



PHYSICO-CHEMICAL ANALYSIS OF TUBEWELL WATER QUALITY OF ARMORI TOWN, MAHARASHTRA STATE, INDIA

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ABSTRACT

The physico-chemical parameters of water samples collected from tubewell groundwater from various sites (wards) in Armori town, Maharashtra, India are analyzed. The major parameters of this study were colour, taste, temperature, pH, electrical conductivity (EC), total dissolved solids (TDS), total alkalinity (TA), total hardness (TA), dissolved oxygen (DO), chloride (Cl^-), nitrate (NO_3^-), sulphate (SO_4^{2-}). The result of analysis concluded that, the water quality in this study is rationally good.

Index Terms: *Physico-chemical, analysis, tubewell, Armori, India.*

INTRODUCTION

The natural resources are an important wealth of our country. Water is the wonder of the nature. "No life, without water" is a common saying as water is one of the naturally occurring essential requirement for all life supporting activities. But, now a days water is highly polluted with various harmful contaminants due to increased human population, manmade activities use of fertilizers in agriculture and industrialization.¹

The ground water resources are the major source of drinking water, thus the quality of ground water plays an important role for public water supply and other uses.² The ground water quality varies from place to place and season to season, which is typically measured by physicochemical characterization.^{3,4,5}

EXPERIMENTAL

1. Study Area

Armori is one of the talukas place of a tribal district Gadchiroli, Maharashtra state. It is located on north latitude $20^{\circ}28'$ degree and east latitude $79^{\circ}58'$ degree. The town is situated between two rivers namely wainganga and Gadhavi. The Nagar Parishad water distribution network provides water for potable and domestic purpose but due to increased in population the Nagar Parishad water distribution network has some limitations. To overcome three limitations, some tubewells are generated in different places with depth in the range of 150 to 250 feet.

The ground water sample collected from eight tubewells from eight different wards of Armori town and analysed for physicochemical parameters.

2. Collection of water samples

All the sample are collected in 2.0 litres precleaned polypropylene bottles using standard procedure as per methods APHA⁶. The samples were assembled in the month of November and December 2019.

Table -1: Sampling code and their location

Sr.No.	Sample code	Ward	Sampling Site
1	S1	1	Kalagota chouk
2	S2	2	Hanuman Mandir, Buldi
3	S3	3	Nagar Parishad Armori
4	S4	4	Zilla Parishad school, Kumbharpura
5	S5	5	Durga Mandir chouk
6	S6	6	Hitkarini school, Buldi
7	S7	7	Indira Nagar
8	S8	8	Arsoda chouk

3.METHODOLOGY

All the reagents and chemicals were used of A.R. grade. The solutions were prepared in a doubled distilled water. The colour, taste and temperature of the samples was recorded at a sample site. The water quality parameters pH, conductivity and total dissolved solids were determined at the sampling site by using pH meter, conductometer and TDS meter. Total hardness (TH) was measured by EDTA titrimetric method. Dissolved oxygen (DO) was determined by Winkler's method. The chloride ions present in the sample was determined by Mohr's methods. Nitrate concentration estimated by colorimeter and sulphate concentration was estimated by turbidometric method.⁷

Table -2: Physicochemical Analysis

Sr. No.	Parameters	Sampling sites								Range of Result		W HO
		S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	Min	Max	
1	pH	7.2	7.8	7.4	7.3	7.6	7.7	7.5	7.6	7.2	7.8	6.5-8.5
2	EC	549	605	526	702	713	568	687	639	526	713	1400
3	TDS	442	530	392	767	789	489	756	566	392	789	1000
4	TH	201	214	189	260	224	209	226	221	189	274	500
5	TA	130	141	187	158	162	137	154	149	127	162	120
6	DO	5.4	5.1	5.6	4.7	4.3	5.2	5.1	5.2	4.3	5.6	4-6
7	Cl ⁻	142	187	127	224	233	156	210	201	127	233	250
s8	NO ₃ ⁻	33	31	20	38	33	26	23	30	20	38	45
9	SO ₄ ⁻	40	50	39	80	94	43	72	61	39	94	200

All the parameters are in mg/l except pH and EC. EC is in μ mhos/cm.

RESULTS AND DISSCUSSION

The physicochemical analysis has given following results

pH value varies from 7.2 to 7.8 which is within the limit prescribed by WHO. EC value slightly the amount of total dissolved salts. EC value varies from 526-713, reveals that the values are within limit. TDS indicates the general natural of water quality. TDS value varies from 392-789, within prescribed limit TH is mainly depend upon the amount of calcium or magnesium salt or both. In present study it varies from 189-274, within limits. DO signify the dissolved oxygen in water. Greater value of D,O, indicates good quality of potable water. The value varies from 4.3-5.6, within limit. In the present study Cl⁻, NO₃⁻, and SO₄⁻ value vary from 125-233, 20-38 and 39-94 respectively, all are within the prescribed limit given by WHO. TA values for all the samples vary in the range of 127-162, where the WHO prescribed limit for T.A. is 120 mg/l. The higher value of TA indicate presence of natural salts in water like hydroxide, bicarbonate, phosphate, borate and some organic acids.

CONCLUSION

The water quality of the eight tubewell samples collected from Armori Town reveals that the parameters pH, EC, TDS, TH, DO, Cl⁻, NO₃⁻ and SO₄⁻ are within the prescribed limit given by WHO. The ground water of Armori town is rationally good for domestic and potable purpose, need treatments to reduce the contamination specially an alkalinity.

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