



Comparative Analysis of Physico-Chemical Parameters of Kishore Sagar Lake, Kota, Raj.

Author: Ekta Sharma, Dr. Bilquees J. Khan

Ph.D. student in Life Science (Zoology) SAM Global University, Bhopal (M.P.) INDIA

Associate Professor in Life Science (Zoology) SAM Global University, Bhopal (M.P.) INDIA

Abstract -In the present study water sample of Kishore Sagar Lake, Kota from three different sites i.e Near KST Boating Ramp(S1), Near Bhagwan Mahaveer Children's Park(S2), Near Shree Tejaji Maharaj Temple(S3) has been physicochemically evaluated for its suitability for domestic and irrigation purposes. In Physical and Chemical Parameters Such as Temperature, turbidity, pH, T.D.S., Alkalinity, Total hardness, Chloride, Nitrate, Dissolve Oxygen, and B.O.D., were analyzed in the laboratory. The Physico Chemical parameters of water were determined as per standard methods of APHA (2012). The results indicate that the lake water quality is suitable and safe for domestic and irrigation purposes.

Keywords: Physicochemical parameters, Kishore Sagar Lake.

1. Introduction

Water, the life-saving universal solvent is that magical liquid, which provides life to animals, plants, trees, bacteria and viruses etc. Our survival on Earth depends on three basic resources – water, air and soil, nature's three valuable gifts to mankind. Among which water is the most important component as it forms the basic medium for origin of life. Water is the most important in shaping the land and regulating the climate. The Earth is commonly referred to as the "Blue Planet" due to the copious presence of water bodies that encompass its surface. Our earth surface has 71% of water and 29% land. Out of total water on earth 96.5% is in ocean which is salty and not useful for drinking, growing crops etc. Only 2.5% water is fresh water in which nearly 70% is locked up in ice and rest is in the ground. Only 1.3 % fresh water is present on surface, mostly in lake and about 1% is salty water is in ground (Shiklomanov, 1993).

Water quality index (WQI) provides a nominal number that represent overall water quality at a certain location and time, based on several water quality parameters. The objective of water quality index is to turn complex water quality data into detailed information useful for public. Temperature, pH, turbidity, nutrients, hardness, chloride, fluoride, alkalinity, dissolved oxygen, BOD, TDS, DO, COD are some of the important factors that play a vital role for the growth of living organisms in the water body. These parameters are important indicators of water quality and can reflect the ecological condition of the lake. The present study deals with the assessment of physicochemical characteristics of water and on the basis of these various parameters, water quality index is determined which revealed in the Kishore Sagar Lake of Kota. Present investigation involves the analysis of water quality in relation to physicochemical parameters of Kishore Sagar Lake of Kota.

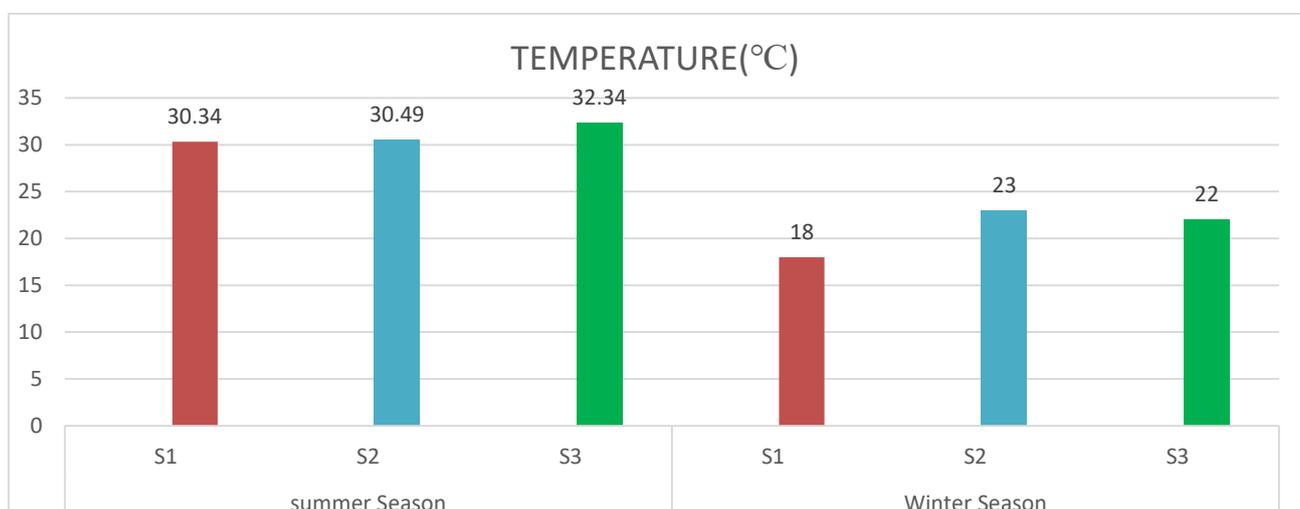
2.MATERIALS AND METHODS:

The present study aims to investigate the physicochemical characteristics in Kishore Sagar Lake, located in Kota, Rajasthan, India. To achieve this, a systematic sampling design was adopted to collect relevant data on various physicochemical parameters. The water samples were collected from three sampling stations i.e. Near KST Boating Ramp(S1), Near Bhagwan Mahaveer Children's Park(S2), Near Shree Tejaji Maharaj Temple(S3) from Kishore Sagar Lake during summer and winter seasons (2023). Only surface water samples will be collected for analysis of selected physicochemical parameters using two litre capacity plastic bottles. Sampling was done in morning hours. The river water samples were collected in different sampling bottles as per standard method APHA. The temperature, pH, and turbidity were estimated at sampling sites. The other parameters were measured by the procedure given by APHA in the laboratory. The investigation period was divided into two seasons i.e. summer and winter. The Physico-Chemical parameters were determined by standard methods of APHA (2012).

