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RESEARCH ARTICLE

PHYSICO-CHEMICAL ANALYSIS OF GROUND WATER TAKEN FROM THREE SITES OF FAUKKS SAGAR LAKE

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ABSTRACT

This paper deals with the study of physico-Chemical parameters of FaukksSagar Lakewater located in Jeedimetla near Kompally, Hyderabad. Telangana State. Monthly changes in physical and chemical parameters such as Water Temperature, Transparency, Turbidity, Total Dissolved Solids, pH, Free Carbon dioxide, Total Hardness, Chlorides, Alkalinity, Phosphate and nitrates, were analyzed for a period of one yearfrom June 2013 to May 2014.According to APHA Standard methods. The result of this analysis point out the fact that all the parameters are not permissible limits. The result indicates the lake is polluted and can't be used for Domestic and Irrigation.

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INTRODUCTION

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the planet having about 70 % of water. But due to increased, industrialization, human population, use of fertilizers in the agriculture and man-made activity it is highly polluted with different harmful contaminants (Patil *et al*., 2012). Due to increased Industrialization, Human population, Use of Fertilizers in Agriculture. The Natural Aquatic Resources are causing heavy pollution in aquatic Environment leading to water quality and depletion of aquatic biota (Manjare *et al*., 2010). The quality of water is vital concern for mankind because it directly linked with human health. Now a day, the menace of water borne diseases and epidemics still looms large on the horizons of developed and developing countries. The polluted water is the culprit in all such cases. Water sources were polluted by domestic wastage in rural areas whereas industrial wastages discharged into natural water sources in urban areas. Water is polluted due to various phenomenons.

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The rapid growing population and improved living standards, the pressure on the present water resources is increasing day by day (Ajit M. Kalwale *et al*., 2012). Groundwater is one of the most important natural resources globally. The availability and sustainability of groundwater in manyprincipal aquifers is threatened because of depletion by human and climatic stresses. The largely hidden nature of groundwater can result in development that is uncontrolled and not incorporated into river-basin management, which can result in overexploitation and contamination of groundwater. Even without considering climate change, groundwater sustainability is a major challenge because groundwater is a widely distributed resource that is affected by local users and contamination (Brekke *et al*., 2009; Alley *et al*., 2002). Several sources contribute to the dissolved contents of groundwater the major elements released via various sources are used as proxies for weathering rates for which the identification of their different origins is required (Drever, 2005). The quality of water in any ecosystem provides significant information about the available resources for supporting life in that ecosystem (Rajesh *et al*., 2002). The importance of adequate water quantity for human health has been recognised for many years and there has been an extensive debate about the relative importance of water quantity, sanitation, water quality and hygiene in protecting and improving health (Guy Howard).

Study area

Study area Faukks Sagar Lake

It is famous for its natural beauty known locally as KollaCheruvu, the Nizam constructed a dam on the lake naming it Fox Sagar in 1897, as part 31 lakes created for improving water sources for the city of Hyderabad. A pump house was built on the bund, constructed in a typical Nizam architecture. It, at the time, provided drinking and irrigation for nearby villages.

The lake is spread over 2 km2. It is home to flamingos, yellow-billed storks, ospreys, grey herons, great cormorants, kingfishers, baya weavers, garganeys, among others. It is often visited by bird watchers. The local fisherman rear fish in the lake. The lake is polluted by emissions from an adjoining industrial estate, killing fish and migratory birds.

Coordinates: 17°31'34"N 78°28'12"E

MATERIALS AND METHODS

The pH was measured by using Elico-pH meter. Total hardness, calcium, magnesium were measured by EDTA titration methods. Total alkalinity was determined by volumetrically by silver nitrate titrimetric methods using potassium chromate as indicator. Fluoride content in water was measured by Shimadzu-Spectrophotometer. The remaining Physico-Chemical analysis was carried out according to APHA standard methods.

Water sampling

In present investigation the water samples were collected in polythene bottles which were cleaned with acid water, followed by rinsing twice with distilled water. The water samples are chemically analyzed (Karunakaran *et al*.). The analysis of water was done using procedure of standard methods.

RESULTS

The results are represented in tabular format.

