



## A REPORT ON THE IRON DISTRIBUTION IN GROUND WATER OF GAUR IN BASTI DISTRICT (U.P.) INDIA

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### ABSTRACT

The presents study concerns the iron distribution in ground water in different locations of Gaur block of Basti district during the month of June- July 2017. Total 10 water samples were collected from hand pumps at different locations in and around Gaur Block. The water samples were analyzed for their physicochemical characteristics viz. pH, turbidity, chloride, total hardness, fluoride nitrate, iron and free chlorine. On comparing the results against water quality standards suggested by WHO, BIS, and ICMR. The analysis reveals that most of the parameters were found under permissible limit but some were exceeds the maximum permissible limit of WHO and other standards.

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### INTRODUCTION

Water is extremely essential for survival of all living organisms in the univeses. Water pollution is one of the most serious problems for human and other type of life on our planet<sup>1</sup>. Over one billion people world wise have no access to safe drinking water. The suitability of ground water for many purposes depends upon its intrinsic quality parameters<sup>2</sup>. The quality of water vital concern for mankind since it is directly linked with human welfare. Since it is a dynamic system, containing living, non living, organic, inorganic, soluble as well as insoluble substances. So its quality is likely to change day by day and from source to source. Any change in the nature, quality may disturb the equilibrium system and would become unfit for any type of uses. It is found in different form on earth, like sea water, river water, pond water, well water and ground water, lake water, ice water. About 71% of the earth surface is covered with water<sup>3</sup>. Out of which about 20% ground water of the world resources of fresh water and which are used in large amount of industry, irrigation and domestic activity<sup>4</sup>. According to different water standards the safe potable water is absolutely essential for healthy living<sup>5</sup>. Today most of the population of our country depends on ground water for drinking and in other purposes of day to day life<sup>6</sup>. Due to urbanization, industrialization and rapidly increased population, the ground water of our country becomes unpleasant for drinking<sup>7-8</sup>.

Polluted ground water is the main cause for the many chronic diseases and epidemics in human as well as animals<sup>9</sup>. There were several states in India were more than 90% population are dependent on ground water for drinking and other purposes<sup>10</sup>. So the present study deals to assess the some physicochemical parameters of ground water of Gaur Block. In the present study, water samples were collected from the hand pumps of different areas in and around Gaur Block of district Basti. Different physicochemical parameters were analyzed and the results were compared with the values of different water qualities standards such as world health organization (WHO<sup>11</sup>), Bureau of Indian standard (BIS<sup>12</sup>) and ICMR<sup>13</sup>.

### MATERIALS AND METHODS

**Study Area:-** The study area Gaur block is situated near the border of Basti and Gonda District of U.P., India. This area is about 85 km west to the Gorakhpur and 65 km east to the Gonda railway station respectively. It is located between 26.75°N latitude and 82.75°E longitude. It is on side of Gaur railway station.

**Sample Collection:-** The samples were collected from all 10-locat ions during the months of June-July 2017. The distance maintained nearly one to two kilometers between each locations. The samples were collected in plastic bottles which are cleaned with acid followed by rinsing twice with distilled water. The physicochemical analysis of ground water was done by using Himedia water testing kit. The sampling places are listed in table-1.

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**Table 1** Sampling places in the Gaur.

S.N.	Sampling Places	Sites
1	Sumahi	S1
2	Near Railway Station	S2
3	Ramvapur	S3
4	Gaur Market	S4
5	Sujiya	S5
6	Chakchai	S6
7	Siddhaur	S7
8	Amarpur	S8
9	Shekhapur	S9
10	Ganesh Ganj	S10