3. Results and Discussion:

The analytical results for the lake water samples in summer & winter seasons are shown in Table 1.

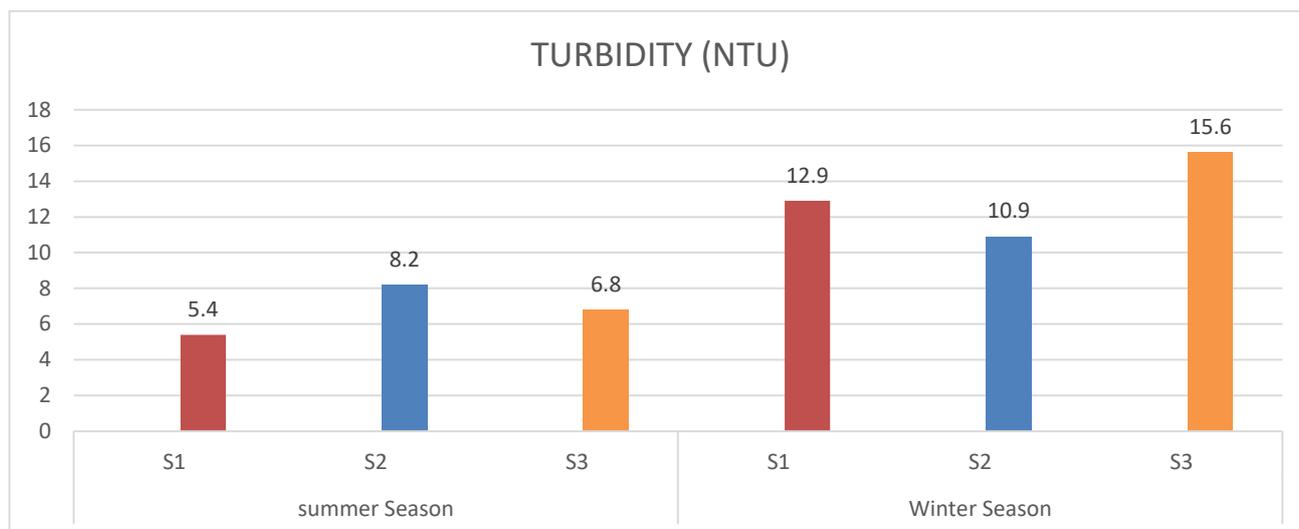
S.No.	Physicochemical parameters	Summer Season			Winter Season		
		S1	S2	S3	S1	S2	S3
1	Temperature (°C)	30.34	30.49	32.34	18	23	22
2	Turbidity (NTU)	5.4	8.2	6.8	12.9	10.9	15.6
3	pH (units)	7.6	8.3	6.8	7.2	7.9	8.5
4	Dissolved Oxygen (mg/L)	6.15	5.68	6.25	8	5.2	9.2
5	TDS (mg/L)	460	594	574	313	315	190
6	COD (mg/L)	250.2	160.8	177.2	200	165	160
7	BOD (mg/L)	60.2	48.5	52.9	25	35	38
8	Free CO ₂ (mg/L)	36	20	30	26.5	28.2	14
9	Chloride (mg/L)	59.7	57.3	55.4	20.8	42.3	28.7
10	Fluoride (mg/L)	0.637	0.653	0.567	0.65	0.72	0.66
11	Coliform Bacteria (MPN/100ml.)	440	360	343	367.4	353.5	348.6
12	Total Hardness(mg/L)	176.6	184.2	156.6	90	95	98
13	Total Alkalinity mg/L	132.3	137.2	142.3	84	110	144
14	Nitrate (mg/L)	0.052	0.049	0.032	0.001	0.002	0.006



Water Temperature recorded in the present study

Temperature:

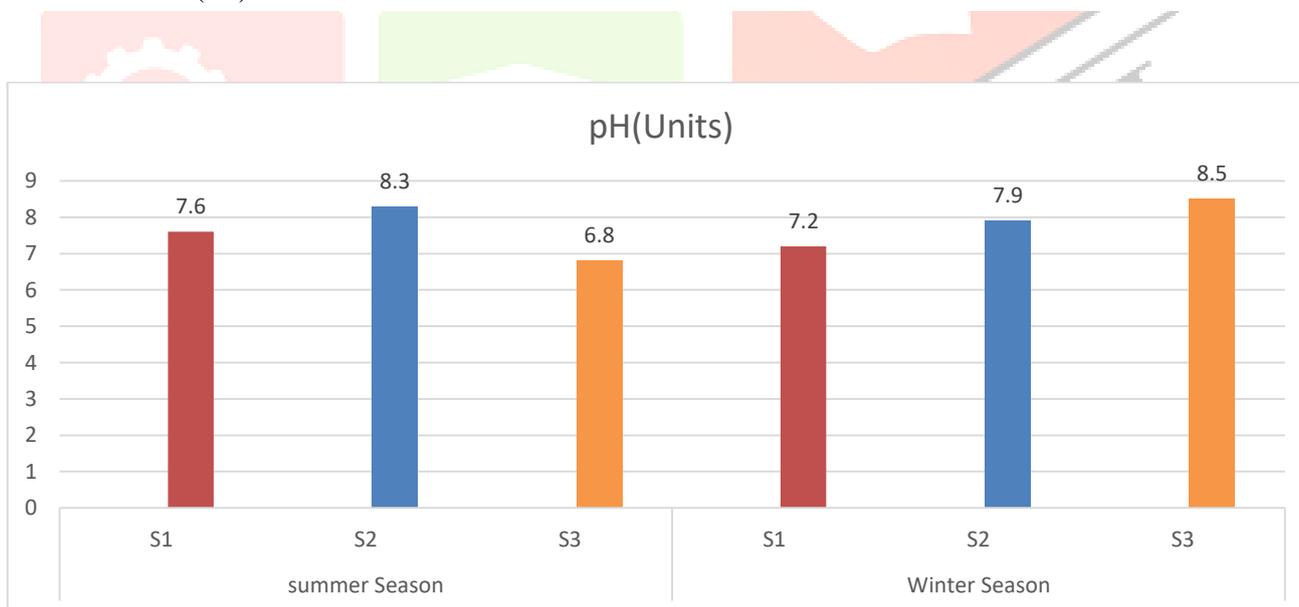
Minimum temperature value 18.0°C was recorded at S1 in winter season and maximum temperature value 32.34 °C was recorded in summer season at S3. Water temperature plays crucial role in an aquatic ecosystem. Quality of water affects both biotic and abiotic components of ecosystem.



Water Turbidity recorded in the present study

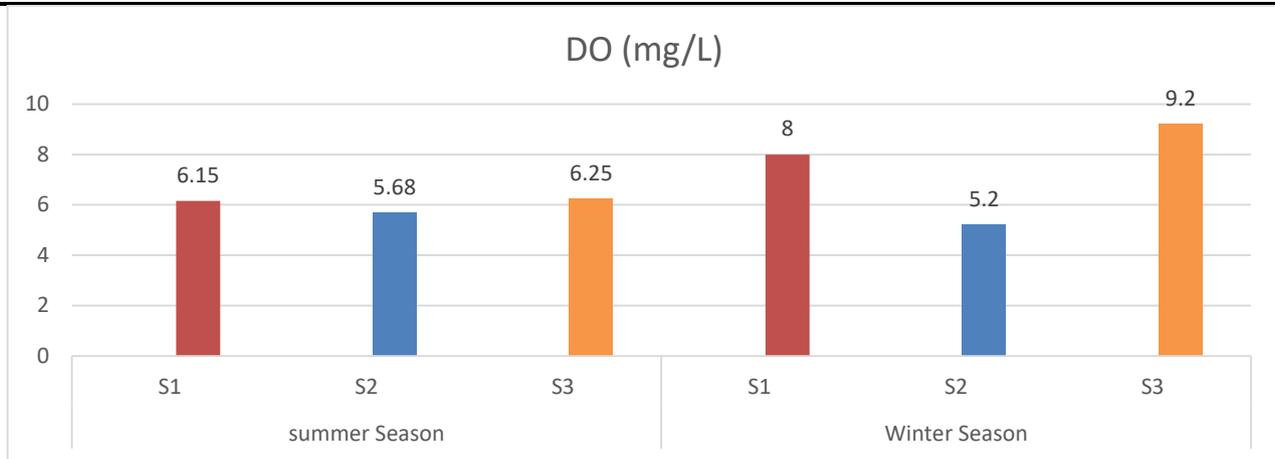
Turbidity:

The turbidity values in the present study ranged from 5.4 (S1) to 8.2 (S2) in summer season and 10.9(S2) to 15.6 (S3) in winter season. Minimum turbidity 5.4 was observed at (S1) during summer season while maximum 15.6 at (S3) in winter.