Physico-Chemical Parameters at Station-I

	Jun-13	July	Aug	Sep	Oct	Nov	Dec	Jan-14	Feb	Mar	Apr	May	Avg
Temp	24.0	23.0	23.0	23.0	22.5	22.0	22.0	23.0	22.5	23.5	24.0	25.0	23.0
pH	8.2	8.4	8.0	8.2	8.2	8.6	8.4	8.2	8.0	8.2	8.2	8.2	8.3
Carbonates	12.06	18.08	6.04	12.08	12.10	32.02	24.08	12.02	6.08	12.06	12.04	12.08	14.22
Bicarbonates	204.02	218.22	211.32	215.31	218.31	216.42	227.34	216.34	220.64	212.34	210.86	208.54	214.97
Chlorides	350.23	378.82	368.80	376.35	.76.82	381.05	394.10	379.10	386.55	368.55	351.05	3.42.35	271.14
DO	2.0	2.8	2.2	3.6	3.4	2.2	3.6	3.4	2.6	2.2	3.6	2.2	2.81
BOD	140	110	130	60	80	120	60	70	120	130	70	120	100
Organic Matter	30	20	25	10	15	30	8	10	20	20	10	30	19
Cod	80	110	90	110	100	118	120	108	120	92	78	66	99
T.H	530.12	546.21	538.13	532.32	533.12	532.32	521.32	529.38	525.42	518.36	532.26	524.22	530.26
Ca	80	110	90	110	100	118	120	108	120	92	78	66	99
Mg	63.38	69.78	77.53	74.56	66.42	63.13	66.79	59.72	67.56	66.55	59.78	70.93	67.17
T.S	700	750	770	790	750	790	710	720	770	760	760	790	580
T.D.S	400	450	410	430	390	430	470	430	390	420	410	440	345
T.S.S	300	300	360	360	360	360	340	390	380	340	380	350	335
Sulphates	49	42	48	42	48	42	44	50	42	48	46	46	45
Phosphates	2.8	3.4	2.9	3.5	3.0	3.6	3.7	2.6	3.8	2.8	3.2	3.3	3.2
Nitrites	0.2	0.2	0.3	0.4	0.2	0.3	0.2	0.3	0.4	0.2	0.3	0.4	0.28
Nitrate	8.2	7.2	6.6	6.4	7.4	6.4	8.4	6.8	7.2	6.4	6.6	6.4	7

Physico-Chemical Parameters at Station-II

	Jun-13	July	Aug	Sep	Oct	Nov	Dec	Jan-14	Feb	Mar	Apr	May	Avg
Temp	24.0	23.0	23.0	23.0	22.5	22.0	22.0	23.0	22.5	23.5	24.0	25.0	23.0
pH	8.2	8.4	8.0	8.2	8.2	8.6	8.4	8.2	8.0	8.2	8.2	8.2	8.3
Carbonates	12.06	18.08	6.04	12.08	12.10	32.02	24.08	12.02	6.08	12.06	12.04	12.08	14.22
Bicarbonates	210.22	221.22	204.32	212.32	208.24	216.42	222.34	220.36	224.28	216.34	228.86	208.54	216.12
Chlorides	370.23	398.80	352.24	376.84	358.44	382.84	386.26	382.28	384.26	380.28	386.24	354.26	376.08
DO	3.2	2.9	2.2	3.6	3.4	2.2	3.6	3.4	3.6	2.2	3.6	2.4	3.1
BOD	70	110	140	50	60	120	60	70	120	130	70	120	100
Organic Matter	10	18	26	12	14	28	16	16	12	26	28	24	19
COD	102	110	120	90	96	114	92	92	90	120	92	94	101
T.H	530.12	546.21	538.13	532.32	533.12	531.32	542.34	531.32	521.15	529.31	525.42	517.35	531.50
Ca	88.22	95.01	86.35	86.22	83.46	90.54	88.24	90.35	90.34	87.34	82.41	86.35	87.90
Mg	72.69	69.78	72.65	75.17	74.90	74.10	76.08	72.97	72.96	75.41	63.12	65.24	72.08
T.S	780	810	710	720	690	700	780	710	720	790	710	780	791
T.D.S	440	390	400	430	390	400	390	410	420	410	390	390	440
T.S.S	340	320	410	270	300	300	390	300	300	380	320	390	327
Sulphates	41	48	42	38	28	32	34	34	32	42	46	36	38
Phosphates	3.1	2.6	2.8	3.4	3.8	3.0	3.2	3.2	3.0	2.8	2.4	3.2	3.1
Nitrites	0.2	0.3	0.1	0.2	0.2	0.1	0.2	0.3	0.3	0.2	0.1	0.2	0.2
Nitrate	6.2	6.4	6.2	7.6	6.4	6.6	5.8	5.6	6.2	6.2	6.0	6.2	6.3

