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Original Research Paper

Chemistry

ANALYSIS OF BORE WATER (MANNAGUDI TAULK)

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ABSTRACT To determine the bore water quality from the different water sources. The sample of the bore water were collected from different places and checked how the characters differ from place to place. Environment pollutes the ground water due to so many reasons. So people use such polluted water, it causes many health problems. Hence the present work "Analysis of bore water", the samples were taken from Mannargudi Taulk and water samples were investigate qualitative analysis of some physico-chemical parameters of ground water in the study area and the results were compared with standard specification.

KEYWORDS : TDS, TSS, TH, pH, Conductivity and Alkalinity.

INTRODUCTION

Water is one of the most important and most precious natural resources. It is essential in the life of all living organisms from the simplest plant and microorganismsto the most complex living system known as human body. Water a combination of hydrogen and oxygen atoms, with a chemical formula, H2O and known to be the most abundant compound (70%) on earth surface. It is significant due to its unique chemical and physical properties [1-3]. Access to safe drinking water is key to sustainable development and essential to food production, quality health and poverty reduction. Safe drinking water is essential to life and a satisfactory safe supply must be made available to consumers [4]. Water is thus becoming a crucial factor for development and the quality of life in many countries. In individual arid areas it has even become a survival factor [5]. Therefore, water intended for human consumption must not contain pathogen germs or harmful chemicals; because water contaminated with microorganisms is the cause of epidemics [6]. That is good drinking water is not a luxury but one of the most essential requirements of life itself [7]. However, developing countries, like Ethiopia, have suffered from a lack of access to safe drinking water from improved sources and to adequate sanitationservices [8]. The WHO [9] revealed that seventy five percent of all diseases in developing countries arise from polluted drinking water. Therefore; water quality concerns are often the most important component for measuring access to improved water sources. Acceptable quality shows the safety of drinking water in terms of its physical, chemical and bacteriological parameters [10]. International and local agencies have established parameters to determine biological and physicochemical quality of drinking water [11]. The problems associated with chemical constituents of drinking water arise primarily from their ability to cause adverse health effects after prolonged periods of exposure, of particular concern are contaminants that have cumulative toxic properties, such as heavy metals and substances that are carcinogenic[12]. Mahmoud et al. [13] also stated that the most common problems in household water supplies may be attributed to hardness, iron, sulfides, sodium chloride, alkalinity, acidity, and disease-producing pathogens, such as bacteria and viruses. The objective of this study is to investigate qualitative analysis of some physico- chemical parameters of ground water in study area.

EXPERIMENTAL SECTION

Sampling Techniques

Sample of bore well water collected in high grade plastic bottles of one litre capacity rinsed with distilled water and before collection of sample they were rinsed thrice with the sample water.

Analysis Techniques

Samples were brought to the laboratory and the parameter pH electrical conductivity and total dissolved solids were analyzed within 36 hours standard methods were adopted for the analysis of water sample.

Physical Testing

Common physical tests of water include temperature, solids concentrations. (e.g) total suspended solids (TSS) and turbidity.

Chemical Testing

Water sample may be examined using the principle of analytical chemistry. Many published test methods are available for both organic and inorganic compounds. Frequency used methods include pH. TDS, TSS, EC, TH, Calcium, Magnesium, Chloride, Sulphate and Dissolved CO_2[14-20].

RESULTS AND DISCUSSION

Table-I Collection of Samples

Sample No.	Area
I	Ullikkottai
II	Mannargudi
III	Kandithampettai
IV	Paravakkottai
V	Kelakuruchi
VI	Avikkottai
VII	Serumangalam
VIII	Sundarakkottai
IX	Andami
X	Serangulam

Table 2 Drinking water standards (concentration in mg/1) (or) ppm

S.No	Constituents	WHO		ICMR	
		Desirable	Maximum permissible	Desirable	Maximum permissible
1.	pH	7.0-8.5	6.5-9.2	7.0-8.5	6.5-9.2
2.	TDS	500	1500	500	1500
3.	Alkalinity	10	33	_	_
4.	Hardness	100	900	300	600
5.	Calcium	75	200	75	200
6.	Magnesium	50	150	50	150
7.	Chloride	200	600	250	1000
8.	Sulphate	200	400	200	400

