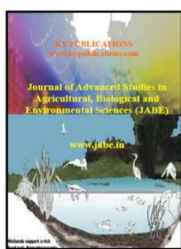# ANALYSIS OF WATER QUALITY OF LINGALA MUNNER KRISHNA DISTRICT, AP, INDIA

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ABSTRACT

The present investigation involved to assess the quality of water by using physico – chemical parameters of Lingala munner Krishna district, AP, India. Monthly changes in physico-chemical parameters were analyzed for a period of one year from 2016 January to December 2016. In the present study different parameters such as air, water temperatures, Dissoloved oxygen, alkalinity, chlorides, Total dissolved solids and hardness turbidity etc,were analysed. Results stated that the quality of water from this Munner is within the acceptable limited ranges. On the basis of the chemical analysis, it was found that, some physico- chemical parameters showed seasonal variations. The present study concluded that the water can be used for drinking purpose in winter and summer seasons, and also water can be used for irrigation.

Key words: Physico-chemical, lingala munner, Irrigation, alkalinity.

INTRODUCTION

Water resources are of critical importance to both natural ecosystem and human development. It is absolutely essential for domestic purposes for cleaning, cooking, bathing, and carrying away wastes, and in agriculture for irrigation, power generation, industries, navigation, propagation of wild life, fisheries, recreation, aesthetics etc. Manifold increase in population has resulted in a rapid decrease in the ground water level due to its over exploitation. Water, the matrix of life is exposed to pollution, unhealthy environment, resulting in human affiction and diseases transmission due to rapid industrialization and population (Simpi et al., 2011). Acquiring potable water is a day to day struggle for most of the people in the Krishna district. The healthy aquatic ecosystem is dependend on the physic-chemical and biological characterstics (Venkatesharaju, 2010). In last two decades, there has been a growing necessity for conservation our resources, especially water. At the same time, growing populations, progressive industrialization and intensification of agriculture have led to increased pollution of surface waters. Water is scare and valuble resource and it is highly essential for the survival of mankind. Water also plays an equally important role in food control. Water quality monitoring is of immense importance in the conservation of water resources for fisheries, water supply and other activities; it involves the assessment of physico-chemical parameters of water bodies. Impacted changes in the quality of water are reflected in the biotic community structure, with the vulnerable dying, while the most sensitive species act as indicators of water quality. Discharge of pollutants from agriculture and industries and also sewage disposal are major causes of pollution of water of reservoirs (Sillanappa et al., 2004). Extensive evaporation of water from the reservoir due to high temperature and low rain enhances the amount of salts, heavy metals and other pollutants, which are conscientious factor for the poor quality of the reservoir ecosystem (Arain et al., 2008). Among environmental pollutants, metals are of particular concern, due to to their potential toxic effect and ability to bioaccumulation in aquatic ecosystems (Miller et al., 2002). The major ions are Ca+, Mg+, Na+, K+, Cl-, HCO_3 and CO^3 are essential constituents of water and responsible for ionic salinity as compared with other ions (Wetzel, 1983). Lingala munner being an important ecological site, this study is aimed at providing useful

inputs and necessary for the management of the environmental aspects of the many multi-purpose lakes and reservoirs. Despite such an exhaustive work, up to now, there was no systematic study carried out for the physico-chemical analysis and quality control assessment lingala munner for a period of January -2016 to December -2016.

Materials and methods

Study area

To evaluate the water quality an effort was made to investigate the water in lingala munner, Krishna district, Andhra pradesh, India. The climatic conditions of the study area with hot summer, cool winter and rainy season. The region gets much rainfall from south west monsoon.

Collection of sample

In order to determine the water quality, water samples collected from the Lingala munner during January –December 2016 in the first week of every month. Some of the results were recorded in the laboratory, according to APHA in 2005 and Kodrakar et al, 2008.

Analysis

The samples thus collected were analyzed for a number of physic-chemical parameters. Protocols were mostly based on the standard methods for the examination of water and waste water (APHA, 1998). The water samples were collected during the month of January to December 2011.The samples for analyses were collected in satirized bottles. Almost care was taken, so that no bubbling should observe during sampling, which avoids influence of the dissolved oxygen. The temperature was recorded at the sample site. The chemicals used were of A. R. grade and was used without further purification. The solutions were prepared in distilled water. The pH of water sample was measured with the help of pH meter (Elico LI-120) with a glass electrode. The pH meter was calibrated using buffer of pH 4.0 and 7.0.

Statistical analysis

All the Statistical analyses were carried out using SPSS for windows release 10.0. The season wise grouped data were used to calculate Student-Newmen-Keuls test (this is the one way ANOVA post hoc non parametric test, for making comparison among the means of three different seasons).

