

# A QUALITY ASSESSMENT OF POTABLE WATER IN NANDYAL, KURNOOL DISTRICT(A.P).

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**Abstract:** This paper presents a study on potable water quality in Nandyal region of Kurnool District (A.P), which involved analyses of Physio-chemical parameters of water samples from different drinking water sources. The drinking water sources examined included Groundwater and surface water. For this, A total of 12 samples were collected from six different villages in Nandyal region, Kurnool district. From each village, we collected 2 samples of potable water as in Groundwater and surface water and to evaluate for the quality of assessment of potable water by using Indian standards analytical procedures and finally compare with Indian standard values. It was shown in results some of the water samples are not safe to drink without treatment of water. In this study, we analyzed the water samples for water prescribed water quality parameters such as pH, EC, Turbidity Nitrate, Sulphate, chloride, fluoride, total hardness, TDS, DO and also trace metal ions like Cu, Zn, Mn, Fe, Al and represented in tables in their respective S.I units.

**Keywords:** water quality, potable water, nandyal region, indian standards.

## I. INTRODUCTION:

Groundwater is one of the Nation's most important natural resources. Groundwater is the most important source of water supply for drinking, irrigation and industrial purposes. It provides about 40 percent of the Nation's public water supply. Water can be found both underground and on the surface of the earth. Groundwater, surface waters (e.g. rivers, streams and ponds), rain-water and springs are the main sources of water. The main potable water source in the present study area is ground and surface water. This water was taken by using bore methods and pump to domestically utilization in this Nandyal region as potable water. We were taken water samples before treated to evaluate the quality of water by using prescribed Indian Standards laboratory water analysis methods. The 12 water samples were collected from six different villages of Nandyal region named Nandyal rural, Chapirevula, Chabolu, HS Kottala, Ayyalur, Pedda Kottala, And then water samples brought to the laboratory to evaluate the quality.

## II. MATERIALS AND METHODS:

### II.I. STUDY AREA

Nandyal town is located at 1528'59. 880'' N 7828'59. 880'' E. Altitude of nandyal is 202 meters (Fig. 1). There are many oil factories located in Nandyal town and one sugar factory was established very near to Nandyal town. The study area is inhabited by around 2,12, 640 populations. Nandyal is surrounded by hills with the Kundu River on its west, the dense forests of Nallamala Hills to the east and granite mines to the south. The town is rich in water resources like reservoirs. These give it an equitable climate throughout the year. However, summers can be particularly hot. The average temperature is around 28 °C. It has total 17 villages in nandyal region named Ayyalur, Bheemavaram, Billalapuram, Brahmanapalle, Chabolu, Chapirevula, Gunthanala, kanala, H.S. Kottala, Pedda Kottala, Mitnala, Munagala, Nandyal rural, polar, pulimaddi, pusulur, Rayalmalapuram, udumulapuram. In this region mainly used groundwater and surface water using as potable water sources to domestically.



