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## **A case study of physico: Chemical and biological parameters of adilabad district town lake, Andhra Pradesh, India**

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### **Abstract**

The present investigation study about the Physico-chemical and biological characteristics of Adilabad district town lake, Telangana State, India. A piece of research work done during the period from June 2014 to May 2015. It is situated 1 ½ distance from bus stand. In this research ten Physico-chemical parameters were analysed by standard methods, plankton, fish species also identified. In Research period Physico-chemical parameters ranges between above moderated polluted water levels that's why in summer season deoxygenated problem in this lake, it is cause to fish species died in summer season, floating on the surface of water body. In this lake low number of plankton species identified. The result of the present investigation reveal that commonly occurrence of 11 fish species were identified. Tvoid sewage consult, drainage water consult, washing of clothes, buffallow cleaning and domestic activities surrounding the lake. Establish waste water recycling plants to protection of Lake Environment. Finally i am concluded lake water quality above moderated pollution level. For future generations some precaution should be taken to the surrounding lake environment. Adilabad district town people it is a very good water resource for sustainable development of future generations.

**Keywords:** physico chemical parameters, lake bundle, above moderated polluted levels, plankton species, fish species

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### **Introduction**

Water is very important renewable resource in the world. Every organism metabolic activities are depends upon the water. In earth fresh water resources like: lakes, ponds, swams, rivers etc. full fill the human needs. Present days fresh water bodies environment condition are polluted because of industrialization, urbanization, increasing population, plastic usage, domestic activities are main cause to pollution of lake water. The lakes are commonly small in size they are made up by naturally (or) man-made. The physico chemical characteristics of lake water influence on both lake environment, surrounding organism health. Phytoplankton is primary biological compounds in the lake environment it is transferred the energy from lower organism to higher organism [3]. Phytoplankton are very good indicators for estimation of water quality and degree biological of eutrophication [5]. Zooplankton are microscopic, minute organism floating freely surface region of Lake Environment, it is transfer of energy from primary producers to secondary consumers in aquatic ecosystem [8]. Fishes is secondary consumers in the lake environment. It is a best source of food for vitamin A&D, fish products are useful for different purpose in daily life. Fishes are one of the important primary elements in the aquatic ecosystem (or) habitat and it is play a key role in economic growth of nations [9].

### **Material and Methods**

Adilabad district is a one of the famous tribal district in the India. Lake is situated north part of the district town. The lake constructed for irrigation and fish culture. Lake 1 ½ km distance from Adilabad district Railway station, water, plankton and fish species samples were collected from the lake at the early morning

hours from 5-30 am to 7-30 am. Physical parameters were analysed on site chemical parameters were analysed in the laboratory by following standard methods. 1. Plankton samples were collected with the help of nylon net. Fish samples were collecting with the help of Fisher man using different types of nets namely Gill nets, caste nets and dragnets. After collecting the samples plankton and fish species were preserved in the 4% formaldehyde solution. Using of Sedgwick Rafter cell to identified phytoplankton and Zooplankton observe under the microscope help with the available literature [7]. Fishes were identified by using standard literature [10].

### **Results**

In the study period water quality parameters play a significant role to determine the biological populations of the lake environment. Table No: 1: Shows physico-chemical parameters of Adilabad district Town Lake during the year June 2014 to May 2015. In the investigation period from June 2014 to May 2015, light grey color indicate in rainy season and green color indicate in the summer season. During the study period maximum air, water temperature were recorded in summer season and minimum temperature were recorded in winter season in January month [13]. The pH values various between 7.2 to 8.2 minimum pH were recorded in rainy season and maximum pH were recorded in winter season. Transparency is a very simple symbolic evidence to estimation of water quality minimum values were recorded in rainy season and maximum were recorded in summer season. Turbidity is indirect proposals to the transparency. High turbidity recorded in rainy season low turbidity were recorded in winter season rainy floods are main cause to increase

of turbidity. Total dissolved solids were maximum recorded in rainy season minimum value were recorded in winter season Total hardness of water ranges between 131mg/lit to 200mg/lit maximum values were recorded in rainy season minimum value were recorded in summer season. DO is a essential parameter it is influence on biotic community of the lake environment maximum values were recorded in winter season and minimum value were recorded in summer season. Biological oxygen demand has been used as measure of the amount of organic material in aquatic solution, which support the growth of the micro-organism. During the investigation period BOD maximum value were recorded in summer season minimum value were recorded in rainy season. The chemical oxygen demand of lake water minimum values were recorded in summer season and maximum values were recorded in winter season. Chloride value were maximum recorded in summer season and minimum values were recorded in winter season. Phosphate is essential element in productivity of lake environment maximum value were recorded in rainy season minimum were recorded in summer season. Suphate is a inorganic compound it is add to the lake environment through hospital wastes, laboratory by products maximum value were recorded in rainy season minimum value were recorded in winter season [24-32,2,14].

