

Investigations of Physico-Chemical parameters of Padalse Dam from Amalner Taluka of Jalgaon District MS.

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Abstract

The current work deals to estimate current status of physico-chemical properties of *Padalse Dam water body in Amalner Taluka of Jalgaon District*. Monthly variation and changes were recorded in quality of water. During the study period Hydro biological parameters such as water temperature, pH, total dissolved solids, dissolved oxygen, total and calcium, were analyzed for one year from March 2016 to February 2017.

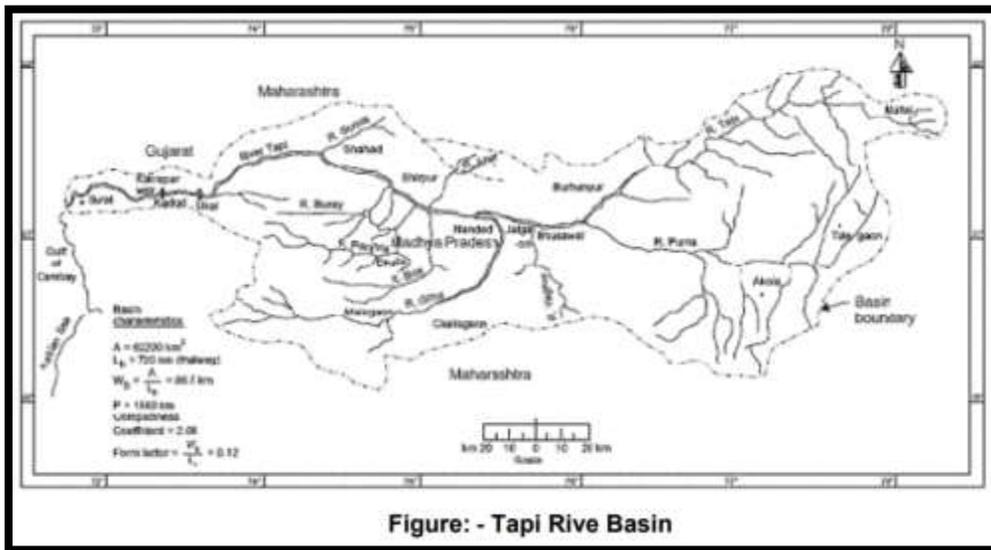
Keywords: Physico-chemical parameters *Freshwater algae, Padalse Dam and, water quality.*

INTRODUCTION

Water resources are of critical importance of both pond ecosystem and human development. It is essential for drinking, agriculture, industry and human existence. The healthy aquatic ecosystem is depended on the physico- chemical and biological characteristics of water (Venkatesharaju *et al.*, 2010)

All around the world, 3240 Km³ of new water is drawn and utilized yearly 69 % of this is utilized for horticulture, 23% for industry and 8% for homegrown use (WRI, 1992). Horticulture exercises fundamentally rely upon fresh water. The industrial business is second biggest client of clean water. In the exceptionally evolved nations 95% of the pre-owned water isn't treated before it is delivered to surface waters (Karagul *et al.*, 2005 and Fathi *et al.*, 2009).

The current examination work manages water quality boundaries in compare to hydrobiology of the Padalse Dam water body in Amalner taluka of Jalgaon (M.S.) India. Water of this lake is valuable for drinking and water system rehearses.



METHODOLOGY

Padalse Dam is located at 21.1869627°N and 75.0004005°E in Amalner taluka of Maharashtra. The particular water body also known as Lower Tapi Dam (or Padalsare Dam) situated on Tapi River. The study was carried out to observed water quality of dam during the year of March 2016 to Feb 2017 by collecting water samples from 2 different sites at the Padalse dam in the morning time 9 to 11 am (APHA 2005).

The parameters were studied by standard method (APHA 2005), water sample were tested in the laboratory by using plastic bottle. The water temperature was recorded at the site by using thermometer. The pH was determined by using pocket digital pH meter. DO was

determined By Winkler's method. Free Co₂ was determined by titration method following Trivedy *et al.*, (1987). Alkalinity estimated by titration method as suggested by APHA (2005).