Fig.1: Kurnool district map

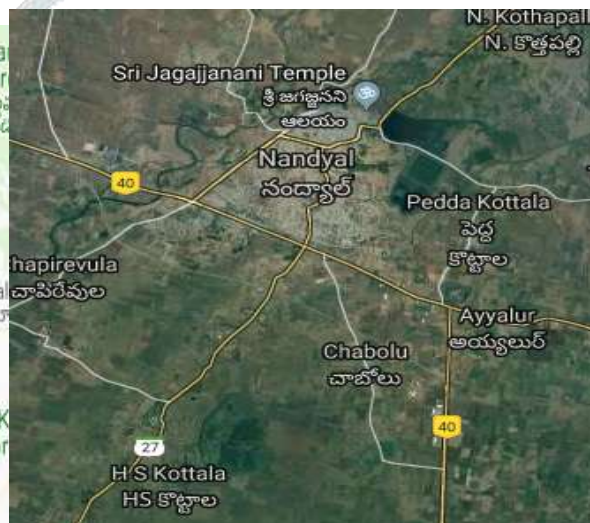


Fig.2: nandyal Region map

### III. SAMPLING ANALYTICAL METHODS:

The 12 water samples were collected from six villages such as Nandyal rural, Chapirevula, Chabolu, HS Kottala, Ayyalur, Pedda Kottala, as per Indian standards water sampling for laboratory analysis procedures. After that water samples were taken in polyethylene bottles and kept very carefully for 24 hours as prescribed by WHO and brought to laboratory to evaluate the selected water quality parameters like pH, EC, Turbidity, Nitrate, Sulphate, chloride, fluoride, total hardness, TDS, DO and also trace metal ions like Cu, Zn, Mn, Fe, Al and represented in tables in their respective S.I units. We used the analytical procedures for pH by pH meter, EC by using Conductivity meter, Turbidity by nephelometric method, Fluoride will find by Colorimetric SPADNS Method, Nitrate and sulphate by using Spectrophotometer, Hardness in water by using EDTA Complexometric Titration method, Chloride by an argentometric method, TDS by using TDS meter, DO by Winkler's method finally trace metals are like Cu, Zn, Mn, Fe, Al by using Atomic absorption Spectrophotometric method. The obtained results are after analysis compared with Indian Standard Drinking water specification IS 10500-2012. Sample codes are distributed as shown in below Table I.

S.No	Sample site code	Name of Village
1	Gd1	Nandyal rural,
2	Sd1	
3	Gd2	Chapirevula,
4	Sd2	
5	Gd3	Chabolu,
6	Sd3	
7	Gd4	HS Kottala,
8	Sd4	
9	Gd5	Ayyalur,
10	Sd5	
11	Gd6	Pedda Kottala,
12	Sd6	

Table.1: sample site code distribution

### IV. RESULTS AND DISCUSSION

Here, After completion of all analytical methods to evaluate the quality of taken drinking water samples observed values are mentioned in the given Table 2, Table 3, Table 4 and Table 5 as Groundwater sources and surface water sources of drinking water, and also a prediction of Minimum and Maximum observations of parameters in separated rows. In these tables Table 2 & Table 3 is a prediction about Physico-Chemical parameters of drinking water and Table 4 & Table 5 is a prediction about Trace metal ions in drinking water.

Table.2 : Observations of Physico-Chemical parameters of water samples- Ground water source

Sample Code	pH	EC $\mu\text{s}/\text{cm}$	Turb NTU	F <sup>-</sup> (mg/l)	NO <sub>3</sub> <sup>-</sup> (mg/l)	SO <sub>4</sub> <sup>2-</sup> (mg/l)	Temp °C	DO Mg/l	TDS (mg/l)	Total Hardness (mg/l)	Chloride (mg/l)
Gd1	6.12	758	37.35	0.86	12.02	64.02	25	6.3	1167	369	41.6
Gd2	7.18	918	86.25	0.74	26.46	96.23	26	5.8	934	426	25.4
Gd3	6.86	1169	62.35	0.63	31.21	326.18	27	6.1	675	294	31.6
Gd4	7.24	1242	72.65	0.58	24.32	198.46	28	4.9	894	634	41.4
Gd5	7.65	836	59.25	0.43	19.43	263.21	25	6.9	761	587	31.8
Gd6	6.32	728	45.45	0.26	18.51	124.85	27	7.2	689	452	11.9
BIS	6.5-8.5	0-800	1-5	1.0-1.5	45-100	200-400	--	<8	<300	300-600	250-1000

Table.3: Observations of Physico-Chemical parameters of water samples- Surface water sources

Sample Code	pH	EC $\mu\text{s}/\text{cm}$	Turb NTU	F <sup>-</sup> (mg/l)	NO <sub>3</sub> <sup>-</sup> (mg/l)	SO <sub>4</sub> <sup>2-</sup> (mg/l)	Temp °C	DO Mg/l	TDS (mg/l)	Total Hardness (mg/l)	Chloride (mg/l)
Sd1	6.23	896	23.15	0.85	10.26	87.53	25	5.1	1054	452	38.26
Sd2	7.21	1248	57.82	0.49	24.16	153.24	29	7.3	965	398	41.09
Sd3	8.14	1024	73.14	0.72	18.23	198.21	27	6.9	853	542	32.48
Sd4	7.96	952	98.43	0.87	21.62	86.27	28	7.3	1124	657	12.56
Sd5	7.52	745	74.23	0.64	14.38	97.51	25	7.4	983	524	29.36
Sd6	8.01	681	87.18	0.52	16.20	258.47	26	6.8	794	498	36.21
BIS	6.5-8.5	0-800	1-5	1.0-1.5	45-100	200-400	--	<8	<300	300-600	250-1000

