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STUDIES ON WATER QUALITY OF JAYAKAWADI DAM IN RELATION TO AQUACULTURE, MAHARASHTRA, INDIA.

Nabilal R. Sayyad
Dept. of Zoology, Jijamata College of Science and Arts, Bhende, Maharashtra, India
*Corresponding Author: nabizoology@gmail.com

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ABSTRACT

Physico-chemical parameters were estimated in Jayakawadi dam from February 2015 to January 2016. The present investigation deals with the water quality of Jayakawadi dam to assess its suitability for aquaculture. Several parameters like pH, dissolved oxygen (DO), alkalinity, nitrate, nitrite, phosphate, and sulphate have been study. All the physico chemical parameter analyzed for assessment of water quality status of Jayakawadi dam. These parameters determined, revealed that the fluctuations in water but within the desirable limits for aquaculture and high level of phosphate were need to be modifying in order to favour aquaculture.

Key words: - *Water quality, Jayakawadi dam, aquaculture.*

INTRODUCTION:

Late Prime-minister Lalabhadur Shasrti laid down the foundation stone of Jayakawadi dam on 18th October 1965. The late Prime-minister Indira Gandhi inaugurated the project on 24th February 1976. The catchments area of Paithan dam is 21,750 sq. Km. the gross storage capacity is 2909 m. cum. (Million cubic meter). The maximum height of dam above riverbed is 37 m. The length of dam is 10.20Km. The length of over flow section is 417 m. The type of dam is Earthen. The area submergence is 35,000 Hectares. The earthwork is 12.85 m. cum. The masonry work is 0.33 m. cum. The dam has 27 spillway gates. The District wise distribution of irrigable command area of the canal is Aurnagabad 9,052 Hectares, Jalna 36,580 Hectares, Parbhani 97,440 Hectares, Ahmednagar 2,290 Hectares and Beed 37,960 Hectares. Water is one of the essential requirements to sustain life. Life on earth would be impossible without water. It is a gift to man by nature. But man's activities have made water as a source of potential danger to his health and very existence. From the literature survey it is clearly understood that extensive work has been done on the water quality of various water bodies, however increasing human activities increases pollution level daily. Hence to know the impurities, which are harmful to human and aquatic organisms' life, is of prime importance. Cao et al., (2007) reported that aquaculture has been a fast growing industry because of significant increases in demand for fish and seafood throughout the world. It is accounted for 46% of total food fish supply. Aquaculture is getting increasing important worldwide due to the increasing demand for fish and crab protein as well as due to the stagnant supply from wild catch Yee et al., (2012). A necessary prerequisite for deciding how to protect rivers and lakes is developing a basic understanding of the physicochemical properties like light, pH, temperature,

dissolved oxygen, alkalinity, acidity and heavy metals. The physicochemical analysis is the prime consideration to assess the quality of water for its best use like drinking, fishing, industrial purpose and agricultural purpose Jha and Verma (2000). Lakes and rivers are undergoing slow evolutionary changes, reflecting the changes that occur in their watersheds. In view of the above, it is proposed to carry out a detailed investigation of the water parameters of Jayakawadi dam.

MATERIALS AND METHODS:

Jayakawadi dam selected as a freshwater body for the present investigation. The water samples were collected every month from Jayakawadi dam for estimation of different water parameters like pH, dissolved oxygen, alkalinity, sulphate, phosphate, nitrate and nitrite was carried out. Water samples were collected at monthly intervals for a period of one year from February 2015 to January 2016 for the estimation of various physicochemical parameters. The pH was measured using pH meter and dissolved oxygen was estimated using Winkler's method as described by Golterman (1969). Alkalinity, nitrate, nitrite, phosphate, and sulphate were estimated by using standard methods as described by APHA (1998). Water samples were kept in well-stopped polyethylene plastic bottles.