Phytoplankton are tiny minute aquatic plants they are in single cell or in colonies of various sites. The make a primary link in the aquatic food chain, it is food for Zooplankton, aquatic insects, fishes, birds and other aquatic animals [11,15].

During my investigation period four groups of Phytoplankton species were identified they are analysed the qualitatively and quantitatively following species were identified

**Chlorophyceae:** Spirogyra, cladophora, chlorella, microspira, volvox etc.

**Bacillariophyceae:** Flagillaria, Navicula, cymbella, pimularia, Diatom species etc.

**Cyanophyceae:** Anabena, Microsystis, Chroococcus, Ossillatoria

**Euglenophyceae:** Euglena

In the investigation period chlorophyceae species was the most dominant percentage represent (47%) lowest percentage were recorded Euglenophyceae species (14%). The density of Phytoplankton in the order of

**Chlorophyceae Cyanophyceae Bacillariophyceae Euglenophyceae**

Above mention physico-chemical parameters are very suitable for growthing of Phyto plankton. Domestic activities and sewage consult to is main effect o fish production.

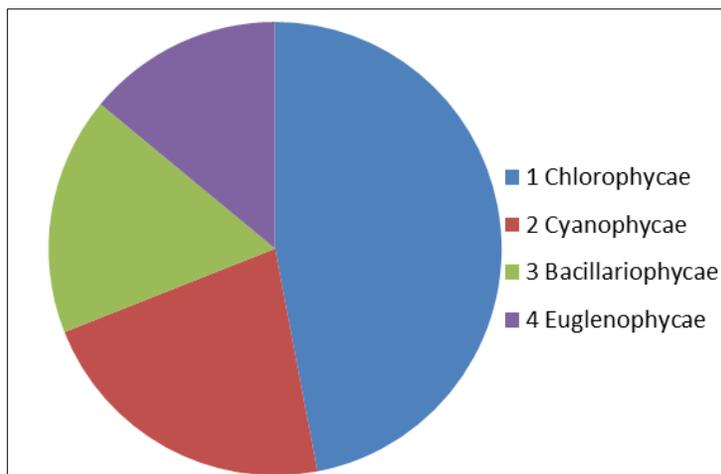
**Table 1:** Physico-chemical Parameters of Adilabad Town Lake from June 2014 May 2015

S.no	Physicochemical parameters	Rainy season		Winter season		Summer season	
		Mini	Maxi	Mini	Maxi	Mini	Maxi
1	Color	Light grey	Light grey	Light green	Light green	Light green	Heavy green
2	Atmosphere temperature (°C)	24.1	27.5	17	24.2	23.5	33.5
3	Water temperature(°C)	21.5	26.1	15.1	22.9	22.5	31.5
4	Ph	7.22	8/1	27.2	8.2	7.5	7.9
5	Transparence(Cm)	12.5	17.4	19.5	25.5	21.4	27.4
6	Turbidity(NTU)	5.1	9.1	9.5	12.5	7.5	8.0
7	TDS (mg/lit)	275	333	203	292	195	215
8	Total alkalinity(mg/lit)	145	175	125	145	135	164
9	TH(mg/lit)	141	200	138	199	131	155
10	DO(mg/lit)	4.8	6.9	7.1	7.8	6.4	7.9
11	BOD(mg/lit)	4.7	6.5	5.4	6.9	5.9	7.8
12	COD(mg/lit)	1.4	14.5	12.5	15.4	8.31	13.5
13	CL(mg/lit)	45	65	41	6	65	79
14	P(mg/lit)	3.1	3.4	3.2	3.45	2.8	3.2
15	S(mg/lit)	11	14	10.5	11.5	8.5	12.5

Mg/lit=Milligram per litre, oC=Degree Centigrade, Cm=Centimeters, NTU= Nephalo metric turbidity unit