The results of the measured in-situ parameters including pH, EC, Turbidity, Nitrate, Sulphate, chloride, fluoride, total hardness, TDS, DO and also trace metal ions like Cu, Zn, Mn, Fe, Al as per in Table .2 & 3. The pH values of the groundwater samples ranged from 6.12-7.65, and The pH values of the Surface water samples ranged from 6.23-8.14, which are within the permissible limits of BIS standards Electrical Conductivity is a measure of total salt content in water. The EC values of the groundwater samples ranged from 728-1242, which are within the permissible limits of BIS standards except for Gd2, Gd3, Gd4, Gd5, and The EC values of the Surface water samples ranged from 681-1248, which are within the permissible limits of BIS standards except Sd1, Sd2, Sd3, Sd4. The turbidity values of the groundwater and surface water samples all are above the permissible limits of BIS standards, The Fluoride values of the groundwater and surface water samples all are within the permissible limits of BIS standards. The Nitrate values of the groundwater and surface water samples all are within the permissible limits of BIS standards. The Sulphate values of the groundwater and surface water samples all are within the permissible limits of BIS standards. The DO values of the groundwater and surface water samples all are within the permissible limits of BIS standards. The TDS values of the groundwater and surface water samples all are above the permissible limits of BIS standards. The Total Hardness values of the groundwater and surface water samples all are within the permissible limits of BIS standards except Gd3 & Sd4. The Chloride values of the groundwater and surface water samples all are within the permissible limits of BIS standards.

Sample code	Cu (mg/l)	Zn (mg/l)	Mn (mg/l)	Fe (mg/l)	Al (mg/l)
Gd1	0.64	0.3	0.002	0.09	0.009
Gd2	0.54	0.6	0.004	0.07	0.01
Gd3	0.49	0.8	0.006	0.1	0.008
Gd4	0.57	0.4	0.003	0.03	0.007
Gd5	0.63	0.6	0.006	0.08	0.02
Gd6	0.62	0.7	0.004	0.07	0.03
BIS	0.05-1.5	5-15	0.1-0.3	0.3(desirable)	0.03-0.2

**Table .4: Observations of Trace Metal Ions of drinking water samples- Ground water source**

Sample code	Cu (mg/l)	Zn (mg/l)	Mn (mg/l)	Fe (mg/l)	Al (mg/l)
Sd1	0.26	0.9	0.009	0.24	0.009
Sd2	0.17	1.1	0.008	0.19	0.003
Sd3	0.57	0.8	0.003	0.04	0.006
Sd4	0.98	0.7	0.004	0.09	0.009
Sd5	0.08	1.3	0.006	0.08	0.012
Sd6	0.22	1.5	0.007	0.07	0.021
BIS	0.05-1.5	5-15	0.1-0.3	0.3(desirable)	0.03-0.2

**Table .5: Observations of Trace Metal Ions of drinking water samples- Surface water source**

As per above results The Copper values of the ground water and surface water samples all are with in the permissible limits of BIS standards, The Zinc values of the ground water and surface water samples all are with in the permissible limits of BIS standards, The Manganese values of the ground water and surface water samples all are with in the permissible limits of BIS standards, The Iron values of the ground water and surface water samples all are with in the permissible limits of BIS standards, The Aluminium values of the ground water and surface water samples all are with in the permissible limits of BIS standards.

## V. CONCLUSION

In conclusion, the concentrations of the investigated major ions and trace metal ions in the drinking water samples from these communities in the Nandyal region, Some of the samples are above the limit of BIS .and maximum samples are within the limit of BIS.

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