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Research Article

QUALITATIVE MONITORING OF UNDERGROUND WATER QUALITY OF MATHURA CITY

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ABSTRACT
The analysis of the quality of groundwater of a particular area is of great importance for both drinking purposes and irrigation. An evaluation of the quality of groundwater was conducted to ascertain its suitability for drinking and irrigation purposes in Mathura city. About 15 groundwater samples were collected from various locations in Mathura city and were analyzed for different physico-chemical parameters like pH, turbidity, alkalinity, total hardness, chlorides and total dissolved solids in order to determine the water quality. The results were compared with standards prescribed by CPCB and BIS.

Keywords: *Water Quality, Qualitative Monitoring*

INTRODUCTION
Water of good drinking quality is of basic importance to human physiology and man's continued existence depends very much on its availability (Lamikarna, 1999). Only 1% part is available on land for drinking, agriculture, domestic power generation, industrial consummation, transportation and waste disposal (Mishra *et al.*, 2002; Parihar *et al.*, 2012). Groundwater is considered as one of the purest forms of water available in nature and meets the overall demand of rural as well as urban population. With the growth of industry the ground water is made susceptible for contamination due to addition of waste materials (Rao *et al.*, 2013). Groundwater is used for agricultural, industrial, household, recreational and environmental activities all over the world. In India, most of the population is dependent on groundwater as the only source of drinking water supply (Ramesh *et al.*, 2012).
Water quality analysis is one of the most important aspects in groundwater studies. In recent years, an increased threat to groundwater quality due to human activities has become of great importance. The adverse effects on groundwater quality are the over burden of the population pressure, unplanned urbanization, unrestricted exploration, unintentionally by domestic, agriculture and industrial effluents and dumping of the polluted water at inappropriate place enhance the infiltration of harmful compounds to the groundwater (Pandey and Tiwary, 2008). To communicate information on the quality of water to the concerned citizens and policy makers, analysis of water is utmost important. It, thus, becomes an important factor for the assessment and management of groundwater (Shivasharanappa *et al.*, 2012). The present work attempts to study the physicochemical properties in ground water of Mathura district. The results of the study will help in gathering significant data pertaining to the aspects quality status of ground water of Mathura. The outcome of the study may help the ground water conservation managers, technocrats and urban planners to improve and restore the ground water.

Study Area
Mathura District is one among 71 Districts of Uttar Pradesh State, India. Mathura District Administrative head quarter is Mathura. It is is Located 387 KM East towards State capital Lucknow. Mathura District population is 2541894. It is 37th Largest District in the State by population. It is Located at Latitude-27°4', Longitude-77°6'. Mathura District is sharing border with Bharatpur District to the South, Aligarh District to the North, Mahamaya Nagar District to the East. It is sharing Border with Rajasthan State to the west. Mathura District occupies an area of approximately 3329.4 square kilometres. Its in the 189 meters to 174 meters elevation range. This District belongs to Hindi Belt India. (MSME, Govt. of India). It is Hot in summer. Mathura District summer highest day temperature is in between 24° C to 45°

C. Average temperatures of January is 15° C, February is 17° C, March is 24° C, April is 31° C, May is 36° C.

MATERIALS AND METHODS

The physico-chemical analysis of groundwater samples collected from selected areas was carried out, according to the standard methods of APHA. A total of fifteen water samples were collected from Hanuman Nagar, Chaudhry D. Nagar, Sarai Azambad, Shastri Nagar, Azad Nagar, Teachers Colony, Mathura Cantonment, Dharamlok Nagar, Anand Puri, Sabzi Mandi, Radhika Vihar, Shri Radha Puram, Surya Nagar, Mayur Vihar and Dholi Pyau.

All the samples were collected in polypropylene bottles. Before collecting the samples, bottles were thorough cleaned followed by repeated washing with deionized water. The reagents used in the study were all analytical grade reagents and demonized water was used throughout for the reagent preparation.

RESULTS AND DISCUSSION

pH

The pH of the water samples taken from the study area was analyzed and found to be within the desirable limit of 6.5– 8.5 given by WHO standard. Most of the samples were slightly alkaline in nature. The minimum value recorded was 6.3 and maximum was 8.7.

TDS

Samples were analyzed for TDS (Total dissolve solids) that showed the values ranged from 760- 1875 mg/L, as compared with the standard value which is 500-2000 mg/L.

Alkalinity

The ranges of alkalinity have been found to lie in between 284- 604 mg/L. The standard values as prescribed by the WHO are between 200- 600 mg/L. Therefore the total alkalinity is found to lie in between the prescribed limits.

Turbidity

The standard values for turbidity are 5- 10 NTU. The turbidity of all the samples obtained from the present area of study are found to be between 5- 9 NTU. Therefore all lie within the prescribed limits.