**Table 2** Various water quality parameters of Gaur

Sampling Sites Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
pH	7.2	7.5	7.6	7.3	7.4	7.5	7.4	7.2	7.1	7.3
Turbidity (NTU)	4	4	2	3	5	3	4	4	2	3
Chloride (mg/lit.)	300	100	60	130	310	130	250	150	30	80
Total Hardness (mg/lit.)	400	450	300	350	600	400	450	375	200	325
Nitrate (mg/lit.)	50	100	10	10	90	45	50	120	80	20
Fluoride (mg/lit.)	0.10	0.50	0.70	0.50	0.90	0.40	0.50	0.50	0.60	0.60
Iron (mg/lit.)	0.50	1.00	1.50	1.00	1.10	0.60	0.60	1.00	0.95	1.10
Free Chlorine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table 3** Comparison of water parameters with drinking water quality standards

S.N.	Parameters	WHO	ICMR	BIS	Min.	Max.	Mean	SD
1	pH	6.5-9.2	6.5-8.5	6.5-8.5	7.1	7.6	7.3	0.14
2	Turbidity (NTU)	5	5	5	2	5	3.4	1.89
3	Chloride(mg/lit.)	250	250	250	30	310	154	41.75
4	Hardness(mg/lit.)	300	300	300	200	600	385	150.5
5	Nitrate (mg/lit.)	50	45	50	10	120	7.5	31.26
6	Fluoride (mg/lit.)	1.50	1.50	1.00	0.10	0.90	0.53	0.16
7	Iron (mg/lit.)	0.30	0.30	0.30	0.50	1.50	0.94	0.30
8	Free Chlorine (mg/lit.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## RESULTS AND DISCOUSION

The various examined physicochemical parameters showed considerable variations in different water samples. The results obtained during the analysis were given in the table-2. The results compared the values of WHO, BIS and ICMR for drinking water standards which is given in the table-3.

The pH of ground water varies from 7.1 to 7.6. This indicates that they are in the range of ground water quality parameters permissible limits i.e., 6.5-9.2 and slightly alkaline in nature<sup>14-16</sup>.

The turbidity varies from 2 to 5 NTU. This indicates that most of the samples were existed within the permissible limits of WHO, BIS and ICMR.

Chloride varies from 30 to 310 mg/lit. Sample no.1 and 5 are above the permissible limits while other samples are under the permissible limits of WHO, BIS and ICMR. Since low concentration of chloride is not harmful to human but high concentration above 250 mg/lit could alter the taste of water.

The taste hardness varies from 200 to 600 mg/lit. It indicates that the maximum sampling sites have higher values than the WHO, BIS and ICMR standards. Thus the drinking water is very hard at all the locations.

The nitrate varies from 10 to 120 mg/lit. The sampling places S<sub>3</sub>, S<sub>4</sub> and S<sub>10</sub> founded to be less than permissible limits while sampling places S<sub>2</sub>, S<sub>5</sub>, S<sub>8</sub> and S<sub>9</sub> found to be very higher than

the permissible limit but samples S<sub>1</sub>, S<sub>6</sub>, & S<sub>7</sub> are in the range of permissible limits of WHO, BIS and ICMR Standards.

Fluoride varies from 0.10 to 0.90 mg/lit. Generally all sampling places values have less than the permissible limits of WHO, BIS and ICMR. Since high fluoride concentration causes dental fluorosis and skeletal fluorosis whereas the absence or low concentration of fluoride (less than 0.5 mg/lit) in drinking water results in dental caries in children particularly<sup>17</sup>.

The value of Iron varies from 0.5 to 1.5 mg/lit. All the values were found to be higher than the permissible limit of WHO, BIS and ICMR. The low consumption of Iron causes a disease called "anemia" and prolonged consumption of drinking water with high concentration of iron may be lead to liner disease called as haemosiderosis<sup>18-19</sup>. Free chloride was found to be absent in all the 10-samples.

## CONCLUSION

The analysis of water quality parameters of drinking water from 10-different locations of Gaur indicates that the pH, turbidity is under permissible limit. Highly exceeded value of Total hardness, Nitrate and Iron were observed of most of the location in the study area. The mean observed for the parameters shows that the deviation in the Total hardness (385), Nitrate (7.5 ) and Iron (0.94) are of moderately high range from this it is concluded that the various parameter concentration are varying highly in different location of Gaur.

