



Physico-chemical analysis of Pus Dam water of Pusad town

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Abstract

The present water quality assessment study has been carried out on water quality of Pus Dam belongs to District Yavatmal of Maharashtra. Pus Dam is considered as drinking water source for Pusad town and many habitats. For this study, water samples collected from the from three different sites have been evaluated for its physicochemical parameters such as temperature, pH, turbidity, phosphate, chlorides, nitrates, dissolved oxygen, biological oxygen demand, total dissolved solids and total hardness etc. The parameters analysed in the months of November and December 2021 and results showed that physicochemical parameters were within the permissible limits with marginal concern and could be used for drinking and irrigation purpose.

Introduction

Water is a fundamental natural resource and most essential necessity to both natural ecosystem and human life. The natural water bodies are strength of plant and a source of energy for living organisms, healthy aquatic life is also depends on the quality of water.[1] . In general water pollution occurs due to the city sewage and manmade waste discharge into water bodies which affects on aquatic ecosystem and human beings. The condition for the ecology of living organisms provides significant information about the available water resource supporting the aquatic life or not supporting due to manmade pollution.[2]

The water pollution occurred due to human activities like idol immersion, which releases non-biodegradable pop, toxic paints into water body and get poisonous. The human activity of immersing such material into water bodies results falling of oxygen level of water to 50%.[3] The water of Pus Dam is utilises for agriculture and also as a drinking water source for Pusad town. Therefore, it is essential to monitor physico-chemical parameters to check the magnitude and source of any pollution load and to suggest appropriate conservative measures.[4-5] For this study we reviewed some work, information in relation to physico-chemical analysis of water in the Pus Dam is not extensively studied, thus study was conducted in the months of November and December 2021.[6]

Therefore, present study is carried out to revealed the status of pollution of Pus Dam in terms of physico-chemical analysis.

Materials and Method

Study Area : The water samples were collected from three stations namely S1 (Wamanwadi village side), S2 (Bhandari village side) and S3 (Marsool village side) in the months of November and December 2021. The sampling spot were chosen considering the location of nearby villages, domestic and agricultural areas.

The water samples (1L) were collected in clean polyethylene bottles in the morning between 8.00 am to 9.00 am. Some parameters were recorded at the sampling points and other physico-chemical parameters checked in the Research Laboratory of Chemistry, Shri R. L. T. College of Science, Akola followed by the method prescribed by APHA (2005). The climatic condition of the study area was cool winter, temperature range a minimum 12.7°C and a maximum of 30.4°C.

Result and Discussion

The physico-chemical parameters such as temperature, pH, turbidity, phosphate, chloride, nitrate, dissolve oxygen (DO), biological oxygen demand (BOD), total suspended solids (TDS), total hardness (Ca and Mg salts) were analysed for the water samples collected from the Pus Dam. The results are tabulated by statistical evaluation as maximum, minimum and average value for Station 1, 2 and 3.

- 1) **Temperature :** Temperature of water ranging from 12.7°C to 30.4°C at all different stations. Variations in water temperature observed due to high or low water level, and clean atmosphere.
- 2) **pH :** The value of pH is very important for plankton growth, During this study, pH is ranging from 6.2 to 9.9. These pH values indicating alkaline nature of water and high values may be due to sewage discharge and agricultural fields.
- 3) **Turbidity :** Turbidity of water was ranging from 0.3 to 11.8 NTU. During winter season silt, clay and other suspended particles settle down results low turbidity value.
- 4) **Phosphate :** Phosphate group is the most important limiting factor for the maintenance of reservoir fertility as it acts as insecticidal agents. During this study the phosphate concentration ranging from 0.003 to 0.097 mg/l at different sites.
- 5) **Chloride :** Chloride found to be high ranging from 32.21 mg/l to 43.44 mg/l revealed the increased level of pollution.
- 6) **Nitrate :** The high concentration of nitrate in water turned to be toxic to aquatic life. The Nitrate value ranging between 0.01 to 0.07mg/l.
- 7) **Dissolved Oxygen :** Dissolved oxygen is an essential parameter for aquatic life. The DO values found between 2.92 to 9.7 mg/l. high values of DO in winter due to low rate of decomposition of organic matter and high flow of water.
- 8) **Biochemical Oxygen Demand :** Biological oxygen demand (BOD) is an important parameter to the oxygen required to degradation of organic matter. During the study period BOD recorded from 1.98 to 6.90 mg/l which is within the permissible range.
- 9) **Total Dissolved Solids :** Total dissolved solids (TDS) values was ranging from 246.5 to 293.2 mg/l at all different stations. TDS analysis has great implications in the control of physical wastes in water treatment process.

