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Physico chemical Assessment of Sulur Lake, Coimbatore District

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Abstract: *The water has been deserved for the betterment of the environment. Major sources of water were lakes, ponds, rivers, streams. Lake water plays a vital role in Tamil Nadu for villages andtaluks as the major source for drinking, agriculture and irrigation purposes. In this paper an interrogation has been made for the physical and chemical assessment of lake water in Sulur Taluk, Coimbatore District of Tamil Nadu. The samples were collected from the sulur lake and examined for the physical and chemical properties such as pH, Temperature, Alkalinity, Electrical conductivity, Turbidity, DO, Biochemical oxygen demand, COD, Total Hardness, Calcium Hardness, Magnesium Hardness, Sulphates, Chlorides, Total Solids, Total Fixed Solids. The experimental values were tabulated and compared withIS 10500:2012, CPCB. The values for turbidity, Magnesium Hardness, Sulphates and BOD were resulted that exceeding thelimits IS 10500:2012, CPCB. The lake water was recommended for treatment.*

Keywords-*Lake, Physico chemical, Permissible limits, Samples, Water.*

I. INTRODUCTION

A lake is a body of water that is surrounded by land. These vary greatly in size. The temperature, light, and wind are three of the main factors that affect the physical characteristics of a lake. The most important chemicals in a lake are nitrogen and phosphorus and the chemistry of a lake is affected by biological, geological, and human actions. The volume of oxygen and the pH level and the pollution, such as the establishment of toxic chemicals from industry or agriculture, can also affect a lake's chemistry. The specific contaminants leading to pollution in water include a wide spectrum of chemicals, pathogens, and physical innovations such as elevated temperature and discoloration.The effluents f the waste and the water used had been disposed in the areas of lake water. This lake water is also been concerned for drinking and other farming purposes. Hence the characteristically importance of lake water was very mandatory. Thus the physical and chemical parameters were assessed. The properties like pH, Turbidity, EC, TH, Calcium Hardness, Magnesium Hardness, Sulphates, Chlorides, Total Solids, Total Fixed Solids were founded. The importance of lake water has been increasing world widely due to the reason that the properties of water will be good and it may accessible for drinking. But the present study shows that the water has been polluted and hence the water must need to be treated for the purpose of drinking and farming.

II. LITERATURE REVIEW

PatilShilpa G et al (2011) studied on Study of physicochemical and biological characteristics of lakes from Shivaji University Campus, Kolhapur, Maharashtra. The samples were collected from 3 different lakes from Shivaji University campus, Kolhapur for this study. The changes in physical and chemical parameters such as Temperature, Turbidity, Total Dissolved Solids (TDS), pH,Phosphate, Dissolved Oxygen, Free Carbon dioxide, Total Hardness, Transparency,Chlorides, Alkalinity, Nitrates and MPN were observed monthly during the period of September 2010 to February 2011. It was shown from the results that excluding BOD,COD and phosphates the values were within permissible limit. From the results it was concluded that the Rajaram Lake was more contaminated due to various anthropogenic activities.

Medudhula.Thirupathaiah et al (2012) studied on Analysis of water quality using physico-chemical parameters in lower manair reservoir of Karimnagar district, Andhra Pradesh. This paper concerns with the aim to evaluate current status of physico-chemical characteristic of Lower Manair Reservoir, Karimnagar District at Andhra Pradesh, India. The physico-chemical parameters such as water temperature,total hardness, transparency, pH, turbidity, total dissolved solids (TDS), chlorides (Cl), phosphate, nitrates, DO and biological oxygen demand (BOD) were assessed for a period of one year from September 2009 to August 2010 with accordance to monthly changes. The outcome of the result showed that physico-chemical parameters of the water were within the permissible limits which might be used for drinking, pisciculture , domestic and Irrigation.

