

Water Quality Assessment of Harsul Dam, Jatwada Ta. and Dist Aurangabad, Maharashtra

M.D.GHUBE

Department of Zoology, Dr. B.A.M.University, Aurangabad, Maharashtra, India 431001.

Abstract: The present study was carried out from July 2015 to June 2016. During the study period water quality was studied. Various water quality parameters were measured which include pH, air temperature, water temperature, free CO₂, total hardness, calcium, DO, total alkalinity, magnesium. The result reveal that the range of variation in different parameters was DO 6.0 to 9.3 mg/l, free CO₂ 6.5 to 9.9mg/l, pH 7.0 to 8.3, Total hardness 100 to 140 mg/l, total alkalinity 50 to 84 mg/l, calcium 17.1 to 30.0 mg/l, Magnesium 1.21 to 2.97 mg/l. All water parameters were within the permissible limit and suitable for biodiversity.

Key Words: Harsul dam, Parameter, Water Quality.

INTRODUCTION

Water plays a vital role in establishing human civilization. Quality of Freshwater becomes a major natural resource due to number of reasons, drinking, irrigation, fish production, recreation and other purposes. Knowing the importance of water for sustenance of life, the need for conservation of water bodies especially the fresh water bodies are being realized everywhere in the world.

The physical and chemical properties of water immensely influence uses of a water body for the distribution and richness of biota (Unanam and Akpan, 2006). Harsul dam is an earthen, perennial dam situated on Kham river basin Godavari and constructed in 1964. The purpose of this dam is for drinking, agriculture and domestic use.

It is therefore necessary that the quality of drinking water should be checked at regular time of interval, because due to use of contaminated drinking water, human population suffers from varied water borne diseases.

It is difficult to understand the biological phenomenon fully because the chemistry of water reveals much about the metabolism of the ecosystem and explain the general hydro - biological relationship. The physico-chemical properties of water quality assessment give a proper indication of the status, productivity and sustainability of a water body (Djukie et al., 1994).

MATERIAL AND METHODS

To study the water quality, which define as physical and chemical characteristics of water, from Harsul dam, Jatwada, Aurangabad city. Water samples were collected monthly at 2 feet depth from the

surface area of the water body from the two sampling points in between 7 to 11 am during the study period. The first sampling point (S_1) near the wall of the dam and second sampling site (S_2) at the river entry point.

The parameters studied were pH, air temperature, water temperature free CO_2 , total hardness, calcium, DO, total alkalinity, magnesium,. Parameters like pH, air temperature and dissolved oxygen was measured at the site, and samples in 5 liter plastic cans were brought to the research laboratory, for further estimation by using standard water analysis method described by APHA (1992), Kodarkar (1992), Trivedy and Goel (1986).

Physical parameter

i) pH (Hydrogen ion concentration)

pH of water was recorded by field pH Meter Hanna –Model champ during study period on sampling sites.

ii) Temperature

Water and air temperature of the two sampling sites was recorded from July 2015 to June 2016. The temperature was recorded with a centigrade mercury thermometer (graduated from $0.0\text{ }^{\circ}C$ to $110^{\circ}C$) in the field.

1.3 Study of Chemical parameters

Water samples from two sampling sites during the study period July 2015 to June 2016 were collected monthly and brought to the laboratory, for analysis of various chemical parameters.

Chemical parameters like dissolved oxygen, free CO_2 , total hardness, magnesium, calcium, total alkalinity, were determined by standard methods as described by Trivedy and Goel (1986), Kodarkar (1992) APHA(1992).

i) Total Alkalinity

Total alkalinity of water samples was estimated in laboratory by using standard method as described by Trivedy and Goel. (1986).

ii) Total Hardness

Total hardness of collected water samples was estimated by EDTA method in the laboratory as described by Trivedy and Goel. (1986).

iii) Magnesium (Mg^{++}) and Calcium (Ca^{++})

Calcium and Magnesium was determined in the laboratory by using titration method as described by Trivedy and Goel (1986). While magnesium was determined as the difference between the total titrant ($Ca^{++} + Mg^{++}$) and the titrant for Ca^{++} .

v) Dissolved oxygen

Dissolved oxygen was estimated in the laboratory by using Winklers iodometric method as described by Trivedy and Goel (1986).

vi) Free CO_2

Free CO_2 was estimated in the laboratory by using titration method as described by Trivedy and Goel (1986).

