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Research Paper :

Seasonal variation in drinking water quality of Shikohabad city in U.P. (India)

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ABSTRACT

Drinking water quality of Shikohabad city has been analysed by various physico-chemical anlaysis. Measurements of all the parameters were carried out seasonally at about fifteen sampling sites. The borewells near solid waste storage and low lying areas are chosen for study. Variation in the values were recorded due to municipality sewage water and solid waste contamination.

Key words : Drinking water quality, pH, Dissolved oxygen, Total alkalinity, Turbidity

Shikohabad is situated in Firozabad district famous for glass industries. The main source of drinking water are borewells of municipality and personal jet pumps. People of the city are using exausting non-renewable ground water badly. The unplanned urbanisation and industrialization have resulted into the changes in physico-chemical parameters which clearly indicates the water quality. It is very important for effective monitoring that water sampling and analysis must be carried out properly. In the present study the examination of water quality by different physico-chemical parameters have been carried out seasonally to note the changes in water quality in different seasons.

MATERIALS AND METHODS

The water samples were collected monthly in sterilized jerrycanes and brought to the laboratory with necessary precautions for analysis of the physico-chemical properties (APHA, 1989 and Trivedy *et al.*, 1987). Reagents used were of AR and GR grade. Temperature with dissolved oxygen and pH were determined on the spot by water analysis kit and pH-meter. Total alkalinity was measured by volumetric analysis by titrating with 0.02 N H_2SO_4 using methyl orange as indicator. The total hardness was determined by using EDTA and Eriochrome black T indicator until colour changes from purple to blue. Ca–H was determined by using Patten and Reader's reagent. The trace elements were determined by Perkin Elmer Atomic Absorption Spectrophotometer Modal 2380.

RESULTS AND DISCUSSION

The physico-chemical characteristics of the drinking water of Shikohabad is summarised in the Table 1. Temperature plays an important role in rate of reaction as it increases rate of reaction of water. Temperature in Shikohabad varies in between 25.0 – 40^{0}C.

The pH range of drinking water of Shikohabad is in permissible limits (7.2-8.5) but carbonates and bicarbonates are present in high quantity. The turbidity level is very high and has been found in the range of 12 – 13 NTU as compared to standard value of 5 NTU (WHO) and 10 NTU (IS 1983). The increase in turbidity level is due to sewage percolation and some organic colloidal compounds.

Total alkalinity found varies in between 58.4 – 72.4 ppm. The higher values are due to leaching of soil during natural filtration of water. Biological oxygen demand (BOD) and Chemical oxygen demand (COD) were found to be 0.8 – 3.8 ppm and 3 – 10 ppm well within the permissible limit, therefore water quality of Shikohabad is suitable for production of energy for growth and reproduction.

Higher percentage of nitrates in water is responsible for lower gastric acidity in human kids, but the nitrate concentration in water of this place has been found to be in limit (0.08-1.2 ppm). Higher concentration of Iron makes water bitter in taste but it has been found to be in the range of (0.19-0.50 ppm) (0.01-1.0 ppm IS). Cu is also present in the permissible limit (0.01-0.02). Similarly, Mn (0.08 – 0.10 ppm), Zn (0.10 – 0.98 ppm), Na (8.00 – 17.00 ppm) and K (8.00 – 16.00 ppm) have been found to be within permissible limits of ICMR, WHO etc.

The dissolved oxygen values were low during summer and increased during winter. The low D.O. values in summer may be due to the decreased oxygen holding