RESULTS AND DISCUSSION:

The water samples were collected every month from Jayakawadi dam for detecting the various water parameters. The results are given in Table 1 and illustrated in figure 1, 2 and 3.

pH:

pH range was 8.1 (September) to 8.8 (March), high pH was observed during summer season due to influence of biological activity and uptake of carbon-dioxide by photosynthesing organisms. Saxena *et al.* (1996) noticed pH of Ganga river water generally above 8 in all seasons except in rainy season. Similar results were also reported by Pawar and Pandakar (2011). The pH was found to be alkaline throughout study period which favours the growth of aquaculture.

Dissolved oxygen:

Pawar et al. (2005**)** reported that minimum 3 mg/l dissolved Oxygen is essential for aquatic life. Sallu *et al.* (1995) observed 0.60 to 1.70 mg/l-dissolved oxygen in Ganga river. In present study, DO of Jayakawadi dam water was recorded in the range of 4.1 to 6.18 mg/l.

Alkalinity:

Alkalinity provides an idea of the nature of salts present in water. The values of alkalinity show fluctuations lower in rainy season and higher in summer season. The alkalinity is inversely related to the water level. In present study, alkalinity of Jayakawadi dam water was recorded in the range of 90 to 230 mg/l. These results are in good agreement with that reported by Sita Rama swamy (1995), Rajput (1999) and Biswas et al (2012).

Sulphate: In present study sulphate of Jayakawadi dam water was recorded in the range of 2.8 to 7.1mg/l. Sulphate is constituent of total dissolved solid (TDS) and may form salts with sodium, potassium and magnesium and other cations. Boyd (1998) reported that sulphate is not a toxicant in the category and its concentration 5 to 100mg/l is desirable for the freshwater aquaculture system.

Nitrate:

Nitrate is formed through nitrification process, i.e. oxidation of NO2 to NO3 by the action of aerobic bacteria. Nitrate not taken up directly by aquatic plants is denitrified in anaerobic sediments. Boyd (1998) reported the desired nitrate concentration for the aquaculture is 0.2 to 10 mg/l. Surface water

can also be contaminated by sewage and other wastes rich in nitrates. Higher concentration of nitrate in drinking water is toxic (Umavathi et al., 2007). In present study, nitrate of Jayakawadi dam water was recorded in the range of 0.034 to 0.097 mg/l. These results are in good agreement with that reported by Smita (2002).

Nitrites:

Nitrogen generally enters water in the form of nitrites, which are converted to nitrates by bacteria and algae through a process that depletes the amount of available oxygen in the water for aquatic organisms. High levels of nitrites, if not quickly converted to nitrates can lead to a serious condition in fish and other aquatic organism. The nitrite oxidizing bacterium oxidizes nitrites to nitrates Cunningham (1994).

Phosphate:

The phosphorus was the most important factor bringing about eutrophication and algal growth. In general concentration of phosphate decreased in monsoon month due to accumulation of rainwater. In river Ganga near Kanpur Saxena *et al.* (1996) recorded maximum phosphate (32 mg/l). Presence of phosphates in water and wastewater analysis has a great significance of all the nutrients of primary concern to the aquatic ecology. In winter values are generally lower than values in summer.

REFERENCES:

APHA (American public Health Association), (1998): Standard Methods for the Examination of water and wastewater, 18th Edition, APHA AWWA. WPCF (eds) Washington D. C. pp. 1268.

Boyd CE. (1998): Water quality for pond aquaculture. Research and Development Series No.43. International center for Aquaculture and Aquatic Environments, Alabama Agricultural Experiment Station, Auburn University, Alabama

Biswas P, Vardia H,and Ghosh A (2012): Water quality of Budha Talab, Chhattisgarh. J. Inland fish Soc. India 44(1), 94-97.

Cao L, Wang W, Yang Y, Yang C, Yuan Z, Xiong S, Diana J. (2007): Environmental impact of aquaculture and countermeasures to Aquaculture Pollution in China. Env. Sci. Pollut. Res.; 14(7):452-462.

Cunningham, W. (1994): Understanding our environment Wmc. Brown publishers. Environment Protection Agency (EPA) About Estuaries online article. www.epa.gov.

