

Assessment of Fluoride Contamination in Industrial Area of Jaipur, (Rajasthan)

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Abstract:- Many countries in the world are facing various health problems due to fluoride contamination and India is one of them. Most of the areas of Rajasthan are highly contaminated with fluoride and they are totally dependent on the ground water for their drinking water needs. Millions of people including children are affected with dental, skeletal and non-skeletal fluorosis. Jhotwara Industrial Area is situated in the north-western part of Jaipur. It is situated between Jaipur-Delhi by pass Benar road. The area was historically a small principality under Jaipur Royal State. Presently more than 180 SME industries are working in this area. The industries are disposing their waste in the surrounding outside without any proper treatment. This is depleting the ground water of the area. Ground water samples were collected from various sampling locations in the industrial area and was tested for fluoride contamination in the pre-monsoon and post-monsoon seasons.

Keywords:- Fluoride, Ground Water, Fluorosis, Waste.

I. INTRODUCTION

Water is one of the most essential natural resources which sustains the life on Earth. Human mankind has always thought that it is a free gift of nature and is available in abundance. However, the chemical composition of the surface is one of the important factors in determining its suitability for domestic, industrial and agricultural purposes. Ground water is the major source of drinking water in both the urban and rural areas. Millions of people in both the rural and urban areas lack access to clean drinking water and basic sanitation. They are completely unaware of the water borne diseases affecting their health. Water contamination is one of the major effects on public health in India. Fluoride pollution in water is a main difficult across the world, with health dangers such as dental and skeletal fluorosis. The

limit of fluoride in drinking water according to BIS (2012) is 1.5 mg/l. (Mahipal Singh Sankhla et.al, 2018). According to the World Bank Report (2010), nearly 85% of the Indian population consumes ground water. Fluoride is necessary for the growth and strength of bones and teeth, but its high concentrations are linked with several serious health problems in humans and animals (Vikas Duggal, Samriti Sharma, 2022). Jhotwara Industrial Area is situated in the north-western part of Jaipur. It is situated between Jaipur-Delhi by pass Benar road. The area was historically a small principality under Jaipur Royal

State. Presently more than 180 SME industries are working in this area. The industries are disposing their waste in the surrounding outside without any proper treatment. This is depleting the ground water of the area. Ground water samples were collected from various sampling locations in the industrial area and was tested for fluoride contamination in the pre-monsoon and post-monsoon seasons.

II. METHODOLOGY

The ground water samples were collected during the summer and winter months of July (Pre-Monsoon) and December (Post-Monsoon) seasons. The water samples were collected in clean sterilized plastic bottles. The samples were collected from the industrial area within the 10 km radius. The samples were analysed for fluoride. Fluoride selective ion meter (Hanna Instrument, HI253) was used for its estimation. All the experiments were performed in the Research Laboratory of Indira Gandhi Centre for HEEPS, University of Rajasthan, Jaipur.

III. RESULT AND DISCUSSION

Fluoride analysis of the ground water samples collected from the industrial area in the pre-monsoon and post-monsoon season:

Table 1: Fluoride Analysis of the ground water of the Jhotwara Industrial Area in the pre-monsoon and post-monsoon season.

S.no.	Sampling Sites	Pre-Monsoon (mg/l)	Post-Monsoon (mg/l)
1.	Balaji Industrial Products Ltd.	0.8	0.6
2.	Bihani Enterprises	0.5	0.4
3.	Sand mark Creations	1.2	1.1
4.	Shri Lal Alloys Ltd.	1.1	1.2
5.	Cement Plant	1.0	0.5
6.	Herbicides India Ltd.	0.3	0.1
7.	Barjatya Industries	0.2	0.6
8.	Cement Plant	0.8	0.5

9.	Shri Vaibhav Meta cast	0.6	1.5
10.	Beeco Rubber	1.3	1.0
11.	Oswal Soap	1.1	0.4
12.	Khemka Industries	0.3	0.2
13.	Nikhil Daal Mill	0.4	0.2
	Max	1.3	1.5
	Min	0.2	0.1
	Mean	0.73	0.63
	Std Dev.	0.37	0.43

The overall analysis of the ground water samples in the pre-monsoon season (July) and post-monsoon season (December) reveals fluoride contamination in the water. The values in the pre-monsoon season ranged from 0.2 mg/l to 1.3 mg/l and the values in the post-monsoon season ranged from 0.1 mg/l to 1.5 mg/l. Though, the water samples are within the permissible limits but still if attention is not given, they may exceed the limit in the upcoming period.

IV. CONCLUSIONS AND RECOMMENDATIONS

As the industries are disposing their waste on the surrounding soil without giving them any prior treatment this is depleting the underground water quality. If serious actions are not taken then within a short span of time the fluoride concentration will start to exceed the permissible limit, as in one of the samples collected in the post-monsoon season from near the Vaibhav Meta cast it has already reached 1.5 mg/l. The industries should restrict disposing their untreated waste. These little and vital important efforts will surely be helpful in maintaining the ground water quality of the area.

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