RESULT AND DISCUSSION

Atmospheric temperature: - The atmospheric temperatures were recorded to be in the ranged between 23-32 °C. The maximum temperature 32 °C were recorded in month of July 2016. The minimum temperature recorded was 23.3 °C in March 2016 (Sathe *et al.*, 2001 and Rahullah *et al.*, 2012).

Water temperature: - It was found to be in the range between 22.5°C to 29.9°C. The maximum in the summer month's i-e 29.9°C and minimum 22.5 °C was recorded in the winter months. The similar trend was observed by Sharma *et al.*, 2000. Gradual increase in water temperature from February to May can be co-ordinate to longer day length and decrease in temperature from November to January is due to decreases in day length (Munawar 1974).

pH: - Observation for the pH were done in the ranged of 7.2 - 8.6 it is indicating alkaline nature, the pH value gradually increases from mid winter to late summer and then decrease in monsoon. The factors like air temperature bring about changes the pH of water (Jayabhaya, *et al.*, 2008) the values are within the permissible limit prescribed by WHO.

Dissolved Oxygen:- Its important factor for water quality and understanding the physical and biological process prevailing in the waters. Dissolved oxygen values ranged between 5.98-10.60 mg/L. The minimum DO was recorded during summer months and maximum during monsoon, owing to the maximum turbulence in the water caused by precipitation as rainfall (Verma and Singh 2010 and Ahamed and Krishnamurthy 1990).

Month	Atmospheric temperature		Water Temperature		pH		Dissolved Oxygen	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Mar-16	24.7	23.3	22.8	26	7.8	7.8	7.21	6.25
Apr-16	23.4	26.8	24.6	27.2	7.6	7.8	7.48	5.98
May-16	24.8	26.4	26	28.6	7.8	7.9	6.93	5.71
Jun-16	26.4	27.2	26.5	29.9	7.9	7.9	6.39	6.25
Jul-16	28.1	32.4	26.8	28	8	8	6.12	9.11
Aug-16	29.2	31.8	28.8	22.9	8.2	8.6	5.98	9.11
Sep-16	30.9	28.5	27	26.4	8.5	8	6.12	10.3
Oct-16	28.8	25.4	22.5	26	8.2	8.2	7.21	10.3
Nov-16	23.9	33.6	22.9	28.3	7.3	7.3	7.48	10.6
Dec-16	23.6	28.9	28.3	29.8	7.2	7.2	7.07	6.25
Jan-17	29.2	24.9	29.8	28	7.3	7.3	6.8	5.98
Feb-17	27.9	25.7	22.9	22.9	7.6	7.6	6.12	5.71
Mean	26.74	27.90	25.74	27	7.78	7.8	6.74	7.62
Tot Mean	27.325		26.37083		7.791667		7.185833	

Table 01. Monthly variation of physicochemical parameters for Atm temperature, Water Temperature, pH and Dissolved oxygen

Biochemical oxygen Demand: - In current observation the monthly variation of BOD value ranged from 2.4 - 7.34 mg/L the high level of BOD value recorded in May. Devaraju *et al.*, 2005 has made similar observations in Muddur Lake and (Garg *et. al*, 2006):

Free carbon dioxide: - The value of free CO₂ ranged from 0.0 - 8.0 mg/L. the maximum value of 8.0mg/L was recorded in the month of September and minimum value 0.0mg/L in the month

of March. This may be depending upon alkalinity and hardness of water body Upadhyay and Gupta reported similar observation in Khudia Dam (Krishnamurthy1990).

Alkalinity :- Alkalinity is a measure of quantity of compounds that shift the pH to the alkaline side of neutrality. In the present investigation the total alkalinity ranged from 121-193 mg/L. The TA found minimum in monsoon and maximum in summer during the study. Similar observations were made by Nair 2000, Mane and Madalpur 2002:

Total dissolved solid (TDS): - This value ranged from 173 -222 ppm in different seasons minimum TDS 173 ppm at observation on nov 2016 at site II and maximum TDS 222 ppm on Aug 2016 at observation site I. The maximum levels of TDS were seen during monsoon due to the extreme turbulence caused by the rainfall and also due to the flow of sediments with the rain water (Oak *et al.*, 2013 and Gupta *et al.*, 2013).

