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ASSESSMENT OF GROUNDWATER QUALITY FOR DRINKING PURPOSE IN THE SELECTED VILLAGES OF TQ. AHMEDPUR DT. LATUR (M.S.) INDIA.

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ABSTRACT

This study was conducted to evaluate factors regulating groundwater quality in an area. Ten groundwater samples have been collected from Selected Villages of Tq. Ahmedpur. Rapid development in recent years has led to an increased demand for water, which is increasingly being fulfilled by groundwater abstraction. A detailed knowledge of the water quality can enhance understanding of the hydro chemical system, to achieve this; a hydro chemical investigation was carried out in the study area. Groundwater samples were chemically analyzed for major physicochemical parameter in order to understand the different geochemical processes affecting the groundwater quality. The analytical results shows higher concentration of total dissolved solids (27.58%), electrical conductivity (26.78%), chloride (34.36%) total hardness (63%) and magnesium (84.68%) which indicates signs of deterioration as per WHO and ISI standards.

KEYWORDS: Groundwater pollution, Selected Villages, Physicochemical parameters, TDS, etc.

INTRODUCTION

Water is essential to the existence of man and all living things. Groundwater occurs almost everywhere beneath the earth surface not only in a single widespread aquifer, but also in thousands of local aquifer systems. Man's activities such as food production, nutrition are dependent on water availability in adequate quantities and good quality. Water is the most common and widespread chemical compound in nature which is a major constituent of all living creatures. The quality of water is of great importance as it is commonly consumed and used by households. Ground water which occurs beneath the earth surface is considered free

from contamination, hence usable but anthropogenic as well as natural factors are affecting the quality as well as quantity of this valuable resource. It has been estimated that once pollution enters the subsurface environment, it may remain concealed for many years, becoming dispersed over wide areas of groundwater aquifer and rendering groundwater supplies unsuitable for consumption and other uses.

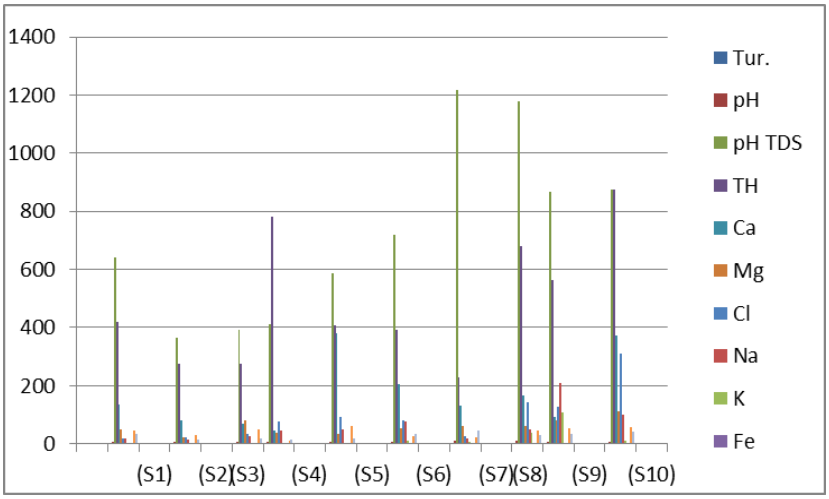
MATERIAL AND METHODS

The current study was designed to investigate the conditions of groundwater contamination in the study areas. The physicochemical study was undertaken by randomly collected 10 borehole water samples from Selected Villages of Tq. Ahmedpur during June 2017 to November 2017. Samples were drawn with a pre cleaned plastic polyethylene bottle. Prior to sampling, all the sampling containers were washed and rinsed thoroughly with the groundwater. Water quality parameters such as pH and electrical conductivity (EC) were analyzed immediately. Total Dissolved Solid (TDS) were computed by multiplying the electrical conductivity (EC) by a factor (0.64). Total hardness (TH) as CaCO3 and calcium (Ca) were analyzed titrimetrically, using standard EDTA. Magnesium (Mg) was calculated by taking the differential value between total hardness (TH) and calcium (Ca) concentrations. Chloride (Cl)) was determined titrimetrically by standard AgNO3 titration. The content of Sodium (Na) and Potassium (K) in groundwater was estimated flame photo metrically. All parameters are expressed in milligrams per litre (mg/l) and mill equivalents per litre (m eq/l), except pH (units) and electrical conductivity (EC). The electrical conductivity (EC) is expressed in micromohs/cm (µS/cm) at 250C.

Result of the physicochemical parameters of Selected Villages of Tq. Ahmedpur.

All parameters are in mg/L except pH and Turbidity, Turbidity in NTU.

