

# A Study of Flora and Fauna of Siliserh Lake with special reference to Bio –Chemical Characteristic

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## Abstract

The present study objectively conducted to analysis the Bio-chemical parameters of Siliserh Lake with special references of *Flora and Fauna present in lake*. For this study the water samples were collected from five sampling stations during the Jan. 2014 to Dec. 2014. The range of Bio -chemical parameters were observed Temperature (24.7-36.6) 0 C, Conductivity (280-380)  $\mu$  mhos /cum , Total Dissolved Solid (345 -388) mg/l, pH (7.0-8.6), Free CO<sub>2</sub> 8.9-16 mg/l, Free alkalinity (14-31) mg/l, Total alkalinity (120-265) mg/l, DO (3.2-7.5) mg/l, BOD (2.6-15.2) mg/l, COD (14-45) mg/l, Chloride (10-39) mg/l, Calcium hardness (89-135) mg/l, Total hardness (100-289) mg/l, Nitrate-nitrogen (0.60-2.9) mg/l during the study. The analyzed result is compared with permissible limits as prescribed by WHO, BIS for drinking water quality. It was concluded that temperature, pH, total alkalinity, dissolved oxygen. Biological oxygen demand, chemical oxygen demand, calcium hardness beyond the prescribed limits of WHO and BIS. It is indicating for increasing in pollution of Siliserh Lake, which need control industrial waste, sewage discharge and human activity in the water body

## Keywords

## Introduction:

Siliserh Lake is a beautiful fresh water lake , Spread in 7 sq Kms area, Siliserh Lake is located just 165 Kms from Dhaula Kuan Delhi and 110 Kms is Jaipur, Siliserh Lake is situate din north eastern part of Rajasthan, Lake was built by maharaja Vinay Singh in year 1845 ,The Lake and reservoir of Siliserh was created by Maharaja for people of Alwar, Because water can be channeled to Alwar city A beautiful Lake palace was also built by Maharaja for his beloved wife Shila, It was used as Lake palace and hutinglodge.<sup>1</sup>

Siliserh Lake is situated just 13 Kms from Alwar city and also can be used as stop over before you move on Sariska Tiger Reserve / Sariska National Park, Lake is that beautiful that every one want to stay for some more time. The water comes in this lake through aravali mountains & through rain. Lovely Siliserh Lake Palace provides option for stay with a breath taking view of 10.5 Kms lake, Beautiful backdrops of Aravali hills adds it beauty, One can spend many hours by just having a look of the lake from Terrace of Lake Palace Siliserh.<sup>2</sup>

Anthropogenic nutrient enrichments cause serious alteration in aquatic ecosystems. Chemical characteristic of water not only alter the physical properties of the medium but also exert significant effect on the distribution and metabolic activities of organisms, which in turn change the chemical qualities of water in due course of time. Many workers have paid attention on the studies of Bio-chemical quality of water. The objectives of present study are to detect changes in different Bio-chemical parameters of the Silisher Lake. The study will help us to know the role of pollutants in deterioration of water quality of this reservoir in different seasons round the year.<sup>3</sup>

## **OBJECTIVES**

To observe the seasonal impact of Bio - chemical characters that effect the yield of aquatic life (fishes & zooplanktons) and to derive the relationship between Bio - chemical parameter variations and the diversity of zooplanktons, fish fauna and its yield, and overall assessment of the eco-systems of siliserh lake with reference to parameter under study.

## **MATERIAL AND METHODS**

### ***StudyArea***

The Silisher Lake is a large man made water body that forms a significant environmental feature and lies to south west of historical city Alwar. The lake is approximately 130 ha in its full spread and has a catchment falls in a dense rural area of 15.5 sq. KM. For analysis of water quality, 4 sampling sites have been selected, 2 sites towards the dam and 2 on opposite west side of the lake. Samplings at different sites were made at monthly intervals from July, 2013 to June 2014. Samples were collected in clean and dry containers and various Bio-chemical features were estimated as per standard methods of APHA and Trivedy and Goyal Hardness was estimated by

EDTA titrimetric method. Free CO<sub>2</sub> were determined by titrimetric method. Dissolved oxygen by curing Winkler's azide modification method and chloride by using titrimetric method. Temperature and pH by clinical thermometer and pH meter respectively.<sup>1,4,7</sup>

## Methodology

- Five sampling station will fixed in the water source and samples will be collected four times a year. That is pre monsoon, monsoon, post monsoon and peak summer.
- Two liters of sample will collected from the source and analyzed in the laboratory.
- The analytical work will be conducted in the laboratory and necessary help will be taken from PHED department alwar as well as water pollution department, alwar.

## Results and Discussion

It is fact that maintenance of healthy aquatic ecosystem is dependent on the Bio-chemical properties of water. The physic-chemical properties of the lake were summarized in Table 1.

### *Temperature*

Temperature is one of the most important ecological factors, which controls the physiological behavior and distribution of organisms. In present study, lowest value of water temperature found in November 24.7°C and highest in July 36.6 °C (Fig 2a) while the average temperature  $29.75 \pm 0.591$  that shows the optimum ranged for growth of aquatic fauna and flora. This result agrees with the reported by Swaranlatha and Rai (1998) in Banjara Lake.

### *Electrical Conductivity*

Conductivity is the measure of mineral content, in present investigation, lowest value (280)  $\mu\text{mho/cm}$  in September and high value (376)  $\mu\text{mho/cm}$  in June (Fig 2b) with the average Conductivity was  $311.3 \pm 5.100$  Similar observation found by Naik et al., (2012) conductivity (136.75-154.25) respectively in Kunigal Lake of Karnataka.