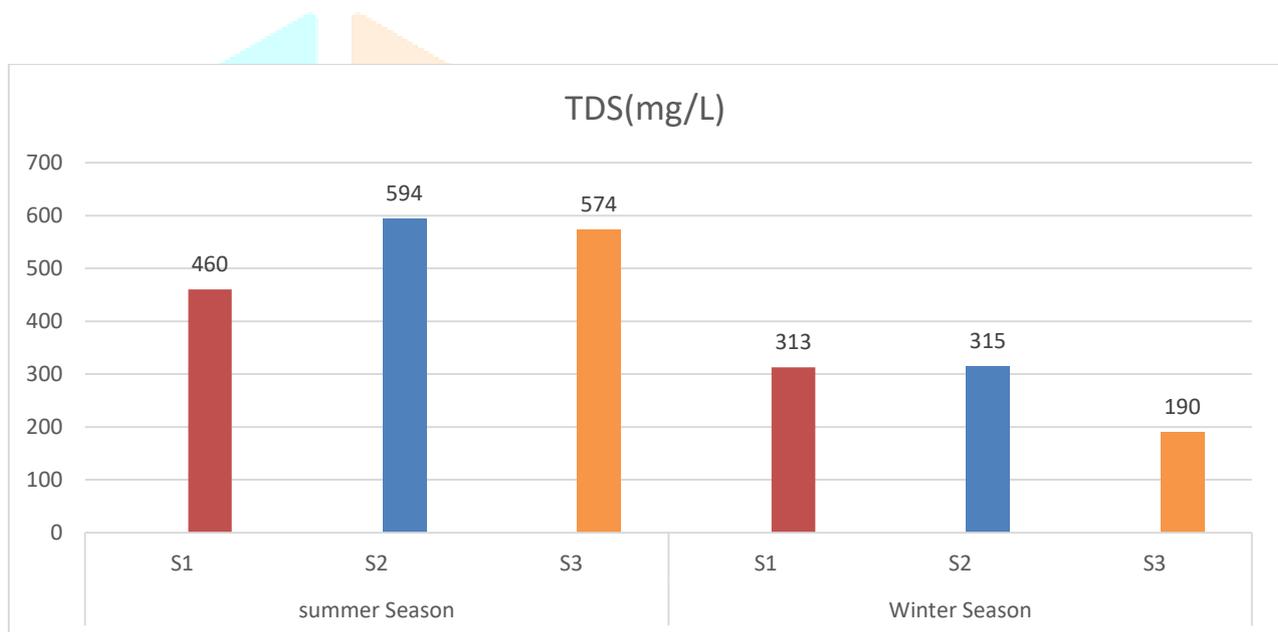
Water pH recorded in the present study

PH –The pH values in the present study ranged from 6.8 (S3) to 8.3 (S2) in summer season and 7.2(S1) to 8.5 (S3) in winter season. Similar pH range was reported in a previous study (Deshkar et al.,2014). Thus, there is no change in the pH level of the water.



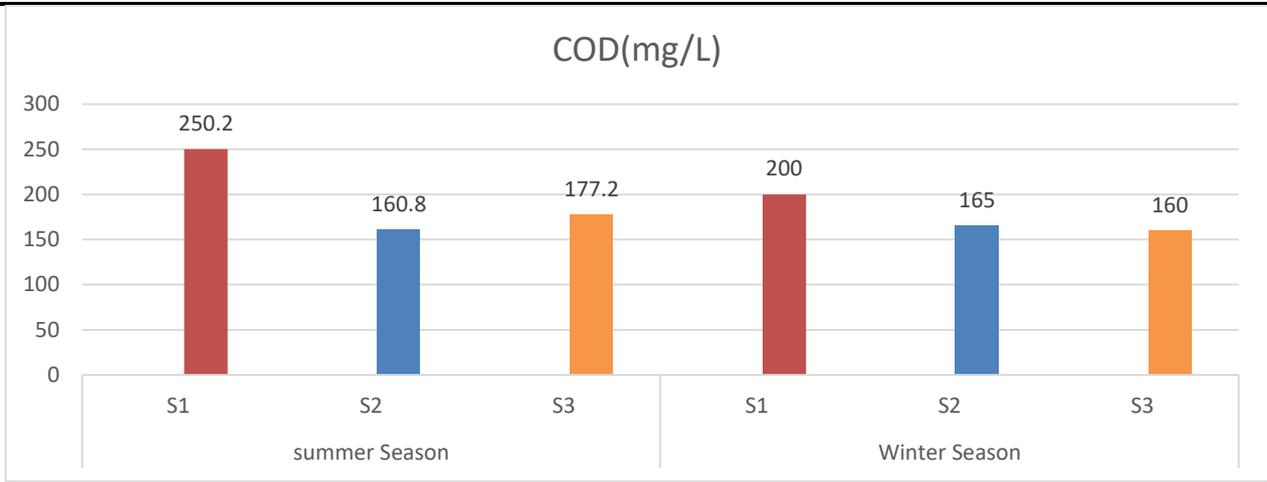
Water DO recorded in the present study

Dissolved Oxygen - DO an important limnological parameter indicating level of water quality and organic pollution in the water body (Wetzel and Likens, 2006). Minimum DO value 5.2 mg/L was observed at S2 in winter season and maximum value 9.2 mg/L was S3 in winter season.



