

Analytical study of ground water from Sangamner Taluka of Ahmednagar District Maharashtra, India

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ABSTRACT

Water is very important for the entire life on earth. Like surface water, ground water is a source of water in many parts of the world. It's very necessary to assess the ground water quality for its use. In order to diagnose the water quality for consumption of earthling the ground water samples from Sangamner Tehsil region were analyzed. Total nine samples were examined with parameters such as p^H , EC and T.D.S. The Ca, Mg, HCO_3^- , CO_3^{2-} were determined titrimetrically and Na by flame photometer. The result obtained were compared with the Indian standard drinking water – specification IS 10500-1991 (Reaffirmed-2009) and also the standards declared by WHO (2005). The selected region is agro-developed area, that being the case the chemical fertilizers oozes through soil and contaminate the ground water increasing the salinity, TDS, and other physicochemical properties of soil. The consequences of such contamination are acute along with chronic diseases. The result showed that the P^H in the range of 7.61 to 8.48, Electrical conductivity from 370 to 2680, TDS 317 to 2460, Sodium 42 to more than 100, Calcium was in the range of 84.4 to 295.6, Magnesium 19.4 to 269.4, HCO_3^- 42 to 530, carbonate 80 to 640. Total hardness, Alkalinity, Nitrite, Sulphate, Silica, Chloride and Fluoride were also determined by using standard methods. Total Hardness was found from 400 to 1950, Alkalinity 130 to 400, Nitrite 15 to 25, sulphate 50 to 110, Silica 75 to 125, Chlorides 50 to 800

(N.B.: All concentrations are reported in mg/l except p^H and EC ($\mu S/cm$) and Na in ppm.)

Keywords: Physicochemical analysis, MIDC, TDS

I. INTRODUCTION

It is important to have reliable source of water for agriculture, drinking and domestic purpose. Surface water and ground water are the major sources of water on earth. Use of ground water is depends on its quality. Considering the importance of water, it is necessary to focus on protection and management of ground water quality. Review of literature reveals that Several researchers has carried out work on ground water in India and other countries. Behailu et

al 2017 has carried out analysis of physical and chemical parameters in ground water in Ethiopia. By using groundwater quality index and pollution index study of characteristics of ground water in Basara province were studied by Dawood et al 2018. Kotagi and Sadhya Kiran 2018 analysed the ground water. Study on physicochemical characteristics of ground water samples at ganga region in Allahabad was done by Sebastein et al 2018. Madhusudan et al 2017 has done physicochemical analysis of ground water in the selected area of Vikhakhapatnam in Andhra Pradesh.

Physicochemical analysis of ground water of selected areas in Raipur city was done by Jena and Sinha 2017. Ashiyani et al 2015 has analysed the physicochemical properties of ground water from Matar Taluka of kheda district. Physicochemical analysis of ground water of village Jalalabad was carried out by Bhatti et al 2016. Patel et al 2016 has done physicochemical analysis of ground water quality of Dhrol. Moayed et al 2011 has carried out ground water quality assessment of Labuan island. Assessment of ground water suitability for drinking purpose from narangal was done by Patil et al 2018. Bansal and Dwivedi 2018 assessed the ground

water quality by using quality index and physicochemical parameters.

II. METHODS AND MATERIAL

We randomly collected Nine ground water sample from wells, from some villages of Sangamner tehsils in Nov. 2018. Samples are collected in clean polythene bottles. The parameter such as pH, EC and T.D.S. were analyzed immediately. The Ca, Mg, HCO₃, CO₃ determined titrimetrically and Na by flame photometer.

Observation Table:

Table 1. Table Showing Collection Spots

Sampling Code	Sampling Station	Sampling Code	Sampling Station
S-1	Ghulewadi	S-6	Jawale Kadlag
S-2	Sangamner MIDC	S-7	Ganore
S-3	Velhale	S-8	Vadgaon Landga
S-4	Gunjalwadi	S-9	Pimpalgaon Konjire
S-5	Rajapur		

Charts:

Table 2. Table Showing Physicochemical Parameters

No.	pH	EC	TDS	Na	Ca	Mg	HCO ₃	CO ₃	Total Hardness	Alkalinity	Nitrite	Sulphate	Silica	Cl ⁻	F ⁻
S-1	8.28	2680	2460	>100	295.6	269.4	530	162	1950	130	15	80	125	800	16
S-2	8.14	280	240	>100	84.4	19.4	308	220	400	160	25	60	75	50	9
S-3	8.03	1540	1440	70	221.1	121.8	120	80	1300	180	15	100	75	350	11
S-4	7.98	560	469	58	100.3	60.94	42	400	450	300	15	50	75	100	5
S-5	7.61	1290	1090	89	158.4	96.22	240	320	950	220	15	110	75	230	4
S-6	8.39	1170	984	53	110.8	80.19	320	640	850	400	25	80	75	300	5
S-7	7.95	1080	892	89	105.6	168.9	85	260	750	300	20	60	75	300	8
S-8	8.48	1050	870	24	121.4	150.8	45	90	800	300	15	90	100	250	7
S-9	8.40	370	317	42	105.6	105.8	260	560	450	300	25	70	75	200	8

Table 3. Table showing standard range of the minerals

Parameter	Indian standard drinking water – specification IS 10500-1991 (Reaffirmed-2009)		Sample exceeding permissible limit	Range of sample	
	Desirable limit	Permissible limit		%	Min
TDS mg/lit	500	2000	9	100	2600
Ca mg/lit	75	200	54.54	64	529.6
Mg mg/lit	30	100	100	108.8	690
TH (asCaCO ₃ mg/lit)	300	600	27.27	80	720

Table 4. Table showing standard range of Physicochemical parameters

Water quality parameters	Units	WHO(2005)		No. Of sample exceeding allowable limit	Percentage of sample exceeding limits	Undesirable effects
		Desirable Limit	Maximum Limits			
pH	-	7-8.5	9.2	-	-	Taste
EC	µS/cm	1000	2000	2	18	Gastrointestinal irritation
TH	mg/L	300	500	3	27	Scale Deposition
Cl ⁻	mg/L	200	600	2	18	Salty Taste
Ca ²⁺	mg/L	75	200	6	54.54	Scale formation
Mg ²⁺	mg/L	50	150	11	100	Encrustation in water supply structure
Na ⁺	mg/L	-	200	5	45	Salinity
TDS	mg/L	500	1500	4	36	Gastrointestinal irritation

III. RESULTS AND DISCUSSION

The result from analysis is predicted in above charts. We can see S-1 and S-3 has more percentage at Ca²⁺ and Mg²⁺. This causes intestinal problems, Kidney stone. In additional, several epidemiological investigation have demonstrated. The relation between risk of cardiovascular diseases, growth retardation, reproductive failure and other health problems. Cl⁻ were common constituent at ground

water but which is exceeding in SI cause discharged into septic system

IV. CONCLUSION

From above analysis, we see that, there is lot of contamination in ground water. This contamination is due to exceeding use of chemical fertilizer in agriculture sector. This chemical residue are percolated through rain water and contaminate with ground water. In our analysis we see there is some

villages where ground water is not safely use for drinking and agriculture. So we have to focus on its management.

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