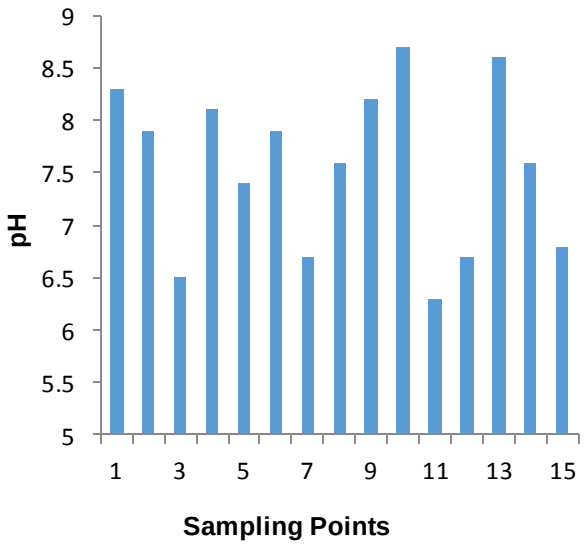

Figure 1: Variation of pH

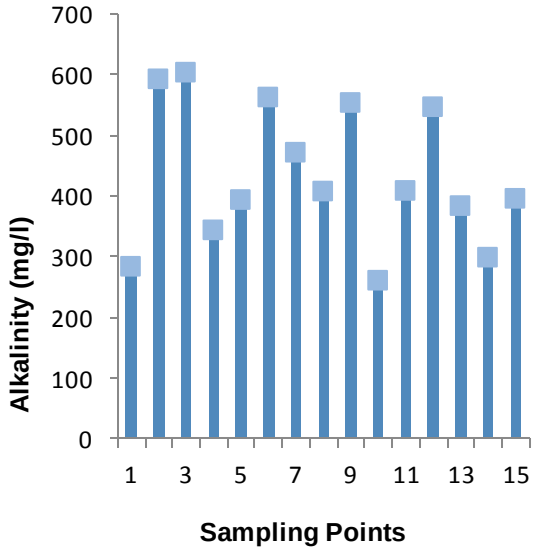

Figure 2: Variation of Alkalinity

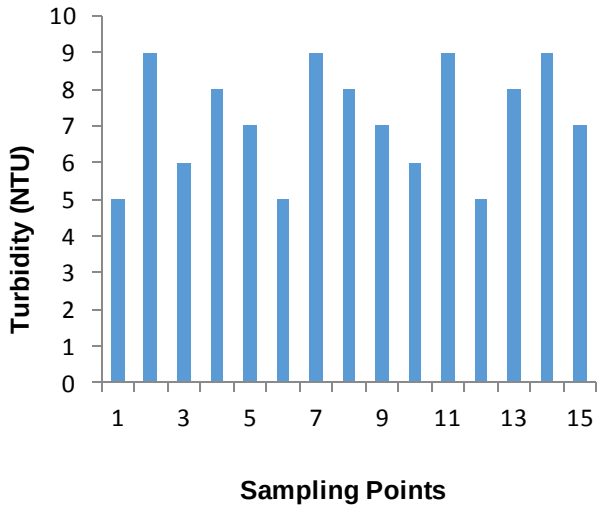

Figure 3: Variation of Turbidity

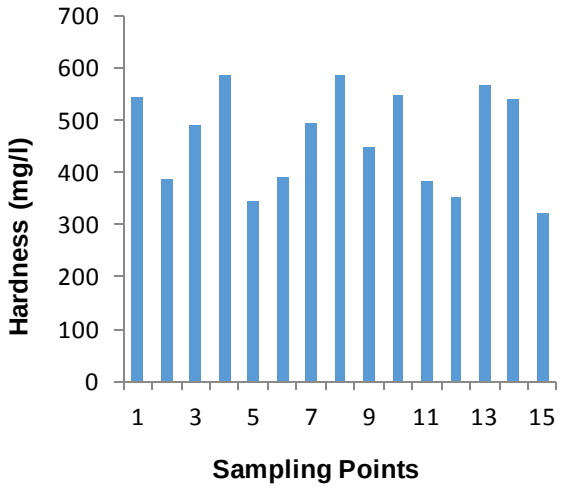

Figure 4: Variation of Hardness

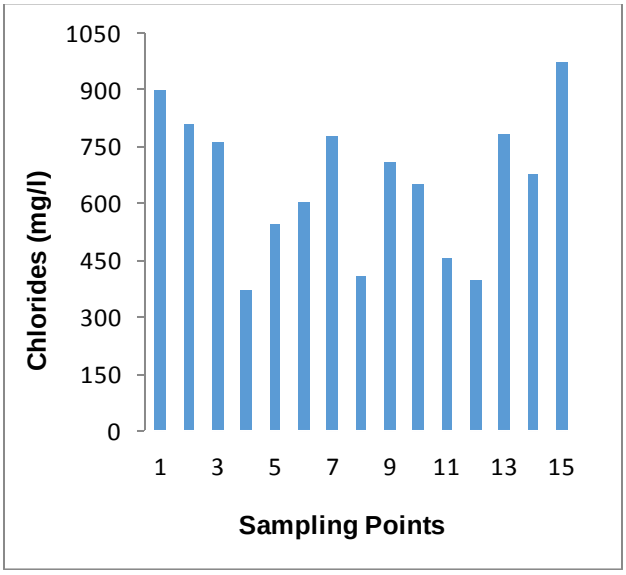

Figure 5: Variation of Chlorides

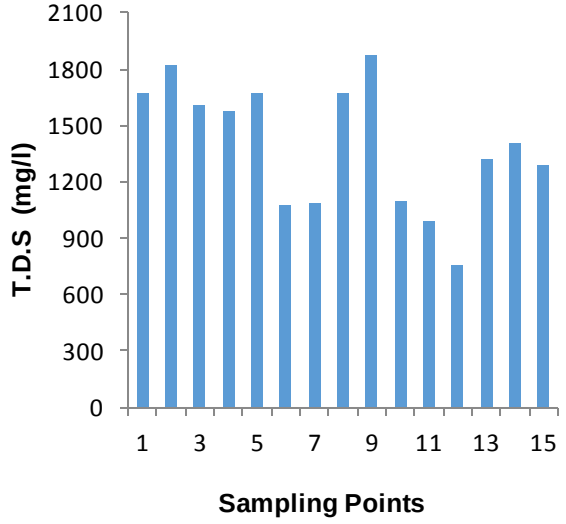

Figure 6: Variation of T.D.S

Total Hardness (TH)

Hardness in water is due to the natural accumulation of salts that are caused when they come into the contact with soil and geological formations or from direct pollution by industrial effluents. Hardness of water is mainly dependent upon the amount of calcium or magnesium salts or both present in it (Meena and Bhargava, 2012). In the present study TH varied from 322 mg/L to 587 mg/L.

Chloride (Cl^-)

There is a wide distribution of chloride salts in the underground water in varying concentrations. Diverse sources such as weathering and leaching of sedimentary rocks and soils, infiltration of seawater, domestic and industrial waste discharge, etc are the origin of chlorides in the water. Chloride exceeding 250 mg/L imparts salts taste to water and causes laxative effects (Chand, 1999). In the present analysis of the water samples, chloride concentration was found in the range of 372 mg/L to 972 mg/L.

Conclusion

The current study was conducted with an aim to analyze different physico- chemical parameters in the ground water samples in Mathura city. In total, all the parameters analyzed were shown to be within the permissible limits for drinking water. The average values for different parameters were found to be 7.4 for pH, 400 mg/L for alkalinity, 7 NTU for turbidity, 450 mg/L for hardness, 675 mg/L for chlorides and 1250 mg/L for total dissolved solids.

REFERENCES

