



## Study of Physico-Chemical Nature of Water from Jangamhatti Dam, Chandgad, Distt. Kolhapur, Maharashtra

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Nat. Env. & Poll. Tech.  
Website: [www.neptjournal.com](http://www.neptjournal.com)

Received: 25/7/2011  
Accepted: 24/9/2011

### Key Words:

Jangamhatti dam  
Water quality  
Drinking water standards

### ABSTRACT

The present investigation has been evaluate the water quality by physico-chemical parameters of dam water of Jangamhatti, Distt. Kolhapur for a period of one year water samples were collected from various places of dam. The parameters analysed includes temperature, pH, transparency turbidity, total dissolved solids, conductivity, dissolved oxygen, free CO<sub>2</sub>, alkalinity, chloride, total hardness and BOD. Result obtained reveals that parameters are within the range prescribed by WHO and BIS standard for drinking purpose.

Water is essential for the survival of any form of life. First life was originated in water. On an average human being consumes about 2 L of water every day. Water accounts for 70 % of the weight of a human body. Out of the estimated 1011 million m<sup>3</sup> of total water present on earth, only 33400 m<sup>3</sup> of water is available for drinking, agriculture, domestic and industrial purposes. The rest is lockup in ocean as salt water, polar icecaps and glaciers and under ground. Owing to increase in industrialization on one hand and exploding population on the other, the demand of water supply has been increasing tremendously. Moreover, considerable part of this limited quantity of water is polluted by sewage, industrial wastes and synthetic chemicals. Thus, quality as well as quantity of clean water supply is of vital significant for the welfare of mankind. India receives about 1400-1800 mm of rainfall annually. It is estimated that 96 % of this water is used for agriculture, 3 % for domestic use and 1 % for industrial activity. An analysis conducted in 1982 revealed that about 70 % of all available water in our country is polluted. Therefore, the present study has been undertaken to evaluate the physico-chemical nature of water of Jangamhatti Dam, Maharashtra

The water samples were collected from the dam in morning between 11 a.m. to 12 noon in plastic containers from the depth of 10-15 cm below the surface of water. The pH and conductivity were measured by using digital pH meter and digital conductivity meter respectively. Temperature was measured by a mercury thermometer. The other parameters like transparency, turbidity, TDS, dissolved oxygen, free

CO<sub>2</sub>, alkalinity, chloride, total hardness and BOD were analysed by the standard methods (APHA 1985). Physico-chemical parameters of the water of the reservoir are given in Table 1.

Temperature is one of the important factors in functioning of aquatic systems. Rise in temperature increase biochemical reactions and reduce solubility of gases. In the present study the temperature ranged between 15.0°C and 30.0°C. The maximum temperature was recorded in the month of May, and minimum in January.

The pH of water is alkaline throughout the year. It ranged from 7.5 in the month of December to maximum 8.1 in the month of April. The average pH is within the favourable range. Transparency is an important water quality characteristic of dams. In the present investigation, the transparency values ranged between 30cm and 91cm, which indicate high trophic status of the water. The transparency values declined in rainy season due to sewage and silt of rain water from the surrounding catchment area. The turbidity ranged from 6 to 32 NTU. Turbidity value was higher in monsoon due to the addition of silt load with the influx of monsoon run off.

The TDS ranged between 98 mg/L and 210 mg/L. The minimum value was recorded in the early winter season, while the maximum value was recorded in early summer season. Winter rains caused a little bit of dilution of the water evidenced from 98 mg/L TDS in of month of November. Maximum value of TDS was obtained as 210 mg/L in months

Table 1: Monthly variation in physico-chemical characteristics of Jangamhatti dam from June 2009 to May 2010.

Months	Temp. Water	pH	Transparency	Turbidity	TDS	Conductivity	DO <sub>2</sub>	Free CO <sub>2</sub>	Alkalinity	Chloride	Total Hardness	Sulphates	BOD
Jun, 09	27.75	8.45	76.00	25.50	167.50	312.00	5.07	6.25	186.75	65.00	136.50	12.55	14.95
Jul, 09	26.50	8.55	64.00	30.00	157.50	294.00	5.42	6.88	170.00	74.50	139.75	13.65	11.65
Aug, 09	24.00	8.22	41.50	25.00	141.00	277.50	6.02	6.35	153.00	110.50	140.50	15.65	9.025
Sep, 09	22.50	8.07	45.00	21.00	122.50	257.00	5.82	6.18	130.00	125.00	135.00	11.90	6.15
Oct, 09	21.25	7.80	31.00	14.00	110.50	250.50	6.20	5.62	87.50	146.00	128.00	7.38	4.25
Nov, 09	19.50	7.68	36.00	12.50	102.25	226.00	6.60	5.42	117.50	133.00	122.50	1.68	2.32
Dec, 09	17.00	7.57	38.00	14.0	122.50	255.50	7.25	5.70	130.50	123.50	116.50	3.40	5.85
Jan, 10	15.75	7.72	48.50	7.75	134.50	308.50	7.85	5.20	141.50	110.00	118.00	4.82	8.95
Feb, 10	17.25	7.90	54.50	7.25	162.50	382.00	7.60	5.25	157.50	85.00	131.00	5.65	40.85
Mar, 10	24.25	8.22	61.50	13.00	194.50	482.75	7.38	5.62	176.50	59.50	129.00	7.35	14.05
Apr, 10	28.00	8.50	77.50	16.00	201.50	460.75	5.42	6.07	176.00	60.0	131.50	8.55	29.10
May, 10	29.25	8.45	90.50	19.00	186.50	459.50	3.62	6.88	182.00	47.50	132.50	11.125	21.75

The values are in mg/L except temperature (°C), pH, transparency (cm) and conductivity ( $\mu\text{mho/cm}$ ).

February and March due to the loss of water by evaporation. Conductivity ranged between 230 ( $\mu\text{mho/cm}$ ) and 489 ( $\mu\text{mho/cm}$ ). Any rise in conductivity of water indicates pollution.

The values of dissolved oxygen ranged from 3.62 mg/L to 7.85 mg/L. Dissolved oxygen is dependent upon temperature, organic content of water and photosynthetic activity. Dissolved oxygen was found highest in winter due to low temperature. The values of free CO<sub>2</sub> ranged between 5.2 mg/L to 6.88 mg/L. The occurrence of free CO<sub>2</sub> during early rainy season may be due to fluctuation of DO and subsequent build up of free CO<sub>2</sub> by the process of anaerobic digestion of dead aquatic plants. The dam water was moderately alkaline throughout the year. The alkalinity ranged between 78 mg/L to 187 mg/L. Chloride ranged between 46 mg/L to 146 mg/L.

The total hardness fluctuated from 116 mg/L to 140.50 mg/L. The total hardness depends on the amount of calcium and magnesium dissolved in water. Hardness was always above 50 mg/L, and it seems that the water of the present dam is suitable for favourable growth of organisms. Sulphate ranged between 1.6mg/L and 16 mg/L. During rainy season higher values were recorded whereas in winter season and summer season lesser sulphate was detected. BOD of the dam water ranged between 2.32 mg/L to 40.85 mg/L. High values of BOD in summer are due to higher rate of organic decomposition.

## REFERENCES

- APHA 1985. Standard Methods for the Examination of Water and Wastewater. American Public Health Association, Washington DC.