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ASSESSMENT OF PHYSICOCHEMICAL CHARACTERISTICS OF WATER FROM SELECTED BOREHOLES IN HUNGARGA (NAL) TALUKA TULJAPUR DIST. OSMANABAD

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ABSTRACT

Water is a prime natural resource, a basic human need, and precious natural assets. People on globe are under tremendous threat due to undesired changes in the physical, chemical and biological characteristics of air, water and soil. Due to increased human population, industrialization, use of fertilizers and manmade activity water is highly polluted with different harmful contaminants. Natural water contaminates due to weathering of rocks and leaching of soils, mining processing etc. It is necessary that the quality of drinking water should be checked at regular time interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. The present research work deals with Different parameters such as Dissolved Oxygen (DO), Biological oxygen Demand (BOD), Turbidity, Total Dissolved Solids (TDS), PH, Total Suspended Solids (TSS), Hardness etc. at eleven Different sites during September 2014 to August 2015, Bhargava WQI method was used to find overall WQI. Rating curves are drawn based on the tolerance limits of inland water & health point of view. Five point rating scale was used to classify water quality in each of the study area.

KEYWORDS: Physicochemical parameters, Boreholes, TDS, Fluoride, Chlorides. etc.

INTRODUCTION

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the

planet having about 70 % of water. But due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity it is highly polluted with different harmful contaminants. Therefore it is necessary that the quality of drinking water should be checked at regular time interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases. It is difficult to understand the biological phenomenon fully because the chemistry of water revels much about the metabolism of the ecosystem and explain the general hydro -biological relationship (Basavaraja Simpi et al. 2011). The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. Natural water contains different types of impurities are introduced in to aquatic system by different ways such as weathering of rocks and leaching of soils, dissolution of aerosol particles from the atmosphere and from several human activities, including mining, processing and the use of metal based materials (Ipinmoroti and Oshodi 1993, Adeyeye 1994, Asaolu 1997).The increased use of metal-based fertilizer in agricultural revolution of the government could result in continued rise in concentration of metal pollutions in fresh water reservoir due to the water run-off.

The prevailing state of unequal distribution of social amenities across major cities in most of the developing countries around the world had posed a lot of challenges to effectiveness and efficiency of infrastructures. In the light of this groundwater is considered alternative sources of water for domestic, industrial and agricultural purposes. Water have been studied and managed as separate resources, although they are interrelated. Surface water seeps through the soil and becomes groundwater. Conversely, groundwater can also feed surface water sources. Surface water or groundwater, can contain a range of contaminants that may make the water unsafe to drink or aesthetically unacceptable (e g, bad taste, odor or appearance). Such contaminants include: particles, microbiological contaminants, naturally occurring chemical substances and chemical substances derived from human activities. Treatment for these contaminants is particularly important for surface waters and shallow groundwater that are effect on the human health. To identify the safe drinking water it is necessary to study the Physico-chemical parameter and by comparing the parameter with the standard values.

MATERIAL AND METHODS

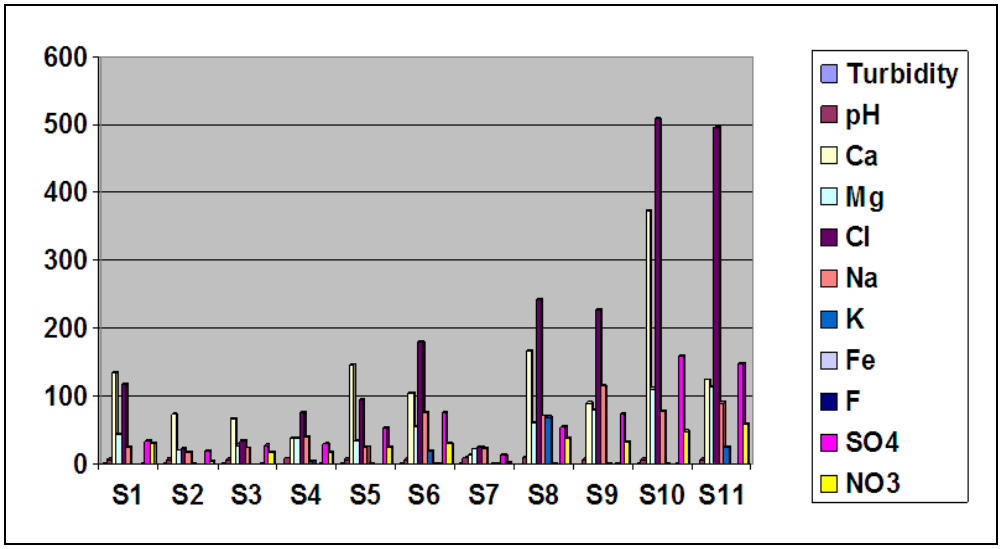
There are eleven Boreholes sampling sites were selected in Hungarga (Nal) Taluka Tuljapur Dist. Osmanabad. The entire sample collected in the morning into a high grade one litter plastic bottles in the month of September-2014 to August 2015 and brought immediately to

