iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** VII **Month of publication:** July 2023

DOI: https://doi.org/10.22214/ijraset.2023.55020

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue VII Jul 2023- Available at www.ijraset.com

Study of Chemical Parameters of Himayat Sagar Lake at Rangareddy District

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Abstract: ***Water is a single major element responsible for sustaining life on Earth. In India, water is sourced from fourteen main stream basins and countless minor basins. Furthermore, it is important to raise awareness among the public about the importance of conserving water. Chemical pollutants have been wreaking havoc on our planet's waterways, and it's time we take a stand.Take Hyderabad, for example. This city is known as the 'Limnological capital of India', and for good reason. It's home to a plethora of major and minor water bodies, many ofwhich are used as drinking water sources***

The study of water quality at Himayathsagar is a necessity due to its close proximity to Hyderabad city, which is growing rapidly in terms of urbanization and industrialization. In order to ensure that this important drinking water source remains safe and clean, a study of the chemical parameters of the Himayat Sagar lake in Rangareddy District was conducted.

Water samples were collected and analyzed for a variety of chemical properties, such as pH, carbonates, and bicarbonates. These parameters are essential to determine the water quality and to plan forthe future management of clean water resources.

The study of water quality at Himayathsagar is an important step in ensuring that this vital drinking water source remains safe and clean forgenerations to come. With the ever-growing urbanization and industrialization of Hyderabad city, it is essential that we take all necessary steps to ensure that the water quality of Himayathsagar remains at its highest level.

Keywords: Chemical parameters, Domestic sewage, Himayat Sagar Lake ,Waterquality,pH

I. INTRODUCTION

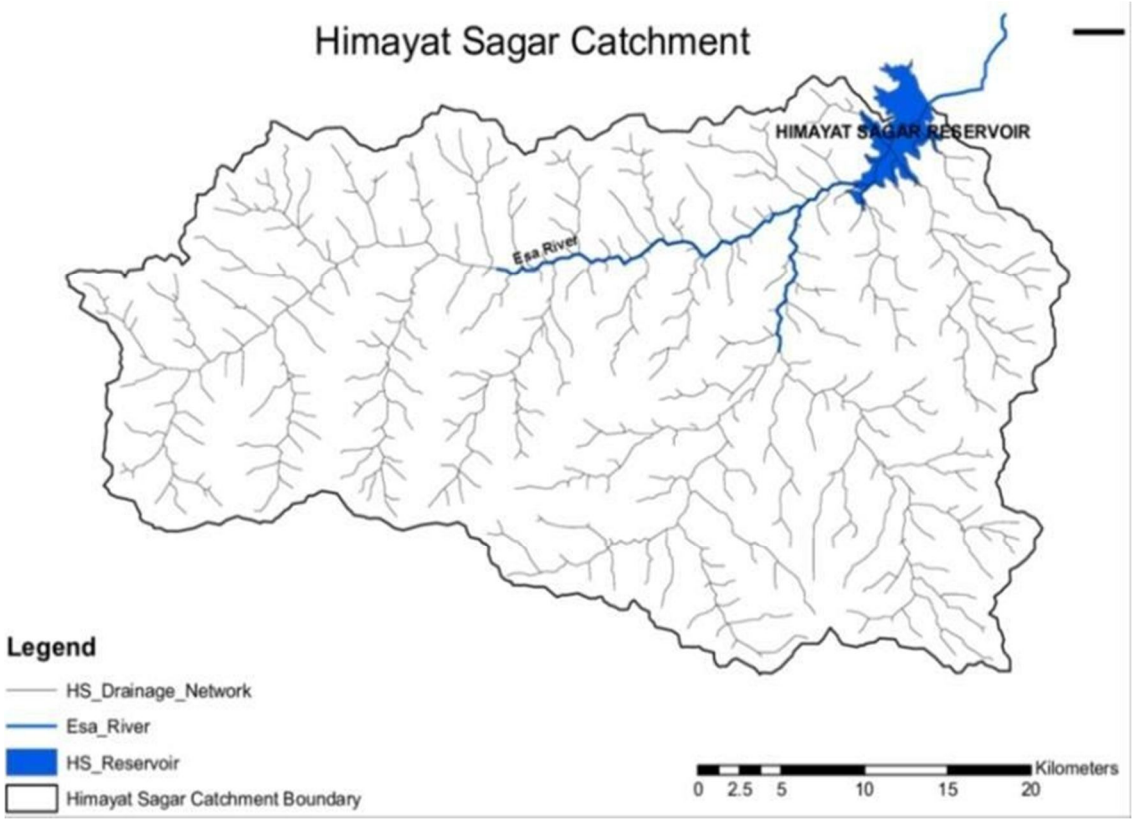
Lakes play a vital role in providing freshwater, storage capacity, and various natural services and they are important part of the hydrologic cycle which acts as additional storage capacity for water. However, human activities like industrialization, increased population, and the use of fertilizers in agriculture leads to pollution and depletion of aquatic biota, which affects the ecological water balance of the region. Hence, regular monitoring of water quality is essential to prevent contaminated water supply, by proper waste management, monitoring of water quality, and implementation of effective management strategies and policies.