Sulekhchandra et al (2012) studied on Assessment of Water Quality Values in Porur Lake in Chennai HussainSagar in Hyderabad and Vihar Lake Mumbai in India. The present study was mainly aimed to assess drinking water quality of various

lakes such as Porur lake in Chennai, Hussain Sager HydrabadVihar lake at Mumbai in India. For this purposes the water samples of lakes were collected from 6 different sites and composite sample prepared were analyzed for pH, turbidity, EC, TDS, total alkalinity (TA), (TH) and (Ca-H), chemical oxygen demand(COD), biochemical oxygen demand (BOD), dissolved oxygen(DO), sulphate, nitrate and chloride levels . Certain heavy metals like Iron, Zinc, Chromium Cadmium, Mercury, Nickel and Cadmium were also analyzed. The result indicated that the parameters like EC, TDS, SO4, were higher than permissible limits of WHO & BIS standard.

Pradeep U. Verma et al (2013) studied on Pollution status of nikol lake located in eastern Ahmedabad, Gujarat- India. In the present study the author analyzed the water of Nikollake for various physicochemical parameters. This study has been carried out from March 2010 to February 2011 for a period of 1 year. The data's had been collected monthly though they were seasonally represented with standard error. The following different parameters Temperature, Electrical conductivity, Turbidity, TDS, pH, Alkalinity, Total Hardness, Calcium, Magnesium, Dissolved Oxygen, BOD, Chloride, Nitrate and Phosphate were studied . From the results the author concluded that the water of Nikollake was highly polluted the eco valance was completely disturbed.

Neha Gupta et al (2013) studied on Assessment of Physicochemical Properties of Yamuna River in Agra City. The present study was done to find out the physico-chemical properties of the river Yamuna water from 9 different sampling sites in the City of Agra. These water samples were collected from 9 locations (vizRunkata, NaireGhat, Kailash Mandir, Etmad-ud-daula, PohiyaGhat, Balkeshwar, RambaghHathiGhat and Tajganj) of Agra City, during the months of March - April, 2011 and these river water samples were taken to the laboratory and examined. The analysis was done for the parameters like Total Dissolved Solids, Electrical Conductivity, Turbidity, pH, Total Hardness,Chloride, Total Alkalinity, Calcium, and Magnesium. pH showed that the River water of Yamuna is alkaline in nature. Total Dissolved Solids and Turbidity was found above the permissible limits of WHO.

B.C. Behera et al (2014) studied on Physico Chemical Properties of Water Sample Collected From Mangrove Ecosystem of Mahanadi River Delta, Odisha, India**.** This present study, investigated the physicochemical parameters of water samples which were compared with the water quality standard of BIS and pollution control board of the state. These variations of different parameters investigated as follows: dissolved oxygen (2.9-10.9 mg/L), pH (6.05-8.6), Temperature (24.2-30.9°C), TDS (4510–11900 mg/L), electrical conductivity (5.16–17.33 mS/cm), chloride content (4389-12575 mg/l), total hardness (800-2090 mg/l), calcium (125.4-400.8 mg/l), magnesium (153.16-474.13 mg/l), phosphate (0.55-2.59 mg/l), and nitrate (13.03-24.01 mg/l). Among different study sites with high load of calcium, nitrate, chloride and phosphate in most of the study sites indicated the pollution status of this estuarine water.

III. METHODOLOGY

The sample was collected from the Sulur lake. The sample has been refrigerated for 4^{o} for analysis and few tests were done immediately after the sample was collected.

Table 1: Shows the Physico chemical Parameters and the apparatus uses.

S.No	Parameters	Apparatus	Reagent
1	pH	pH meter	
2	Turbidity (NTU)	Turbidity meter	Hydrazine sulphate ad Hexamethylene Tetramine
3	Temperature (°C)	Thermometer	-
4	Electrical Conductivity (µmho/cm)	Conductivity meter	Potassium Chloride
5	Total Hardness (mg/L)	Titration by EDTA	EBT and Ammonia Buffer
6	Permanent Hardness (mg/L)	Titration by EDTA	EBT and Ammonia Buffer
7	Calcium Hardness (mg/L)	Titration by EDTA	Murexide
8	Magnesium Hardness (mg/L)	Total Hardness (mg/L)-Calcium Hardness (mg/l)	-