Month	BOD		free CO ₂		Alkalinity		TDS	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Mar-16	7.34	2.7	0	0	183	180	196	196
Apr-16	7.34	2.4	1.0	1.0	183	183.6	197	197
May-16	7.21	2.7	2.1	2.2	182	193.3	198	198
Jun-16	7.48	3.6	4.4	4.4	182	175	207	202
Jul-16	6.12	2.8	5.87	5.866	147	148.3	216	208
Aug-16	5.98	3.2	7.33	5.866	121	122.3	222	217
Sep-16	6.93	3.2	8.8	7.333	153	153.3	194	193
Oct-16	6.12	3.6	1.1	1.2	163	153.3	177	177
Nov-16	6.8	3.4	0	0	173	170	177	173
Dec-16	6.25	3.4	0	0	172	170	179	190
Jan-17	5.98	2.8	0	0	177	172	191	189
Feb-17	5.71	2.7	0	0	185	183	191	192
Mean	6.60	3.04	2.55	2.32	168.41	167.00	195.41	194.33
Tot Mean	4.82		2.43		167.71		194.87	

Table 02. Monthly variation of physicochemical parameters for BOD, free CO₂, Alkalinity and TDS

Sr No.	Physico-chemical parameters	General permissible Limit	Desirable standard by WHO	Padalse Dam Range
1	Temperature	Narrative	Narrative	Acceptable
2	pH	6.0 to 8.25	6.5 to 8.5	7.1 to 8.7 mg/L
3	Dissolved oxygen	7.4	7.4	5.44 to 10.88 mg/L
4	BOD		30	1.2 to 5.2 mg/L
5	Free Co ₂			0.00 to 8.8 mg/L
6	Total Alkalinity	30 to 500	120	120.33 to 191.66 mg/L
7	TDS	550 to 1500	5000	173 to 222 ppm
8	Atmospheric temperature			21.4 - 33.6 °C.

Table 3: Comparison of Physico - chemical parameters of water from Padalse Dam, with Surface standard by WHO.

CONCLUSIONS

Padalse Dam water body in Amalner Taluka was critically studied in aspects on atmospheric temperature, Water temperature, Dissolve oxygen, pH etc, in two different sites for all months in a year. The physico chemical parameters of Padalse Dam are within the normal range of WHO standards. There for the water is suitable for all purposes of human consumption.

REFERENCE

- A Tiwari 2006 “Seasonal phytoplanktonic diversity of Kithamlake, Agra”, Journal of Environmental Biology, (35-38) – 27(1).
- Abidjan U.G., R. Rates and A. Bijou Kumar, 2012: Distribution and diversity of aquatic insects of Vellayani Lake in Kerala. Journal of Environmental Biology, Vol.34, pp. 605-611.

