

WATER QUALITY ASSESSMENT OF RURAL AREAS OF PATNA (BIHAR), INDIA

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(Received 3 June, 2019; accepted 10 November, 2019)

ABSTRACT

Potable water quality of rural areas of Patna was studied. The water samples from rural areas of Patna were collected to assess the quality of potable water. A laboratory test was conducted for assessment of water quality. The physico-chemical and bacteriological parameters were studied. The results obtained were compared with WHO/ICMR standard. Results showed high TDS, hardness at some locations and coliform counts were high at some sampling sites. Conductivity increases with increase of hardness of water. The pH of drinking water samples were followed by the standards recommended by the ICMR or WHO. TDS of water samples showed wide range of variations. Such quality of water can cause various diseases like diarrhoea, jaundice, typhoid, dysentery etc.

KEYWORDS : Water quality, Coliform bacteria, Hardness. conductivity

INTRODUCTION

Water is the most important constituent of life support system. The ground water contains higher degree of minerals, which varies according to quality of soil and rocks. The quality of water is of vital concern for mankind since it is directly linked with human welfare and sustainable development. Drinking water is drawn from subsurface of water by different means like wells, hand pumps or tube wells. We pollute these sources of supply with our own excreta. Water polluted in this way can spread epidemic diseases like cholera, typhoid, dysentery not to mention a score of minor ailments.

Water pollution has become not only an aesthetic problem for man but an economic and medical one as well. Bacterial and viral contamination is a threat for the spread of water borne diseases. About 80% of all communicable diseases are water borne. WHO report has pointed out that four out of five children suffer from water borne diseases. All over the world bacteriological diseases alone account for 25,000 deaths per day. According to international experts on potable water, most of the water before they reach the consumer have been exposed to some amount of contamination. These include

impurities like water bacteria, coliforms or microscopic organism or even dissolved impurities like gases, salts, iron oxide etc. The kind of impurity depends entirely on the water supply and sewage disposal system as a whole. The objective of the study was to assess the physico-chemical and bacteriological quality of water.

MATERIALS AND METHODS

Water samples were collected from Mohamadpur, Patna. Physico-chemical and bacteriological analysis of water was done, following the standard method (APHA, 1992), (Trivedy and Goel, 1986). Water samples were collected in polythene bottles and samples were brought to laboratory. Conductivity, pH and TDS were tested by using pH meter, conductivity meter and TDS meter respectively. The hardness of water were estimated by EDTA method. The coliform counts were determined by surface count method/MPN method. Sixty water samples were collected for analysis.

All physico-chemical and bacteriological parameters of water were recorded during the period of investigation.

Table 1. Physico-chemical and bacteriological characteristics of potable water and its statistical Analysis

Parameter	Minimum	Maximum	Range	Mean	SD	SE	CV (%)
Conductivity	0.35	3.18	2.83	0.668	0.438	0.056	65.56
pH	6.85	7.82	0.97	7.36	0.233	0.030	3.16
TDS	253	1460	1207	428.58	233.54	30.15	54.49
Hardness	150	650	500	263.83	110.54	14.27	41.89
Coliform count	00	350	350	5.83	45.18	5.83	774.95

Coefficient of variation for conductivity of water is 65.56% for village Mohamadpur.

RESULTS AND DISCUSSION

Conductivity of water ranged from 0.35 mL mhos/cm to 3.18. mhos/cm during the period of investigation (Table 1).

Shrivastava and Patil (2002); Murugesan *et al.* (2006) reported similar findings.

The pH value of water was determined from different region of village Mohamadpur. of Patna district. pH value varied from 6.85 to 7.82. The pH of water samples were within the safe limits as recommended by WHO.

Coefficient of Variation for pH was 3.16% for village Mohamadpur during the period of investigation. A similar value of pH was also reported by Mathur *et al.* (1987) and Gawas *et al.* (2006). TDS of water were recorded during the period of investigation. It ranged form 253mg/L to 1460 mg/L). Coefficient of variation for TDS was 54.49%, Samson (2011) and Singh (2011) found similar observations.

Hardness of water varied from 150 mg/L to 650 mg/L. Maximum hardness was recorded from well water and minimum hardness was recorded from Hand Pump. Coefficient of Variation for hardness was 41.89%. Similar trends of observation were found by Gawas *et al.* (2006).

Hardness of water is due to natural accumulation of salt from contact with soil and geological formations or it may enter from direct pollution by human activities.

Numbers of coliform bacteria were counted from different region of Mohamadpur, (Patna). The Coliform number varied from 02/L to 350/L during the period of investigation. The highest number of coliform bacteria was found in well water.

The coliform group of bacteria is the principal indicator of suitability of water for domestic use. The density of coliform organisms is the criteria for the degree of contamination and has been the basis for bacteriological water quality standards. The drinking water standard recommended by ICMR

for coliform group is 1 per 100 mL. Hence, Near about 2% water samples were contaminated with coliform group in village Mohamadpur. Kumar *et al.* (2005); Udhaya Kumar *et al.* (2006) Sharma *et al.* 1919 also found high coliform bacteria during the period of investigation.

CONCLUSION

It is fundamental right of the people to live in healthy environment. Field and laboratory investigations of the present study revealed that the most water samples are affected by various human activities. values of some parameters are more than the permissible limits while others are well within the limits.

The overall picture that emerges out of the present study warns strict check to maintain the quality for drinking water. Improved methods for handling and disposal of sewage, garbage and night soil should be introduced. To control epidemics and other diseases, proper method of disinfection of water should be developed. Various legislative measures should also be employed to control water pollution. The most comprehensive legislation called water act 1974 enacted to cleaned up nation's water became law on 23rd March 1974 in India.

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