Golterman, H. L. (1969): Method for chemical analysis of fresh water. Blackwell scientific publication, Oxford Edinburg. Pp. 210.

Jha, A. N. and Verma, P. K. (2000): Physicochemical properties of drinking water in town area of Godda district under Santal Pargana (Bihar), India. Poll. Res. 19 (2): 245 – 247.

Kataria, H. C. and Igbal, S. A. (1995): Pawar B A and Pandarkar A K (2011): Studies on water quality of kelewadi lake in relation to pisciculture. Uttar Pradesh J. Zool 31(1), 35-41.

Pawar, S. K. and Pulle, J. S. (2005): Studies on physicochemical parameters in Pethwadaj Dam. Nanded District in Maharastra, India. J. Aqua. Biol. 102: 110-112.

Rajput, R. A. (1999): Hydrological conditions of Godavari water in relation to biota. Ph. D. Thesis, Marathwada University, Aurangabad

Sallu, B. K., Rao, R. J. and Behera, S. K. (1995): Studies on some physicochemical characteristics of the

Ganga river water (Rishikeshanpur) within twenty four hours during winter. Eco. Environ. Conserv. 1: 35-38.

Saxena, K. L., Chakrabarthy, R. N., Khan, A. K., Chattopadhyay, S. N. and Chandra, H. (1996): Pollution studies of river Ganges near Kanpur. Env. Hlth. 18 (4): 270 – 285

Sharma, M. S; Selvaraj, N; Chistry and Sharma, R. (2000): Heavy metal toxicity to freshwater. Zooplankton poll. Res. 19 (1): 159 – 165.

Sita Rama Swamy (1995): Environment impact studies on the Teki Drain Coringa river. Ph, D. Thesis, Andhra university, Visakhapatanam, India. J. Aqua. Biol. 102: 110-112.

Smita, S. P. (2002): Hydrological studies of Garkheda Dam. Ph. D. Thesis, Marathwada University, Aurangabad.

Srinivas, H. Ravi Shankar, P. Venkateshwar, C. and Satyanaryana Rao (2000): Studies of ground water quality of Hyderabad. Poll. Res. 19(2): 285-289.

Umavathi S, Longakumar K, Subhashini. (2007): Studies on the nutrient content of Sulur pond in Coimbatore, Tamil Nadu. Journal of Ecology and Environmental Conservation. 13(5):501-504.

Yee LT, Paka DD, Nyanti L, Ismail N, Emang JJJ. (2012): Water Quality at Batang Ai Hydroeletric Reservoir (Sarawak, Malaysia) and Implications for Aquaculture. International Journal of Applied Science and Technology, 2(6):23-30.

Table 1: Physico-chemical parameters of water (Mg/l) from Jayakawadi dam

Month	pH	DO	Alkalinity	Sulphate	Nitrate	Nitrites	Phosphate
Feb. 2015	8.3	5.27	210	4.2	0.053	0.044	7.0
Mar.2015	8.8	4.08	220	4.6	0.044	0.041	6.0
April 2015	8.5	4.01	214	4.2	0.052	0.039	6.5
May 2015	8.7	5.15	230	4.3	0.034	0.035	6.0
June 2015	8.5	5.29	090	5.2	0.052	0.038	5.25
July 2015	8.4	5.36	095	3.9	0.034	0.039	4.5
Aug. 2015	8.3	4.43	108	2.9	0.078	0.023	5.0
Sept. 2015	8.1	4.71	150	2.8	0.043	0.035	5.5
Oct. 2015	8.6	5.13	160	3.9	0.065	0.052	5.0
Nov. 2015	8.6	5.27	220	6.1	0.086	0.044	3.0
Dec. 2015	8.7	6.11	230	6.4	0.088	0.062	3.5
Jan. 2016	8.8	6.18	220	7.1	0.097	0.059	4.5

Figure 1: Monthly Variation of pH, Do, Sulphate and Phosphate of Jayakawadi dam During February 2015 to January 2016.