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## References

1. Suraj P.Gajbhiye,S.A.Bhalerao, A study of physicochemical and some heavy metal pollutants in soil from the industrial area of Thane –Belapur MIDC region, Maharashtra state, India, *Journal of Chemical and Environmental Sciences*,vol.4,[1], 43-52, February 2016.
2. A.Shanmugasandharam<sup>1</sup>,G.Kalpna<sup>1</sup>,S.R.Mahapatra<sup>1</sup>,E. R.Sudharson<sup>1</sup>, M.Jayaprakash<sup>1</sup>, Assessment of ground water quality Krishnagiri and Vellore district in Tamil Nadu, India, *Appl. Water Sci.*(2017) 7:1869-1879.
3. R.V. Prasad, D.R. Tripathi\* and Vinod Kumar\* Assessment of ground water quality in Saltaua Gopalpur Block of Basti District (U.P.) India. *Current world invironment*. Vol.8(3), 483-487 (2013).
4. Bhagirathi Behera\*, Mira Das and G.S. Rana, Study on ground water pollution due to iron content and water quality in and around, Jagdalpur, Bastar district, Chattisgarah, India, *Journal of Chemical and Pharmaceutical Research*, 2012,4(8):3803-3807.
5. R.V. Prasad\*, D.R. Tripathi\*\* And V. Kumar\*\* Physico-Chemical Analysis of Ground water of Basti Sadar Block of District Basti, (U.P.) India, *IJCPS* vol.3, No.4, Jul-Aug 2014.
6. Agrawal, R. Physico-chemical analysis of some ground water sampler of Kotputlu town Jaipur, Rajasthan. *International Journal of Chemical Environment and*

- Pharmaceutical Research, Rajasthan*, 1(2): PP 111-113 (2010).
7. Raja R.E., Sharmila, Merlin P. and Chirtopher G., Physico Chemical analysis of some groundwater samples of Kotputli Town Jaipur. Rajasthan, India *J. Envirion Port.*, 22(2):137 (2012).
  8. Parihar S.S., Kumar A., Kumar A., Gupta R.N., Pathak M, Shrivastav A. and Pandey A.C., Physico-Chemical and microbiogicest analysis of underground water in and ground Gwalior city, M.P., *India. Res. J.Recent Sci.*, 1(6):pp 62-65(2012).
  9. S. Md. And K.M. Singh, IJPQA, 2009,1 (1), 9-12.
  10. Ramachandraiah, Center for Economic and Social Studies, 2006, 56.
  11. WHO, International standard for drinking water, 3<sup>rd</sup> ed., Geneva (2008).
  12. BIS, Specification for drinking water. Bureau of Indian standard, New Delhi, 171-178 (1998).
  13. Manual of Standards of quality of drinking water Supplies, Indian Council of Medical Research, New Delhi, 1975.
  14. B.Behera, M. Das and G.S. Rana, *Indian J. chem. Pharma. Res.*, 2012, 4(8), 3803-3807.
  15. Dharmaraja, J.S. Vadivel and E. Ganeshkarthick, *Int. J. of Scientific Tech. Res*, 2012, 1(5), 92-95.
  16. R.V. Prasad, D.R. Tripathi and V.Kumar *Res. J. Chem. Sci.*, 2013, 3(9), 80-82.
  17. Patil, N; Ahmed.; Suresh babu H. Kottureshwar, N.M., Jayashree, M., and J Nijalingappa. Study on the physico-chemical characteristics of ground of Gulbarga city (Karnataka), *Int. J appli. Biopharm. Tech.* vol.1(2)518-523.(2010)
  18. Behra, B., Das M. and Rana G.S., studies on ground water pollution due to iron content and water quality in and around Jagdalpur, Bastar District, Chattisgarh, *India. J.Chem. Pharma Res.*4(8):3803-3807.(2012)
  19. Rajgopal; Ground water quality assessment for public policy in India. 1st Annual report. Dept. Of geography, IOWA University, IOWA,10-11.(1984)

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