

Physico-chemical Analysis of Drinking Water in Lormi Tehsil of Chhattisgarh State

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ABSTRACT

Drinking water qualities play a significant role in human health. For present investigation scientific study of physico-chemical properties of various drinking water sources were surveyed in Lormi tehsil in four categories i.e., municipal supply water, direct bore well water, hand pump water, and small tank stored water. Samples of drinking water from each source were collected in sterilized plastic bottles of one liter capacity. Each sample from different sources was subjected to scientific study of physico-chemical properties. Through regular collection this study showed that the drinking water distribution system of Lormi tehsil is contaminated and that there is a need for a strict, year-round disinfection strategy to ensure adequate drinking-water quality.

Key words Drinking water, physicochemical, Lormi tehsil, disinfection strategy.

The present investigation is being proposed to assess the quality and suitability of drinking water consumed by urban as well as rural people of Lormi Tehsil by scientific study of physico-chemical properties in various samples of drinking water. Hence, the investigation will be focused on chemical pollutants of water available for public use. Obviously water is the carrier of several diseases, either chemical imbalance or microbial contamination in human society.

The physico-chemical parameters of different fresh water systems (river, stream, ocean etc.) have been studied by various researchers (Dere et al., 2006). In addition, several investigators have worked on seasonal variations of heavy metal pollution with microbiological parameters of Biga Stream, Turkey (Yaintas et al., 2007a). Various workers in our country have carried out extensive studies on water quality. Assessment of water quality of kolar reservation in Bhopal (MP) has been done by Kataria et al. (1996). Ground water pollution problem and evaluation of its Physico-Chemical properties has also been reported by Singh V. and Chandel S.C.P. (2006).

MATERIAL AND METHODS

Drinking water samples were collected from each of the marked sites and were analyzed to determine its physico-chemical nature monthly. After collection, each sample was labeled clearly. The parameters i. e. Temperature, pH, Total alkalinity, free CO₂, DO, BOD, COD, Chloride, T. H., Calcium hardness, Magnesium hardness, Nitrate, Iron parameters were analyzed. Temperature and pH of the samples were recorded immediately and the samples then carried to the

laboratory carefully. For some of the chemical parameter, like dissolved oxygen (D.O.) and alkalinity, the samples were taken in brown glass bottles avoiding any kind of bubbling and were fixed at the site with preservatives. Standard methods (A.P.H.A. - 1971, 1992), were carried out.

Result

The physicochemical analysis of the drinking water samples as observed during present investigation of various parameters have been presented systematically as follows-

Temperature:

The temperature was found to be in the range between 18.5 °C to 28.6 °C during study. The lowest value was observed in January month while the highest value of water temperature observed was attributed to the March month and average temperature range was 20.23 °C

pH

The pH values fluctuated between 7.3 to 7.8, the limit of pH value for drinking water is specified as 6.4 to 8.4, observed data shows slightly alkaline trend. Generally pH of water is influenced by geology of catchments area and buffering capacity of water.

Total alkalinity:

The alkalinity was found with a range of variation between 643 mg.l⁻¹ to 137 mg.l⁻¹ during study. The maximum value was observed in the month of February & March.

Free CO₂

The monthly variation in free CO₂ was found to be fluctuate between 10.5 mg.l⁻¹ to 30.2 mg.l⁻¹ during study.

Dissolved Oxygen:

Dissolved Oxygen of drinking water in different month at all sampling sites, varied from 6.0 mg.l⁻¹ to 14.6 mg.l⁻¹ the lowest range was observed in month of February while the highest range was observed in the month of November.

Biological Oxygen Demand:

Variation in BOD value of samples was observed, the value was ranged from 1.4 to 3.8 mg.l⁻¹ BOD value was found maximum in march and it was lowest in August.

Chemical Oxygen demand (COD)

Observed COD value of all the 5 stations were variable ranged from 7 mg.l⁻¹ to 18.0 mg.l⁻¹. The permissible limit of COD for drinking water is 253 mg.l⁻¹. Hence the observed COD values in all the 5 stations were well within the desirable limit.

Chloride:

Chloride value was found to be in the range between 14.15 mg l⁻¹ to 39.23 mg l⁻¹.

Total hardness (TH):

Regarding total hardness fluctuating trends in its value were observed in all the 20 sites, the observed total hardness values were well within the limits, the highest TH value (220.00 mg l⁻¹) was found in March while the lowest value was (97.00 mg l⁻¹) observed in the month of August.

Calcium hardness:

Calcium concentrations were found to vary from 14.19 mg l⁻¹ to 41.87 mg l⁻¹. The calcium hardness observed in all the 20 stations were well within the desirable limits.

Mg hardness:

Magnesium hardness of the sample water that fluctuate between 15.27 mg l⁻¹ to 42.12 mg l⁻¹ the lowest and highest value was recorded at site BWW1 and EWW1 respectively.

Nitrate:

Monthly variation in the Nitrate (mg l⁻¹) of drinking water, the values were ranged between 0.53 mg l⁻¹ to 1.12 mg l⁻¹, the lowest was recorded in site month of August while the highest was recorded in the month of March.

Iron:

Iron concentration (ppm) of drinking water, the values range between 0.19 ppm to 0.69 ppm the lowest value was recorded in site EWW3 while the highest value was recorded in BWW2 and BWW3.

CONCLUSION

It is thus suggested that good treatment techniques

Also, proper sanitation practices should be implemented within the vicinity of borehole water, reservoirs and during production of sachet water. Furthermore, improved monitoring of water and frequent application of chlorine and other water treatment agent should be adopted. Finally, siting of latrines/toilets close to borehole systems should be avoided. On this basis of longong investigation it can be the physico-chemical nature of drinking water of Lormi Tehsil, which reveal the fact that the drinking water of this semi-urban & rural area is more or less polluted, especially the well water and tank storage water. Such drinking water is not safe for human society.

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