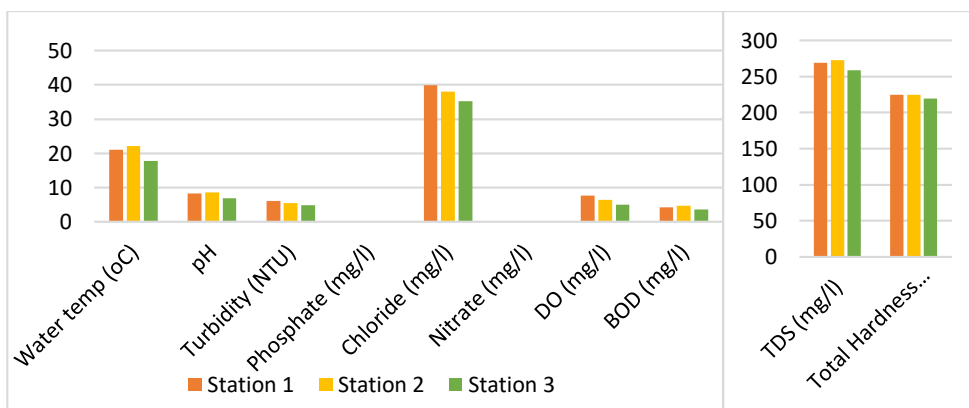
10) **Total Hardness :**

Total hardness is due to calcium and magnesium salts and temporary hardness is due to bicarbonates present in the water. The hardness was ranging between 238 to 208 ppm.

The increase in hardness can be attributed to decrease in volume and increase in rate of evaporation of water at high temperature.

Table-1 Water quality parameters and sampling stations from Puss Dam

Water quality parameters (unit)	Station 1 (Wamanwadi village)			Station 2 (Bhandari village)			Station 3 (Marsool Village)		
	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Water temperature (°C)	29.5	12.7	21.1	30.4	14.1	22.25	12.9	22.7	17.8
pH	9.9	6.9	8.4	9.7	7.7	8.7	7.7	6.2	6.95
Turbidity (NTU)	11.8	0.5	6.15	10.5	0.5	5.5	9.5	0.3	4.9
Phosphate (mg/l)	0.097	0.015	0.056	0.09	0.012	0.051	0.087	0.003	0.045
Chloride (mg/l)	43.44	36.39	39.91	42.0	34.0	38	38.20	32.21	35.20
Nitrate (mg/l)	0.06	0.02	0.04	0.07	0.02	0.045	0.04	0.01	0.025
Dissolved oxygen (DO) (mg/l)	9.7	5.60	7.65	8.40	4.36	6.38	7.13	2.92	5.025
Biological oxygen demand (BOD) (mg/l)	5.93	2.62	4.27	6.90	2.50	4.7	5.20	1.98	3.59
Total dissolved solids (TDS) (mg/l)	277.2	261.5	269.3	293.2	252.0	272.6	271.2	246.5	258.8
Total Hardness (ppm)	238.0	211.6	224.8	235.2	214	224.6	230.9	208.1	219.5
Concern	Marginal Concern			Marginal Concern			-		



Conclusion

All physico-chemical parameters found to be within desirable limits with only marginal concern at some site. The physico-chemical analysis of Pus Dam water suggest that the water is not harmful to drinking and irrigation. The results obtained from the present investigation shall be useful to maintain potability and future management of water.

References

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