

Fluoride Distribution In Ground Water Of Godwar Region In Pali District

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Physico-chemical analysis of ground water of the Godwar region, was performed to have a clear picture of water quality of the area so that the remedial measures could be work out for high fluoride concentration, which may cause osteoporosis and fluorosis. Fluoride concentration of groundwater samples from twenty stations of Godwar region (Bali and Desuri Tehsils) of Pali district of Rajasthan was determined. In the region the maximum fluoride concentration is recorded 4.8 mg/l in the ground water of Dungrasani Bali.

Keywords: fluoride, ground water, fluorosis.

1. INTRODUCTION

Fluoride has been repeated as a health affective substance by health organization with in 1mg/L concentration in water. It has been recommended as an essential substance in water for building healthy in teet. The maximum permissible/ allowable limit of fluoride in water has been laid down as 1.5 mg /L by WHO and ICMR and 0.7-1.7 mg/L by U\$PHS. The concentration of fluoride exceeds 1.5 mg/L. It may cause teeth mounting and still higher concentrations may lead to skeletal fluorosis. Pali District was identified as the worst fluoride affect district in Rajasthan. The survey of fluoride level in drinking water may help in identification and reporting of sensitives areas to endemic fluorosis. In this paper fluoride level of ground water from twenty Stations of Bali and Desuri Tehsil (Godwar region) of Pali district of Rajasthan is reported.

2. EXPERIMENTAL

The water samples were collected from different areas of ground water. Investigation was carried out for period of two years covering two different seasons viz. Winter and Summer. Samples for analyses were collected in sterilized bottles (plastic). Fluoride concentration was determined by Ion Selective electrode method [1,2,3]. The twenty sampling stations were selected for seasonal studies, which are given in Table 1.

Table 1 Name of the selected stations

Station No.	Name of the Station	Station No.	Name of the Station
1	Mundara Bali (W)	11	Poonadia pinjkar, Bali (W)
2	Dungrasani Bali (N)	12	Sri-Sela, Bali (H)
3	Layada, Bali (H)	13	Devtara, Phalana (H)
4	Sadri, Bali (W)	14	Doodaria, Desuri (H)
5	Iunawa, Bali(H)	15	Kabristan, Desuri (H)
6	Selvi Dam, Desuri	16	Godawada dam, Narlai, Desuri

Station No.	Name of the Station	Station No.	Name of the Station
7	Suthro ka gudda, Desuri (H)	17	Old bus stand, Bali (H)
8	Near police station, Desuri (B)	18	Nadol, Desuri (B)
9	Railway station, Phalana (H)	19	Narlai Pond, Desuri
10	Mevo ka suthara, Desuri (W)	20	Dewli Pabuji, Desuri (H)

W: Well, N: Nalkoop, H: Hand-Pump, B: Bawari

Fluoride concentration at various stations with summer and winter seasons are summarised in Table 2.

Table 2. Fluoride concentration at various stations

Station No.	Fluoride content (mg/L)	
	Summer	Winter
1	2.3	2.46
2	3.2	4.8
3	2.5	2.8
4	1.1	1.5
5	2.9	3.1
6	0.65	0.65
7	4.7	4.7
8	1.6	1.8
9	1.6	1.8
10	0.5	0.7
11	4.2	4.7
12	3.6	3.8
13	3.6	3.8
14	0.7	0.8
15	3.0	3.1
16	0.7	0.75
17	0.2	0.29
18	1.3	1.5
19	0.8	0.9
20	0.6	0.71

Fluoride distribution in Godwar region with station no. is summarised in Table 3.

Table 3. Fluoride distribution in Godwar region in terms of station numbers

Category I <1mg/L	Category II >1mg/L & <1.5mg/L	Category III >1.5mg/L & <3.0mg/L	Category IV >3.0mg/L & <5.0mg/L
6	4	1	2
10	18	3	5
14		8	7
16		9	11
17			12
19			13
20			15

Datas of Table 2 are represented in Fig. 1

Variation of fluoride in different seasons at various stations

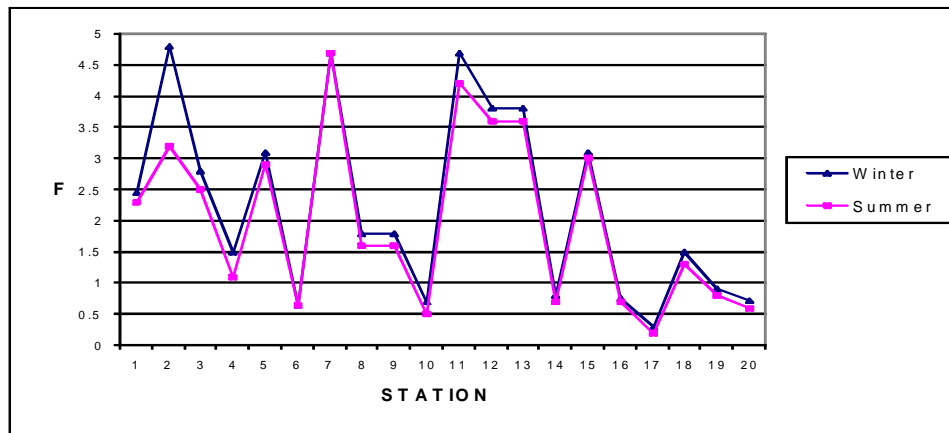


Fig. 1

3. RESULT AND DISCUSSION

Water is contaminated with fluoride as the earth crust is heavily loaded with fluoride containing minerals / salts [4,5]. Fluoride was found to be in the range of 0.2mg/L (Hand pump-old bus stand, Bali) to 4.8 mg/L (Nalkoop-Derngrasani,Bali).

From the Table 3, it is clear that seven stations fall in category I. In these villages fluoride concentration is below 1.0 mg/L which is maximum desirable limit of standards for drinking water recommended by Bureau of Indian Standard (BIS) in IS: 10500 - 1991. Fluoride is beneficial when present in this limit, for calcification of dental enamel especially for children below 10 year age.

Two stations of the tehsil have fluoride concentration between 1.0 to 1.5 mg/L (Category II) 1.5 mg/L is the maximum permissible limit of standard for drinking water (IS: 10500 - 1991).

In four stations, the fluoride is between 1.5 to 3.0 mg/L (Category III). This concentration is above the maximum permissible limit as recommended by BIS.

Dental Fluorosis may visible sign of overexposure to excessive fluoride in this villages. At this concentration level, teeth lose their shining appearance and chalky black, gray or white patches develop on them (known as mottled enamel) [6].

In 7 station (Category IV) fluoride concentration is above 3.0 and below 5.0 mg/L. The per-day intake of fluoride in these villages is very high. There are all degree of fluorosis (Mild, Moderately, Moderately severe, severe fluorosis) including skeletal fluorosis after 30 year of age in local residential, but the probability of IInd stage skeletal fluorosis after 45 year age may be common [6,7].

The present studies have shown occurrence of high fluoride content in the ground water of

several station of Godwar Region. The station which do not have alternate water sources, should be provided with defluoridation plants to eliminate the problems.

4. REFERENCES

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