

Contamination Study of Bidar and Aurad Taluka Ground Water

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Abstract: The study is taken up to investigate the contamination in the groundwater of BIDAR and AURAD taluka. First Samples were collected during in the month of January, All the necessary reagents are prepared according to standard methods. The analysis of physico-chemical parameters like pH, total hardness, dissolved oxygen, chloride, alkalinity and heavy metals like iron, fluoride and nitrate was carried out during the study. From results it can be concluded that the physico-chemical parameters are within the permissible limit according to BIS. The heavy metals like, iron was rarely found in areas like CHINTAKI, SANTHPUR, JANWADA and fluoride and nitrate were within permissible limits in all areas. By comparing with BIS the parameters which are within the permissible limit are safe for drinking.

Keywords — Contamination, Ground water, Heavy Metals, Water quality.

I. INTRODUCTION

Groundwater is the, water present beneath the earth's surface in rock and soil pore spaces and in the fractures of rock formation, and it is one of the most valuable natural resources. The ground water resources are being utilized for drinking, irrigation and industrial purposes across the globe. Due to continue dry and wet process of bore wells there is chances of dissolution of heavy metals in groundwater. Excessive drilling of bore wells has led to exploitation of groundwater at higher rates of water recharge and caused depletion of the groundwater levels. Climatic changes also affect groundwater quantity and quality, due to low rainfall groundwater table decreases. Excess untreated sewage can run off or percolate down to groundwater, causing contamination of groundwater, particularly in developing countries, hazardous contaminants such as heavy metals like iron; nitrate and fluoride affect the groundwater quality. Hence it is decided to study the groundwater of Bidar and Aurad taluka^[1].

II. OBJECTIVES

1. Determination of physico-chemical parameters like pH, alkalinity, chloride, total hardness, dissolved oxygen from groundwater.
2. Determination of heavy metals like iron, fluoride, nitrate from groundwater.
3. To identify the status of water quality with Bureau of Indian Standards (BIS).

III. STUDY AREA

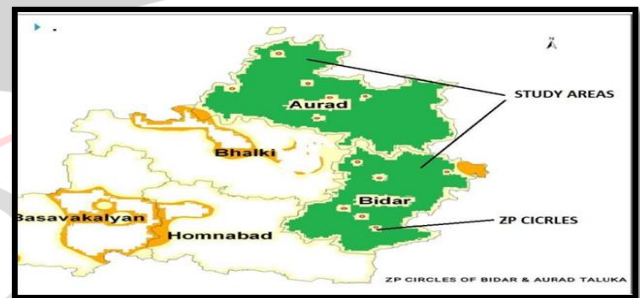


Figure 1: Map showing the study area

The Bidar district is the northern most part of the Karnataka state with geographical area of 5460 sq.km. It lies between 17°35' and 18°29' North latitude and 76°41' to 77°39' East longitude. It is bounded by Nizamabad and Medak districts of Telangana state on the eastern side, Latur and Osmanabad districts of Maharastra state on the western side, Nanded district of Maharastra state on the northern side and Gulbarga district on southern side. The district experiences semi-arid climate with extreme summer. The dust storms and severe heat waves are common in the district between April and May^[3]. Generally, the monsoon sets in the month of June and reaches its climax in the month of September. The rainfall generally is spread over 39 to 53 days. Nearly 75% to 80% of the annual rainfall is during the period of Southwest monsoon^[5].

Selection of sampling points from ZP circles of Bidar and Aurad talukas as study areas. Collection of samples from the bore wells of sampling points through composite sampling method. First Samples are collected during in the month of January.

IV. RESULT AND DISCUSSION

Table-1. Water Sample analysis report of Bidar Z.P. circles during January 2021-22

Parameters	pH	alkalinity	DO	Chloride	Total hardness	Iron	Fluoride	Nitrate
Maxvalue(g)	8.5	200	6	250	120	1.0	4	100
Minvalue(g)	6.5	20	4	4	60	0.3	1.5	45
BAGDAL	7.4	30	5.45	94.97	30	0	0.59	12.7
CHITTA	6.4	52	5.20	34.98	76	0.2	0.86	16.6
JANWADA	6.3	50	4.25	184.9	84	0	0.3	11.5
KAMTHANA	7.4	4	5.76	196.9	120	0	0.55	13.4
MALEGAON	7.2	10	4.50	169.9	116	0.1	0.10	9.9
MANALLI	6.8	110	5.24	129.5	34	0	0.21	19
AURADS	6.5	10	2.9	32.98	24	0	0	14.3

Table-2. Water Sample analysis report of Aurad Z.P. circles during January 2021-22