Water TDS recorded in the present study

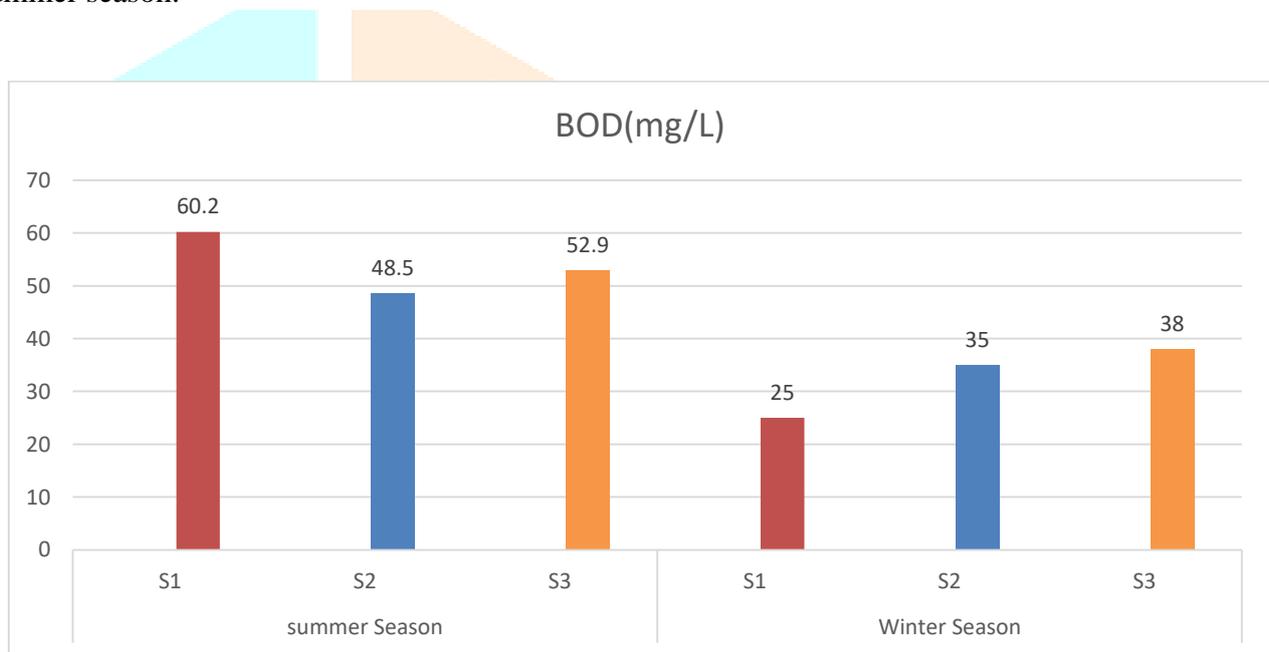
Total dissolved solids (TDS) -Total dissolved solids (TDS) include salt and variety of organic substances, which readily dissolve in water and often impart a degree of hardness (Watkari A.M et al. 2015). Minimum TDS value 190.0 mg/L was recorded at S3 in winter season and maximum TDS value 594.0 mg/L was observed at S2 summer season.



Water COD recorded in the present study

COD:

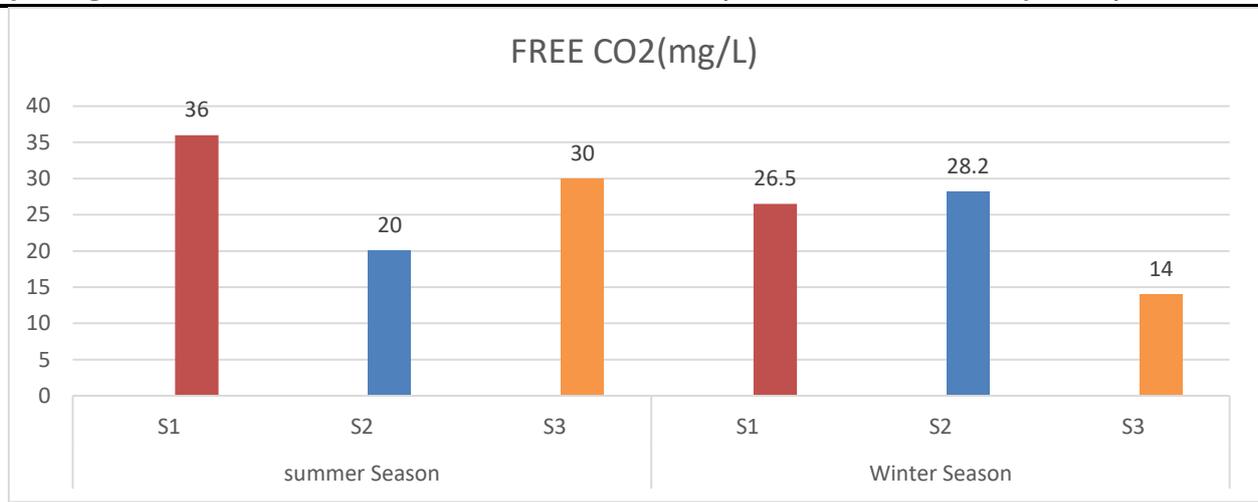
Minimum COD value 160.0 mg/L was recorded at S3 in winter season and maximum 250.2 was observed at S1 summer season.



Water BOD recorded in the present study

BOD:

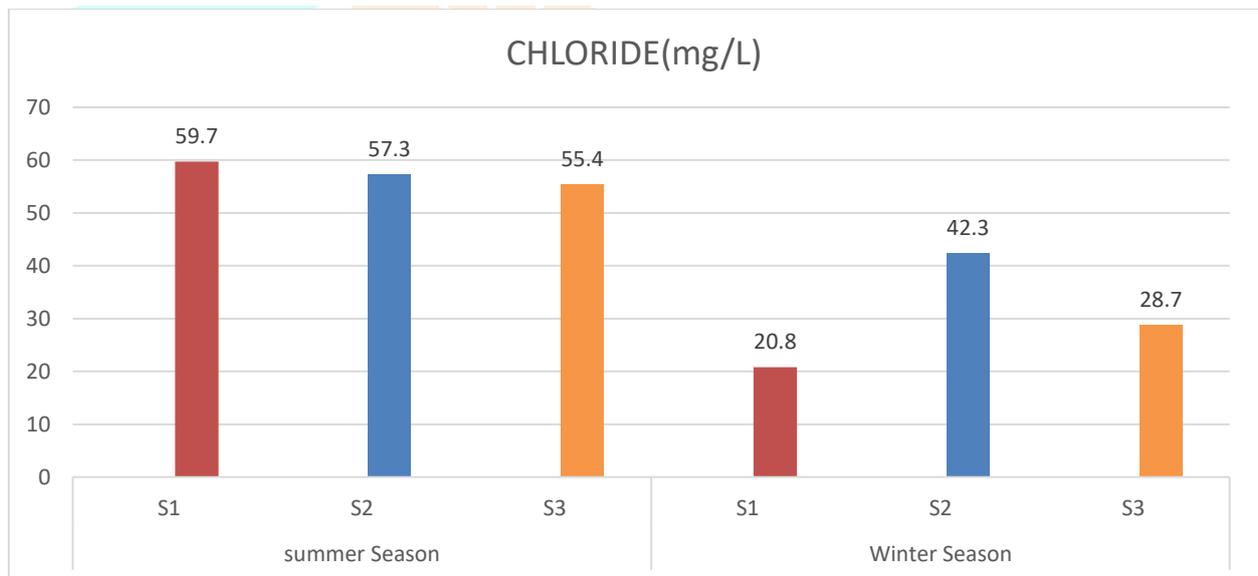
Minimum BOD value 25.0 mg/L was recorded at S1 in winter season and maximum 60.2 was observed at S1 summer season.



