

Physico-chemical analysis of Thunga Bhadra River in and around Kurnool town

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ABSTRACT

A systematic study has been carried out to assess the water quality index of Tungabhadra River in and around Kurnool District. Water samples from five sampling stations were collected during premonsoon and post monsoon seasons in the year April 2013 and March-2014 and analyzed for physico-chemical parameters like pH, temperature, conductivity, turbidity, total hardness, total alkalinity, Dissolved Oxygen, Calcium, Magnesium, Chloride, Nitrates, Sulphate, fluoride. The observed values of different physico-chemical parameters were compared with standard values recommended by world health organization(WHO). The study revealed that due to discharge of untreated sewage into the Tungabhadra, the water quality of Tungabhadra has been severely deteriorated and the potable nature of water is being lost

Key words: Quality guidelines, Titrimetry, River quality, Kurnool Town, Sampling

INTRODUCTION

Water resources and water quality affect the economic, social and political development of the society. Comprising over 70% of the Earth's surface, water is undoubtedly the most precious natural resource that exists on our planet. Without the water life Earth would be non-existent, it is essential for everything on our planet to grow and prosper. Although humans recognize this fact, we disregard it by polluting our rivers, lakes and oceans. Water pollution causes a number of problems such as diseases and killing the fishes. It is harmful for human beings and animals.

First of all, one of the main causes of water pollution is industrial effluent, because the factories let the polluted water go into the lakes or rivers, and make the water polluted. The industry water contains various kinds of chemicals like acid, hydroxide which are harmful to the water and to aquatic life. If people drink the water, which is polluted, it can cause cancer, suppress immune systems and disrupt hormones. Also illegal dumping of chemical kill the nature lives in the river like fish, crab, etc. The importance of water in our daily life need not be emphasized for it is well known. Water is the basic component of life. Surface water offers a promising source of water for domestic, industrial and agricultural use. For this it is essential to study the physicochemical characteristics of surface water. Kurnool Town, the erstwhile capital of Andhra Pradesh and headquarter of one of the four districts of Rayalaseema region is situated between the Northern latitudes of $14^{\circ}51'$ and $16^{\circ}18'$ and Eastern longitudes of $76^{\circ}58'$ and $79^{\circ}34'$. As it is one of the drought prone areas in the state of Andhra Pradesh, it is considered worthwhile to study the physicochemical characteristics of water samples from Tungabhadra River in Kurnool Town.

It is a fact that good water quality produces healthier humans than one with poor water quality. Tungabhadra River is life line of kurnool and its water is used for domestic and agriculture purposes therefore, effective maintenance of

water quality is required through appropriate measurements. Physico-chemical and micro-biological characteristics may describe the quality of water; therefore, an analysis on physico-chemical parameters of Tungabhadra water was made by many workers in literature.

The present work deals with the study of 13 physico-chemical parameters like pH, temperature, turbidity, conductivity, alkalinity, total hardness, Dissolved Oxygen, calcium, magnesium, chloride, sulphate, fluoride and nitrates of Tungabhadra River water in Kurnool. The observed values of various physico-chemical parameters of water samples were compared with standard values recommended by World Health Organization.

MATERIALS AND METHODS

All chemical used in the present investigation were of analytical reagent grade and double distilled water was used throughout investigations. The instruments which are used in present investigation were includes, pH meter, Conductivity Meter, Turbidity Meter, Spectrophotometer and Water quality analyzer.

Water sample were collected from different sites of Tungabhadra River. These samples were collected in plastic bottles. During sampling pH and temperatures were determined using pH meter and thermometer respectively. The laboratory analysis of samples was done using standard methods. Titrimetric method was used for the determination of total alkalinity. Complexometric method was used for determining chloride content, whereas EDTA titrimetric method was used for total hardness analysis.

Hydrochloric acid solution: 0.02N Hydrochloric acid solution was prepared from standard acid solution by proper dilution.

EDTA solution(0.02N): EDTA solution was prepared by dissolving 3.723 g of EDTA in 100 distilled water.

Sodium Hydroxide Solution(1N): 40 g of NaOH was dissolved in 1000 ml distilled water.

Barium Chloride solution: 2.4443g of barium chloride was dissolved in 1000 ml distilled water.

Silver Nitrate solution(0.02): 4.791g of silver nitrate was dissolved in distilled water and diluted upto to 1000ml. It was further diluted to obtained 0.2N.

Potassium chromate solution(5%): 50g of potassium chromate was dissolved in distilled water. To this silver nitrate solution was added till a definite red precipitate was formed. It was allowed to stand for 12 hours and filtered. The filtrate was diluted to 1000ml with distilled. Starch indicator and methyl orange indicator were prepared according to standard procedures.

RESULTS AND DISCUSSION

The results obtained from analysis of water samples of river Thunghabhadra are shown in table 1. The results indicate that the quality of water varies considerably from location to location. A summary of the findings is given below. The water temperature showed an upward trend from winter season to summer season followed by a downward trend from rainy season onwards. The maximum turbidity was observed in monsoon season and minimum was observed in winter season. The conductivity of water is affected by the suspended impurities and also depends upon the amount of ions in the water. The highest conductivity was observed in monsoon season. From monsoon season onwards the conductivity decreased and minimum conductivity was observed in winter season. The values of dissolved oxygen are quite satisfactory indicating that the water samples are free from major organic pollutants. Variation in hardness of river water is probably due to regular addition of sewage detergents due to huge human activities called Anthropogenic Factor. Most of the sample shows a higher value of hardness indicates these areas of water sample unsuitable for bathing and washing though they may be used for drinking purposes after preliminary purification. The values of fluoride in six samples were within the permissible limits The greater alkalinity values may be due to large scale use of river bank as open latrine and consequent washing of excreta in and near by the water body. Maximum amount of nitrate was found in rainy season and minimum amount was found in summer season. Nitrate concentration depends upon the activity of nitrifying bacteria.

Some samples show deviation from this value which may be due to pollution at the sample sites. The experiment shows that the information necessary for interpreting drinking water quality analysis. It focuses on testing results obtained from drinking water supplies of different areas of city.

Table:1. Physico-chemical analysis of Thungabhadra river water of various locations of Kurnool Town

S.No	Parameters	Range	Average	Accepted level
1	Temperature	27-30	29	-
2	D.O	5.7-7.0	6.35	5-6
3	pH	6.8-8.5	7.65	7.0-8.5
4	Turbidity	0.8-3.6	2.2	5.0
5	Conductivity(μ mho)	950-2450	1700	-
6	Alkalinity(ppm)	220-460	335	-
7	Total Hardness(ppm)	250-450	350	100
8	Calcium(ppm)	50-170	110	75
9	Magnesium(ppm)	130-180	155	30
10	Chloride(ppm)	150-340	245	200
11	Sulphate(ppm)	150-330	240	200
12	Nitrate(ppm)	13.8-49	31.4	46
13	Fluoride(ppm)	0.8-2.0	1.3	1.0-1.5

CONCLUSION

From the present study we conclude that Thungabhadra water is most probably not fit for drinking at sample collection sites and its need to be treated to reduce the contaminations specially the alkalinity and hardness. To minimize the contamination of Tungabhadra water at Kurnool city the values obtained had their significance level will help in selecting the proper experimental method used for treatment of water.

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