Table 3 Drinking Water for U.S. Standards

S.No	PARAMETER	U.S. STANDRAD VALUE
1.	pH	6.0-8.5
2.	TS	550 ppm
3.	TDS	500 ppm

4.	TSS	50 ppm
5.	Total hardness	300 ppm
6.	Calcium	200 ppm
7.	Magnesium	100 ppm
8.	Chloride	250 ppm
9.	Sulphate	250 ppm
10.	Alkalinity	33 ppm
11.	Dissolved CO2	Less or more than 10 ppm

Table 4 Physical Characteristics

S.No	Sample No	Color	Odor	pH	Conductivity (m.mhos)
1	I	Colorless	Odorless	7.86	0.69
2	II	Colorless	Odorless	7.99	0.56
3	III	Colorless	Odorless	7.01	0.03
4	IV	Colorless	Odorless	7.09	0.08
5	V	Colorless	Odorless	7.37	0.10
6	VI	Colorless	Odorless	7.33	0.22
7	VII	Colorless	Odorless	7.31	0.58
8	VIII	Colorless	Odorless	7.60	0.72
9	IX	Colorless	Odorless	8.14	0.62
10	X	Colorless	Odorless	7.52	0.88

Table 5 Physical Characteristics

Sample No	pH	Conductivity (m.mhos)
I	7.86	0.69
II	7.99	0.56
III	7.01	0.03
IV	7.09	0.08
V	7.37	0.10
VI	7.33	0.22
VII	7.31	0.58
VIII	7.60	0.72
IX	8.14	0.62
X	7.52	0.88

Fig 1. Physical Characteristics

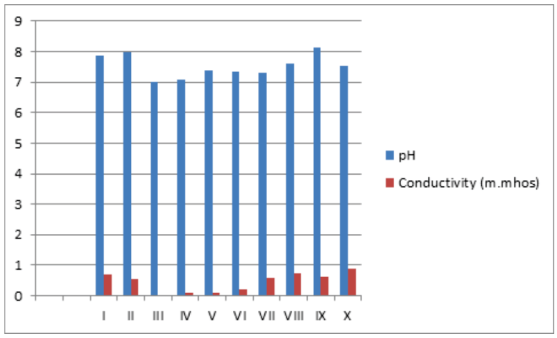


Table 6 Chemical Characteristics

S.No	TS (ppm)	TDS (ppm)	TSS (ppm)	Total hardness (ppm)	Calcium (ppm)	Magnesium (ppm)	Chloride (ppm)	Sulphate (ppm)	Dissolved Co^2 (ppm)	Alkalinity (ppm)
I	830	120	258	162	90	130	141	832	12	124
II	734	200	534	102	73	39	780	834	374	69
III	410	373	37	250	98	152	42	832	154	115
IV	220	107	124	130	126	4	206	804	242	124
V	744	580	105	275	155	134	21	127	748	105
VI	382	296	314	171	177	175	170	817	264	171
VII	171	116	55	105	144	20	269	847	220	126
VIII	911	817	706	54	94	40	382	825	286	182
IX	933	194	155	155	124	31	425	815	198	185
X	336	142	194	122	104	180	106	774	264	174

Fig 2. Chemical Characteristics

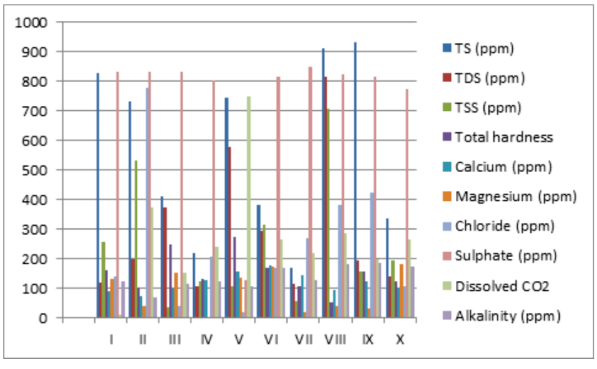


Figure 3 Suspended solids

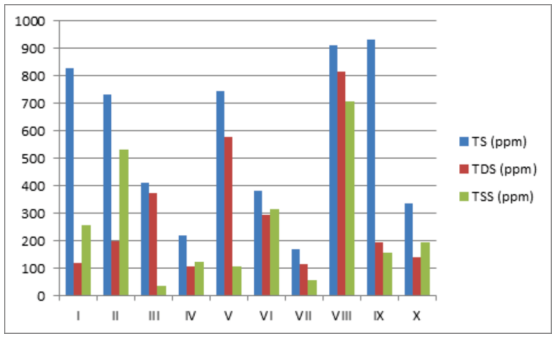


Table 7 Suspended solids

S.No	TS (ppm)	TDS(ppm)	TSS(ppm)
I	830	120	258
II	734	200	534
III	410	373	37
IV	220	107	124
V	744	580	105
VI	382	296	314
VII	171	116	55
VIII	911	817	706
IX	933	194	155
X	336	142	194