Water CO₂ recorded in the present study

Free CO₂:

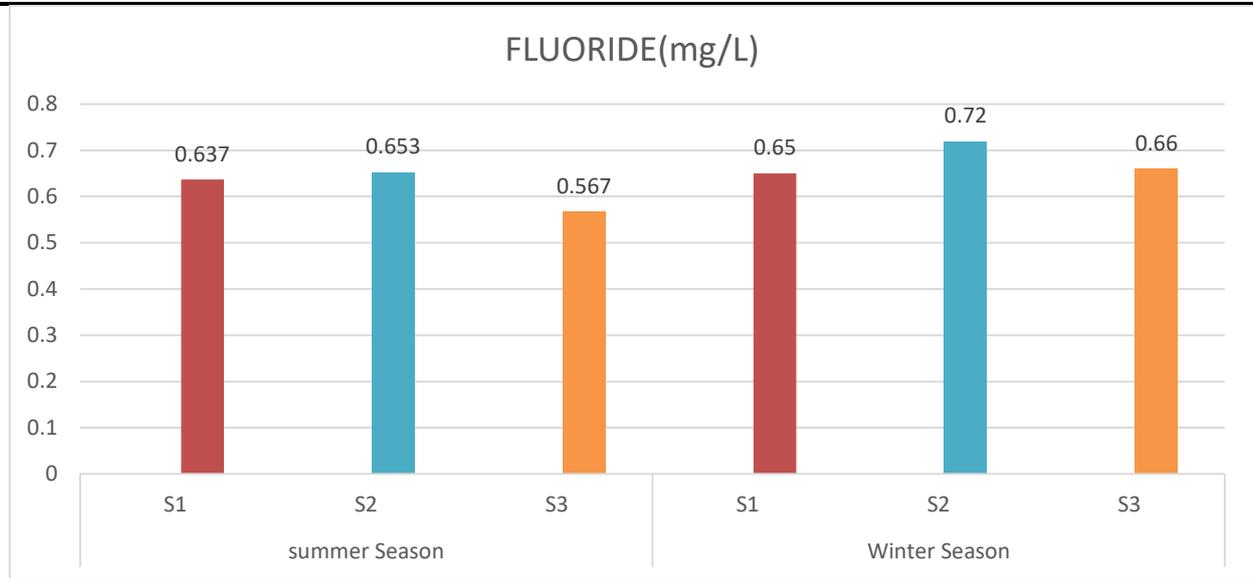
Minimum free CO₂ value 14 mg/L was observed at S3 during winter season while maximum free CO₂ value 36 mg/L was S1 in summer season.



Water Chloride recorded in the present study

Chloride -

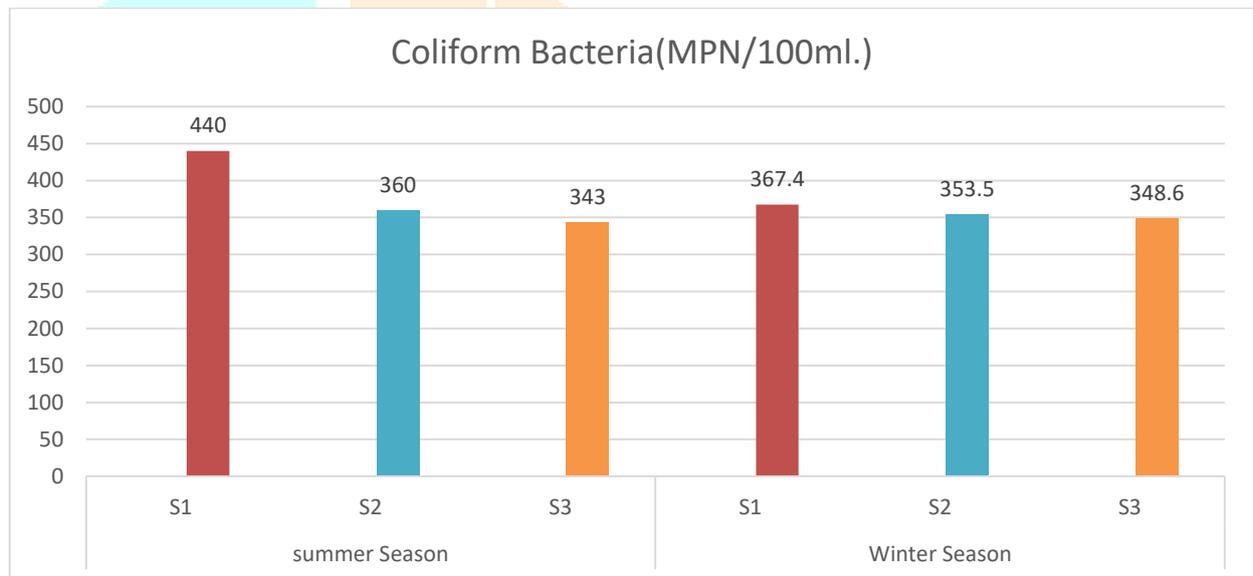
The present study minimum Chloride value 20.8 mg/L recorded in the winter season at S1 while maximum value 59.7 mg/L in the summer seasons at S1.