Himayat Sagar Lake is an artificial lake about 20 kilometres (12 mi) from Hyderabad in the Ranga Reddy district of Telangana, India., is an important source of drinking water for the surrounding population. Unfortunately, this vital resource is facing increasing pollution day by day, caused by a variety of sources, including industrial and agricultural runoff, sewage, and garbage. It is crucial to continuously monitor and assess the parameters of water quality in Himayat Sagar. This monitoring should include testing for contaminants such as heavy metals, pesticides, and also other pollutants. Additionally, the lake is also a popularspot for picnics and recreation and plays an important role in saving the city from floods. Therefore, protecting the quality of water in Himayat Sagar is not only important for human consumption but also it is equally important for maintaining the ecological balance and preserving the natural services and products provided by the lake.

Himayat Sagar Lake

II. STUDY AREA

The Himayat Sagar Lake is located in HyderabadLatitude of the lake: 17.3575° N
Longitude of the lake: 78.3819° ECatchment area -688.937 Sq. KmSurface area -19.6839 Sq. Km
The temperature during summer can reach to 40°C (104°F), and during winter can drop as low as 15°C (59°F).The storage capacity is 2.9 tmc ft,(Reduced capacity due to silt accumulation); 4.251 TMC (During 1927)



Study area map of Himayat Sagar

III. COMPASS AND OBJECTIVES

1) Assess the quality of water collected from this lake.
2) To measure or assess chemical parameters similar as Carbonate,Bicarbonate and pH.

IV. MATERIALS AND METHOD METHODOLOGY

Water sample was collected from the face of the Himayat Sagar lake on 22nd September 2022 at 8 am in a 2 litre vessel and brought to council thesame day and Carbonates, Bicarbonate, and pH of the water sample was estimated and the values of them was reported where pH of the water wasbetween 8-8.5 which is alkaline.

V. PROCEDURE

1) *pH Estimation:*10 ml of water sample in a test tube is taken and 0.2ml of the universal index is added. The colour produced in the sample is compared with the colour strips pasted on the bottle. The approximate estimation of pH is made.
2) *Carbonate Estimation:* 50 ml of water sample is pipette out intoa conical beaker.0.5 ml of phenolphthalein index is added. It produces a pink colour if carbonate is present. The original reading of burette with N/ 20 H2SO4 is noted and the sample titrated against N/ 20 H2SO4 until the pink colour disappears. The volume of standard sulphuric acid consumed is noted.
3) *Bicarbonate Estimation:* To the below result in which carbonates are estimated, pipette out 50 ml of water sample into a conical beaker. Add 0.2 ml of methyl orange index. It imparts light unheroic colour to the result. The result is titrated against N/ 20 H2SO4 until the light unheroic colour just changes to orange. If redundant acid is added result turns to pink. The quantum of H2SO4 consumed is noted down.

VI. RESULTS AND DISCUSSION

A. *Blank*

Table 1

S. No	Volume ofsample	IR	BR	Volume of$H2SO_4$
1.	10ml	0	5.9	5.9
2.	10ml	0	6.8	6.8

Table 2

S. No	Volume ofsample	IR	BR	Volume of$H2SO_4$
1.	10ml	0	14.8	14.8
2.	10ml	0	17.4	17.4

B. *Sample*

1) *Carbonate Table*

S. No	Volume ofsample	IR	BR	Volume of$H2SO_4$
1.	10ml	0	0.6	0.6
2.	10ml	0	0.8	0.8

2) *Bicarbonate Table*

S. No	Volume ofsample	IR	BR	Volume of$H2SO_4$
1.	10ml	0	2.6	2.6
2.	10ml	0	4.1	4.1

CalculationsCO_3^{2-} (Mg/1)=$\underline{2Y\times N\times R\times 1000}$
Wt Y=volume of blank sample
N=Normality of =$H2SO_4$ 0.01N
R=Ratio between total volume soil extract used for filtrationWt=weight of dry soil=20g

Y=blank-sample
=5.9-0.6
=3
N=0.01N; R=10; Wt=20g

CO_3^{2-} (Mg/1)=$\frac{2(5.3)\times 0.01\times 10\times 1000}{20}$
=$\frac{1060}{20}$
=53mg/l

HCO_3^-=$\frac{(t-2Y)\times N\times R\times 1000}{Wt}$
=t-2Y
=14.8-2.6
=12.2-2(5.3)
=1.6
N=0.01N; R=10; Wt=20g

$$HCO_3^- = \frac{12.2 - 2(5.3) \times 0.01 \times 10 \times 1000}{20}$$

$$= \frac{12 - 10.6 \times 0.01 \times 10 \times 1000}{20}$$

$$= 7 mg/l$$

VII. CONCLUSION

The Himayat Sagar Lake in Rangareddy district was studied for its chemical parameters. The results of the study has shown that the averagepH of the water sample was between 8 to 8.5, which is alkaline. The total alkalinity of CO3mg/l present in the sample tested was recorded as anaverage value of 53mg/l and the total value of HCO3 was recorded as7mg/l, which is very low. The pH of the water sample is an important indicator of water quality andthe alkalinity of the water sample is also equally important for assessing the water's suitability for drinking and other uses. The alkalinity of the water sample indicates the presence of dissolved carbonates and bicarbonates in the water. The total alkalinity of the water sample is also important for assessing the water's suitability for drinking purpose and other uses.

