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STUDY OF POTABILITY OF WATER OF DIFFERENT SOURCES LOCATED AT BHADRAWATI, CHANDRAPUR (M. S.)

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ABSTRACT

The study of potability of water of different sources like river water, pond water and well water was done at Bhadrawati (M. S.) in the month of December 2006 and May 2007. The parameters studied were temperature, pH, total hardness, total alkalinity, chloride, fluoride, Fe (Iron), TDS, turbidity and nitrate. It was found that water samples have higher alkalinity, total hardness, chloride, fluoride, nitrate. TDS in the month of May 2007 than December 2006. Among river water, pond water and well water the pond water, was found to be unsafe for drinking purpose.

Key words: River water, Pond water, Well water, Bhadrawati, TDS, Hardness.

INTRODUCTION

The present study is about surface water as well as ground water. Surface water like pond water, river water and sea water etc. All the sources of water are useful for domestic, agricultural as well as industrial purposes. In India, water is polluted in all the states and Maharashtra state is not an exception to this phenomenon[2-4].

Many authers[5-9] have studied the physio-chemical properties of ground water as well as surface water in different parts of India to decide the potability of water.

There are many reasons for pollution of water bodies like washing of clothes, cattles, land drainage, domastic waste and industrial effluents. If such polluted water is used for drinking purpose, it may cause severe diseases and also it affects the floura and fauna. Hence, it is essential to study the physico-chemical properties of all the sources of

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water and to decide the potability of water.

EXPERIMENTAL

Water sample of S1, S2 and S3 were collected in a cleaned polythene container and preserved according to standard methods[10] in the month of December 2006 and May 2007 between 9.00 am - 10.00 am and brought to the laboratory for the study of its physico-chemical properties. Temperature of water was measured at the sampling place by Celsius thermometer.

For analysis E-Merck reagents, distilled water and borosil glassware were used throughout the work. Nitrate was determined by U.V. spectrophotometric screening method; fluoride was determined by SPADNS method; iron was determined by titration with standard KIO_3 solution[1]. pH was determined by digital pH meter (type 335); turbidity was determined by Nephelometric method; chloride was determined by volumetric titration with potassium chromate[1]; total hardness was determined by volumetric titration with EDTA solution using eriocrome black-T indicator[1]; alkalinity was determined by titration with 0.01N H_2SO_4 solution and TDS was determined by TDS meter (MFTZ-701).

RESULTS AND DISCUSSION

Results obtained are shown in Table 1 and 2. The pH of water ranged between 7.4 - 8.2 in the month of December 2006 and 7.5 - 8.4 in May 2007, which shows slightly alkaline nature of pond water due to contamination by soap used for washing clothes.

The total hardness was found to be in the range of 566 - 644 mg/L in the month of May, may be due to increased rate of evaporation of water. Among three samples, the pond water was found to be unpotable.

Total alkalinity in sample was found to be in the range of 388 - 488 mg/L in the month of December 2006 and 400-500 mg/L in the month of May 2007; thus, during winter as well as in summer, the concentration of alkalinity in pond water was found to be high as compared to river and well water, which shows that the pond water is unsafe for drinking.

The chloride content in the sample was found to be in the range of 130-245 mg/L in the month of December 2006 and 130-280 in the month of May 2007.

Table 1. December 2006

Temperature (°C)			pH			Total hardness (mg/L)			Alkalinity			Chloride (mg/L)		
S1	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**
21.5	21	21.3	7.4	8.2	7.6	432	629	509	392	488	388	136	244	139

Fluoride (mg/L)			Fe (Iron) (mg/L)			TDS			Turbidity (NTU)			Nitrate (mg/L)		
S1	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**
1.1	1.2	1.1	0.045	0.048	0.045	930	989	921	8.5	6.2	2.6	43	43	42

Table 2. May 2007

Temperature (°C)			pH			Total hardness (mg/L)			Alkalinity			Chloride (mg/L)		
S1	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**
31	31.5	31	7.5	8.4	7.8	587	644	566	108	500	404	139	288	138

Fluoride (mg/L)			Fe (Iron) (mg/L)			TDS			Turbidity (NTU)			Nitrate (mg/L)		
S1	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**
1.2	1.4	1.3	0.046	0.049	0.045	935	992	924	8.4	6.6	2.4	43	44	42

Fluoride content in the sample was found to be in the range of 1-1.2 mg/L in the month of December 2006 and 1-1.4 mg/L in May 2007 which shows that the pond water contains more fluoride as compared to well water and river water, which may cause teeth and bone fluorosis. Hence pond water is unsafe for drinking purpose.

The nitrate contents was found to be 40-43 mg/L in December 2006 and 40-44 mg/L in May 2006. The result shows that pond and river water have high contents of nitrate as compared to well water, because of more organic matter contents in river and pond water.

The value of TDS was found to be 920-980 mg/L in winter and 990-960 mg/L in May 2007, among three samples the TDS content in pond water was found to be high.

Iron content was found to be 0.045-0.048 mg/L in December 2006 and 0.045-0.049 mg/L in May 2007, which is much more less than required value.

Turbidity is one of the common forms of pollution. Turbidity prevents the growth of aquatic plants by reducing rate of photosynthesis and due to more turbidity self purification of water can not take place. Out of three samples, the turbidity of river water was found to be more than that of pond and well water, as river water is a flowing water and pond and well water remain stable and therefore turbidity in the river water is high.

CONCLUSION

The concentration of total hardness, alkalinity, chloride, fluoride, nitrate, iron, TDS and turbidity was found to be high in pond water than in river and well water.

Thus, in Bhadrawati, Chandrapur (M.S.), the river water and well water supplied is potable during all the seasons, where as pond water is unsafe for drinking purpose.

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