

## **Contamination Of Fluoride And Seasonal Variation In Ground Water Quality Parameters, Krishan Nagar Area, Mahendergarh (Haryana)**

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### **Abstract**

Fluoride is one of the most important Geo- Environmental issues in 25 developed as well as developing nations. Excessive ingestion of fluoride results into a disease called fluorosis. The fluoride content is ground water and it's imparted on human health imparting human living. In addition, the water sample contain Fluoride content in ground water in some locations are also evaluated, further which put effect on human health on the population of Mahendergarh areas. Ground water samples of Krishan Nagar area of Mahendergarh district have been collected from the bore wells. The results indicate that fluoride concentration is varying from 0.9- 5.9 mg/L. This Paper briefly presents the high content of fluoride in ground water. Also in present paper water quality parameters like pH, electric conductivity, sodium, potassium, calcium, magnesium, bicarbonate, chloride, Sulphate, dissolve oxygen, biochemical oxygen demand, chemical oxygen demand, nitrate, phosphate, and iron has been studied in the period of August 2020 to April 2021. The study shows that seasonal variation in the physico-chemical parameters. In addition, all the parameters are compared with different water quality standards in the research work.

**Key words: Physico-chemical parameters, Fluoride, Seasonal variation, Mahendergarh**

### **Introduction**

We have enormous resource on the earth amounting to about 13,481,96000 Km<sup>2</sup> of water. Due to its unique properties water is of multiple uses for living organisms. In India 77% of water is used in agricultural sector (1). Human being depends on water for almost every developmental activity. Water is used for drinking, irrigation, washing, and Industrial purposes. Although water is very abundant on this earth, yet it is very precious. Out of the total water reserves of the world, about 97% is salty water and only 3% is fresh water. Even this small fraction of fresh water is not available to us as most of it is locked up in polar ice caps and just 0.003% is readily available to us in the form of ground water and surface water.(2) Due to the availability of onsite water for

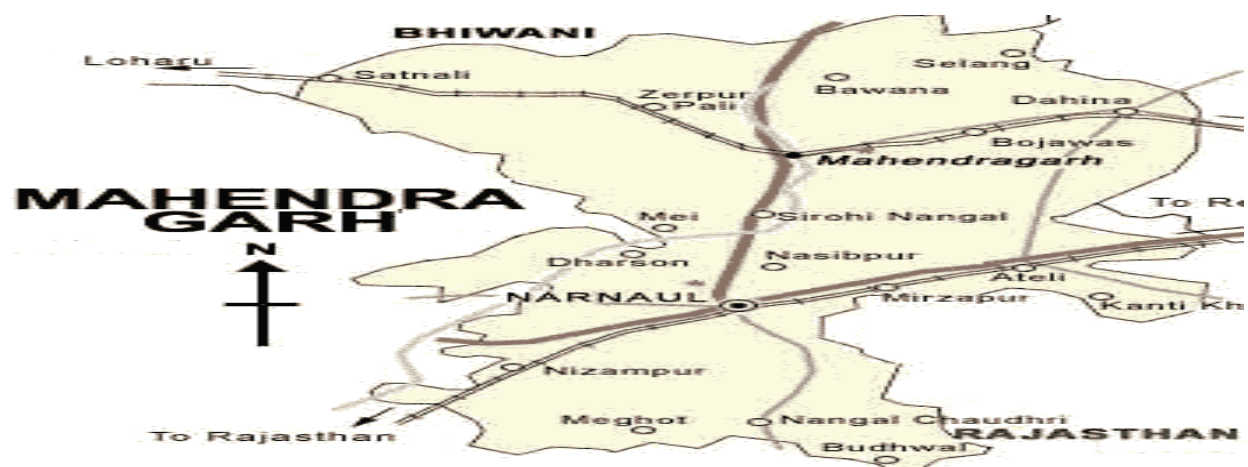
various purposes like drinking, agriculture and industrial, various villages are developed on the both bank of reservoir (3). Due to the various agricultural as well as domestic activities, large numbers of pollutants are discharged every day. The domestic use of water from reservoir is large like bathing, washing of cloths, cattle bathing, and leads to water pollution (4). The routine monitoring of water can assure the populace that the quality of their drinking water is adequate. It can also be beneficial in detecting deterioration in the quality of drinking water and facilitate appropriate timely corrective actions with minimal negative impacts on population health. In the present study, groundwater of Krishan Nagar was mapped for fluoride distribution, which is mainly used for drinking and other domestic purpose.