-	pH	alkalinity	DO	Chloride	Total hardness	Iron	fluoride	Nitrate
Max value (mg/l)	8.5	200	6	250	120	1.0	4	100
Min value (mg/l)	6.5	20	4	4	60	0.3	1.5	45
CHINTAKI	6.9	4	5.7	39.98	46	0.1	0.1	13.8
DABKA	4.3	6	5.43	30	44	0	0.8	9.1
KAMALNAGAR	6	74	5.40	109.96	134	0	0.3	6.3
SANTHPUR	6.7	8	4.38	24.9	67	0.12	0.34	17.8
THANAKHUSHNOOR	7.4	40	5.40	124.5	128	0	0.86	23
WADAGOAN	5.9	80	5.33	190	22	0	0.45	12.5
EKAMBA	7.2	6	3.40	65.97	76	0	0.6	15.3

- The physico-chemical parameters like pH varies from range of 6.3-7.4 of BIDAR Z.P.samples and 4.3-7.4 of AURAD zp samples which are within permissible limit of BIS.
- Alkalinity ranges from 4mg/l-110mg/l of BIDAR Z.P.samples and 4mg/l-80mg/l of AURAD Z.P. samples which are within permissible limit of BIS,
- Dissolved oxygen varies from 2.9mg/l-5.8mg/l of BIDAR and 4mg/l-5.9mg/l of AURAD samples which are within the permissible limits of BIS,
- Chloride varies from 32.5mg/l-196.93mg/l of BIDAR zp samples and 24.9mg/l-190mg/l of AURAD samples which were within permissible limit of BIS.
- Total hardness varies from 24mg/l-123mg/l of BIDAR zp samples and 21mg/l-134mg/l of AURAD samples which were within permissible limit of BIS.

- The ranges of heavy metals, iron varies from 0mg/l-0.2mg/l of BIDAR zp samples and 0mg/l-0.1mg/l of AURAD samples which were within permissible limit of BIS^[6,7].
- Flouride varies from 0mg/l-0.86mg/l of BIDAR zp samples and 0.1mg/l-0.97mg/l of AURAD zp samples which were within permissible limit of BIS^[6,7].
- Nitrate varies from 9.9mg/l-17.6mg/l of BIDAR zp samples and 5mg/l-23.2mg/l of AURAD zp samples which were within permissible limit of BIS^[6,7].

V. CONCLUSION

The water is too acidic in KAMTHANA, AURAD.S and MALEGAON during the month of January in BIDAR taluka. Hence it is not safe for drinking and this need to be treated. The dissolved oxygen is less than the acceptable value in AURAD.S during the month of January due to sewage enters into the fresh ground water. Hence it needs to be treated. The heavy metals like, iron was rarely found in areas like CHINTAKI, SANTHPUR, JANWADA. Fluoride and nitrate were within permissible limits in all the study areas.

REFERENCES

- [1] Akkaraboyina, M. and Raju, B. (2012): A Comparative Study of Water Quality Indices of River Godavari. Int. J. Eng. Res., 2(3): 29–34.
- [2] Anitha, P., Charmaine, J. and Nagaraja, S. (2011) Evaluation of groundwater quality in and around Peenya industrial area of Bangalore, South India using GIS techniques. Environ Monit Assess. doi:10.1007/s10661-011-2244.
- [3] Alam Mohammad and Pathak, J.K.(2010) : Rapid Assessment of Water Quality Index of Ramganga River,Western Utter Pradesh (India) Using a Computer Programme. Nature and Science, 8(11).
- [4] Almasri, et al., 2007. Nitrate contamination of groundwater: A conceptual management framework. Environ. Impact Assess. Rev., 27: 220-242. DOI: 10.1016/j.eiar.2006.11.002.
- [5] A.R. Tembhurkar and Shilpa Dongre, (2006), “Studies on Fluoride Removal Using Adsorption Process”, JOURNAL OF ENVIIRON. SCIENCE & ENGG. Vol. 48 No.3, pp 151-156.
- [6] BIS “Drinking water specification IS 10500:1991”, Bureau of Indian Standards, New Delhi, 1996.
- [7] BIS, “Drinking water specification IS 10500:2012”, Bureau of Indian Standards.
- [8] Gunnar Nordberg and Bruce Fowler; Monica Nordberg. Handbook on the toxicology of metals, 4th ed.; Amsterdam, Elsevier, 2014, Chapter 41, Iron. pp 879-902.
- [9] Nitrate and Nitrite: Agency for Toxic Substances and Disease Registry. 2011, CAS ID: 84145-82-4.
- [10] Saxena, K L, and Sewak, R. Fluoride consumption in endemic villages of India and its remedial measures. International Journal of Engineering Science Invention. 2015; 4: 2319– 6726.
- [11] WHO, 2004, Guidelines for Drinking-Water Quality, World Health Organization, Geneva, (2nd edn.), 1, 375–377.