Table: 1

parameter	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
Air temp °C	28	27.5	25	23	21	20	19	21	24	29	34	31
Water Temp °C	27	26	24	21	20	19	18.5	19	22.5	27	33	30
pH	7.9	7.7	7.4	7.4	7.9	8.1	8.3	8.2	7.7	7.4	7.2	7.0
DO mg/L	6.5	6.9	7.1	8.6	9.1	9.3	8.6	7.9	7.1	6.3	6.1	6.0
Free Co ₂ mg/L	8.9	8.1	7.6	7.1	6.9	6.5	7.2	8.0	8.9	9.3	9.7	9.9
Ca mg/L	29	26.6	20.2	19.4	18.5	17.1	20.1	21.1	25	26.0	29	30
Mg mg/L	1.71	1.89	2.1	2.46	2.53	2.55	2.97	2.76	1.93	1.41	1.21	1.23
Total Alkanity mg/L	78	80	81	84	79	71	68	61	59	57	54	50
Total hardness mg/L	132	136	130	100	109	121	129	130	132	135	140	136

RESULT AND DISCUSSION

During the study period from July 2015 to June 2016 it was observed that air temperature ranging between 19°C to 34°C. The average minimum air temperature was 19°C in Jan 2016 and maximum was 34°C in May 2016 (Table 1). Watkar A.M. and Barbate M.P.(2015) reported similar results from Chandrabhaga River in Dhapewada, Dist. Kalmeshwar Shivaji Ubarhande and Jywant dole (2017) similar result from Jeevrekha dam Jalna In the present investigation the air temperature is minimum in winter season and maximum in summer season. This change in temperature may be related to the photoperiod. During the study period from July 2015 to June 2016 it was observed that water temperature ranging between 18.5°C to 33°C. The average minimum water temperature was 18.5°C in Jan 2016 and maximum was 33°C in May 2016 (Table 1).Watkar A.M. and Barbate M.P.(2015) reported similar results from Chandrabhaga River in Dhapewada, Dist. Kalmeshwar Shivaji Ubarhande and Jywant Dole(2017) similar result from Jeevrekha dam Jalna. Shinde et. al (2009)reported similar result from Harsul dam Aurangabad. In the present investigation it was observed that water temperature is minimum in winter season and maximum in summer season. This change in temperature may be related to the photoperiod. During the study period from July 2015 to June 2016 it

was observed that pH ranging between 7.0 to 8.3 The average minimum pH was 7.0 in June 2016 and maximum was 8.3 Jan 2016 (Table 1). The high range of pH indicates higher productivity of water. Concentration of dissolved oxygen July 2015 to June 2016 was between 6.0 mg/L and 9.3 mg/L. The minimum DO was 6.0 mg/L in June 2016 and maximum was 9.3 mg/L in Dec 2015 (Table 1). These results are similar to those reported by Ajit M. *et. al* (2012) reported DO is maximum in winter season and maximum in summer season from Deoli Bhorus Dam water, Shah Nawas *et al.*, (2009) from Bhadra river of western Ghats, Shivaji Ubarhande and Jywant dole (2017) similar result from Jeevrekha dam Jalna *et al.* (2009) reported similar result from Harsul dam Aurangabad. Concentration of Free CO₂ July 2015 to June 2016 was between 6.5 mg/L and 9.9 mg/L. The minimum Free CO₂ was 6.5 mg/L in Dec 2015 & maximum was 9.9 mg/L in June 2016 (Table 1). Ajit M. *et. al* (2012) reported DO is maximum in winter season and maximum in summer season from Deoli Bhorus Dam water, Ubarhande and Dole (2017) reported similar result from Jeevrekha dam Jalna. Free CO₂ concentration was minimum in winter. This might be due to high photosynthesis activity and maximum in summer which may be due to less photosynthetic activity because of low phytoplankton population. Concentration of Calcium from July 2015 to June 2016 was between 17.1 mg/L and 30 mg/L. The minimum Calcium was 17.1 mg/L in Dec 2015 and maximum was 30 mg/L in June 2016 (Table 1). The desirable limits of calcium and magnesium for drinking water are 75 mg/L and 30 mg/L respectively (BIS, 1991). Calcium is helpful for the shell construction and bone building of aquatic organism lowest in monsoon season, Rajana *et al.*, (2002). Concentration of Magnesium July 2015 to June 2016 was between 1.21 mg/L and 2.97 mg/L. The minimum Magnesium was 1.21 mg/L in May 2016 and maximum was 2.97 mg/L in Jan 2016 (Table 1). Similar result were reported by Arun Kumar (2015) from Chilar Dam, Sajapur Town M.P India. Magnesium occur in all kinds of natural water with calcium but its concentration remains generally lower than calcium because dissolution of magnesium reach minerals is a slow process and calcium is more abundant in earth's crust, Dakshinini and Soni, (1997). Concentration of Total Alkanity July 2015 to June 2016 was between 50 mg/L and 84 mg/L. The average minimum Total Alkanity was 50 mg/L in June 2016 and maximum was 84 mg/L in Oct 2015 (Table 1). Watkar A.M. and Barbate M.P. (2015) reported similar results from Chandrabhaga River in Dhapewada, Dist. Kalmeshwar, Ajit M. *et. al* (2012) reported from Deoli Bhorus Dam water. Concentration of Total Hardness July 2015 to June 2016 was between 100 mg/L and 140 mg/L. The average minimum Total Hardness was 100 mg/L in Oct 2015 and maximum was 140 mg/L in May 2016 (Table 1). Ajit M. *et. al* (2012) reported the range of 110.75 mg/L to 120.91 mg/L. from Deoli Bhorus Dam water., Similar results were reported by Bodane Arun Kumar (2015) from Chilar Dam, Sajapur Town M.P India were Hardness of samples of dam water is in the range of 111.05 to 117.90 mg/l. The total hardness is a contribution of calcium and magnesium salts dissolved in water. Normally these ions are not problematic but at higher concentration increases hardness. The high value of hardness in