Results and discussion

The main purpose of analyzing physical and chemical characterstics of water is determine its ecological status.   The physico-chemical characteristics of water quality may be affected by rainfall, temperature, availability of light. The monthly variation in physico-chemical parameters was presented in Table -1. The physico-chemical parameters such as temperature, pH, DO, organic and inorganic constituents play an important role in determining the nature and pattern of fluctuations of population densities of zooplankton in an aquatic environment. The physico-chemical analysis of water is the prime considerations to access the water quality for its best utilization like drinking, irrigation, industrial fisheries purpose and helpful in the understanding the complex process interaction between the climatic and biological process in the water. The physico-chemical parameters of water and dependence of all life process of these factors make it desirable to take water has environment. Therefore any change in any one of the factor directly or indirectly influence the other parameters.

1. Atmospheric temperature

Temperature is a primary environmental factor that affects and governs the biological activities and solubility of gases in water. Owing to the gases in air, humidity, dust and other colloidal particles, the air temperature is always higher than water temperature. The Atmospheric temperature of lingala munner ranged from 23.8°C to 34.7°C in different seasons. Variation in the air and surface water temperatures are due

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to changing seasons. The temperature directly influences some of chemical reactions in aquatic eco systems and it is important physical parameter (Jakhar and Rawat, 2003).

2. Water temperature

Temperature is basically important parameters and affects on the chemical and biological in the organisms of water (Trivedi and Goel, 1986). The temperature of reservoir water ranged from 23.6°C to 33.9°C in different seasons. The water temperature is always lower than air temperature. The reason for higher temperature values can be attributed to low water level, low velocity, clear atmosphere and greater solar radiation while its lower values can be explained due to frequent clouds, high percentage of humidity, high current velocity and high water levels.

High seasonal variations were observed at different sites of reservoir. The water temperature was high due to the low water levels and high air temperatures. Water temperature plays an important role which influences chemical, biological characteristics of water body

3..pH

During the present study water p^H values were found to be 7.5 to 7.94. It is indicating that it possesses alkalinity nature throughout the study period. The high values may be due to the sewage discharged from agricultural fields and higher temperatures. P^H values were important for plankton growth (Chisty, 2002).

4. Dissolved Oxygen (DO)

Dissolved oxygen is a most important aquatic parameter; it is vital to aquatic fauna. It plays an important role in the respiration process. Adequate DO is neccessery for good water quality. In the present study, the DO values ranged from 5.1 to 6.8 mg/l . As DO levels in water drop below 5.0 mg/L, many life forms are put under pressure (Bowman et al., 2008).

5. Alkalinity

Alkalinity of natural water is due to the salts of carbonate, bicarbonates, silicates phosphates along with hydroxyl ions. In the present study alkalinity values were ranged from 55-155mg/l. An increase in the free CO_2 may result in the increase in alkalinity (Singhal et al., 1986).

6. Hardness

In the present study, total hardness ranged from 195-260 mg/l in different seasons. Hardness often employed as indicator of water quality depends on the concentration of carbonates and bicarbonate salts of calcium and magnesium or sulphate chloride or other anions of mineral acids. The above higher values may be due to increased concentration of these ions. Hardness is inversely proportional to water volume and directly proportional to rate of evaporation.

7. Electro conductivity

The electrical conductivity of water depends upon ions present in water. It reflects the Nutrient status of water and distribution of Macrophytes. In the present study, the EC values ranged from 566 to 643 mmho. The overall mean record was 575.58 mmho. Das (2000) studied the limno-chemistry of some important reservoirs of Andhra Pradesh and observed that specific conductivity was in the range of 316 to 610 ms/cm.

8. Total Dissolved Solids

Dissolved solids are important in drinking water and other water quality standards. Water probability depends on the total dissolved solids. Total dissolved solids value ranged from 376 to 516 mg/l in different seasons. The desirable level of TDS is 500 mg/L where as the permissible limits is 2000 mg/L. The TDS analysis plays an important role in the control of Biological and physical waste water treatment processes. During present study the total dissolved solids were high in summer followed by winter and rainy. Presence of excess

of TDS may cause gastrointestinal irritation and if used for cooking will form scales on the cooking vessels (Anadaparameswari et al., 2007).

9. Fluorides

In the present study fluoride values ranged from 0.5 to 0.7 mg/l with the mean value 0.5.High concentration of fluoride may reflects on aquatic ecosystem.

10. Nitrates

Nitrates are essential nutrients for plant growth. During the study nitrate fluctuated between 0.01 to 0.04 mg/l. these values are much lower than the Rani et al (2004). High concentration of nitrate in drinking water is toxic (Umavathi et al 2007).

11. Calcium

Calcium is found in all the natural waters and its main source is weathering of rocks from which it leaches out .In the present study Calcium ranged from 50 to 140 mg/l with mean value 99.16 mg/l concentration of Calcium ions indicates the hardness of water the hardness of water with 15 ppm more satisfactory for growth of fishes (Rajashekar et al., 2005).

12. Chlorides

Chloride ions are essential for plants and animals. Chlorides found high during the study ranged in between 80 to 240 mg/l. In the present study the higher chloride values were recorded in summer and lower in rainy. Many results are also reported in different studies by Umavathi et al., (2007) showed that higher concentration of chloride indicates the increased levels pollution in water bodies.

