ASSESMENT OF HYDRO-GEOCHEMICAL PARAMETEROF GROUND WATER AT MANYAD DAM, AURANGABAD (MH)

Megha Rai[1] *, Shivaji Jadhav[1], Ayesha Durrani[1] and Mazahar Farooqui[1,2]

1. Dr. Rafiq Zakaria College for Women, Aurangabad.

2. Post graduate and research centre, Maulana Azad College, Aurangabad.

Correspondence author Email ID*: simshivv_48@yahoo.com

ABSTRACT

The ground water samples were collected from Manyad Dam station at Aurangabad district was evaluated during 2012-13 for its hydro-geochemical parameters regularly in every month. A systematic study of correlations among the water quality parameters has been carried out. The parameters studied were pH, Conductivity, TDS, Turbidity, Hardness, Ca, Mg, Na, K, Fe, Alkalinity, CO_3, HCO_3, Cl, F, NO_3 and SO_4. Monthly variations in the parameters were discussed here. All parameters were found to be within permissible limit.

Key Words: Ground water quality, Hydro-geochemical parameters, Manyad Dam.

INTRODUCTION

Water is one of the most important commodities which man has exploited than any other resources for the sustenance of his life. Most of our demands for water are fulfilled by rainwater which gets deposited in surface and ground water resources. Though, water is continuously purified by evaporation and precipitation, pollution of water has emerged as one of the most significant environmental problems of recent times. The cause of such a situation is many but the quality of water is deteriorated day by day to rapid increase in urbanization and industrialization [1-3].Some of the major adverse effects have arised from construction of reservoirs, surface water irrigation, deforestation, industrial and urban waste disposal. Water quality deterioration has made potable water resource scarcer and endangered for plant and animal life[4].

Generally ground water is clear and colourless as it percolates from various levels. During percolation, it dissolves inorganic salts. Secondly, it was also observed that generally ground water does not have certain bacteria until contamination because they are filtered out while percolating through subsoil. In order to monitor the pollution status at Manyad Dam and as part of ongoing research in the relevant field[5-6] we decided to study the assessment of ground water

quality of this area. In the present work, various water samples of tube wells of Manyad Dam have been analysed and correlation matrix carried out. Many authors[7-9] have studied the physiochemical characterization of ground water of different parts of the worlds.

The Manyad Dam is situated about 25 Km away from Vaijapur taluka of Aurangabad district (MH), Water is supplied From Manyad Dam to rural areas of Vaijapur taluka. The objective of present study was to determine the quality of water supplied to the rural community in order to estimate the health implications.

EXPERIMENTAL

Water samples were collected in polythene bags of tube wells from Manyad Dam during June- 2013 to May -2014. The temperature was recorded at the Spot.The chemicals used for analysis were analar grade and the solutions were prepared in double distilled water. The solutions were standardised as per methods given in literature. Analyses for Physico-chemical parameters were done by following method described in the literature [10-11]. Hardness is determined by EDTA-titrimetric methods, chloride by Mohr's methods and DO by Winkler's method.
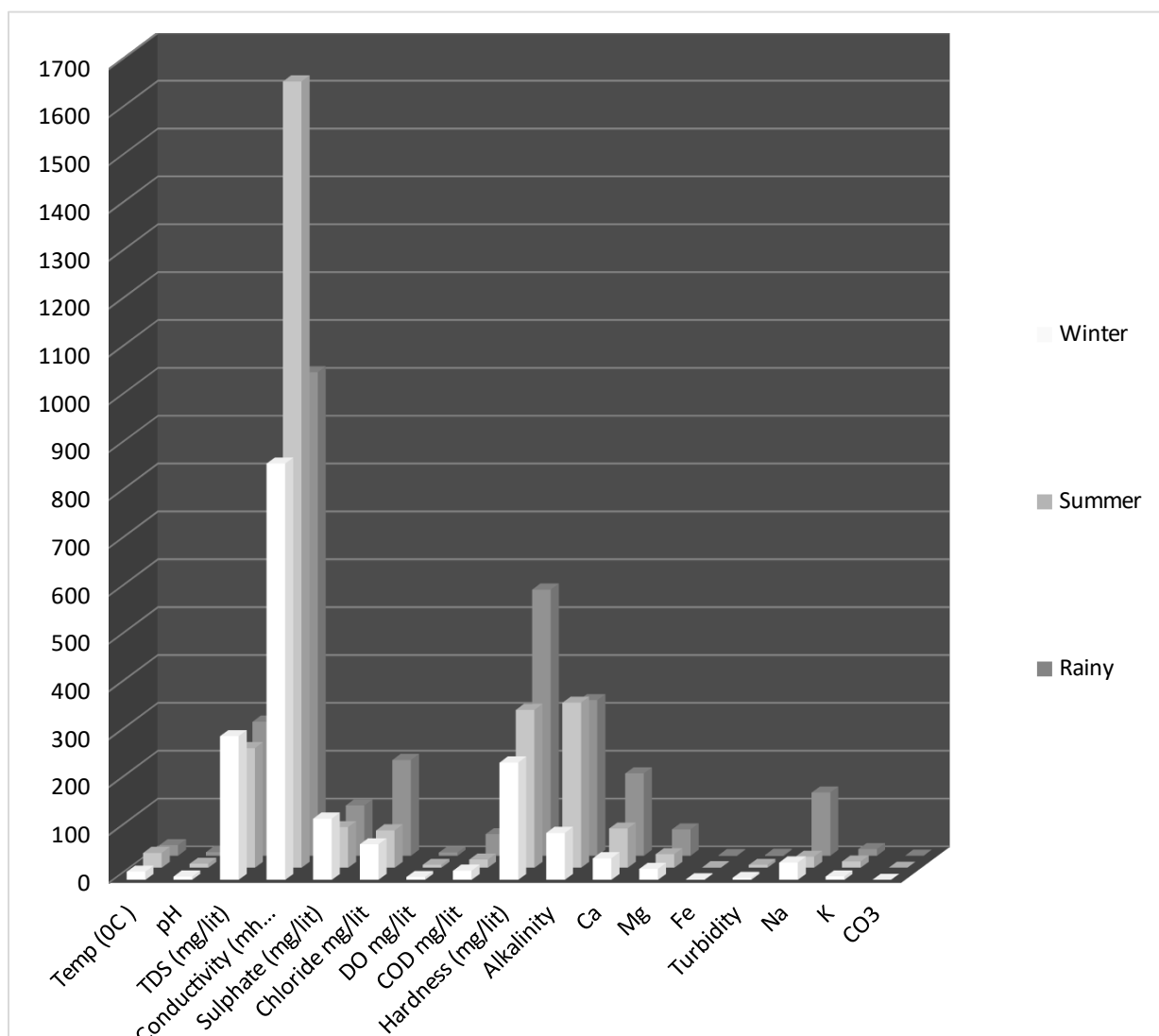
RESULTS AND DISCUSSION