Physico-Chemical Parameters at Station-III

	Jun-13	July	Aug	Sep	Oct	Nov	Dec	Jan-14	Feb	Mar	Apr	May	Avg
Temp	24.0	24.0	23.0	23.5	23.0	22.5	22.0	22.5	23.0	23.0	24.0	25.0	23.5
pH	8.2	8.0	8.2	8.2	8.4	8.2	8.0	8.2	8.6	8.0	8.2	8.2	8.2
Carbonates	12.08	6.04	12.06	12.08	18.08	12.08	6.02	12.04	36.08	6.02	12.04	12.06	13.05
Bicarbonates	216.21	214.32	218.42	224.32	218.36	224.36	220.32	204.32	216.32	214.34	220.32	218.42	218.42
Chlorides	386.23	366.85	372.94	386.20	384.60	396.24	384.24	344.26	376.23	366.85	388.42	376.24	377.44
DO	2.8	3.2	2.8	3.4	3.2	3.0	2.8	3.2	3.0	2.6	2.8	3.0	3.0
BOD	120	90	110	100	90	110	100	90	100	90	90	100	99
Organic Matter	20	16	18	16	16	18	20	16	18	18	16	14	17
COD	120	70	90	60	76	72	90	78	76	96	90	80	83
T.H	539.31	540.23	546.13	547.31	530.21	537.36	536.34	537.21	518.35	527.48	533.92	528.43	535.19
Ca	91.23	89.12	92.21	96.23	89.52	92.64	85.36	92.45	80.32	86.32	86.42	89.33	89.26
Mg	63.21	65.87	69.75	76.33	74.16	76.34	75.65	74.41	70.78	72.44	75.03	69.34	71.94
T.S	720	790	720	750	720	790	700	780	770	790	750	760	762
T.D.S	4.0	440	450	450	470	490	490	450	470	490	480	490	467
T.S.S	390	350	370	300	350	400	390	390	300	300	370	370	395
Sulphates	36	38	42	35	44	32	32	36	24	32	26	32	34
Phosphates	3.8	3.7	2.6	3.2	1.6	3.5	3.2	4.1	3.6	3.8	4.0	3.2	3.5
Nitrites	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.25
Nitrate	5.2	4.8	5.2	4.6	5.2	4.8	5.2	5.0	4.6	4.6	4.2	3.8	4.8

PHYTOPLANKTON TABLES

Station-I

S.No	Month	Chlorophyceae	Cyanophyceae	Bacillariophyceae	Euglenophyceae
1	JUN-13	70	310	10	22
2	JULY	60	300	11	25
3	AUG	65	310	14	24
4	SEP	40	440	9	23
5	OCT	50	340	15	19
6	NOV	38	350	18	21
7	DEC	42	250	19	28
8	JAN-14	42	290	15	25
9	FEB	40	280	16	28
10	MAR	48	300	9	27
11	APR	50	380	8	25
12	MAY	40	370	12	24

Station-II

S.No	Month	Chlorophyceae	Cyanophyceae	Bacillariophyceae	Euglenophyceae
1	JUN-13	48	340	12	30
2	JULY	50	400	14	32
3	AUG	47	440	14	31
4	SEP	42	340	14	30
5	OCT	34	340	17	22
6	NOV	42	320	15	26
7	DEC	45	350	18	22
8	JAN-14	41	440	16	22
9	FEB	44	380	15	24
10	MAR	47	390	14	26
11	APR	38	370	21	24
12	MAY	39	350	13	21

Station-III

S.No	Month	Chlorophyceae	Cyanophyceae	Bacillariophyceae	Euglenophyceae
1	JUN-13	52	310	12	22
2	JULY	58	354	15	24
3	AUG	54	350	9	31
4	SEP	52	325	10	27
5	OCT	51	320	8	29
6	NOV	54	332	11	26
7	DEC	48	360	16	30
8	JAN-14	47	370	14	32
9	FEB	48	310	17	34
10	MAR	49	320	15	31
11	APR	44	360	14	32
12	MAY	48	355	15	31

DISCUSSION AND CONCLUSION

The result of this analysis point out the fact that all the parameters are not under permissible limits. The result indicates the lake is polluted and cannot be used for Domestic and Irrigation.

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