Chand D (1999). Fluoride and human health- causes for concern. *Indian Journal of Environmental Protection* **19**(2) 81-89.

Lamikarna A (1999). *Essential microbiology for student and practitioner of Pharmacy, Medicine and Microbiology*, 2nd edition, Amkra books Lagos 406.

Meena BS and Bhargava N (2012). Physico-chemical characteristics of groundwater of some villages of Dag Block in Jhalawar district of Rajasthan State (India). *Rasayan Journal of Chemistry* **5**(4) 438-444.

Ministry of Micro, Small & Medium Enterprises (MSME), Govt. of India (No Date). Brief industrial profile of district Mathura 34, Industrial Estate, Nunhai, AGRA – 282006. Available: www.msmediagra.gov.in.

Mishra KR, Pradip and Tripathi SP (2002). Groundwater quality of open wells and tube wells. *Acta Ciencia Indica* XXXIIIC **2** 179.

Pandey SK and Tiwari S (2008). Physico-chemical analysis of ground water of selected area of Ghazipur city-A case study. *Nature and Science* **6**(4) 25-28.

Parihar SS, Kumar A, Kumar A, Gupta RN, Pathak M, Shrivastav A and Pandey AC (2012). Physico-chemical and microbiological analysis of underground water in and around Gwalior City, MP, India. *Research Journal of Recent Sciences* **1**(6) 62-65.

Ramesh M, Dharmaraj E and Raj BJR (2012). Physico-chemical characteristics of ground water of Manachanallur Block Trichy, Tamilnadu, India. *Advances in Applied Science Research* **3**(3) 1709-1713.

Rao J, Babu H, Swami AVV and Sumithra S (2013). Physico-chemical characteristics of ground water of Vuyyuru, part of East Coast of India. *Universal Journal of Environmental Research and Technology* **3**(2) 225-232.

Shivasharanappa, Padaki S and Mallikarjun SH (2012). Study on the physico-chemical characteristics of ground water of Bidar City and its industrial area. *International Journal of Applied Biology and Pharmaceutical Technology* **3**(1) 359-367.