13. Turbidity

Water turbidity is mainly due to suspended in organic substances like clay, silt, phyto-zooplankton and sand grains Reservoirs with clay bottom are likely to have high turbidity. During the present study turbidity values ranged from 0.6 to 2.4 NTU .the maximum values (2.2 NTU) Was recorded in the month of May it might be human activities, decrease in water levels and presence of suspended particulate matter, and minimum value (0.5 NTU) in the month of march.

Table-1 LINGALA MUNNER WATER ANALYSIS 2016 JAN -DEC 2016

	PH	AT	WT	DO	ALK	HARD	EC	TDS	FLOU	NO₂	CA	CL	TUR
16-Jan	7.58	23.8	21.8	5.1	85	190	657	459	0.5	0.04	140	110	1.6
16-Feb	7.68	25.9	21.6	4.2	85	190	640	448	0.5	0.05	80	90	0.9
16-Mar	7.5	28.5	22.4	5.4	50	195	536	346	0.7	0.04	70	130	0.7
16-Apr	7.74	32.5	25.4	5.8	70	190	570	348	0.7	0.03	50	120	1.3
16May	7.54	33.9	28.7	6.2	90	220	586	378	0.4	0.03	60	140	2.2
16-Jun	7.56	34.7	30.9	6.8	125	250	610	488	0.7	0.05	70	130	0.8
16-Jul	7.84	29.9	30.8	6.1	50	220	613	382	0.4	0.04	90	220	1.5
16-Aug	7.36	28.2	27.4	6.3	60	220	572	502	0.4	0.07	100	240	1.2
16-Sep	7.64	29.6	26.2	6.5	130	240	595	406	0.4	0.07	100	240	1.2
16-Oct	7.4	27.3	25.9	6.1	150	190	572	368	0.4	0.08	90	190	1.1
16-Nov	7.72	27.2	23.2	6.4	110	210	588	479	0.7	0.02	110	160	0.8
16-Dec	7.52	26.3	21.7	5.8	90	210	576	372	0.7	0.03	120	120	1.2
SUM	92.08	438.8	306	73.7	1100	2550	7907	5476	5.9	0.38	1170	1950	14.8

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AVERAGE	7.506667	29.23333	25.5	6.308333	85.33333	205.1667	675.5833	473	0.583333	0.025833	90.16667	164.1667	1.15
MIN	7.3	23.8	21.6	6.1	50	190	636	446	0.5	0.04	50	90	0.5
MAX	7.84	34.7	30.9	7.5	145	340	713	506	0.7	0.07	140	340	2.2
STDEV	0.156969	4.258927	4.437758	0.950089	33.81846	25.14315	25.3022	23.2215	0.112986	0.010836	27.74643	58.34328	0.440041

Correlation (r) between different parameters

In the present study the correlation coefficient (r) between every parameter pair in computed by taking the average values as shown in table-3. Correlation coefficient (r) between any two parameters, x & y is calculated for parameter such as PH, atmospheric temperature, water temperature, dissolved oxygen, alkanity, hardness, elecroconductivity, total dissolved solids, fluorides, nitrates, calcium of the lingala munner. The degree of line association abetween any of the water quality parameters measured by the simple correlation coefficient (r) is presented in table-3 as correlation matrix.

TABLEE-2 C0RRELATION COEFFICIANT OF LINGALA MUNNER

	PH	AT	WT	DO	ALK	HARD	EC	TDS	FLOU	NO₂	CA	CL	TUR
PH	1												
AT	0.044639	1											
WT	-0.04611	0.803976	1										
DO	-0.3055	0.350764	0.812988	1									
ALK	-0.50681	0.218435	0.071705	0.376491	1								
HARD	-0.1547	0.658475	0.858713	0.674374	0.401352	1							
EC	0.087296	0.613403	0.872032	0.833561	0.362806	0.899176	1						
TDS	-0.33556	0.390245	0.683771	0.751443	0.237333	0.803284	0.827727	1					
FLOU	0.334257	0.164326	-0.30029	-0.37864	-0.09277	-0.25893	-0.04483	-0.37938	1				
NO₂	0.046895	0.099538	0.263558	0.498864	-0.21461	0.483018	0.673318	0.660078	0.7765	1			
CA	-0.28888	-0.60249	-0.73036	-0.01211	0.381825	-0.12416	-0.01427	0.360174	-0.44571	0.4149346	1		
CL	-0.24562	0.284144	0.412226	0.801586	0.205303	0.695618	0.456248	0.880643	-0.61736	0.480232	0.23664	1	
TUR	-0.24947	0.29208	0.571029	0.047669	-0.01303	0.291924	0.400107	0.087983	-0.60151	-0.5099	-0.00204	0.077724	1

Conclusions

The present investigation is an attempt to assess the physico-chemical parameters inLingala Munner krishna district Andhra Pradesh, India. Due to man made activities, anthropogenic stress have a considerable effect on the physico-chemical characteristic of water samples of lingala Munner. The results reveal that the all water quality parameters are within the permissible limits. Reservoir is not polluted. The water is useful for drinking, irrigation, fishing and hydro electric generation activities.. However, further detailed pilot studies are required for the improvement of the water quality and fish productivity.

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