are essential for plant and animals. In the present study chloride concentration varied between 138 mg/l noted in March 2017 to 220 mg/l in June 2017. These observations are supported by Sumitra *et. al.* (2007) and Sharma *et. al.* (2011). Higher chloride concentration in June because higher temperature and consequent evaporation. Lower concentration of this factor due to dilution. Nitrates are essential nutrients for plant growth, in this study rich contents of nitrates were observed with minimum of 2.75 mg/l in March 2017 and Maximum 4.46 mg/l in June 2017. This can attributed to high evaporation increase in concentration in June. Similar observation by Sharma *et. al*. (2011) and Kumar *et. al*. (2016).

Present study observes maximum orthrophosphates contents of 3.54 mg/l in June 2017 and minimum of 2.09 mg/l in April 2017. Higher value of phosphates in June month was also reported by Sarang (2001), Sharma *et. al.* (2009) and Sharma *et. al.* (2011). Higher phosphates contents in June because of high temperature can be evaporate water and increase conc.

Conclusion: In any aquatic ecosystem, limnological characteristics may be affected both fauna and flora. Biodiversity contribute both direct and indirect to human such as food for good health, security, social relationship, life and freedom for choice. The primary aim of the study is to understand and elements affected reservoir quality. Another goal is to show the benefits of keeping a long term record of water quality data. Such a record documents changes and helps to distinguish between reservoirs naturally variability and the impact of human activity. Our result will be relevant to limnological study in Garia reservoir. This investigation will be useful for railway and other peoples. It may be recommended to prohibit all anthropogenic activity and other factors from polluting decrease and aesthetic beauty of Garia reservoir.

REFERENCES

Venkatesharaju K., Ravikumar P., Somashekar R. K. and 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), 50-59

Hussain S. U. (1965) Limnological studies of the departmental of at Annamalainagar. Environ. Health 7, 24-31.qui.

Iqbal S. A., Khan S. S., Chaghtai S. A., and Hussain I., (1984) Assessment of pollution levels of river Betwa. J. Sci. Res. 6(3), 165-170.

Prasad B. N., Jaitly Y. C. and Singh Y. (1985) Periodicity and interrelationship of

ISSN: 2348-8344 (Online)
DOI: 10.26540/ijgsr.v5.i1.2018.90

physico-chemical factor in ponds. Proc. Nat. Symp. Pure Appl. Limnology (ed. Adoni A D) Bull. Bot. Soc. Sagar 32, 1.

Das H. B.,Kalita H., (1990) Physico-chemical quality of water, Mizoram. JIWWA 22(2), 203-204.

Iqbal S. A., Masood A., Mohd Ibrahim and Sadaf Farooqui (2002): Physicochemical studies of Halali river reservoir with special reference of water quality. Orient. J. Chem. 18 (1), 151-154.

Magarade V., Iqbal S. A. and Malik S. (2006) Pollution parameters including toxic and heavy metals contamination studies of Upper Lake, Bhopal. Curr. World Environ. 1, 173-175.

Magrade V., Iqbal S. A., Iqbal Nilofar and Zaafarany I (2011) Limnological studies of Upper Lake of Bhopal. Orient. J. Chem. 27, 703-711.

Sharma R., Sharma V., Sharma M. S. andVarma B. K. (2011) Study on limnological characteristics, planktonic diversity and fishes in the Pichola, Udaipur Rajasthan. Univer. J. Envir. Res. Tech. 1,274-285.

Kumar Hemant., Ansari G., Bano S., Qureshi S., Kumar A., Arya P. and Kushwaha K. (2016) Physico-chemical Studies of Garia dam, Jhansi, India. J. exp. Zool. India 19 (1), 1351-1353.

APHA (2005) Standard methods for the examination of water and waste water, American public health association, 21st Ed.

Pandey J. and Sharma M. S. (2003) Env. Sci. Practical and field manual, Yash Pub. House, Bikaner.

Naz S., Musfaqua N. and Sharminz (2006) Primary productivity of an Artificial Lake in Rajashahi, Bangladesh. Nat. Env. Poll. Tech. 5, 139-141.

Sumitra M., Sharma R., Sharma V. and Sharma M. S. (2007) Trophic status of LakePichola in relation of Physico-chemical Characteristics of its water. National symposium on Limnology 244-248 pp.

Negi R. K., John N. S. and Negi T. (2006) Study of the Physico-chemical parameters of water of Pongdam Reservoir, Himachal Pradesh: A Ramsar site. Him. J. Env. Zool. 20, 247-256.

Kolekar V. (2006) Ecology and fisheries status of Keetham Lake of Agra (U.P.) in Early Nineteen. Him. Env.Zool. 20,253-260.

Upadhyay B. L. and Dwevedi D. D. (2006) Impact of Human Activities on Physico-chemicl characteristics of Mansi Ganga water at Goverdhan (Mathura). Him. J. Env. Zool. 20, 131-133.

Sarang N. (2001) Selected Aspects of Limnological changes in Different Parameters of Raniser and Padamsar lakes. Ph. D. Thesis, J. N. V University, Jodhpur Rajasthan.

Sharma V., Ridhhi S., Malera H. and Sharma M. S. (2009) Zooplanktonic Diversity and Trophic status of Mahi dam in relation to physico-chemical characteristics of its water. Poll. Res. 28, 571-576.