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Study of trace metals in water of Satna region and their effect on health

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ABSTRACT

Water pollution is a threat to lead a healthy life. Vast industrialization and uses of nsecticides and pesticides are the reason of changing Physico-Chemical characteristics of water. The present study was undertaken with a view to detect different types of trace metals found in water of Satna region. For this purpose mineral resources of this region are considred at the root level

Key words: Trace metals, water quality, Satna region, health.

INTRODUCTION

Satna is a district of M.P. in India. It is situated in eastern part of the state. It abounds in natural resources like lime stone, latterite and silica sand i.e. silicates. Due to the availability of different kinds of industries, main among them are cement factories and lime kilns. Due to industrial activities and uncontrollable use of insecticides, pesticides and fertilizers the water pollution has become a threat in this region.

The present paper has the target to give data base informations of trace metals found in water of this region as well as their effect on human health. For this purpose valuable help from P.H.E. Department, water pollution control authority and communication, and capacity development unit is availed. The test of different trace metals are done using the method furnished by this unit.

Key words(abbreviation)

1. P.H.E—Public Health Engineering.
2. C.A.C.D.U.—Communication and capacity development unit.

Methodology

Several water samples were taken from rural areas of the district viz. Rampur Baghelan, Nagod, Uchehara. The sampling was done in pre-cleaned polyethene bottles and were analyzed spectrophoto metrically using SPANDS method, and other parameters were determined using standard method (APHA 1991). The results obtained were compared with the standard accepted parameters. Along with this, cross-sectional survey was also performed by the authors in different villages of tehsil Rampur Baghelan as well as tehsil Majhgoan. Main causes of attending this Tehsil was that:-

1. Rampur Tehsil abounds in calcium deposits as well as in laterite deposits.
2. Majhgoan Tehsil abounds in Silica sand deposits.

Due to availability of calcium and iron in Rampur Baghelan Tehsil the analysis of iron and calcium in water of this Tehsil became indispensable requirement of this work. Along with this Silica contents of Majhgoan Tehsil suspects the availability of Fluoride in the water of this region.

Communication and capacity Development unit of P.H.E. Deptt. M.P. has developed a keat to find concentration of Iron, Fluoride, Chloride, turbidity and p^H of water. This keat has found wide application in collection of data of concentration and to extract vital informations regarding health care.

Status of different trace metals in the water of this region

As it is stated that several water samples were collected. To find a data base to analyse the concentration of different trace metals in the water of this region. A table shown below contains concentration of Iron, Fluoride, Chloride, Turbidity, Conductivity and other parameters.

A :- Acceptable.

U :- Unacceptable.

Special keat developed by CACDU was used to collect the data base which imparts fruitful information about different trace metals concentration in water of this region which will help in taking remedial steps in this regard to safe human kind and to provide them a sound and a healthy life.

Sampling Station	Sample	pH	Conductivity	Turbidity	Colour	NO_3^-	Iron	Cu	F^-	Result
Rampur Baghelan										
Aterha	I	6.45	220	11	Colourless	7.00	0.90	Not	1.25	A
Padkhudi	II	8.39	425	29	Colourless	3.77	0.36	Not	1.01	A
Gudkus	III	7.44	330	05	Colourless	8.72	0.83	Not	1.31	U
Bihra	IV	6.56	300	27	Colourless	0.50	0.20	Not	1.44	A
Churahata	V	6.57	522	10	Colourless	7.85	0.49	Not	1.18	A
Dhundhchirah	VI	6.67	647	09	Colourless	3.30	0.40	Not	1.50	A
Gordiya	VII	8.22	487	17	Colourless	4.89	0.59	Not	0.97	A
Khamhariya	VIII	8.17	343	15	Colourless	5.50	0.02	Not	2.15	A
Kajgawan	IX	8.38	485	15	Colourless	5.61	0.23	Not	1.61	U
Nagod										
Surdaha	I	8.23	446	05	Colourless	1.56	0.60	Not	1.00	A
Dureha	II	7.45	1275	11	Colourless	2.23	0.87	Not	0.73	A
Richull	III	7.05	338	17	Colourless	4.81	0.54	Not	0.70	A
Katuniha	IV	7.48	462	20	Colourless	6.10	0.77	Not	0.53	A
Dudai	V	7.43	309	04	Colourless	11	0.65	Not	1.40	A
Atrora	VI	7.00	574	05	Colourless	3.18	0.87	Not	2.21	U
Umri	VII	7.17	377	05	Colourless	11.43	0.40	Not	1.80	U
Madhatoia	VIII	8.02	316	19	Colourless	1.60	0.35	Not	2.03	U
Shahpur	IX	7.04	412	05	Colourless	9.68	0.65	Not	1.17	A
Urdan	X	8.14	428	05	Colourless	7.50	0.39	Not	2.00	U
Unchehra										
Amdari	I	8.34	534	11	Colourless	0.05	0.10	Not	2.34	U
Nandhara	II	7.44	475	10	Colourless	1.00	0.04	Not	2.33	U
Maharajpur	III	7.18	502	10	Colourless	0.06	0.04	Not	1.29	A
Gurha	IV	7.26	468	04	Colourless	0.08	0.09	Not	1.70	U
Pahadi	V	7.47	423	05	Colourless	0.00	0.00	Not	0.33	A
Parsmania	VI	7.87	536	10	Colourless	0.04	0.30	Not	0.24	A
Piparia	VII	7.14	387	98	Colourless	0.21	0.31	Not	0.24	A
Rampur Patha	VIII	7.28	449	24	Colourless	0.63	0.20	Not	0.16	A
Rampurva	IX	8.01	521	10	Colourless	0.15	0.64	Not	0.60	A

RESULTS AND DISCUSSION

From the above results it is evident that concentration of Iron is more in Rampur Baghelan Tehsil , Fluoride ion concentration is also more in this Tehsil as well as in some places of Nagod Tehsil and Majhgoan also. P^H is mostly found ranging between 6.73 to 8.46 while the accepted limit of drinking water is 6.5 to 8.5 prescribed(B:10500-1991). Nitrate ion concentration ranged between 0.00 to 9.68 mg/l while the limit fixed is 4.5 mg/l. Iron ion concentration ranges between 0.00 to 0.87 mg/l while accepted limit is 0.3 mg/l. Concentration of copper in this region is found to be nil. Fluoride ion concentration in Padkhudi village of Rampur Baghelan is found to be 1.05 mg/l while accepted limit is 1.5 mg/l. Fluoride ion concentration in Majhgoan is found to be 0.90 to 1.45 mg/l which is above the accepted limit. The reason for more Fluoride ion concentration is attributed to plenty of silica sand which have greater affinity for Fluoride and Chloride salt formation. Above results reveal that accumulation of Fluoride due to regular use of Fluoride containing water, may take place. Fluorides has been reported in different parts of country. The states of Rajasthan, Gujarat Tamil Nadu, Karnataka and Andhra Pradesh are reported to be suffering Fluorosis. The possibility of lead, cadmium, mercury and arsenic is not found in any water sample. Therefore toxic effects of such metals are not prevailing in this region. Iron and calcium are some extent useful during metabolic activities but their excess proportion in water is harmful. Several stone patients are reported in this region.

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