the lab for analysis. During the analysis the temperature is kept constant at 26^0c to 27^0c. Analysis of water sample is done by using standard procedures. For example TDS were measured in lab by using standard procedure of Trivedi and Goel. The pH measure by digital pH meter. Chlorides, calcium, magnesium, sulphate etc. were measured by the standard methods.

Result of the physicochemical parameters in Hungarga (Nal) Taluka Tuljapur Dist. Osmanabad

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

Sampling Sites	color	odor	Tur.	pH	TDS	Total H	Ca	Mg	Cl	Na	K	Fe	F	SO_4	NO_3
(S1)	colorless	odorless	0.3	7.5	643	421	136	47	19	20	1	0.16	0.36	47	34
(S2)	colorless	odorless	0.5	7.8	367	274	79	24	24	13	3.6	0.17	0.12	29	16
(S3)	colorless	odorless	0.3	8.0	392	274	69	79	37	25	1	0.17	0.38	49	19
(S4)	colorless	odorless	0.2	8.1	413	460	354	50	76	46	4	0.15	0.25	11	49
(S5)	colorless	odorless	0.4	8.6	1177	409	249	34	99	50	2	0.15	0.21	64	20
(S6)	colorless	odorless	0.4	7.2	721	395	206	55	80	77	112	0.47	0.25	26	46
(S7)	colorless	odorless	0.3	8.7	1219	329	373	63	310	26	39	0.11	0.25	24	23
(S8)	colorless	odorless	0.1	8.4	1075	876	168	62	149	49	3.9	0.38	0.31	45	31
(S9)	colorless	odorless	0.3	8.2	867	681	96	81	128	219	11.2	0.13	0.47	54	32
(S10)	colorless	odorless	0.4	7.3	877	576	173	112	212	99	11	0.14	0.35	59	21
(S11)	colorless	odorless	0.2	8.0	727	392	104	57	81	79	9	0.32	0.27	28	33



RESULT AND DISCUSSION

The collected water sample from different stations was the colorless and odorless and the temperature of the entire water sample sites in Hungarga (Nal) Taluka Tuljapur Dist. Osmanabad is maintained 26^0c to 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 S5 & S7 water sample has the pH above the standard range (8.6 & 8.7 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 S8 (876 mg/l), S9 (681 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 S7 (1219 NTU) and S5 (1177 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 many villages of S4 region the calcium is present above the range given by WHO. The Site such as S4 (354 mg/l), and S7 (373 mg/l

MAGNESIUM: Hardness of water is directly concern with the magnesium and the sample of the different Sites of Hungarga (Nal) Taluka Tuljapur Dist. Osmanabad ranging below the standard value given by the WHO.

CHLORIDE: In the investigated water samples in which the water sample of S7 (310 mg/l) which were found above the limit of ISI and WHO.

SODIUM: The sodium concentration into the all sample Sites of Hungarga (Nal) Taluka Tuljapur Dist. Osmanabad 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 S6 (112 mg/l) & S7 (39 mg/l).

IRON: The concentration of Iron in the water sample of S6 (0.47 mg/l) & S8 (0.38mg/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 cations. Sulfate is commonly found in nature and can be present at concentrations of a few to several hundred milligrams per liter.

NITRATE: The nitrate concentration in the water sample of the S6 (46mg/l) and S4 (49 mg/l) ranging above the standard limit of ISI.

CONCLUSION

The physico-chemical analysis of different sites of Hungarga (Nal) Taluka Tuljapur Dist. Osmanabad reveals that water of all villages is fit for drinking but needs some primary treatment except S7, S8 & S9 because of high TDS & total hardness.

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