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STUDIES AND ASSESSMENT OF WATER QUALITY PARAMETERS OF AKOLA DISTRICT REGION (MAHARASHTRA)

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ABSTRACT

Surface water samples and ground water samples were collected from different sampling point in the range of 30 Km of Akola District (Maharashtra). Twenty two water samples of Akola District were analysed in the laboratory for their physico-chemical properties. The tests were performed in the laboratory for the analysis of EC, pH, ORP, Hardness, chloride, Alkalinity, DO, TDS etc. All the results of theses testes compared to the results against drinking water quality standard WHO (World Health Organisation) & ISI standard. After comparision analysis says that that some of the water samples are not obeying one or some other parameters of the above *drinking* water quality standards. Water of many sampling area were highly contaminated for TDS. The importance and usefulness as well as unusefulness of these parameters in predieting ground water and surface water quality characteristics were discussed.

Key words: Ground water, Physicochemical study, DO, BOD, Drinking water.

INTRODUCTION

The quality of water is not same in every region[1]. It is different because chemical constituents and the concentration of constituents in various regions is different[2] i.e. Geological data of every region is different[3]. Decrease in water quality, indicates that the polluted water is not potable for human being. The cause of decrease in water quality due to contamination by foreign matters such as micro-organisms, chemical, industrial or other wastage or sewage[4].

The quality of surface water and ground water is a very important issue. The natural activity like erosion precipitation inputs and artificial activity like industrial waste

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and agricultural activity calling for increasing exploitation of water resources, these both activity determine the quality of ground water as well as surface water in that that particular ragion.

River plays also important role[5] because it carries and assimilates industrial waste material of Puja Municipal waste and run-off from agricultural land. Percolation of these types of water is not potable for human being. In some region, water is contaminated with total dissolve solids (TDS), which may causes gastro intestinal irritations. The season wise variation always occurs in water quality. To control the variation (spatial or temporary) regular monitoring is essential. Many authors have studied the physico-chemical properties of ground water as well as surface water in different parts of India to decide the potability of water[6].

EXPERIMENTAL

Practical and methods

Water samples were collected from 21/08/11 to 04/02/12. All these samples were collected in clean plastic bottles as per standard from twenty sources distributed in different region of Akola District. Presentation and transportation of water samples to the laboratory were as per the standard methods. All the bottles marked for the study of ground water and surface water suitability for drinking and other domestic purpose. Water temperature was measured on the site by using mercury thermometer. pH was measured by pH meter, conductance and oxidation reduction potential measured by conductometer and potentiometer. Distill water and A. R. grade samples were used. Parameters and method used to analyse samples are given below in the Tables 1 and 2.

In many regions the percentage of hardness was varied.[7] It was from 184 ppm to 472 ppm. Hardness is due to presence of magnesium carbonate, calcium carbonate and bicarbonates. In some region, there is significant increase in calcium concentration as well as magnesium concentration. When evaporating rate increases or decomposition rate increases then concentration of calcium and magnesium increases.

The range of TDS (Total dissolve solids) was from 450 to 950 mg/L. The data show that the solids in water sample is high. Dissolved solids or Total dissolved solids (TDS) denotes the various types of minerals present in water in dissolved form. This may also includes organic substances as in the case of polluted waters, and may also contribute to the total dissolved load.

In some region the percentage of chlorides was high. It may be due to high evaporation rate.

RESULTS AND DISCUSSION

The results of physical and chemical parameters are given in the table. All samples were colourless and odourless. The pH values of the water samples recorded in the range 7.2 to 7.9. There was no significant change in the pH values. During observation most of the water samples are alkaline in nature. The dissolved oxygen concentration of the water samples varied from 3.8 to 8.2 mg/L. The values of alkalility as $CaCO_3$ for methyl orange was from 72 mg/L to 582 mg/L. Magnesium concentration in the sample ranges from 96 to 336 mg/L. Calcium concentration in the water samples ranges from 04 mg/L to 364 mg/L.