summer and low value in monsoon show that the water may be suitable for the growth of the aquatic fauna.

The present study gives database information about the water quality of Harsul dam. All the water parameters were within permissible limit and helpful for the maintaining biodiversity. Need to stop the domestic and agricultural activities.

ACKNOWLEDGEMENTS

Author is thankful to Head, Department of Zoology, Dr. B. A. M. University Aurangabad and Research Guide for their kind Suggestion and Cooperation.

REFERENCES

- Ajit M. Padmakar A. Savale (2012).** Determination of Physico-Chemical Parameters of DeoliBhorus Dam water., *Advances in Applied Science Research*, 2012, 3 (1):273-279
- APHA(1992).** Standard Methods for the Examination of Water and Wastewater, 18th ed. American Public Health Association, Washington DC.
- BodaneArun Kumar (2015).** Physico-Chemical Parameters Assesment Of Chilar Dam Water In Different Sites Of Shajapur Town, M.P., India., *International journal of research granthaalayahvol* 3(issu 3)
- Dakshini K.M.M. and Soni J.K. (1997)** Water quality of sewage drains entering Yamuna in Delhi Indian *J. Environ. Health.*21 (4):354-361.
- Gupta P, Agarwal S, Gupta I (2011).** Physiochemical parameters of various lakes of Jaipur Rajasthan India., *Indian Journal of Fundamental and Applied Sciences* 1(3)246-248.
- Kodarkar .M.S (1992)** Methodology for Water Analysis. Published by The secretary, IAAB. Hyderabad.
- Patil P.R, Badgujar S.R, Warke A.M (2001)** Evaluation of Ground water quality in Ganesh Colony area of Jalgaon city ., *Oriental J.Chem* : 17(2): 283.
- Ranjana, Borah, Das,P.K. and Bhattacharrya, K.G (2002)** Studies on interaction between surface and groundwater at Guwahati, Assam, India *Jr. of Env. & Poll.* 8(4): 361-369.
- Shahnawaz A., Venkateshwarlu M., Somashekar D.S. & Santosh K.(2009):** Fish Diveristy with relation to water quality of Bhadra River of western Ghats (India)., *Environ. Monit. Assess. DOI.* 10. 1007/s 10661-008-0729-0, Accepted 23 December 2008, published online: 320 January 2009.
- Shivaji Ubarhande and Jywant Dhole (2017).** Study Of Physico-Chemical Parameters From Jeevrekha Dam, Maharashtra, India., *international journal of Researches in biosciences , agriculture and technology ., special issue(1) vol V .*

Trivedy R. K. and Goel P. K. (1986). Chemical and Biological methods for Water Pollution Studies, *Env. Publications*, Karad: 247.

Watkar A.M. and Barbate M.P.(2015) Seasonal variations in Physico-chemical Properties of Chandrabhaga River in Dhapewada, Dist. Kalmeshwar Maharashtra, India., *research Journal of recent science*. Vol 4(ISC 2014)., 1-4 .