### Total dissolved solids (TDS)

TDS is measure of all the dissolved substances, both organic and inorganic in water. The lowest TDS was observed in October 345 mg/l and high in September 388 mg/l (Fig 2c) while the

average TDS in the lake was  $377.65 \pm 1.915$ . Similar results were also reported by Chaturbhuj et. al., (2004) in the Jamwa Ramgarh Lake, Jaipur.

### ***pH***

In the Sahapura lake lowest (7) in November and highest (8.4) in September (Fig 2d) with the average value of pH  $7.61 \pm 0.078$ . pH regulated most of Biological processes and Bio-chemical reactions. Scuthorpe (1967) has reported that pH, free CO<sub>2</sub> and ammonia are more critical factors in the survival of aquatic plants and fish than the oxygen supply. Chaturbhuj et. al., (2004) that present study was support in the observations.

### ***Free CO<sub>2</sub>***

Free carbon dioxide showed an irregular pattern in the lake which reflects less load of organic matter in water. In the present investigation, minimum (8.9) mg/l October and maximum (12.8)mg/l September (Fig 2e) while the average Free CO<sub>2</sub> in the lake was  $11.28 \pm 0.300$ . According to Gang (1994) reported similar occasional presence of free carbon dioxide in some water bodies of Jodhpur, Rajasthan

### ***Free alkalinity***

Free alkalinity of water is usually caused by carbonate, bicarbonate and hydroxyl ions and less frequently by borates, silicate and phosphates (APHA, 1995). In the present study, it varied from (14 to 31) mg/l. Low value 14 mg/l November while it was high 31 mg/l September (Fig 2 f) and the average value of Free alkalinity was  $20.25 \pm 0.954$  mg/l.

### ***Total alkalinity***

Total alkalinity of water is the quality of water and kinds of components present in water such as bicarbonate, carbonate and hydroxide. Spence (1967) classified the lake into three categories based on alkalinity. On the basis of this classification, Sahapura lake considered as a nutrient rich lake because during the present investigation the lowest value of total alkalinity was observe in August 120 mg/l and high value in November 265 mg/l (Fig 2g) with the average  $211.1 \pm 6.821$ .

### ***Dissolved oxygen***

Dissolved oxygen is an important limnological parameter indicating level of water quality and organic production in the lake. It ranged was 3.5 to 7.5 mg/l, lowest value of DO was observed in July 3.5 mg/l and highest value in November 7.5 mg/l (Fig 2h) while the average DO in the

lake was  $4.69 \pm 0.221$  mg/l. The results were reviewed by the observation from Kumar (2009) in the Jawahar Sagar Lake.

### ***Biochemical oxygen demand***

Biochemical oxygen demand determines the amount of oxygen required for biological oxidation of organic matter with the help of microbial activities. In the present study, lowest value of BOD was recorded in June 2.6 mg/l and high value in October 15.2 mg/l (Fig 2i) while the average BOD in the lake  $5.045 \pm 0.401$ . The similar result was observed by Agarwal and Rajwar (2010) in the Tehri dam.

### **Chemical oxygen demand**

Chemical oxygen demand determines the amount of oxygen required for chemical oxidation of most organic matter and oxidizable inorganic substances with the help of strong chemical oxidant. In present investigation, low value of COD (14) mg/l July and high in October (48) mg/l (Fig 2j) while the average COD in the lake was  $28 \pm 1.575$ . These results were in conformity with the study of Mathur et al., (2009) found the similar COD in Pushkar Lake, Ajmer.

### ***Chloride***

Chloride is found widely distributed in nature in the form of salt sodium, potassium and calcium. The chloride status in water is indicative of pollution, especially of animal origin. In the present investigation, it varied from (10-39) mg/l. Minimum chloride in June 10 mg/l and maximum value recorded in September 39 mg/l

while the average  $30.35 \pm 1.421$ . Zutshi and Khan (1988) attributed high chloride values due to bathing activity and urination in the Dal Lake.

### **Calcium hardness**

Calcium is essential for all the organisms. It is required as micronutrient for algae and important nutrient for the metabolism of plants. In present study, the lowest (89) mg/l in November and high (135) mg/l in July (Fig 2l) with the mean value  $110.3 \pm 2.577$ . Ohle (1934) observed that the biota of the lakes in north Germany to be good when calcium ranged between 10 to 25 mg/l and very good to rich if the calcium exceeded 25 mg/l. The present studies also supported the findings of Ohle (1934).

### ***Total hardness***

The hardness of water is mainly governed by the content of calcium and magnesium which largely combine with bicarbonates & carbonates (temporary hardness) and with sulphate,

chlorides and other anions of minerals (permanent hardness). In the present study, it ranged was 100-289 mg/l. The minimum and maximum value in the month of June to October respectively (Fig 2m) While the average value  $288.55 \pm 11.898$ . Kannan (1991) has classified water on the basis of hardness and Sahapura Lake comes under the category of very hard.

### ***Nitrate-nitrogen***

Nitrate-nitrogen is basic nutrient, which is determined the productivity of lake. The value of Nitrate-N was observed in June 0.6 mg/l was low and in July 2.9 mg/l was high (Fig 2n) while the average Nitrate-N in the lake was  $1.08 \pm 0.120$ . Similar results were found by Sahu et. al., (2007) from Daphrin hospital discharge, sagar Madhya Pradesh

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