



ESTIMATION OF IRON AND FLUORIDE CONTENTS IN DRINKING GROUND WATER OF KATIHAR BLOCK, KATIHAR (BIHAR) AND ITS IMPACT ON TRIBAL POPULATION

N. N. JHA, JITENDRA KUMAR YADAV and KRISHNA DEO JHA

P. G. Deptt. of Chemistry, D. S. College, KATIHAR (Bihar) INDIA

ABSTRACT

The study of iron and fluoride contamination in drinking water of a small village, Mania, a tribal village under Katihar Block has been reported.

Key words : Contaminants, Bacteria, *E. coli*, Fe, Fluoride, Iron, Drinking water.

INTRODUCTION

Water is essential for our lives and it is responsible for all kinds of biological activities in all living systems but water, we use for different purposes is becoming scarce day by day. Due to heavy pollution, pure and potable water has become out of reach of common people in many areas of this country. The water qualities of entire Katihar District is very poor due to iron and other contaminants. Larger fluoride ion concentration has been reported in some parts of Katihar and bacteriological qualities of water is also questioned due to low water level of this district. Human body contains about 4 % of Fe and it is excreted mostly in faeces and in smaller amounts through urine and sweat.

As per I.S. code, the desirable limit of iron contents in drinking water is 0.3 ppm. Water is not recommended for drinking purposes beyond this limit [I.S. Code (1991)]. Above the desirable limit, not only the taste and appearance are different. Iron contamination also causes several complications e.g. increase in respiration, pulse rate, hypertension, drowsiness, etc. In general, brown colour and turbidity due to iron contamination makes water unacceptable for general uses, although it is beneficial for human health. Fluoride is essential for all human beings as it helps normal mineralisation. The standard permissible concentration of fluoride in drinking water is 1 ppm, which has been declared safe by the Indian Council of Medical Research and Committee on Public Health Engineering. The concentration of fluoride ion above and below this desirable limit causes dental problems, fluorosis etc.

Study Area : The present study was conducted in a village Mania under Katihar block. The water level in this village is very low and the people depend on tube-wells.

EXPERIMENTAL

For the analysis of water, a house to house survey was made to collect different samples of water in this village.

RESULTS AND DISCUSSION

The water of different samples was found to be heavily contaminated with iron. The concentration of iron in water ranged from 7 ppm to 9 ppm. far beyond the desirable limit of 0.03 ppm. The higher concentration of iron was found in September (8 ppm to 9 ppm) and also in November (8 ppm to 9 ppm) and lowest value was observed in June (7 ppm to 8 ppm). A survey has also been carried out on health of tribal people of Mania Panchayat.

Table 1. Iron and Fluoride Concentration in Drinking Water of Different Panchyats of Katihar Block (Katihar)

Season	Year	Month	Concentration of iron (ppm)	Concentration of fluoride (ppm)
Winter				
Sample-1	2001	November	8.0	0.307
Sample-2	"	"	9.0	0.296
Sample-1	2002	"	8.0	0.307
Sample-2	"	"	9.0	0.296
Summer				
Sample-1	2001	June	7.98	0.307
Sample-2	"	"	8.99	0.296
Sample-1	2002	"	7.97	0.307
Sample-2	"	"	8.89	0.296
Monsoon				
Sample-1	2001	September	9.01	0.306
Sample-2	"	"	8.01	0.295
Sample-1	2002	"	8.01	0.306
Sample-2	"	"	9.01	0.295

It showed that most of the people are under a severe threat of diseases like hypertension and drowsiness alongwith untimely miscarriage among women.

Other water borne diseases were also seen among tribal people. The maximum permissible limit of fluoride by ISI is 0.6 to 0.12 ppm is 1.5 mg/litre but and by ICMR, 1 ppm. It was found that fluoride ion concentration was much below the desirable level ranging form 0.295 ppm to 0.37 ppm. Thus, the concentration of fluoride ion has been declared safe.

A survey has been carried out to study the effects of fluoride ion concentration on tribal people, which showed that fluoride contamination does not pose any major dental problems in tribal population and another people of study area.

ACKNOWLEDGEMENT

The authors are thankful to Prof. I. S. Choudhary, Head, P.G. Deptt. of Chemistry, D.S. College, Katihar for providing necessary research facilities.

REFERENCES

1. N. N. Jha and S. N. Poddar, *J. Fresh Water Biol.* (1977) pp. 96–100.
2. K. M. Aboo, C. A. Sastry and P. C. Alex, *Indian J. Environ. Health*, **10**, 203 (1960).
3. N. N. Jha and A. K. Deo, *Asian J. Chem.*, **14**, 551 (2002).
4. Franks, Felex, "A Comprehensive Treatise", Plenum Press, New York, (1972).
5. A. Vogel "A Text Book of Macro and Semimicro Qualitative and Quantitative Inorganic Analysis" ELBH.

Revised : 24.2.2004

Accepted : 29.4.2004