9	BOD (mg/L) IV. V. VI. VII. VIII.	Titration by sodium thiosuplhate	Phosphate buffer MgSo4, CaCl2,FeCl3 DO using Winkler's method
10	COD(mg/l) IX. X. XI. XII.	Reflux apparatus,Titration	Potassium dichromate, Sulphuric acid reagent,Ferroin indicator
11	Sulphates (mg/L) XIII. XIV. XV.	Titration	Phenolphthalein indicator
12	Chlorides (mg/L) XVI. XVII. XVIII.	Titration by AgNO3	Potassium chromate
13	Total alkalinity (mg/l) XIX. XX. XXI.	Titration by H_2SO_4	Methyl Orange indicator
14	Phenopthalein alkalinity (mg/l) XXII. XXIII.	Titration by H_2SO_4	Phenolphthalein indicator
15	Total Solids (mg/L)	Water Bath, Crucible	-
16	Total Volatile Solids (mg/L)	Water Bath, Crucible, Muffle furnace	-
17	Total Fixed Solids (mg/L)	Water Bath, Crucible	-

IV. RESULTS AND DISCUSSION:

The importance of Physico chemical properties was determined with great concern. Under the physical parameters pH, Turbidity, Electrical Conductivity and Temperature were under the permissible limits of IS10500:2012. The chemical parameters such as Total Alkalinity, DO, BOD, COD, Sulphates, Chlorides, Total Hardness, Calcium Hardness, Magnesium Hardness, Total Solids were detected in accordance with permissible limits of IS10500:2012, CPCB. The results were statedin tables. The comparisons of values were carried out with graphs.

S.No	Parameters	Sample
1	pH	8
2	Turbidity (NTU)	47
3	Temperature (°C)	29
4	Electrical Conductivity (µmho/cm)	101.99
5	Total Hardness (mg/L)	237.7
6	Permanent Hardness (mg/L)	190.15
7	Calcium Hardness (mg/L)	75.06
8	Magnesium Hardness (mg/L)	162.64
9	BOD (mg/L)	135.4
10	COD(mg/l)	13
11	Sulphates (mg/L)	768
12	Chlorides (mg/L)	64.998
13	Total alkalinity (mg/l)	1000

14	Phenolphthalein alkalinity (mg/l)	350
15	Total Solids (mg/L)	35
16	Total Volatile Solids (mg/L)	20
17	Total Fixed Solids (mg/L)	15

