

A Study Was Done to Investigate and Evaluate the Water Quality Indicators in The Akola District Region of Maharashtra

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ABSTRACT

Groundwater and surface water samples were collected at several sampling points within a 30km radius of the Akola district region between 16/08/2014 and 16/02/2015. A total of twenty water samples were examined in the laboratory to determine their physical and chemical characteristics. Laboratory tests were conducted to analyses several parameters including pH, EC, ORP, BOD, Hardness, Alkalinity, Chlorides, TDS, and DO. The results were compared to the drinking water quality standards set by the World Health Organization (WHO) and the ISI Standard. When the findings were compared, it was found that certain water samples did not meet one or more of the parameters specified in the drinking water quality standards. Several samples exhibited significant contamination levels of Total Dissolved Solids (TDS). The significance and utility, as well as the lack of utility, of these indicators in forecasting the characteristics of ground water surface water quality were discussed.

Keywords: Drinking Water, BOD, DO, Physicochemical study.

I. INTRODUCTION

Water is an inorganic chemical substance that is clear, tasteless, colorless, and odorless. Several distinct phases of water occur naturally. It generates rainfall and produces fog by the formation of aerosols. Clouds are composed of water droplets that are suspended in the air. The gaseous phases of water are steam or water vapours. The water quality varies throughout different regions. The variation in chemical ingredients and their concentrations across different regions is the reason. Water pollution diminishes the water's quality. It is not suitable for consumption by humans. The quality diminishes due to the introduction of foreign substances such as microorganisms, chemicals, industrial waste, or sewage[1-2].

The river water plays a crucial part in the lives of human beings. It transports and absorbs industrial trash, festival debris, and runoff from agricultural land. The water in that region is not suitable for human consumption. Water quality consistently varies with the changing seasons. Regular monitoring is crucial for controlling spatial or temporal variation.

II. EXPERIMENTAL

Water samples were collected from August 16, 2014, to February 16, 2015. Twenty samples were gathered from various sources in the Akola district region, following conventional protocols, and stored in glass bottles. The water samples were presented and transported to the laboratory in accordance with normal protocols. The bottles are designated for the

investigation of the stability of ground water and surface water for drinking and other household uses. The water temperature on the site was determined using a mercury thermometer. The potentiometer is used to measure the oxidation-reduction potential. Conductance is measured with a conductometer. pH is determined with a pH meter. Both distilled water and samples of A.R. grade were utilized. The tables 1 and 2 provide the parameters and procedures utilized to analyze the samples.

The level of hardness was altered in different areas. The range was from 119 parts per million (ppm) to 477 ppm. The presence of magnesium carbonate, calcium carbonate, and bicarbonates is responsible for the hardness. The high hardness in certain regions can be attributed to elevated levels of calcium and magnesium concentrations. An increase in the rates of decomposition and evaporation leads to a rise in the content of magnesium and calcium [3-5].

Dissolved solids, also known as total dissolved solids (TDS), refer to the diverse array of minerals that are present in water in a dissolved state. The TDS range

varies throughout different regions. The TDS levels ranged from 261 mg/L to 586 mg/L. This may also encompass industrial waste and organic substances in the case of water pollution. It also impacts the overall amount of dissolved material in the load. The percentage of chloride varies throughout different regions. During high evaporation, the sodium and chloride ions exhibit strong electrostatic attraction, leading to the formation of salt crystals [6].

III. RESULTS AND DISCUSSION

The table presents the findings of the physical and chemical parameters. All samples exhibited no odor or color. The pH values of the water samples ranged from 7.2 to 7.88. Most of the water samples had alkaline characteristics. The dissolved oxygen (D.O.) concentration of the water samples ranged from 6.2 to 8.5 milligrams per liter (mg/L). The water samples exhibit a range of magnesium concentrations from 43mg/L to 223 mg/L and calcium concentrations from 32mg/L to 255 mg/L[7-9].

Table 1

Parameters	Method	Standard values (WHO 1993)	ISI 1991
Colour	colorimeter		-
Odour	By smelling		-
Temperature	Thermometer	100°C	-
pH	pH meter	7.5 to 8.5	6.5 to 8.5
D.O.	Winkler method	< 5.0 mg/L	< 5.0
Alkalinity	Titrimetric	-	-
Chlorides	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 more than 250 mg/L	-
ORP	Potentiometer	-	-

Table 2

Sr.No	Location	pH	conductance	ORP	TDS (mg/L)	DO	Chlorides	TH	Mg	Ca	BOD	COD
1	Pailpada	7.82	416.3	52.19	499	7.36	115.1	435	221	136	2.07	21
2	Katepurna	7.88	427	54.9	435.3	7.65	42.0	463	210	118	2.08	10.1
3	Kolambi	7.80	492.9	56	535.2	7.1	93.1	194	223	70	2.12	17.4
4	Akot fail	7.65	500	59.5	261	6.50	117	341	175	52.2	2.98	18
5	Umari	7.35	490	51.0	486.3	6.61	93	363	211	151	2.11	20.4
6	Panch gavhan	7.53	506	44.6	511.9	6.29	154.9	367	141	223	2.10	17
7	Gordha	7.81	464.1	51.3	574	6.63	185.2	415	119	215	2.12	17
8	Mundgaon	7.70	486	55.1	536	6.63	230.8	477	195	81	2.03	16.4
9	Deori	7.77	701	60.1	511.9	6.89	148.9	455	175	74	2.18	20.3
10	Adsul	7.89	430	52.1	429	6.22	241.7	461	155	255	2.05	18.4
11	Bordi – Bodkha	7.29	375	48	314	7.16	118.6	263	43	89	1.81	20.4
12	Bordi-Chinchkhed	7.38	431	50.1	499	7.48	21.52	287	48	95	2.62	20.2
13	Bordi-Patur	7.22	309	54.4	432.9	8.13	26.1	210	73	98	1.91	19.3
14	Bordi-shirla	7.48	469	57.2	586.1	7.68	30.2	261	71	101	1.83	20.1
15	Morna – Astool	7.52	430.9	64.1	461.3	8.07	34.1	119	75	58	1.83	16.7
16	Morna – Pardi	7.32	371.1	58.1	475	8.1	32.1	120	75	49	2.92	20.5
17	Morna-Agikhed	7.59	440	56.1	462.5	7.83	25.9	120	55	66	2.11	18.6
18	Morna-Khamkhed	7.40	515.1	53.9	536.9	8.5	29.2	110	79	32	2.60	18.4
19	Katepurna-Mahan	7.56	369.1	61.2	449.9	8.1	25.6	261	61/159	101	2.71	19.4
20	Katepurna-Bihad matha	7.31	221.9	48	424	8.02	27.4	276	58/123	89	2.67	15.3

IV. CONCLUSION

After analysing several parameters, it has been determined that the total dissolved solids (TDS) in certain areas is relatively high. The presence of a high TDS value may result in gastrointestinal side effects. The two different water sources are both suitable for human consumption.

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