Water Fluoride recorded in the present study

Fluoride:

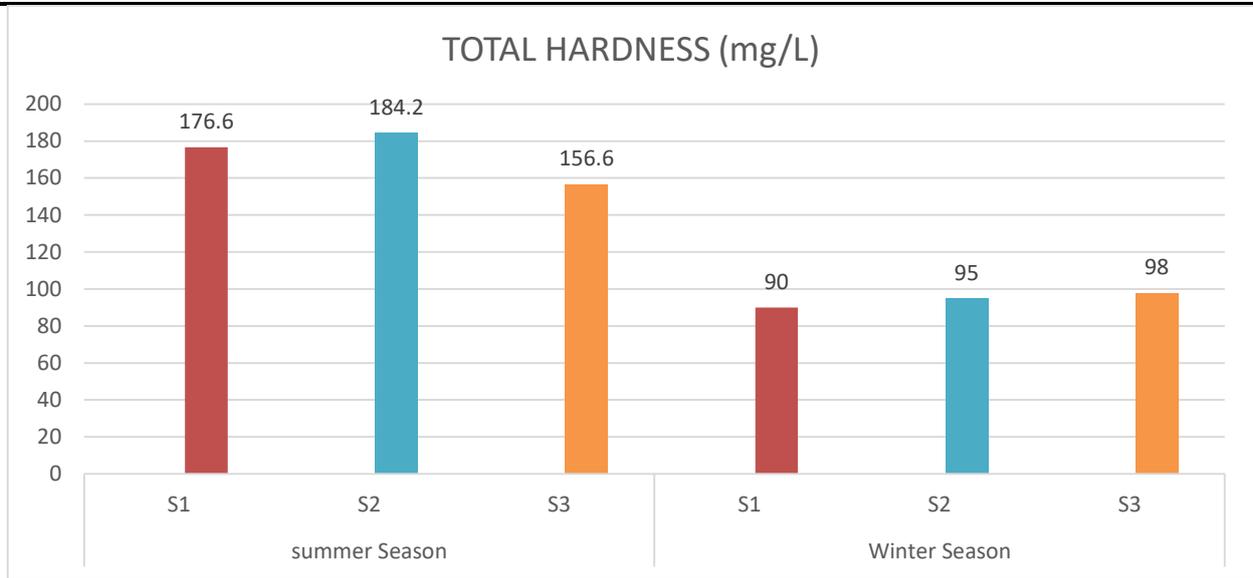
Minimum fluoride value 0,567 mg/L recorded in the summer season at S3 while maximum value 0.72 mg/L in the summer seasons at S2.



Coliform bacteria recorded in the present study

Coliform Bacteria:

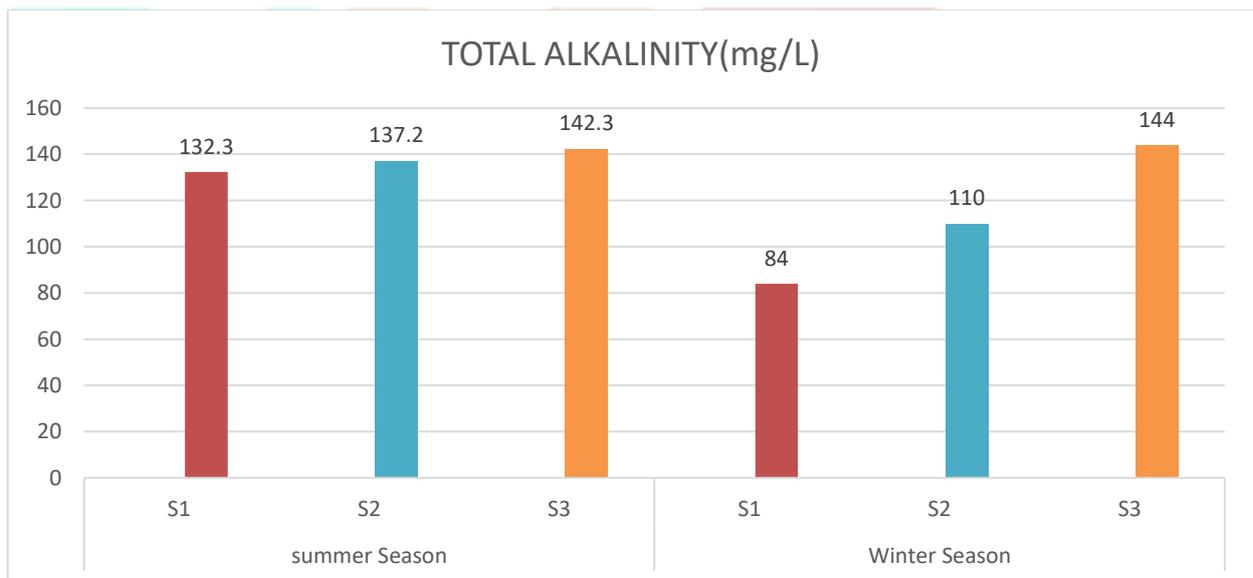
Minimum value 343 of coliform bacteria as observed in the summer season at S3 while maximum value 440 in the summer seasons at S1.



