International Journal of Advanced Educational Research
ISSN: 2455-6157
Impact Factor: RJIF 5.12
www.educationjournal.org
Volume 3; Issue 2; March 2018; Page No. 369-370

Assessment of Physico-chemical parameters of Gundalamma Lake, Tumkur, Karnataka India

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Abstract
Assessment of physico-chemicals of Gundalamma Lake, Tumkur was done during period of Jan-2016 to Dec-2016. Lake water is a source for ground water level increase in the surrounding areas of Tumkur city, its may helpful in Bore wells recharge for drinking domestic and fish culture purpose. The analysis was carried out for the parameters like temperature, conductivity, turbidity, TDS, TSS, pH, Total Hardness, Ca, Mg, alkalinity, COD, BOD, DO, etc., the study report discusses about the analysis of lake water quality.

Keywords: Gundalamma Lake, water quality, pollution, Tumkur

Introduction
In recent years the pollution of water has become the most significant environmental problem in the world. The survival and quality of human life depends up on the availability of freshwater. The aquatic animal's life directly or indirectly depends on water quality status. (Bajpai, 1993; Mishra *et al*.1993; Sayeshware, 2010) [8, 6, 5]. Water quality study provides the current information about the suitability of water for designated uses and to improve existing condition. Now a day most of the aquatic ecosystem receives million litres of municipal sewage, industrial and agricultural runoff. It cause to nutrient enrichment cause to the eutrophication in aquatic ecosystem (Ausari, 2006), water of acceptable quality is essential not only for drinking and domestic purposes but also for agriculture, industrial and commercial uses. The main object of this paper to examine the water quality. This lake serves as a rich source for recharge of surrounding Bore wells and fish culture. The quality of water is getting polluted due to urbanisation, draining of several terminals of sewage, cloth washing and adding human waste.

Material and Method
Present study was carried out during Jan-2016 to December-2016, Gundalamma tank situated in tumkur city. The water samples were collected between 7.00 am to 9.00am and were brought to the laboratory carefully for further analysis using standard procedure (APHA, 1998) [1].
Physico-chemical parameters such as water temperature, conductivity, turbidity, DO, BOD, COD, TDS, TSS, Hardness, Ca and Mg etc., were analysed according to APHA (1998) [1] standard methods.

Table 1: Physico-Chemical parameters of Gundalamma Lake, Tumkur.

Sl. No.	parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Water Temp.	23	22	23	24	24	23	22	22	22	23	22	21
2	PH	7.8	7.9	7.8	8.5	8.5	7.8	7.8	7.6	7.5	7.4	7.4	7.2
3	Conductivity	1400	1380	1500	1550	1610	1622	1416	1380	800	850	1220	1200
4	Turbidity	28	26	22	20	16	14	22	26	30	30	28	26
5	TSS	42	46	42	32	26	26	32	46	52	52	58	60
6	TDS	890	872	974	1002	1010	1008	942	792	502	504	826	832
7	DO	5.2	05	4.8	3.8	3.2	03	3.8	4.2	5.1	5.2	5.5	5.5
8	COD	130	142	148	146	152	154	134	110	80	82	98	110
9	BOD	13	16	18	16	15	15	13	11	08	08	10	10
10	Cl	201	206	212	216	220	232	189	170	90	90	152	150
11	Alkality	182	178	192	200	206	210	168	162	88	86	178	182
12	Hardness	210	212	220	226	234	236	200	204	104	100	210	214
13	Ca	125	130	132	136	140	142	110	108	62	60	128	134
14	Mg	85	82	88	90	94	94	95	96	42	40	82	80
15	So_4	39	41	43	46	48	48	46	34	28	20	20	36
16	Am	15	18	22	26	32	38	30	24	12	12	14	14
17	No_3	01	01	1.2	1.5	02	1.5	01	1.0	1.0	1.2	1.0	1.5
18	Dissolved phosphate	12	08	10	09	14	12	08	10	12	12	06	10

Atmosphere, water temperature an important role plays in determine the growth of organisms ultimately the water qyality. Excess amount of nutrients, high temperature cause to the eutrophication. The maximum water temperature 24°c in the months of May and June and minimum 21°c was recorded in the month of Dec-2016.

pH plays an important role in the aquatic situations for the growth of flora and fauna. The most of the aquatic organisms and adapted to average pH and don't withstand abrupt changes. Present lake water body pH ranges from 7.2 to 8.5 at the spot in the present study the alkaline trend of the pH was observed similar pH was reported by khan *et al*. (2005) [3], the high pH was observed in summer season it is due to aquatic plants use Co_2 in their photosynthesis activity and its removal is responsible for such a high pH.

DO is very important parameter of water quality and is an index of physical and bio-chemical process occurs in water. The Do content in present studied Lake 3.0 mg/l to 5.5 mg/l. The highest value of Do was observed in early summer months and it may be due to high photosynthetic activity by plants, and low values in summer which is due to high atmospheric temperature, similar results were repeated by Devidas (2006) [2] and lokhande (2009) [4].

The TDS are the amounts of particles that are dissolved formed in the water. In present study TDS value ranges from 502 mg/l to 1010 mg/l. The lowest values were observed in the months of September and October while highest values in the months of April, may, June due to evaporthum the similar results were observed by Lokhande (2004).

In the present investigation the total hardness ranges from 100 mg/l to 236 mg/l the maximum value recorded in the month of june-2016 and minimum in the month of oct-2016. The maximum value of Ca 142 mg/l was recorded in the month of June and minimum 60 mg/l in the month of October. Nitrate is normally the most common form of combined inorganic and organic nitrogen in lakes. In the present study nitrated Enfwa deom 1.0mg/l to 2.0mg/l.

The maximum value of alkalinity 210mg/l and minimum value of alkalinity was 86mg/l. The maximum value of chlorides 232mg/l was recorded in the month of June and minimum 90 mg/l in the month of Sep and October. Chlorides increases in summer and decrease in winter (Singh 1960, zafar A.R. 1964) [9]. The maximum value of phosphate 22mg/l was recorded in the month of may and minimum 06mg/l in the month of November, high value of phosphate during summer may be attributed to decrease water level and release of phosphate due to decomposition of organic matter. In the present study sulphate 38 mg/l was recorded in the month of June and minimum 20 mg/l in the month of October and November. Reddy *et al*. (2009) [7] high value recorded in monsoon season.

Conclusion

The physic-chemical properties of Gundallamma tank water body reveals that the level of water pollution is continuously increasing. The intensity of water pollution has very deteriorated in Gundallammma tank. The pollution of the water body is mainly due to draining of several terminals of sewage, cattle washing, mass bathing, cloth washing, and adding human waste. Therefore, it is necessary to take some preventive measures to reduce the water pollution of the water body and its surroundings. Preventive measures like, diversion of sewages, total prohibition on washing of cattle and cloths. Therefore, it has concluded that there is close relation between locations of water body and a level of water pollution. It is studied that there is inverse proportion between quantity of water in the water body or tanks and level of pollution.

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