

Seasonal Variation of Groundwater Quality in Vatika village (Sanganer Tehsil), Jaipur (Rajasthan)

Hina Shahnawaz¹, Chandni Kriplani², Mohammad Asif Iqbal³

School of Basic and Applied Science, Poornima University
henafatimaknp@gmail.com, chandni@poornima.edu.in, asif@poornima.org

Article Info

Volume 83

Page Number: 1191 - 1195

Publication Issue:

March - April 2020

Abstract-

Water of good drinking quality is of essential significance to physiology and man's proceeded with presence depends particularly on its accessibility. The goal of this investigation is to comprehend the regular varieties in the physico-chemical parameters of the ground water of three destinations of Sanganer Tehsil of Jaipur region, Rajasthan using statistical tools. The methodology used is to complete the examination ground water tests were gathered for pre monsoon, monsoon and post monsoon time of a year. For this reason five examples were gathered from every area and the procedure of substance investigation was directed. With the help of t-test, the distinctions between the three locations dependent on the parameters were calculated. The findings of this paper were that the ground water of these three locations demonstrates seasonal variations in each of the twenty one parameters using statistical methods like t-test. The groundwater of the considerable number of destinations isn't reasonable for drinking and mechanical purposes which will assist the neighborhood government with taking vital activity.

Article History

Article Received: 24 July 2019

Revised: 12 September 2019

Accepted: 15 February 2020

Publication: 14 March 2020

Keywords: Physico-chemical Analysis, Ground Water, T-test, parameters

I. INTRODUCTION

Water is a basic natural resource of the environment that supports life in all forms. Its main use in the country is to irrigate regional crops. Due to lack of water, irrigation is a basic requirement to maintain high yields of crops in dry and semi-arid areas. In the case of Rajasthan, where availability of surface is very limited due to low water and availability, farmers depend on ground water storage, which is for drinking and irrigation purposes. Apart from

this, farmers also use polluted water, which contain viruses and bacteria; polluted water affects the health of adverse human and farm animals. Be efficient, economical and rapidly deployed in a broad range of physical settings [6]. Vegetable growing in South Jaipur due to water scarcity Increased pollution of vegetable crops in Jaipur city is seized and in spite of fertilization and purification, it is used for irrigation of vegetable crops. This is the reason that vegetable cultivation is increasing and they are polluted too [8]. Although the supply of

water in the plants is very high, which increase the growth and production, they are still in contact with the infectious diseases of pathogenic unguis, nematodes, viruses and bacteria. It spreads roots in stems, leaves and fruits. This vegetation causes health hazards in animal and human populations, so human and agricultural animals are essential for its effect. Pollution of heavy metals has been recognized as the major environmental concern due to their generality and persistence. These heavy metals cannot be biodegradable, so there is a need to develop such treatment techniques which should Thus, it was thought to study the quality of ground water in Vatika village(Sanganer tehsil), Jaipur district, Rajasthan and rural areas of India. Various samples of ground water were collected from different sites of Vatika village (Sanganer-Tehsil) and following norms will be followed for sample collection: Pre monsoon (June), monsoon (August), post monsoon (October) Sampling will be for 2 years and various water parameters will be examined. Water samples were collected in various glass bottles, a laboratory testing program was developed to measure the properties of water and to assess the values of all the parameters, which were used for full-screen lateral tests will be done to analyze [5].

II. MATERIALS AND METHODS

Collection of samples

Groundwater samples were collected for pre monsoon, monsoon and post monsoon period of a year from the Tube well and Hand pump of five different sites of Vatika village (Sanganer Tehsil). Sample were collected from each site and as per APHA-Standard Methods for Examination of Ground Water Samples analyses conducted and the mean value calculated. The mean values from each sampling site were recorded as the concentration/value for that particular month. The Five Samples were used to analyze impact of variation of season on all twenty one parameters

III. RESULTS AND ANALYSIS

Experimental values from Table 3 are the indication of various physicochemical parameters of water samples of Vatika area in different seasons. From Table 3, it is observed that values of these sixteen parameters are higher in post-monsoon season than pre-monsoon season. All the parameters are in permissible limit except Sulphate, Fluoride, Nitrate, Alkalinity content. In order to test whether there is any significant difference in the parameters of the water samples before and after monsoon, the following null hypothesis was framed: H₀: There is no significant.