Total Hardness recorded in the present study

Total Hardness-

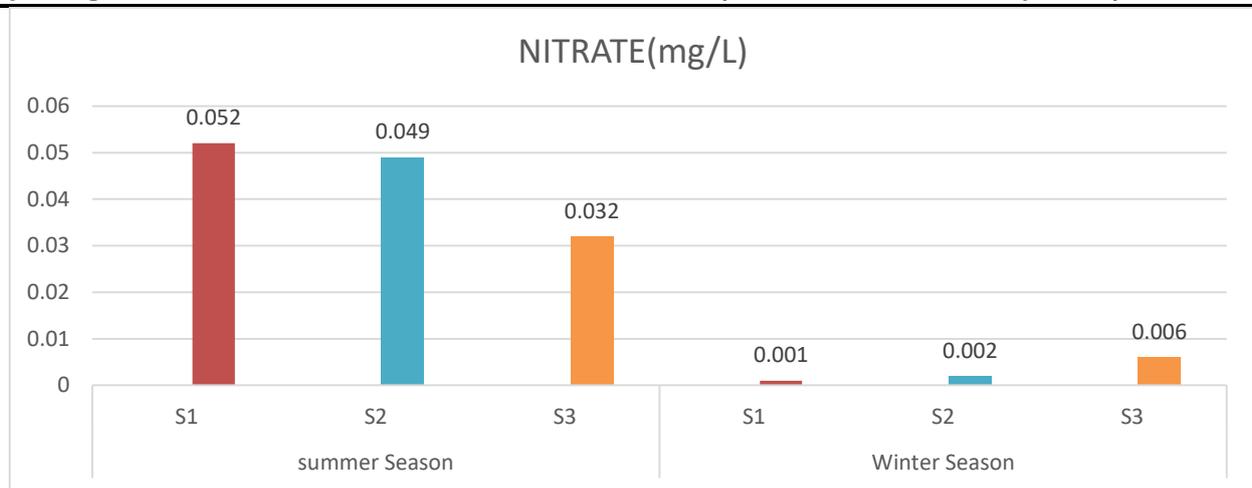
Minimum Total Hardness value 90 mg/l recorded in the winter season at S1 and maximum values 184.2 mg/l in the Summer season at S2.



Water Alkalinity recorded in the present study

Total Alkalinity:

Minimum alkalinity value 84 mg/l recorded in the winter season at S1 and maximum value 144 mg/l in winter seasons at S3.



Nitrate recorded in the present study

Nitrate-

The minimum Nitrate value 0.001 mg/l recorded in the winter season at S1 and maximum value 0.052 mg/l during the summer season at S1.

CONCLUSION-

In the present study many physicochemical parameters and its characteristic behavior of a lake water samples in different seasons and different sampling stations, the water quality of lake is deteriorated due to pollution. From the above study, it may conclude that except little variation, all the physico-chemical parameters were in permissible limit at the study site of the Kishore Sagar Lake. It is suggested that proper measures are necessary to avoid contamination as water is used for drinking purposes. At present the lake is suitable for irrigation and other purposes.

REFERENCES -

- APHA(2012), Standard Methods for the Examination of Water and Waste Waters, 22nd Edition, American Public Health Association, Washington, DC.
- BIS (2012), Specifications for Drinking Water, IS: 10500; 2012, Bureau of Indian Standards, New Delhi.
- Baroni, L.; Cenci, L.; Tettamanti, M.; Berati, M. (2007). "Evaluating the environmental impact of various dietary patterns combined with different food production systems". European Journal of Clinical Nutrition. **61** (2): 279–286. doi:10.1038/sj.ejcn.1602522. PMID 17035955.
- Deshkar S., Mewada K. and Gavali D.: Spatial difference in pollution levels across Vishwamitri River, International Journal of Environmental Biology, Universal Research Publications 2014.
- GL. Thermal pollution, influence of temperature on aquatic life. B.T.I. Ministry of Agriculture. 1968, pp: 224-881.
- Troell, Max; Naylor, Rosamond L.; Metian, Marc; Beveridge, Malcolm; Tyedmers, Peter H.; Folke, Carl; Arrow, Kenneth J.; Barrett, Scott; Crépin, Anne-Sophie; Ehrlich, Paul R.; Gren, Åsa (16 September 2014). "Does aquaculture add resilience to the global food system?". Proceedings of the National Academy of Sciences. **111** (37): 13257–13263.
- Watkar A.M., Barbate M.P.(2015); Seasonal variations in Physico-chemical Properties of Chandrabhaga River in Dhapewada, Dist. Kalmeshwar Maharashtra, India. Research Journal of Recent Sciences ISSN 2277-2502 Vol. 41- 4.
- Wetzel R.G., Likens G.E. (2006) Limnological analysis.3rd ed. Springer-Verlag, New York, 391.