Villages	Temp 27^0c	color	odor	Tur.	pH	TDS	TH	Ca	Mg	Cl	Na	K	Fe	F	SO_4	NO_3
Khandali (S_1)	27	colorless	odorless	0.2	7.5	640	420	136	48	18	20	1	0.16	0.36	44	32
Nagzari (S_2)	27	colorless	odorless	0.5	7.8	365	274	79	24	24	13	3	0.17	0.12	29	16
ThavaraTanda (S_3)	27	colorless	odorless	0.3	8.0	392	274	69	79	34	25	1	0.17	0.38	48	19
Waderwadi (S_4)	27	colorless	odorless	0.3	8.1	413	780	47	39	76	46	4	0.15	0.25	11	15
Ujana (S_5)	27	colorless	odorless	0.5	7.9	588	408	380	34	94	50	2	0.15	0.21	62	20
Gangahipparga (S_6)	27	colorless	odorless	0.4	7.4	721	392	206	55	80	77	9	0.31	0.25	26	32
Anandwadi (S_7)	27	colorless	odorless	0.3	8.6	1216	229	130	63	26	20	6	0.70	0.25	23	46
Sangvi Tanda (S_8)	27	colorless	odorless	0.1	8.8	1180	681	168	62	142	49	39	0.48	0.31	45	31
Sangvi (S_9)	27	colorless	odorless	0.3	8	867	564	91	81	128	210	108	0.13	0.47	54	32
Shanni (S_{10})	27	colorless	odorless	0.4	7.3	876	875	374	112	309	99	11	0.14	0.35	59	43



RESULT AND DISCUSSION

The collected water sample from different stations was the colorless and odorless and the temperature of the entire water sample is maintained 27^0c.

pH: It is a measure of how acidic/basic water is. The range is from 0 - 14, with 7 being neutral. pH less than 7 indicate acidic, whereas a pH greater than 7 indicates a basic. pH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water. The standard range pH is 6.5 to 8.5 given by ISI and WHO. In the analysis the pH of Anandwadi and Sangvi Tanda water sample has the pH above the standard range (8.8 & 8.6 respectively).

Turbidity: turbidity is the measure of relative clarity of a liquid. Clarity is important when producing drinking water for human consumption. Turbidity can provide food and shelter for pathogens. If not removed, turbidity can promote growth of pathogens in the distribution system, leading to waterborne disease outbreaks, which have caused significant cases of gastroenteritis throughout the United States and the world. Although turbidity is not a direct indicator of health risk, numerous studies show a strong relationship between removal of turbidity and removal of protozoa. In the water sample of all stations have the turbidity below the standard range of ISI and WHO.

TOTAL HARDNESS

In ground water hardness is mainly due to carbonates, bicarbonates, sulphates, chloride of Ca and Mg. The data of the analysis reveal that the total hardness of Shanni (875 mg/l), Waderwadi (780 mg/l), are above the standard value of WHO.

TOTAL DISSOLVE SOLID (TDS)

TDS is directly related to the purity of water. The TDS is the term used to describe the inorganic salts and small amounts of organic matter present in solution in water. The principal constituents are usually calcium, magnesium, sodium, and potassium cations and carbonate, hydrogen carbonate, chloride, sulfate, and nitrate anions. The TDS of water sample of Anandwadi (1260 NTU) and Sangvi Tanda (1180 NTU) having the range above the standard values of WHO.

CALCIUM

CALCIUM is a mineral that is an essential part of bones and teeth. The heart, nerves, and blood-clotting systems also need calcium to work but higher the amount of calcium causes harmful effects on the health. In the water sample of the Selected Villages of Tq. Ahmedpur, the calcium is present above the range given by WHO, the villages such as Gangahipparga (380 mg/l), Ujana (206 mg/l).

MAGNESIUM

Hardness of water is directly concern with the magnesium and the sample of the selected villages of Tq. Ahmedpur below the standard value given by the WHO.

CHLORIDE

In the investigated water samples in which the water sample of Shanni (309 mg/l) which were found above the limit of ISI and WHO.

SODIUM

The sodium concentration of the all sample of Selected Villages of Tq. Ahmedpur is lower than the prescribed limit by WHO and ISI.

POTASSIUM

It is found that the content of potassium is higher in the water sample of Sangvi (108 mg/l).

IRON

The concentration of Iron in the water sample of Anandwadi (0.70 mg/l) & Sangvi Tanda (0.48mg/l) ranging above the standard value given by the WHO and ISI.

FLUORIDE

Fluoride can occur naturally in water and the fluoride concentrations above recommended levels, which can have several long term adverse effects, including severe dental fluorosis, skeletal and weakened bones The World Health Organization recommends a guideline maximum fluoride value of 1.5 mg/L as a level at which fluorosis should be minimal. In the analysis of the water sample it is found that the fluoride is below the standard range**.**

SULPHATE

Sulfate is a constituent of TDS and may form salts with sodium, potassium, magnesium, and other captions. Sulphate is commonly found in nature and can be present at concentrations of a few to several hundred milligrams per liter. In the water sample of all stations have the sulphate below the standard range of ISI and WHO.

NITRATE

The nitrate concentration in the water sample of the Anandwadi (46mg/l) and Sangvi Tanda (43 mg/l) ranging above the standard limit of ISI.

CONCLUSION

Chemical constituents in water can cause a variety of problem in living things. To improve its quality, it should be recognized that the most effective and protective way through the application of regular check up and taking exact measure with a specific period of time before it is supplied to living things. The physico-chemical analysis of bore well of Selected Villages of Tq. Ahmedpur reveals that water is fit for drinking but needs some primary treatment except Anandwadi and Sangvi Tanda because of high TDS & total hardness. For sample with above permissive value need immediate interventions and need a special attention to improve the quality of drinking water. Generally, most of the parameters in the waters samples were found to be within the limit of drinking water quality standards and are safe for dirking and other domestic purposes at the physicochemical level.

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