Table 1(b) . Permissible limite of physico-chemical parameters as per BIS standards

S. No	Parameters	Permissible limit as per BIS standards
1	pH	6.5-8.5
2	Total Hardness	600
3	TDS	2000
4	Fluoride	1.5
5	Nitrate	100
6	Sulphate	400

7	Calcium	200
8	Alkalinity	600
9	Magnesium	100
10	Chloride	1000

Table 2. Experimental values of physico-chemical parameters of Vatika Area

		Pre monsoon					Monsoon					Post monsoon				
S. No	Parameters	SA MP LE-1	SA MP LE-2	SA MP LE-3	SA MP LE-4	SA MP LE-5	SA MP LE-1	SA MP LE-2	SA MP LE-3	SA MP LE-4	SA MP LE-5	SA MP LE-1	SA MP LE-2	SA MP LE-3	SA MP LE-4	SA MP LE-5
1	pH	6.5	6.6	6.6	7.2	7	7.2	7.3	7.3	8	7.8	7.4	7.2	7.4	7.1	7.6
2	Hardness	540	140	480	410	140	604.8	156.8	537.6	459.2	156.8	604	146.6	527.5	449.1	157.7
3	Chloride	395.3	154.28	964.24	636.4	188.03	442.7	172.7	1079.94	712.7	210.5	429.5	892.9	1000.88	700	700.4
4	TDS	1371	1198	661	1410	445	1535.5	1341.7	740.3	1579.2	498.4	1535	1341	730.4	1579	468.3
6	Sulphate	154.2	22.43	82.14	60	24.86	172.8	25.1	91.9	67.2	27.8	180.7	134.2	80.8	76.6	106.6
7	Nitrate	90.6	13.03	117.5	35.3	14.69	104.9	14.6	131.6	39.6	16.5	103.8	109.0	110.4	28.7	95.4
8	Fluoride	0.96	1.33	2	2.2	2	1.1	1.5	2.2	2.5	2.2	1.2	1.4	2.4	2.6	1.5
9	Alkalinity	455	614	523	586	726	509	487	585	456	813	467	560	465	521	789
10	Electrical conductivity	2772	2386	1326	2906	862	1602	2672	1480	1684	965	1504	2432	1326	1689	890
11	Salinity	0.9	2	1.8	2.3	1.2	1	2.2	2	2.1	1.3	1.1	2.3	1.3	2.2	1.4
12	Temp.	29	30	30	31	29	29	29	29	29	29	30	30	30	30	30
14	calcium	80	20	96	40	20	95.04	20.88	580.52	40.76	29.88	103.4	26.08	108	53.26	56.8
15	magnesium	70.33	13.44	58.32	60.4	13.44	65.3	21.7	50.3	68.92	50.7	77.5	380	75.3	69.72	250
17	COD	4.85	6.46	8.08	3.23	1.62	5.4	7.2	9	3.6	1.8	6.3	8.2	6.2	4.4	1.6
18	sodium	415	454	850	560.2	360	480	500.8	540	625	330.2	510	490	765	600	400
19	potassium	2.2	2.8	5	3.2	2	3	3	3.6	4.2	2.24	3.8	4.4	3.6	5.2	5.4
21	BICarbonates	636	960	1072	600	664	712.32	1075.2	1200.64	743.68	890	1295	980.23	850	943	

Table 3. Paired t-test results for difference in the physico-chemical and parameters of pre monsoon, monsoon and post monsoon of Vatika Area

y		VATIKA			
		Premonsoon-monsoon		monsoon-post monsoon	
S.No	Parameters	Value of T	Value of P	Value of T	Value of P
1	pH	30.21	0	0.931	0.405
2	Hardness	4.024	0.016	2.415	0.073
3	Chloride	3.089	0.037	1.369	0.243
4	TDS	5.195	0.007	1.439	0.224
5	Sulphate	2.826	0.048	1.667	0.171
6	Nitrate	2.496	0.067	1.155	0.313
7	Fluoride	7.507	0.002	0.492	0.648
8	Alkalinity	223	0.834	0.267	0.803
9	E.C	1.092	0.336	2.75	0.051
10	Salinity	1.089	0.338	0.375	0.727
11	Temperature	2.138	0.099	0.863	0.437
12	Calcium	1	0.345	1.702	0.164
13	Magnesium	1.024	0.364	0.084	0.937
14	COD	4.22	0.013	1.285	0.268
15	Sodium	0.456	0.672	2.427	0.072
16	Potassium	0.398	0.711	1.333	0.253

