

Study of The Physicochemical Parameters of Soja Lake Under Biotic Stress

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Abstract- This is study of the Physicochemical status of Soja lakes belongs to Gandhinagar District, Gujarat India. This Lake is situated on the Kalol-Mansa Highway and located between 72.034'58''E to 72.035'05''E latitude and 23.021'47''N to 23.022'49''N Longitude. It is oldest and natural freshwater body. Water is essential for living organisms like Flora and Fauna. This study done through various field trips. A study of Physicochemical status of this lake was done in period January to June 2016. The lake is biotically affected by various anthropogenic activities. In the present study Parameters like pH, Fluoride, COD, BOD, Chloride, Alkalinity, Total Hardness, Calcium, Calcium Hardness, Magnesium, Magnesium Hardness, DO, EC and TDS are measured and analysed for lake water. The result indicates that the lake is much more polluted.

Keywords- Physico-chemical status, Hardness, Flora, Fauna.

I. INTRODUCTION

As compared to marine and terrestrial habitats, Fresh water habitats occupy a relatively small portion of the earth surface but their importance to man is greater than their areas. Fresh water is the most suitable and cheapest source for industrial and domestic needs and It provide convenient waste disposal systems. The increased demand of water due to population growth, agriculture and industrial development, building construction has forced environmentalists to study the physical, chemical and biological characteristics of natural water resources. Temporary ponds are found allaround the world but there are considerable regional differences in their formation method. The worldwide distribution of types of water body leads to a large variety of temporary pond due to climate and geological differences. In comparison to running water bodies, stagnant water bodies have more complex and fragile ecosystems due to lack of self cleaning ability and hence have greater quantities of water polutions. Due to increased anthropogenic activities in and around the water bodies, aquatic systems are damaged and ultimately the physicochemical properties of water are also changed. Man is abusing water resources at a large scale so there is need to conserve these natural resources. Factors affecting the sustainability of such lentic systems are temperature, salinity,

transparency, biogenic salts, dissolved gases etc. (Munawar, 1970; Misra and Yadav, 1978). Regular monitoring of lakes is necessary because the lakes are favourable habitats for a variety of flora-fauna and anthropogenic society.

II. STUDY AREA

A study of the water quality of Soja Lake, which is man-made water body situated in Kalol taluka, Dist: Gandhinagar, Gujarat. The study of physico-chemical and biological characteristics of this Lake water was carried out in the period Jan-June 2016. Analysis of water quality was carried out with changes in water properties. Water samples were collected from different sites and were examined for various physico-chemical parameters like pH, Alkalinity, total hardness, Carbonates, Chloride Content, Bi-carbonates, Magnesium and Calcium Content, Nitrates and Electric Conductivity (EC) etc. by standard APHA (2005) methods. Soja lake is located between 72.034'58''E to 72.035'05''E latitude and 23.021'47''N to 23.022'49''N Longitude. The climate of Gujarat is tropical in nature. Presence of Arabian sea in the west changes the climate of Gujarat resulting three prominent climate arid, semi-arid, and sub-humid. The arid climate spreads over northwest part of Gujarat comprising kutch district, western part of banaskantha and mehsana district.

III. MATERIALS AND METHODS

Soja lake was selected which is effected by activities like sewage, man cleaning cloths, washing of castles, small scale industrial effluents and worshipping. The lake is in a big village Soja. The study was carried out in the period January to June 2016. The water sample were collected from surface near the margins of the lake between 8-30 to 10-00 AM. at regular interval. The analysis of physico-chemical parameters was done by following the standered methods (APHA,1985)..

IV. RESULTS AND DISCUSSIONS

The physico-chemical parameters of Soja lake were analysed for the period January to June 2016 and are

presented in the table given below. The pH of lake water indicates the alkaline nature of lake and it varies from 8.3 pH to 8.8 pH. The dissolved Oxygen in water varies from 6.3 mg/l to 7.2 mg/l in the lake. Low content of dissolved Oxygen is a sign of organic pollution and it is due to inorganic reductants like Hydrogen sulphide, Ammonia, Nitrates, Ferrous ions and other such oxidisable substances (Ara et al., 2003). The alkalinity in the water varies from 368 mg/l to 424 mg/l. The high value of alkalinity is a function of ions exchange, that is calcium ions are replaced by Sodium ions and later contributed to alkalinity (Sharma and John 2009). It may also caused due to evolution of CO₂ during decomposition of organic matter. The Chloride content varies from 176.6 mg/l to 199.4 mg/l. Chloride is one of the important indicators of pollution (Khare et al., 2007). There are no indication of Nitrate in the lake water. The main source of Nitrate is the run-off and decomposition of Organic matter. The higher inflow of water and consequent land drainage cause high value of Nitrate. (Thilanga et al., 2005). The variation in Calcium was found between 47.3 mg/l to 53.6 mg/l in the water. It is linked with the Carbon dioxide and is an important constituent of the skeletal structure of organisms. Calcium forms the most abundant ions in fresh water. (Thilaga et al., 2005). Variation in total dissolved solid was found from 834 mg/l to 942 mg/l of lake water. The Electrical conductivity varies from 1239 mg/l to 1403 mg/l. From obtained results, it is concluded that the lake water is polluted. Fresh water bodied due to the continuous discharge of domestic usage like cleaning clothes, cattle and vehicle washing, sewage, drainage and runoff high amount of nutrients lead to eutrophication.

Table 1. Soja lake

Sr.No.	Test Parameters	Year-2016						Unit
		Jan.	Feb.	Mar.	Apr.	May.	June.	
1	pH	8.4	8.3	8.4	8.8	8.5	8.3	
2	Alkalinity	368	389	405	424	407	400	mg / lit.
3	Chloride	176.6	186.4	194.7	199.4	196.4	192.1	mg / lit.
4	Dissolved Oxygen	6.3	6.7	6.7	6.9	7.2	6.7	mg / lit.
5	Electric Conductivity	1239	1325	1362	1403	1377	1360	mg / lit.
6	Total Hardness	214	204	226	227	231	224	mg / lit.
7	Magnesium	21.6	22.5	23.8	24.2	24.1	23.3	mg / lit.
8	Magnesium Hardness	86	95	97	99	99	96	mg / lit.
9	Calcium	47.3	49.7	51.3	53.6	52.8	51.3	mg / lit.
10	Calcium Hardness	117	126	129	131	131	128	mg / lit.
11	Fluoride	3.99	4.19	4.34	4.49	4.36	4.35	mg / lit.
12	Nitrate	00	00	00	00	00	00	mg / lit.
13	Total Dissolved Solid	834	887	913	942	926	912	mg / lit.
14	C. O. D.	49.2	52.1	54.6	55.4	54.9	54.8	mg / lit.
15	B.O.D.(3 Day 27C)	2.5	2.8	2.14	2	2.3		

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