## **Experimental**

### **Water sampling, Materials and methods**

Firstly total of 10 ground water samples taken from ten locations of Krishan Nagar were collected in polythene bottles which were cleaned with acid water, followed by rinsing twice with distilled water. The water samples are chemically analyzed. The analysis of water was done using procedure of standard methods. This samples are focus on fluoride content in Krishan Nagar area. Also in the present investigation of Seasonal variations of water quality parameters a twenty water samples taken from different sources are collected. The water samples were collected in polythene bottles which were cleaned with acid water, followed by rinsing twice with distilled water. The water samples are chemically analyzed. [5] The analysis of water was done using procedure of standard methods. Methodology- The pH and EC were measured by using Eutech-cybernetics PH meter and EC scan meter. [6] Total hardness, calcium, magnesium was measured by EDTA titration methods. [7] Total alkalinity was determined by volumetrically by silver nitrate titrametric methods using potassium chromate as indicator. [8]. Sulphate was determined nephelometrically using ELICO-52 Nephelometer. [9] Fluoride content in water was measured by ELICO-52 Spectrophotometer. The Physico-chemical analysis was carried out according to standards methods. [10, 11, 12] Temperature, turbidity and TDS were observed with thermometer, turbidity rod and with the help of digital water kit. [13] Nitrate and arsenic was observed by phenol dysphonic acid method and colorimetric methods. [14, 15] Iron was determined by spectrophotometer. [16]

## Map: Mahendergarh (Haryana)



### Study Area

Krishan Nagar area is located in Mahendergarh district, which is one of the districts of Haryana state in Northern India. The district occupies an area of 1, 859 km<sup>2</sup>. The district has a population of 922,088 (2011 Census). Narnaul Town is the administrative headquarters of the district. Mahendergarh is one of the very few districts in India where the name of the district and its town are different. As of 2011 it is the third least populous district of Haryana (out of 21), after panchkula and Rewari. The district lies between north latitude 27° 0' to 28° 26' and east longitude 75° 56' to 76° 51'. It is bounded on the north by Bhiwani and Rohtak districts, on the east by Rewari district and Alwar district of Rajasthan, on the South by Alwar Jaipur and Sikar districts of Rajasthan, and on the west by Sikar and Jhunjhunu of Rajasthan.

### Result And Discussion

Most of the water sample, collected from the different location in Krishan Nagar area do not meet the water quality standards and many other quality parameters. Hence it is not suitable for consumption with any prior treatment. A hand pump attached filter based on Nalgonda Technology or activated alumina adsorption might be the solution to this problem. The water from the study area has no colour, odour and low turbidity. Taste of the water of the water sample in most of the locations is pleasant. The result of the chemical analysis of water in the present study, so it is necessary to make a comparison of water given by USPH, EUROPEAN and ICMR standards. The data of chemical parameters showing considerable variations due to seasonal changes which reflect the chemical composition. The pH of water shows variation in its ranges. It indicates that they are in range of water quality parameter permissible limits. The EC of water samples

shows wide variation in Mahendergarh. Water of studied is found moderate in all seasonal changes.

**Table: Fluoride Content in Ground water of Krishan Nagar Area, Mahendergarh District**

| Sr. No. | Fluoride (mg/L) |
|---------|-----------------|
| 1       | 2.1             |
| 2       | 2.7             |
| 3       | 1.9             |
| 4       | 2.9             |
| 5       | 1.8             |
| 6       | 0.9             |
| 7       | 5.9             |
| 8       | 1.0             |
| 9       | 2.9             |
| 10      | 4.4             |

**Table: Average values of seasonal variation in water quality parameters**

| Sr.No | Parameters                    | Pre-Monsoon | During - Monsoon | Post -Monsoon |
|-------|-------------------------------|-------------|------------------|---------------|
| 1     | pH                            | 7.8         | 6.5              | 7.2           |
| 2     | SO <sub>4</sub> <sup>2-</sup> | 36          | 30               | 35            |
| 3     | NO <sub>3</sub> <sup>-</sup>  | 136         | 130              | 135           |
| 4     | CL <sup>-</sup>               | 36          | 30               | 35            |
| 5     | F <sup>-</sup>                | 2.8         | 1.4              | 3.9           |
| 6     | Fe <sup>2+</sup>              | 0.52        | 0.49             | 0.5           |
| 7     | Turbidity                     | 11          | 7                | 9             |
| 8     | Ca <sup>2</sup>               | 90          | 85               | 87            |
| 9     | Mg <sup>2+</sup>              | 8           | 5                | 7             |
| 10    | TH                            | 266         | 263              | 265           |
| 11    | TDS                           | 378         | 370              | 374           |
| 12    | EC                            | 781         | 775              | 779           |
| 13    | TA                            | 284         | 280              | 282           |
| 14    | BOD                           | 1.4         | 1.1              | 1.2           |
| 15    | COD                           | 2.2         | 2                | 2.1           |
| 16    | DO                            | 1.9         | 1.5              | 1.7           |
| 17    | HCO <sub>3</sub> <sup>-</sup> | 46          | 40               | 45            |
| 18    | CO <sub>3</sub> <sup>2-</sup> | 8           | 5                | 7             |
| 19    | Na <sup>+</sup>               | 175         | 170              | 172           |
| 20    | K <sup>+</sup>                | 2.8         | 1.5              | 2.2           |

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