

Physico-chemical characteristics of surface water of Sehore town, district Sehore, M.P. (India)

RACHNA SHARMA¹, ANAND SHARMA² and D.R. TIWARI³

¹Department of Chemistry, LNCT, Bhopal - 462 001 (India).

²Department of Chemistry, Government, M.V.M, Bhopal - 462 001 (India).

³Department of Geology, Government, M.V.M, Bhopal - 462 001 (India).

(Received: June 05, 2008; Accepted: August 17, 2008)

ABSTRACT

The paper deals with analytical data of different type of parameters such as Ca^{2+} , Na^{2+} , K^{+} , Turbidity and Temperature of pH, Hardness of surface H_2O of sehore town. Eight different surface water samples were collected during August 2008. Results were discussed with respect to possible impact on Human Health.

Key words: Water Quality, Sehore Town, Physico-chemical parameters.

INTRODUCTION

Today water resources have been the most exploited natural system since man strode the earth. Pollution of water bodies is increasing steadily due to rapid population growth, industrial proliferations, urbanizations, increasing living standards and wide spheres of human activities. Time is, perhaps not too far when pure & clean water, particularly in densely populated, industrialized water scarce areas may be inadequate for maintaining the normal living standards.

Ground water, rivers, seas, lakes, ponds, and streams, are finding it more & more difficult to escape from pollution. Many rivers of the world receive heavy loads of sewage, industrial effluents, domestic and agriculture waste which consist of substances varying from simple nutrient to highly toxic hazardous chemicals. In Sehore Parwati River, Jamunia Dam and Bhagwanpura Dam and Siwan

River is the main source of surface water in the area of study.

MATERIAL AND METHODS

Water samples were collected from 4 sampling points of different locality in Sehore town during a period of August 2008. The sampling points and places are given in Table 1.

Water samples were collected in plastic canes of 3 liter capacity as per standard procedure. The physico-chemical parameters such as pH, Temperature, Turbidity Total Alkalinity (TA), Total hardness (TH), Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Sodium (Na^{+}), potassium (K^{+}), chloride (Cl^{-}), Sulphate (SO_4^{2-}), Nitrate (NO_3^{-}), were determined using standard method Reagents used for the present investigation were AR grade and Double Distilled Water was used for preparing various solution.

RESULTLS AND DISCUSSION

The average values of physicochemical parameters during Aug-2008 are presented in Table-3. The pH is a measure of the intensity of acidity or alkalinity and gives the concentration of hydrogen ions in water. It has no direct adverse effect on health, but a low value below 4.0 gives sour taste and higher value above 8.5 shows alkaline taste. In the present study, the pH values of water samples varies between 6.7 to 7.7 and were within the limit prescribed by WHO.

Turbidity of water is actually the expression of an optical property (Tyndall effect) in which the light is scattered by the particles present in water.

Table 1: Sampling Point and Places

Sampling Point	Place
A1	Parwati River
A2	Bhagwanpura Dam
A3	Jumania Dam
A4	Sewan River

Table 2: Methods used for estimation of various physico-chemical parameters

S.No	Parameters	Method
1.	pH	pH Metry
2.	Turbidity	Nephelometric Method
3.	Total Alkalinity	Titration Method
4.	Total Hardness	EDTA Method
5.	Calcium	EDTA Method
6.	Magnesium	EDTA Method
7.	Sodium	Flame Photometric method
8.	Pottasium	Flame Photometric method
9.	Chloride	Silver Nitrate Method
10.	Sulphate	Turbidimetric method
11.	Nitrate	Brucine Method

Table 3: Values of parameters of different sampling stations

S. No.	Parameters	Sample Points								WHO 1993 ISI 10500-91			
		A1 (a)	A1 (b)	A2 (a)	A2 (b)	A3 (a)	A3 (b)	A4 (a)	A4 (b)	Min	Max	Min	Max
1.	pH	7.09	7.00	7.08	8.3	8.0	8.2	7.7	7.8	6.7	7.7	6.5	8.5
2.	Turbidity	0.6	0.6	0.5	0.5	0.6	0.5	117	100	3.8	8.6	-	10
3.	T.H.	580	550	560	150	160	150	68	80	168	923	500	300
4.	Mg ²⁺	384	380	375	90	75	95	28	40	25.34	153.2	150	30
5.	Ca ²⁺	196	170	185	60	85	55	40	40	25.65	117.8	100	75
6.	Cl ⁻	240	250	220	60	55	60	16	20	69.02	477.5	250	250
7.	SO ₄ ²⁻	55	56	50	9.6	9.0	9.5	19.2	20	39.73	93.39	250	200
8.	Na ⁺	22	20	22	18	17	19	15	15	15	73	200	200
9.	K ⁺	0.2	0.2	0.2	0.3	0.2	0.1	0.3	0.2	0.6	3.4	-	-
10.	NO ₃ ⁻	14	12	11	Nil	Nil	Nil	Nil	Nil	0.035	0.158	45	45

[All parameters in mg/l except pH, Turbidity (NTU)]

Turbidity makes the water unfit for domestic purposes, food and beverage industries and many other industrial uses. In the present study the turbidity values varies between 0.5 to 117 NTU and were not within the limit prescribed by ISI 10500-91 of Sample A4.

Hardness of water mainly depends upon the amount of calcium or magnesium salts or both. Hardness of water is objectionable regarding water use of laundry and domestic purpose, since it consumes a large quantity of soap. In the present study; Total Hardness (TH) value varies from 168 to 923 mg/l. The values are not higher than the prescribed limit.

The amount of calcium varies from 25.65 to 117.8 mg/l. which is not found in prescribed limit in A1 and A2. Sodium content varies between 15 to 73 mg/l and found within the prescribed limit. Potassium concentration varies from 0.6 to 3.4 mg/

l in which no standard values are suggested for drinking by WHO and ISI 10500-91.

Chloride imparts salty taste if present in excess (> 250mg/l). People accustomed to high chloride in water are subjected to laxative effects. Chloride presence in study area ranges from 69.02 to 477.5. All samples found within the prescribed limit. The sulphate content varies between 39.73 to 93.39 mg/l and the nitrate content varies between 0.035 to 0.158 mg/l. The sulphate was found within the prescribed limit. But the nitrate content is more than prescribed limit in sample A1 and absent in all other sample.

ACKNOWLEDGEMENTS

The authors are thankful to Mr. Ashok Rai OSD LNCT, Bhopal for continuous encouragement and support for doing my research work.

REFERENCES

1. WHO, International standard for drinking water Genera (1984).
2. APHA standard method for examinations of water and waste water (19th Edn.) American public Health Association, Washington, OC (1995).
3. India standard specification for Drinking Water, ISI, New Delhi (1991).
4. ICMR, Manual Standards of Water Quality for Drinking Water supplies, 2nd Edition, Indian council of Medicinal Research, New Delhi 21 (1973).
5. Holden, W.S. Water Treatment and Examination church hill London, 513 (1970).
6. Rebhun M., Goodman N.2. and Barker F.B., *J. Water pollution control Fed*, **59**: 242-248 (1987).
7. Anand Sharma and Tiwari D.R., **3(1)**: 199-202 (2008).
8. B.K. Sharma Environmental Chemistry sixth edition 2001 (water 17-18).