Table 8 Hardness

S.No	Total hardness (ppm)	Calcium (ppm)	Magnesium (ppn)
I	162	90	130
II	102	73	39
III	250	98	152
IV	130	126	4
V	275	155	134
VI	171	177	175
VII	105	144	20
VIII	54	94	40
IX	155	124	31
X	122	104	180

Figure 4 Hardness

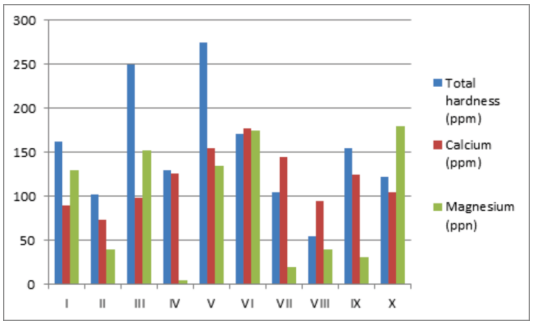
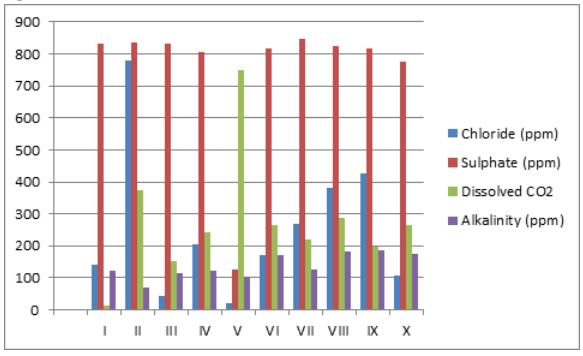


Table 9 Chemical Parameters

S.No	Chloride (ppm)	Sulphate (ppm)	Dissolved Co_2 (ppm)	Alkalinity (ppm)
I	141	832	12	124
II	780	834	374	69
III	42	832	154	115
IV	206	804	242	124
V	21	127	748	105
VI	170	817	264	171
VII	269	847	220	126
VIII	382	825	286	182
IX	425	815	198	185
X	106	774	264	174

Figure 5 Chemical Parameters



- For the samples 1, 2, 3, 4, 6, 7, 9, 10 TDS values were permissible according to the US standard.
- For the samples 5, 8 TDS values were near than US standard. TSS values for all samples were near to the permissible limit according to WHO and ICMR standard.
- Total hardness of all the sample values was higher than US standard. Calcium hardness of all the sample values was near to the permissible limit according to WHO and ICMR standard.
- Magnesium hardness value of sample 4, 7, 9, 8, 2 near to the permissible limit. Remaining sample values were higher than WHO and ICMR standard. But in US standard, all the sample values were near.
- Chloride values are samples 5, 3, 10, 1, 6 were near to the permissible limit. Remaining samples were higher.
- Sulphate values of all samples were higher to the permissible limit, according to WHO, ICMR and US standard.
- Dissolved CO2 values of the sample 1, 3, 9, 7 were near to the permissible limit. Remaining sample values were higher.
- Alkalinities of all the samples were higher, according to WHO, ICMR and US standard.

• CONCLUSION

- In this project the water quality in and around Mannargudi Taulk carried out based on various physiochemical characteristics.
- Ten samples of bore water were collected from Mannargudi Taulk. 4 physical characteristics and 10 chemical characteristics were analyzed.
- Physiochemical activities such as pH, TDS, TSS, TS, alkalinity, conductivity, total hardness, calcium, magnesium, chloride, sulphate, free chlorine and dissolved CO2 have been using standard procedure.
- The data obtained are compared with standard values for drinking water standard such as WHO, ICMR and US standard.
- Based on the water quality data obtained from this investigation it clear that the 6 samples such as 1,2,3,4,7,8 were used for drinking purpose. Four samples such as 5,6,9,10 were not used for drinking purpose.

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