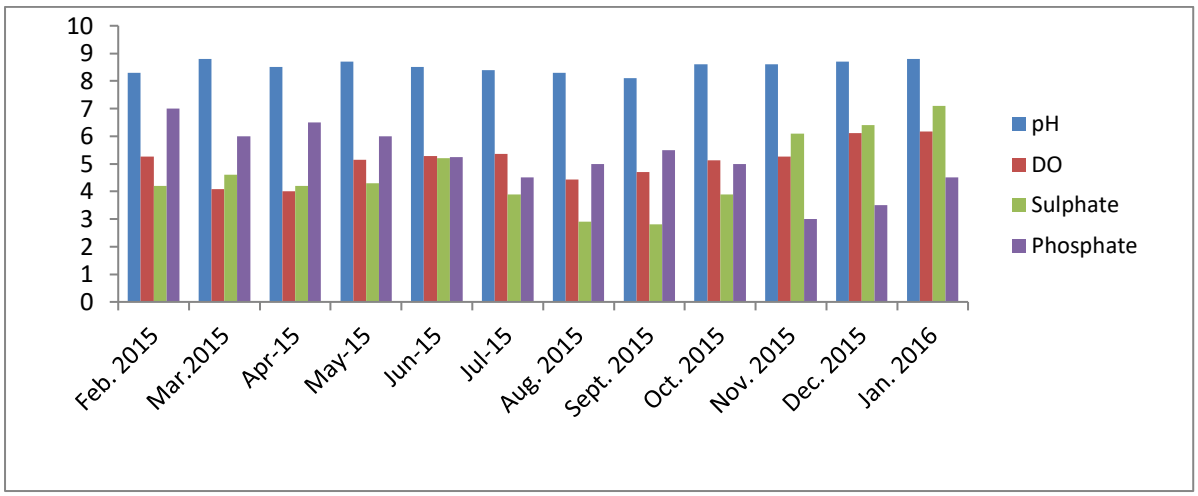

Figure 2: Monthly Variation of alkainity of Jayakawadi dam During February 2015 to January2016.

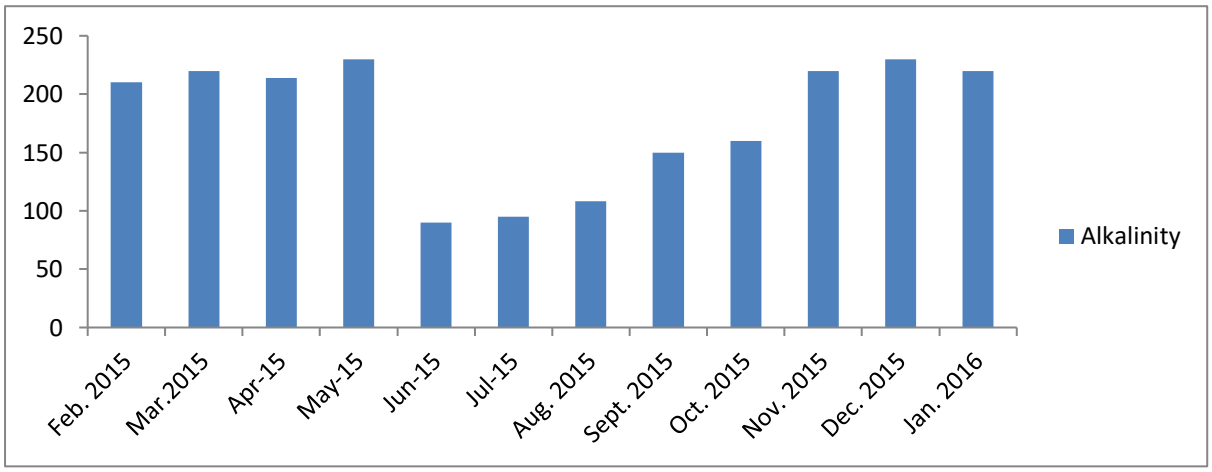

Figure 3: Monthly Variation of nitrate and nitrites of Jayakawadi dam During February 2015 to January 2016.