The results of the study of the Himayat Sagar Lake in Rangareddy districthas given important information about the water quality of the lake. The pH and alkalinity of the water sample shows that the water is suitable for drinking and other uses. However, further research is needed to check thesuitability of the water for long-term use. Besides, further research shouldbe conducted to assess the impact of other factors such as pollution, agricultural runoff, and climate change on the water quality of the lake.

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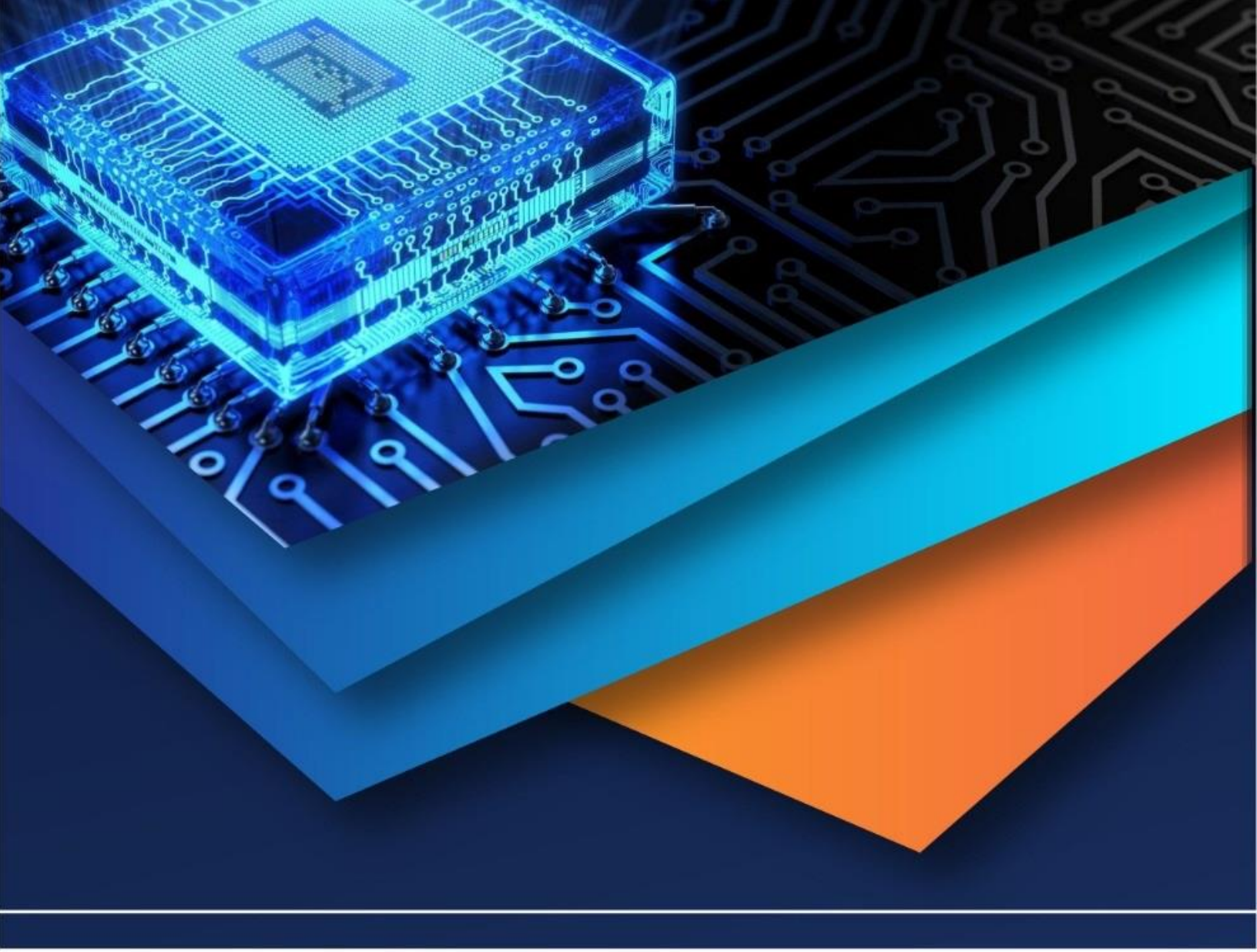

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