difference in the pre monsoon and post monsoon values. To test the hypothesis t-test was applied. The results of the test are given in Table 4. From the table we can clearly see that the calculated values of t-test Hardness, Chloride, TDS, Sulphate, Nitrate, Alkalinity, E.C, Salinity, Temperature, Calcium, Magnesium, COD, Sodium, Potassium are significantly higher than the tabulated value at 5% level of significance. This implies that null hypothesis is rejected i.e. there is a significant difference in the water parameters before and after monsoon. Also it is evident from the table that the calculated values of paired t-test for pH, Fluoride are less than the tabulated value at 5% level of significance. This result in the acceptance of null hypothesis i.e. there is no significant changes in pH, Fluoride.

4. Conclusion

Studies show that all sites are not suitable for drinking water and industrial purposes. Technical equivalence has been examined by comparing prices with BIS standards. Statistical method has been verified using statistical methods such as pair t-test method. T-test used for all parameters has been shown to calculate many standards, T and P-value, Hardness, Chloride, TDS, Sulphate, Nitrate, Alkalinity, E.C, Salinity, Temperature, Calcium, Magnesium, COD, Sodium, Potassium are more than tabular values, which are in the rejection of zero persuasion, indicating that in the post monsoon, There is a significant difference between pre monsoon and monsoon. After monsoon, after monsoon samples, due to the high concentration of TDS, alkalinity, fluoride and nitrate, prices of all water

samples are due to the mixture of various types of salts of ground water, which leads to poor quality. Hence the results and discussion have confirmed the chemical and statistical suitability of the ground water of five sites of the village of Vatika (Sanganer tehsil).

REFERENCES

- [1] Srinivasan AV, Sampath K, Paramasivam M (1980) Pollution of river Cauvery from industrial and urban waste. Proc. Symp. Environ. Biol:179-190.
- [2] APHA(1989) Standard methods for the examination of water and wastewater. Am J Public Health Washington, D.C
- [3] Kakati GN, Bhattacharya KG (1990) Bacteriological quality of drinking water in rural India. INDIAN J. ENVIRON. 276-279.
- [4] Gupta S., Satpati S., Nayek S. and Garai D. (2010) Effect of wastewater irrigation on vegetables in relation to bioaccumulation of heavy metals and biochemical changes, ENVIRON MONIT ASSESS, 169–177.
- [5] Morrison GO, Fatoki OS, Ekberg A. Assessment of the impact of point source pollution from the Keiskammahoek sewage treatment plant on the Keiskamma River. WATER SA. 27: 475-480.
- [6] Mukhopadhyay S. and Mukherjee R. (2013) Physico-Chemical and microbiological quality assessment of groundwater in adjoining area of TamlaNala, Durgapur, District-Burdwan (W. B.), India, INT. J. ENVIRON. SCI, Vol. 4, No. 3.
- [7] Duran M, Suicmez M (2007) Utilization of both benthic macro invertebrates and physico-chemical parameters for evaluating water quality of the stream CekerekTokat, Turkey J ENVIRON BIOL.28: 231-236.
- [8] Smitha PG, Byrappa K, and RamaswamySN(2007) Physico-chemical characteristics of water samples of BantwalTaluk, South-Western Karnataka J ENVIRON BIOL.28: 591-595.
- [9] Sharma A. K., Sharma N. and Sharma R. (2013) Study of Physico-chemical Characteristics of Water Quality of Yamuna River at Mathura, UP BULL. ENV. PHARMACOL. LIFE SCI. Vol 2 (10), 131-134.
- [10] Trivadi S. and Kataria H.C. (2012) Physico-Chemical Studies of Water Quality of Shahpura lake, Bhopal (M.P) with Special Reference to Pollution Effects on Ground Water of its Fringe Areas. Curr. World Environ. Vol. 7(1), 139-144