



Physicochemical Limnology of Chitri Reservoir, Ajara, Maharashtra

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ABSTRACT

Analysis of important physicochemical characteristics of water from Chitri reservoir, Maharashtra was carried out during January 2009 to December 2009. The study helps in proper utilization of water, agricultural development, industrial development, establishment of aquatic bird sanctuaries, pollution control, and also for improving the biodiversity. The water temperature ranges from 17 to 34°C, pH from 7.3 to 8.1, DO from 6.50 to 10.10 mg/L, total dissolved solids from 40 to 160 mg/L, transparency from 75 to 148 cm and total alkalinity from 24 to 106 mg/L. Free carbon dioxide was totally absent during the entire study period. Chlorides and total hardness of water varied from 30.1 to 45.1 mg/L and 54 to 107 mg/L respectively.

Chitri reservoir is earthen dam constructed on river Chitri, at Rajewadi near Ajara in Kolhapur district (latitude 16°4' north, longitude 74°9' east). Many limnological studies were carried out on the reservoirs in India (Thomas & Aziz 2000). Similarly a number of studies have been conducted on limnology from different regions of Maharashtra (Shashtri & Pendse 2001). However, no work has been carried out on Chitri reservoir. Water from this reservoir is being used by people of Ajara and Gadhinglaj taluka for drinking and irrigation purposes. Being lentic water system, it is essential to study seasonal variation in properties of water. Therefore, the present work was undertaken to study physico-chemical limnology of Chitri reservoir.

To analyse the water, four sampling stations (Sampling Stations A, B, C and D) were selected as shown in Fig. 1 and Table 1. Water is collected once in a month on 1st day around 10.00 a.m. The temperature, pH and total dissolved solids were measured by digital thermometer, pH meter, and conductometer on the spot. Other parameters like, dissolved oxygen, transparency, free carbon dioxide, total alkalinity, hardness and chlorides, etc. were analysed in the laboratory according to the methods suggested by APHA (1980). The water samples at a depth of one meter were collected with the help of a sampler in one litre plastic containers and brought to the laboratory.

The data of various physico-chemical parameters at different sampling stations during the study period from January 2009 to December 2009 have been given in Table 2. Temperature is one of the important physical factor. It is variable according to seasons. It is found to be high during summer, April-May, and low during winter, December-

January. pH is an important indicator which indicates acidic or alkaline nature of water. Water from Chitri reservoir was found to be slightly alkaline as pH varies from 7.3 to 8.1.

Dissolved oxygen is an important factor that supports the aquatic life. DO in the reservoir ranges from 6.50 to 10.10 mg/L. This indicates that there is no pollution in water. Only at the sampling station D near village side shows lower dissolved oxygen. This is only because of washing cloths, animals, bathing and other human activities. Total hardness ranges from 12 to 107 mg/L. The hardness of water is mainly due to the presence of calcium and magnesium. Maximum value (107 mg/L) was found during summer, and minimum (12 mg/L) during winters.

Total dissolved solids (TDS) irrespective of the seasons ranged from 40 to 160 mg/L. The maximum value of 160 mg/L was detected in April, and minimum of 40 mg/L in August. The observed values of TDS indicate that it was high in summer followed by winter and monsoon. Water transparency is a physical measurable variable and is quite significant for production. Transparency is inversely proportional to turbidity created by suspended matter. The minimum transparency of 75 cm was recorded in September, and maximum of 148 cm in February. The less transparency might be due to the silt brought in to the reservoir during rainy season.

Total alkalinity is the measure of the capacity of water to neutralize a strong acid. The alkalinity in the water is greatly imparted by the salts of carbonates, bicarbonates, phosphates, nitrates, borates, silicates, etc. together with the hydroxyl ions in free state. The minimum value of total alkalinity (20mg/L) was noticed in August, while the maximum

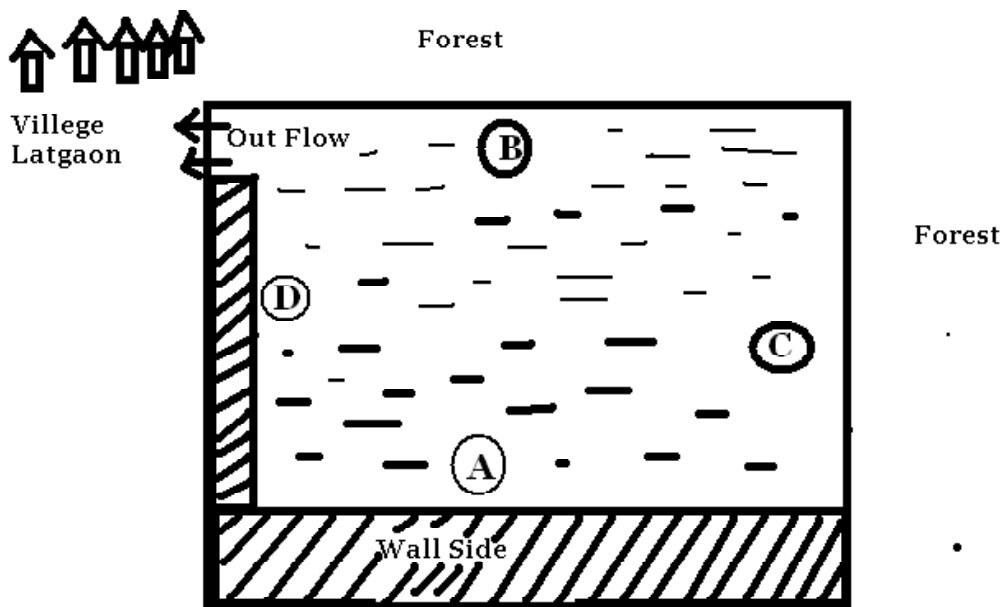


Fig.1: Sampling stations in the Chitri reservoir.

Table 1: Sampling stations.

1. Sampling station-A	East side of the dam	Wall Side
2. Sampling station-B	West side of the dam	Forest side
3. Sampling station-C	North side of the dam	Chaloba forest side
4. Sampling station-D	South side of the dam	Latgaon village side

Table 2: Physicochemical parameters in Chitri reservoir.

Sr. No.	Parameters	Range
1.	Water temperature	17 to 34°C
2.	pH	7.3 to 8.1
3.	DO	6.50 to 10.10 mg/L
4.	Total dissolved solids	40 to 160 mg/L
5.	Transparency	75 to 148 cm
6.	Total alkalinity	20 to 106 mg/L
7.	Total alkalinity	21.1 to 46 mg/L
8.	Chlorides	4.0 to 45.1 mg/L
9.	Total hardness	12 to 107mg/L
10.	Free carbon dioxide	Nil

(106mg/L) in December. Maximum values of total alkalinity were observed in winter followed by summer and monsoon. Free carbon dioxide was totally absent in reservoir water. The minimum and maximum values of chlorides

were 4.0 to 45.1 mg/L in the month of February and April respectively.

The study reveals that there is no gross pollution in this reservoir. Only the parameters at sampling station D, which is village side, shows some degree of pollution due to washing of cloths , cattle and bathing.

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