Results of Physico-chemical parameters of Manyad Dam, Ta- Vaijapur, Dist- Aurangabad (MH) during June- 2013 to May -2014 is shown in **Table-1**

Table-1: Average Values of Physico-chemical parameters seasonally at Manyad Dam.

Parameters	Winter	Summer	Rainy
Temp (^{0}C)	17	31	22
pH	6.8	8.4	7.5
TDS (mg/lit)	300	250	280
Conductivity (mhos/cm)	870	1643	1010
Sulphate (mg/lit)	128	85	105
Chloride mg/lit	74	78	200
DO mg/lit	5.9	6.1	6.5
COD mg/lit	19	17	45
Hardness (mg/lit)	245	330	556
Alkalinity	98	345	325
Ca	45	82	172

Journal of Medicinal Chemistry and Drug Discovery
ISSN: 2347-9027
Special Issue
Analytical Chemistry Teachers And Researchers
Association
National Convention/Seminar
18 January 2015

Mg	23.0	28.37	55
Fe	0.99	0.99	1.0
Turbidity	4.1	5.9	1.7
Na	36.13	23	132
K	6.9	13	13.9
CO$_3$	000	000	000

Temperature: All the metabolic and physiological activities and life processes by aquatic organisms are generally influenced by temperature. It accelerates chemical reactions. In the present study the temperature in tube well is ranged from 17^0C to 31^0C. The temperature was recorded at the sites only.

pH: The pH value of drinking water is an important index of acidity, alkalinity and resulting value of acid base interaction of no. of its minerals and organic components. During the study period pH between 6.8 to 8.4 was noticed in tube wells.

Conductivity: Conductivity of water provides quick and convenient method for determination of total amount of ionisable salts present in it and expressed as mhos/cm. In the present finding conductivity varied from 870 to 1643 mhos/cm. There was no regular trend in the conductivity of water at Manyad Dam, this might be due to difference in geometrical structure.

TDS: According to world health organization and Indian standard, total dissolved solids values should be lower than 500 mg/L for drinking water. In the present study total dissolved solids range from 250 to 300 ppm, all the samples have moderate values of TDS as prescribed by WHO and Indian standards.

Turbidity: Turbidity found in between 1.7 to 5.9 NTU.

Hardness: Total hardness is a measure of the capacity of precipitate soap. It is the sum of polyvalent cation present in water. It was found to have been varied from 245 to 556ppm. Samples values are compared to IST and WHO.

Alkalinity: Alkalinity is due to the presence of carbonates, bicarbonates, hydroxides, phosphates and other ionic radicals. The alkalinity of water in our study area varies from 98 ppm in the month of Sep-2009 and maximum 345 ppm June-2010.

Ca: Calcium is needed for the body in small quantities. Calcium hardness in mainly due to salts present in water and expressed as calcium carbonates. The limits of calciumhave been prescribed in the range of 75 to 200 mg/L, The observed calcium values were within range i.e. 45 to 178 ppm.

Mg: The limits of magnesium have been prescribed in the range of 50 to 100 mg/L, The observed calcium values were within range i.e. 23 to 55ppm.

Na: The water having value of sodium can decreases the crop yield significantly and a long term use of such water can cause increasing damage of soil properties. The source of sodium in ground water may be chemical fertilizer etc.

In the present work, the amount of sodium varies from 23 ppm to 132 ppm.

K: The potassium content of ground water was found in between 6.9 to 13.9 ppm.

Fe: The Fe content of ground water found to be near about 1 ppm.

CO_3: The carbonate content of ground water found to be zero ppm in all the samples.

Cl: Presence of chloride in high amount in water indicated that it is contaminated by sewage. But in the present study quantity of chloride is moderate i.e. 74-200 ppm.

The desirable limit of chlorides is 250 mg/L and permissible up to 600 mg/L.

SO_4: The variation in sulphate content represents the pollution status. The decrease in sulphate indicates detoriation and increase in sulphate indicate improvement of water quality. The highest desirable value of sulphate, as prescribed by WHO is 200mg/L. The present investigation shows that sulphate is under permissible limit.

CONCLUSION

The ground water of Manyad Dam was analysed for various Physico-chemical parameters. From the analysis data we conclude that the ground water of the selected site is suitable for drinking and agriculture purpose.

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