**Table 2:** Phytoplankton composition of Adilabad Town Lake from June 2014 May 2015

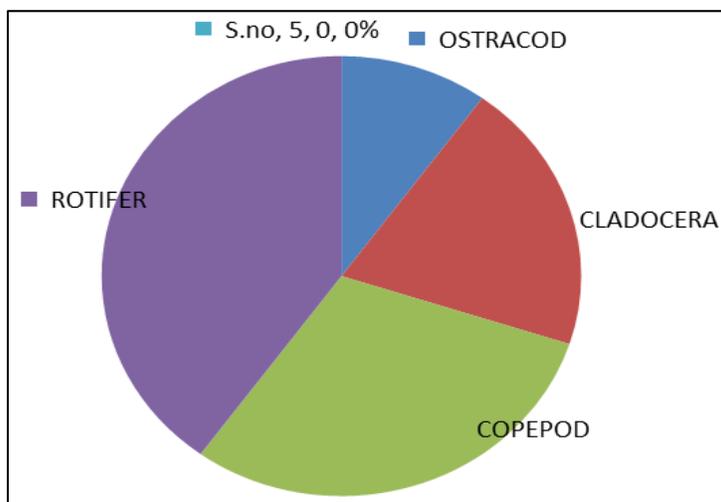
S.no	Phytoplanktons	Percentage
1	Chlorophyceae	47 %
2	Cyanophyceae	22 %
3	Bacillariophyceae	17 %
4	Euglenophyceae	14 %



**Fig 1:** Phytoplankton Composition of Adilabad Town Lake June 2014 To May 2015

**Table 3:** Zooplankton composition of Adilabad Town lake from June 2014 May 2015

S.no	Zooplanktons	Percentage
1	Rotifer	39 %
2	Copepod	33 %
3	Cladocera	21 %
4	Ostracod	7 %



**Fig 2**



**Fig 3:** Rotifers



Fig 4: Cladocera



Fig 5: Green Algae



Fig 6: Labeo rohita



Fig 7: Catla catla

Zooplankton are minute, microorganism that float freely in the surface column of waterbodies they are important food material for fish and invertebrate predators. It acts as a Bioindicator of waterbodies. Zooplankton species play a vital role in energy transfer from primary producers to secondary consumers in aquatic ecosystem (Kodarkar 1994) [8]. After observing under the microscope zooplankton species comprises of four groups consisting of 17 genera of zooplankton in order of Rotifers(39 %)

Copepod (33%) Cladocera (21%) and Ostracod (17%) species they are:

**Rotifer:** Branchiurus falcatus, Branchiurus Angulatus, Branchiurus Caudatus, Lecane luna.

**Copepod:** Paracyclops, Mesocyclops, Tropocyclops.

**Cladocera:** Moina Branchiata, Daphnia.

**Ostracod:** Cypris, Steno Cypris.

All over the study period Rotifer species were dominated to another zooplankton species high percentage of Rotifers present in summer season Low percentage was recorded in rainy season Cladocera, Copepod species were highly percentage recorded in winter season low percentage were recorded in summer season. Ostracods are highly percentage recorded in summer season low percentage were recorded in rainy season. The density of zooplankton in the order of:

**Rotifer>Cladocera >Copepod>Ostracode**

The diversity, production of the Fishes mainly depends upon the abiotic and biotic factor, type of the ecosystem. Fish production influence on lake depth, age of water body, water levels. In my case study period 11 fish species were identified they are:

1. Catla catla
2. Labeo Rohita
3. Cyprinus mrigala
4. Clarius batracus
5. Mystis
6. Channa punctatus
7. Notopterus
8. Wallago attu
9. Channa Stratus
10. Cyprinus carpio
11. Channa striata

Above mention fish species like *Labeo Rohita*, *Catla Catla* were more dominant culture fishes 16. Increasing of Human population, people interact with lake surrounding environment is main cause to pollution of this lake it is affected on fish production. The Human anthropogenic activities and over exploitation leads to rapid decline in the fish diversity.

#### Summary

Physico chemical parameters were analysed to estimate water quality this lake water environment highly moderated pollution level, physical chemical parameters values above moderated values Geographically lake environment suitable for different fish culture. During my investigation period Labeo Rohita, Catla-

Catla fish species were highly culture this lake. Fish production is useful to economic development of Fisher man families and development of national economy. City drainage, sewage consult to the lake south region of the lake. In summer season water dioxegenated problem generate. Waste water treatment plants are used for decrease of pollution levels. Avoid sewage, drainage, omestic activities, buffallow cleaning stop the lake water environment. Those precautions following to Adilabad town people this lake gives good future to becoming generations.

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