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Short communication

CORRELATION OF FLUORIDE WITH SOME INORGANIC CONSTITUENTS IN GROUND WATER IN SAIDNAGAR TALUKA, RAMPUR DISTRICT, UTTAR PRADESH, INDIA

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ABSTRACT: Ground water sample of Saidnagar Taluka of Rampur district of Uttar Pradesh, India have been collected either from the bore wells (from the part of the municipal water supply) or from the hand pumps (direct consumption) were determined the relationship of the fluoride content to other inorganic constituents in ground water samples from 14 different villages in the Saidnagar Taluka of Rampur district of Uttar Pradesh,India,the levels of various inorganic constituents in the water such as pH hardness, total hardness, alkalinity, Cl^-, So_4^{2-}, No_3^-, Ca^{2+} and Mg^{2+} were determined, from correlation analysis was found to be positively related to total hardness, noncarbonated hardness, So_4^{2-}, Ca^{2+} and Mg^{2+} but there appeared no significant association between the fluoride concentration and other parameter.

Keywords: Ground water, fluoride correlation, inorganic constituents, Rampur (Saidnagar Taluka)

INTRODUCTION

In spite of India's spectacular achievement in some areas of science and technology since independence, most of our rural areas and even many urban areas do not have access to safe drinking water. The government of India is determined to rectify this situation and consequently, supplying safe drinking water to rural and urban population has identified as one the "Technology Mission" to pursue by the nation. (1) Water, the precious gift to nature of human being is going polluted day by day with in increasing urbanization. India around 62.5 million people are suffering from disorder of teeth or bones through flourosis. (2) Fluoride (F) in drinking water is usually the main source of F intake and excessive consumption of F can cause a wide range of adverse health effects (3-7).To determine the F concentration of ground water and its correlation with other drinking parameters in this study, we examined the relationship between the F content of ground water and other inorganic constituents such pH, noncarbonated hardness (NCH),carbonate hardness (CH),total hardness (TH),Cl^-,So_4^{2-},No_3^-,Ca^{2+},Mg^{2+} in villages of Saidnagar Taluka of Rampur district area of Uttar Pradesh, India.

EXPERIMENTAL

STUDY AREA

The district Rampur is located at longitude 78.54E & 69.28E, latitude 28.25N & 29.10N spread in area of 2367 Km^2 falls in Moradabad division of Uttar Pradesh state with a population of approx.four million(8).The maximum 85% ground water is used for drinking purpose for the rural population in the source of bore wells and hand pumps.

WATER SAMPLING

A total number of 60 water samples were collected from privately owned manually operated hand pumps. Only those installations were selected for sampling whose water is used for domestic purpose.

METHODOLOGY

The parameter such as total hardness(TH),Carbonate hardness(CH) ,alkalinity(ALK), Cl^- and So_4^{2-} were determined by standard methods(9), and pH was determined using a pH meter. Since TH was greater than ALK, carbonate hardness (CH) was considered to be equal to ALK and noncarbonated hardness (NCH) was taken the difference between TH and CH (10) also for fluoride (F) determination $Ca^{2+,}$ Mg^{2+} and No_3^- with ELICO CL-220 Flame Phtometer (11).

RESULTS

The fluoride concentration (F) and the inorganic parameter of the ground water in 14 villages are shown in (Table.1).As seen in Table1.Because of high So_4^{2-} levels, most of the total hardness in the ground water is due to NCH, CH.Morover the F content of water also has a significant and direct correlation with So_4^{2-}, NCH and TH (Table2).High concentration of $So_4^{2-,}$ Ca^{2+}, Mg^{2+}, NCH and TH in our water samples may be attributed to the aquifer soil texture in this area (12), after multiple regression analysis of the data, the following equation was obtained. $F=6.285+0.0016\ So_4^{2-}-0.0472\ No^{3-}-0.614$ pH.As indicated by above equation $S0_4^{2-}$ has a positive association with F, but No_3^- and pH have negative relationship.

Table 1Analytical results of Ground water samples in 14 villages of Saidnagar Taluka.

Villages Name	F	pH	NCH	CH	TH	ALK	Cl^-	So_4^{2-}	No_3^-	Ca^{2+}	Mg^{2+}
Mutyapura Bajar Patti	2.80	7.13	636	245	830	235	67	760	2.5	217	78
Hamirpur	2.42	7.17	1045	155	1210	175	58	980	5.8	262	167
Kaliya Nagla	2.31	7.14	1490	180	1666	170	416	1100	15.5	385	171
Bendu Khera	2.07	7.27	566	180	748	190	86	775	2.3	166	78
GaganNagla	2.08	7.46	1440	160	146	170	74	890	1.9	475	162
Nasimganj	1.97	7.74	565	165	728	185	46	790	10.8	155	68
Milak Nagli	1.97	7.74	535	165	730	185	37	670	10.6	188	56
Haunspur	1.90	6.75	920	240	1108	220	76	970	16.6	251	154
Saharia Narpat	1.77	7.38	460	146	627	240	86	710	4.5	241	25
Saharia Daraz	1.63	7.75	260	250	410	210	29	385	1.6	99	89
Paharpur	1.60	7.26	620	180	530	188	80	685	7.0	148	32
Runwa Nagla	1.69	7.16	312	218	760	218	170	615	22.9	235	81
Bhawanipur	1.90	7.23	298	260	548	260	19	515	16.7	248	89.5
Bijpuri	1.99	7.82	405	245	520	225	19	320	2.9	94	59.5

Table2 Correlation Coefficient values of water quality parameter

Parameter	pH	NCH	CH	TH	ALK	Cl-	So_4^{2-}	No_3^-	Ca^{2+}	Mg^{2+}
F	-0.427	0.651	-0.451	0.657	-0.451	0.238	0.723	-0.385	0.573	0.535
pH		-0.360	0.175	-0.356	0.285	-0.259	-0.471	0.309	-0.194	-0.366
NCH			-0.568	0.918	-0.538	0.574	0.823	0.236	0.956	0.838
CH				-0.453	1.56	-0.142	-0.620	0.288	-0.573	-0.346
TH					-0.162	0.682	0.953	0.257	0.973	0.846
ALK						-0.162	0.590	0.298	-0.503	0.376
Cl^-							0.659	0.675	0.639	0.568
So_4^{2-}								0.289	0.876	0.940
No_3^-									0.184	0.186
Ca^{2+}										0.823

CONCLUSION

Most of the sample collected in different location of Saidnagar Taluka, view of high F content in certain part of locations, and then we recommended these of low F bottled drinking water is used in Saidnagar Taluka, Rampur (U.P.) India.

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