Table 1

Parameters	Method	Std values WHO 1993	ISI 1991
Colour	Colourimeter	-	-
Odour	By smelling	-	-
Temperature	Thermometer	100^0C	-
pH	pH meter	7.5 to 8.5	6.5 to 8.5
DO	Winkler method	< 5.0 mg/L	< 5.0
Alkalinity	Titrimetric		-
Chloride	Titrimetric	250 mg/L	250
TDS	-	500 mg/L	500
Total hardness (as $CaCO_3$)	Titrimetric	100 mg/L	300
Total magnesium	Titrimetric	150 mg/L	30
Total calcium	Titrimetric	100 mg/L	75 mg/L
BOD	Titrimetric	Not more than 8 mg	-
COD	Titrimetric	Not exceed 250 mg/L	-
Lenoluctana	Conductometer	-	400
ORP	Potentiometer	-	-

Table 2

Location	pH	Cond.	ORP mili/unit	TDS mg/L	Methyl orange alkalinity mg/L as $CaCO_3$	DO mg/L	Chloride mg/L	Hardness ppm	Mg mg/L	Ca mg/L	BOD mg/L	COD mg/L
Umari	7.9	0.821	0.050	800	102	6.4	300.6	396	144	252	1.77	18.1
Adsul	7.9	0.893	0.058	900	100	6.09	273.6	388	128	260	1.78	18.8
Deori	7.7	0.828	0.060	750	100	6.09	248.15	244	96	148	1.96	20.5
Mundgaon	7.9	0.716	0.062	700	84	6.09	242.47	232	144	88	1.77	20.8
Washimba	7.6	0.682	0.066	700	76	6.88	45.37	320	192	128	1.97	20.9
Wani	7.6	0.495	0.054	550	84	6.88	34.03	278	128	112	2.08	21.4
Akot Fail	7.7	0.508	0.056	600	88	6.68	138.96	78.6	181	97	1.77	22.6
New Tapadia	7.6	0.850	0.068	950	62	6.49	304.8	472	256	216	1.97	22.1
Gajanan M	7.7	0.810	0.052	900	84	8.2	113.4	692	112	12	1.91	20.9
Wadegaon	7.6	0.738	0.060	800	96	8.2	83.6	176	80	96	1.52	19.8
Chikhalgaon	7.6	0.540	0.059	500	82	8.0	35.4	100	80	20	1.74	21.8
Patur	7.2	0.519	0.051	550	62	7.47	148.66	104	48	56	2.8	21.8
Kapashi	7.6	0.463	0.020	650	202	7.67	86.4	376	160	216	1.77	20.3

Cont…

Location	pH	Cond.	ORP mili/unit	TDS mg/L	Methyl orange alkalinity mg/L as $CaCO_3$	DO mg/L	Chloride mg/L	Hardness ppm	Mg mg/L	Ca mg/L	BOD mg/L	COD mg/L
Ramsundar	7.4	0.579	0.054	550	82	6.09	45.3	320	160	160	1.89	21.1
Bordi River-1	7.6	0.361	0.049	450	88	6.29	29.7	240	128	112	1.99	20.3
Bordi River-2	7.7	0.490	0.051	700	86	7.6	29.7	152	64	88	1.9	20.8
Dagad Parva Dam-1	7.8	0.619	0.050	900	76	6.49	29.7	172	64	108	1.58	20.3
Dagad Parva Dam-2	7.6	0.609	0.050	900	72	7.08	20.9	212	112	100	2.10	21.8
River Astool	7.5	0.491	0.061	600	270	7.47	26.9	108	80	28	2.1	18.8
Pardi	7.6	0.716	0.059	950	176	7.08	25.5	164	64	40	2.36	18.1
Barshi Takali Sanket Farm	7.5	0.251	0.056	500	104	7.08	49.6	104	56	48	1.97	20.0
Barshi Takali Rautwadi	7.3	0.328	0.062	500	98	6.88	76.4	76	48	28	1.7	20.9

CONCLUSION

The conclusion drawn from the given data is that the concentration of chloride, total hardness of some region higher than permissible range. TDS of all region is high. Water of Telhara tahsil, Akot tahsil and Akola tahsil and Murtizapur tahsil is hard, it is contaminated with calcium and magnesium hardness. Problem may arise due to this hard water. Therefore, it is essential to improve the water quality. High percentage of TDS may cause gastro intestinal troubles, B.O.D. in all samples remained three and less than three showing normal microbial activity.

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