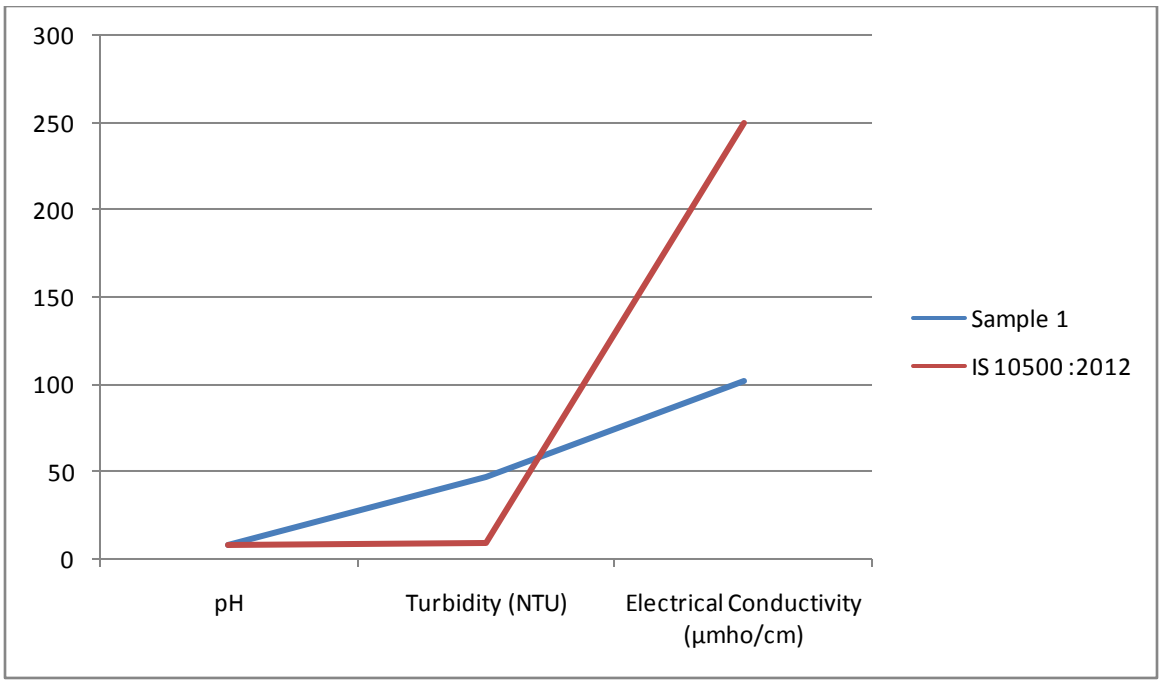

Fig 1 Show the comparison Physical properties with BIS standards.

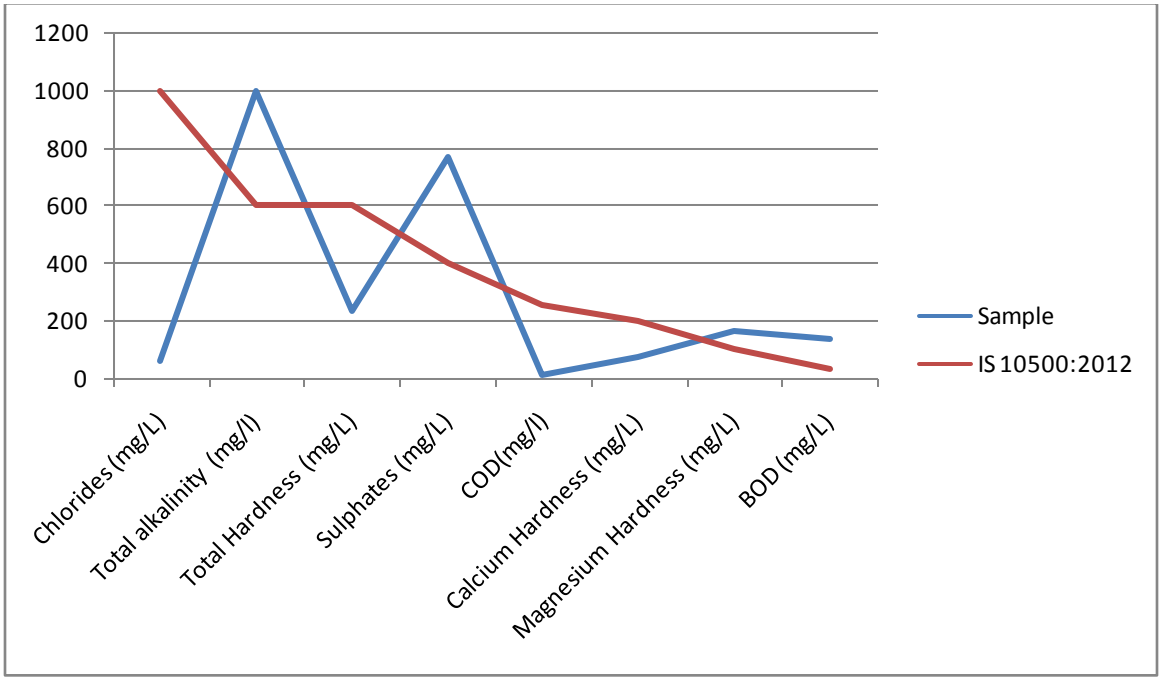

Fig 2 Show the comparison Chemical properties with BIS standards.

V. CONCLUSION

The present scenario of water is very critical, accordingly the research and need for water is high esteemed. In this study the lake water located at Sulur taluk, Coimbatore has been a major source for drinking.The Physico chemical parameters of the water had been analyzed. The outcome of the results showed that the samples were almost within permissible limit but turbidity (41 -51 NTU), Magnesium Hardness (162.64 mg/l)(768 mg/l), Sulphates and BOD (135.34 mg/l) were exceeding these limits IS 10500:2012, CPCB. The water is highly recommended for treatment. The treated water can be suggested for drinking.

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[7] BIS, Indian standard Drinking water Specification, Bureau of Indian Standard, Indian Standard (10500):1991.