- ✚ Adak M. D., S. Adak and K. M. Purohit, 2002: Studies on water quality of village Timjore, Orissa: Part –I. physico-chemical parameters, Indian J. of Envntl. Prtcn. 22 (9), pp. 1040-1046.
- ✚ Adam M. S., A. A. Mohammed and A. A. Issa, 1990: Physico-chemical characteristics and planktonic algae of two irrigation canals and a closed pond at Assiut area, Egypt, Bull. Fac. Sci. Assiut Univ. 19 (2D), pp. 219-245.
- ✚ Adholia U. N. and A. Vyas, 1992: Correlation between copepods and limo chemistry of Manasarower reservoir, Bhopal. J. Environ. Biol. Vol. 13 (4): pp. 281-290.
- ✚ Agale M.C., J. V. Patil and N. G. Patel, 2013: Study of seasonal variations of phytoplankton and their correlation with physicochemical parameters of Budaki medium irrigation tank Shirpur. Dist. Dhule (M.S.) India. European Journal of zoological Research. Vol. 2 (3): pp. 8-16.
- ✚ Agarwal R. K., S. Thiske and S. Mondal, 2014: Diversity and seasonal fluctuation of zooplankton in fresh water reservoir Mongra Bai raj Rajnandgaon district, CG, India. Research Journal of Animal, Veterinary and Fishery Sciences Vol. 2(8), pp. 1-4
- ✚ Akin-oriola, G.A., 2003: Zooplankton association and environmental factors in Ogupa and Ona rivers, Nigeria. Rev. Biol. Trop., 51 (2): pp 391-398..
- ✚ B.K.Sharma, 2010: “Phytoplankton diversity of two floodplain lakes (pats) of Manipur, northeastern India”, Journal of Threatened Taxa, (1273-1281) – 2(11).
- ✚ D. Tiwari et al.,2001 “Algal dynamics of river Ganga at Kanpur”, Phycos., (45-51) - 40(1/2).
- ✚ D. Tiwari et al., 2007 “Algal biodiversity and trophic status of some temporary water bodies of Kampur”, Nat. Environ. Pollut. Technol., (85-90) – 6.
- ✚ Lokhande R.S., Shinde D.N., Kulkarni S.W., Lohani P., Ghodvinde V. and Gangele S. (2008). Hydrobiological studies of Ulhas River , Thane District (M S), India. Poll. Res. 27 (4): 735-738.

- ✚ M. Singh et al. 2010: “Seasonal Diatom Variations with reference to physico-chemical Properties of Water of Mansagar Lake of Jaipur, Rajasthan”, Research journal of Agricultural Sciences, (451-457) – 1(4).
- ✚ Mishra S. and Lingaraj P 2015. Evaluation of physico-chemical property- carbon dioxide, dissolve oxygen and total dissolved solid content in the water of chilika Lagoon. J. Global Biosci. 4(2):1543- 1550.
- ✚ Muley D.V and Patil M. 2006. J. Aqua. biol. 21:68-75. Nalina Eand Puttaiah I.M. J. Aqua. Biol. 21:105.
- ✚ N. Shiddamallaya et al. 2011, “Seasonal Changes in Phytoplankton Community in Pappnash Pond, Bidar, Karnataka Along With Physico-Chemical Characteristics of Water”, Journal of Advances in Development research, (186-190) – 2(2).
- ✚ Nyamangara J., Jeke N. and Rurinda J. 2013. Long term nitrate and phosphate loading river water in the Upper Manyame catchment, Zimbabwe water SA, 39(5):637-642.
- ✚ R. Senthilkumar et al., 2008: “Studies on phytoplankton diversity in response to abiotic factors in Veeranam lake in the Cuddalore district of Tamil Nadu”, Journal of Environmental Biology, (747-752) – 29(5).
- ✚ Ravindra K., Meenakshi Monika Rani, and Kuushik A. 2003. Seasonal variation in physico-chemical characteristics of river Yamuna in Harayana and its ecological best-designated use. J. Environ. Mohit. 5:419-426.
- ✚ Sagar S.S., Chavan R. P. Patil C.L., Shinde D.N., Kekane S.S. 2015. Physico-chemical parameters for testing of water – A review. Int. J. Chemical Studies. 3(4): 24-28.
- ✚ Sharma G. and John R.V. 2009. Study of physic-chemical parameter of waste water from dyeing units in Agra city. Poll Res. 28:439-442.
- ✚ Sharma R.K. and Rathore V. 2000. Pollution ecology with reference to commercially important fisheries prospects in rural-based water body : the Lake Sarsai Nawar, Etawah (Utter Pradesh) Pollut. Res.19:641-644.
- ✚ Shastri Y., Sonawane Y.D. and Pingle S.D. 2004. Physico-chemical characteristics of a village pond near Nashik. J. Ecotoxicol. Environ. Monit. 14:137-141.

- ✚ Tamluykar and Ambore 2006. Correlation co-efficient of some physico-chemical characteristics of Alisagar dam water, district Nizamabad, Andhar-pradesh, India. *Agna Biol.* 2:115-118.