Research Article

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Physico-chemical characterstics of khajana and darmasagar lakes, in Adilabad, AndhraPradesh, India

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Abstract

The present study deals with the physico-chemical parameters of Khajana and Darmasagar lakes of Adilabad district, Andhra Pradesh during the period of 2009 (September) to 2010 (August). The parameters studied comprised temperature, pH, total hardness, total dissolved solid, dissolved oxygen, chemical oxygen demand, biological oxygen demand and total alkalinity.

Key-Words: Khajana and Darmasagar Lakes, Physico-Chemical, Adilabad

Introduction

The Khajana and Darmasagar lakes are located between the latitude of 17° 18 and 18°35Northand longitudes of 78°18 and 80° 63 East in Adilabad District. The lakes are constructed during the period of 11th century by Nimma Naidu Kings. The lakes are main sources of drinking water, irrigation purposes. And also for other recreational purpose (boating and fishing, swimming, bathing) which are surrounded by forest with rockey hills and paddy fields. The present investigation attempts to find out the seasonal variations in the physic-chemical parameters and also focus on water quality respectively.

Material and Methods

Monthly collection of water samples were carried out at two different sampling stations for one complete year (from September 2009- August 2010). All the sample collections and field observations were conducted between 9.00 am to 12.00 Noon throughout the study period. The water samples collected from the lakes in bottles were brought to the laboratory for analysis as perthe standard methods described[1-2] .

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Results and Conclusion

The results of the physico-chemical properties of Khajana and Darmasagar lakes water during September 2009-August 2010 are shown in Table-1&2.Temperature of water was found to be in the range of 20.3°C to 27.61°C.The temperature was maximum (27.61°C) in summer and minimum (20.3°C) in the winter in Khajana lake. The range of temperature was found in Ramappa Darmasagar lake was 20.96°C to 22.51°C and maximum temperature was 22.51°C in summer and minimum(20.96°C) in the winter under study. During the inverstigation , pH value ranged from 7.0 to 7.4 in Khajama, maximum (7.4) in summer and minimum (7.0) in winter , In Darmasagar lake the pH was shown to be ranged from 7.0 (winter) to 7.2 (summer) under investigation . the high pH value during summer may be due to high photosynthetic activity of micro and macro vegetation resulting in high production of free carbon dioxide shifting the equilibrium towards alkaline[3] factors like temperature influence the pH of water. Dhembare[4] has observed a direct relationship between water temperature and pH. The study of total hardness of water was found in the Khajana lake was 348mg/l in winter and 360mg/l in summer and in Darmasagar lake 331mg/l in winter and 352mg/l in summer under study[5] observed maximum hardness in summer and minimum in rainy season . According to Kannan[6] the water is classified as very hard if the value exceed 180 ppm. The total dissolved solid ranged from 490mg/l to 556mg/l in Khajana lake. Maximum (556mg/l) and minimum (490 mg/l) were observed in summer and monsoon season. In Darmasagar lake the

maximum dissolved solid were observed in summer (480mg/l) and minimum was found in monsoon (467mg/l).

In the present study COD values in Khajana lake varied from minimum (28.88 mg/l) in monsoon to maximum (32.10mg/l) in summer. Where as in the lake of Darmasagar the COD varied from 22.14mg/l to 24.10mg/l, in monsoon (22.14mg/l) and summer (24.10mg/l) . The five day BOD indicates the amount of organic load in the water sample[7]. The study showed that BOD ranged from 15.11mg/l to 18.14 mg/l i.e., minimum(15.11 mg/5) in monsoon and maximum (18.14mg/l) in summer season in Khajana lake and whereas in Darmasagar lake it is varied from 13.01mg/l to 20.11 mg/l and minimum (13.01 mg/l) in winter and maximum (20.11mg/l) in summer under observation. Alkalinity value ranged from 206mg/l to 240mg/l in Khajana lake. Maximum (240mg/l) and minimum (206 mg/l) were seen in the summer and monsoon respectively. In Darmasagar it is varied from 210 mg/l to 232 mg/l, minimum in winter(210mg/l) and maximum in summer (232mg/l). According to Hutchinson[8] a skillful Limnologist can probably learn more about the lake from a series of oxygen determination than from any other kind of chemical rate. In the present study DD varied from 8.88mg/l to 9.40 mg/l in Khajana lake and it is ranged from 7.79mg/l to 9.01mg/l in Darmasagar lake. Minimum DO was found in summer (8.88mg/l) and maximum was observed in winter (9.40 mg/l) in Khajana lake respectivety. Maximum (9.01mg/l)in monsoon and minimum (7.79mg/l) in summer were found in the lake of Darmasagar. Low DO in summer might be due to high organic content which leads to oxygen depletion[9]. During monsoon the winter the level of DO was quite satisfactory, perhaps due to good aeration caused by rain water as reported earlier[10-11].

Just after the rain, abundant growth of *Microcysties aeroginosa* was identified as a result of abundance of nutrients in boath lakes. Blooming has a direct correlation with pH, temperature, DO and other nutrients contributed by sewage and sedimentary cycle[12]. The water quality of these water bodies has to be maintained for the sake of human health. Because a large number of people use this source of water for drinking and recreational purposes. From now public awareness have to be created to develop a safe guard against any type of contamination and pollution of these water bodies. To achieve the above mentioned goals the foremost prerequisite is to study the water bodies limnologically. Thus, it requires a continuous monitoring and study of algae existing in waters of various quality in order to determine what controls. What changes or what uses can be instituted for benefit of man and for the conservation of waters and desirable aquatic life.

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Table 1 : Physico-Chemical Properties of Khajana Lake during September 2009 to August 2010

Properties	Summer (Feb.-May)	Monsoon (June-Sep.)	Winter (Oct.-Jan)
Temperature (°C)	27.61±1.78	25.16±0.78	20.±0.75
PH	7.4±0.24	7.2±0.11	7.0±0.17
Total hardness (mg/1)	360±5.42	354±4.73	348.±3.41
Totaldissolvedsolid(mg/1)	556±0.14	490±1.23	501±1.24
COD(mg/1)	32.10±1.81	30.14±0.14	28.88±0.74
BOD(mg/1)	18.14±2.14	15.11±1.70	16.0±1.21
Total alkalinity(mg/1)	240.25±7.12	206±15.1	220±3.40
DO (mg/1)	8.88±0.14	9.11±0.17	9.40±1.10z

Table 2 : Physico-Chemical Properties of Darmasagar lake during September 2009 to August 2000

Properties	Summer (Feb.-May)	Monsoon (June-Sep.)	Winter (Oct.-Jan)
Temperature (°C)	22.51±2.14	20.96±0.15	21.81±0.74
PH	7.2±0.42	7.1±0.21	7.0 ±0.14
Total hardness (mg/1)	352±1.42	336±1.74	331±2.14
Total dissolved solid	480± 0.72	467± 1.74	476± 1.74
COD (mg/1)	24.10± 2.40	22.14± 0.31	23.12± 0.54
BOD (mg/1)	20.11± 1.01	14.91± 1.20	13.01± 1.24
Total alkalinity (mg/1)	232.11± 5.01	228± 2.10	210± 1.40
DO (mg/1)	7.794± 1.14	9.01± 1.0	8.9± 0.21