

## A COMPARATIVE STUDY OF RURAL AND URBAN WATER QUALITY OF PATNA (BIHAR) INDIA

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### ABSTRACT

Water quality of rural and urban area of Patna district was studied. To assess the quality of water the samples were collected from both rural and urban area of Patna district. The physico-chemical and bacteriological parameters were studied for both rural and urban area of Patna. Water hardness and coliform count were high at some sampling sites for both rural and urban area of Patna. The results showed that there were significant difference between quality of water for both areas of Patna.

**KEY WORD :** Parameter, Bacteriological, Water Quality Contamination

### INTRODUCTION

Water is being put to various uses by man like cooking, drinking, bathing, disposal of sewage, Irrigation, generating electricity in power plants. During all these processes the undesirable substances are added to the water sources to such an extent that 70% ponds, lakes and rivers in India contain polluted water. To throw away pollutants we must add pollutants that are the inevitable byproduct of transportation, industry and agriculture, as these human activities expand and so does pollution. However, from the stand point of the totality of the pollution abatement it is Important that we first recognise two basic types of pollutants. First are the non degradable pollutants, the materials and poisons, such as long chain phenolic chemicals, DDT etc that either do not degrade or degrade only very slowly in the natural environment. Such non degradable pollutants not only accumulate but are often biologically magnified as they move in biogeochemical cycles and along food chains. Second are the biodegradable pollutants, such as domestic sewage that can be rapidly decomposed by natural processes or in engineered systems such as municipal sewage treatment plant that enhance Nature's great capacity to decompose and recycle. Bacterial and viral contamination is also a threat for the spread of water

borne diseases. About 80% of all diseases are water borne. According to international experts on potable water, most water before they reach the consumer have been exposed to some amount of contamination. These include impurities like water bacteria, coliforms or microscopic organisms. The kind of impurity depends entirely on the water supply sewage disposal system. Study Area -The area selected for study is rural population of Patna district. These rural populations are located at the distance of 40 km to 50 km far from Patna. The second selected area for study is urban population of Patna.

### MATERIALS AND METHODS

Water samples were collected from rural and urban area of Patna. Physico-chemical and microbiological analysis of water was done, following the standard methods (APHA, 1992), (Trivedy and Goel, 1986). Water samples were collected in polythene bottles and samples were were brought to laboratory and tested.

### RESULTS AND DISCUSSION

Physico-chemical and bacteriological observations were made during the period of investigation. The conductivity of water ranged from 0.35 to 3.18 ml

**Table 1.** Characteristics of Potable water and its statistical analysis of rural Patna

Parameter	Min	Max	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
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

**Table 2.** Characteristics of Potable water and its statistical analysis of urban Patna

Parameter	Min	Max	Range	Mean	SD	SE	C V (%)
Conductivity	0.34	1.25	0.91	0.566	0.1106	0.0111	19.54
pH	7.20	7.75	0.55	7.36	0.104	0.0104	1.41
Hardness	90	320	230	136.3	28.56	2.8568	20.95
Coliform Count	00	6000	6000	1451.66	1243.47	124.347	85.65

mhos/cm during the period of investigation (Table 1) for rural area and 0.34 to 1.25 ml mhos/cm for urban area of Patna. Coefficient of variation for conductivity of water is 65.56% for rural area and 19.54% for urban area of Patna. Wide range of variations were found in both area of Patna during the period of investigation. Shrivastava and Patil (2002) and Koshy (2005) found similar trend of observation.

The pH value of water varied from 6.85 to 7.82 for rural area and 7.20 to 7.75 for urban area. The pH of water for both area were within the safe limits as recommended by WHO. A similar value of pH was also reported by Koshy (2005).

Hardness of water varied from 150 mg/l to 650 mg/l for rural area and 90 mg/l to 320 mg/l for urban area of Patna. A similar trend of observation were found by Gawas *et al.* (2006).

Number of coliform bacteria were counted from different regions of rural urban area of Patna.

The coliform count varied from 0 to 350/l for rural area and 0 to 6000/l for urban area. Maximum number of coliform bacteria was found in well water. Hence urban water samples were more contaminated than rural water samples.

Kumar *et al.* (2005), Joshi *et al.* (2006), Vayas (2011), Kiran and Jha (2011) and Hazim *et al.* (2020) also found high bacterial count.

### CONCLUSION

The present study suggests that the water quality of rural area is more suitable than urban areas of Patna. Field and laboratory work of the present study revealed that the most water samples are affected by human activities. Values of some parameters are

more than the permissible range while others are within permissible limits of WHO for both rural and urban area of Patna. Such water causes different types of water borne diseases.

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