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Physico-chemical analysis of river water from Madhepura district, Bihar, India

Priyanka & P.K. Poddar

Purnea Mahila College, Purnea, B.N.Mandal University, Madhepura, Bihar, India

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Abstract : A survey was conducted at three sites of Madhepura district Site A belongs to Singheshwar asthan, a rural area of the district, Site B in Madhepura town near bus stand and Site C near railway crossing for the study of water pollution. Site B and C were more polluted. The BOD, COD and DO were very high at Site B and C.

Keywords : water pollution, anthropogenic contaminants, drinking water

INTRODUCTION

Water pollution is a major global problem which requires ongoing evaluation and revision of water resource policy at all levels (international down to individual aquifers and wells).[1] It has been suggested that water pollution is the leading worldwide cause of deaths and diseases, and that it accounts for the deaths of more than 14,000 people daily.[2] An estimated 580 people in India die of water pollution related illness every day. About 90 % of the water in the cities of China is polluted. A of 2007, half a billion Chinese had no access to safe drinking water. In addition to the acute problems of water pollution in developing countries, developed countries also continue to struggle with pollution problems.[3,4]

Water is typically referred to as polluted when it is impaired by anthropogenic contaminants and either does not support a human use, such as drinking water, or undergoes a marked shift in its ability to support its constituent biotic communities, such as fish.[5] Natural phenomena such as volcanoes, algae blooms, storms, and earthquakes also cause major changes in water quality and the ecological status of water.[6]

*Corresponding author :
Phone : 09430402839
E-mail : priyankabarail2k@gmail.com

The specific contaminants leading to pollution in water include a wide spectrum of chemicals, pathogens, and physical changes such as elevated temperature and discoloration.[7]

Madhepura district is situated in the Plains of River Kosi and located in the Northeastern part of Bihar at longitude between 25°.34 to 26°.07' and latitude between 86° .19' to 87°.07'. Tributaries of Kosi River pass through different parts of this district. Three sites from tributaries of Kosi River were selected for study, one of which belongs to rural area 'A' and other two in urban areas 'B & C'. Site A belongs to Singheshwar asthan, a rural area of the district, Site B in Madhepura town near bus stand and Site C near railway crossing.

METHODOLOGY

Water samples were collected in 1 liter plastic bottles and preserved for laboratory analysis as per standard procedures recommended in APHA (1975). The preserved samples were brought to the laboratory and were kept at 4°C in refrigerator before the start of chemical analysis. The time interval between collection, storage and analysis was intentionally shortened to avoid any major change in chemical characteristics of the sample. Analysis was made for Temperature, pH, Transparency, Total solid, Carbonate,

Bicarbonate, D.O, B.O.D, C.O.D, Silica, Nitrate, Ammonia, Sulphide, Sulphate, Chloride, and Phosphate.

RESULTS

The physical and chemical parameters were studied at 3 different sites of river Ramjan each being about 1 km away from each other. Site B was near the thickly populated area were sewage, detergents, soap and other organic matters were frequently added by human activities. Therefore this site was more pollutant in comparison to Site A and C. Site C was near hospital area in which less pollution was recorded. Site A was away from the population surrounded agriculture fields Hence it was less polluted in comparison to the Site B and C. The physical and chemical parameters recorded from all these sites are included in the Table.

Table 1- Range of physico-chemical parameters at different sites in Madhepura district

Parameter	Site A	Site B	Site C
Temp.	9.00	15.00	12.00
pH	8.00	9.00	8.20
Transparency	85.00	120.00	100.00
Total Solids	66.00	100.00	85.00
Carbonate	10.00	14.00	11.00
Bicarbonte	60.00	80.00	70.00
DO	7.00	8.50	8.00
BOD	2.00	3.00	2.50
COD	10.00	16.00	14.00
Silica	4.00	5.50	5.00
Nitrate	0.65	0.80	0.72
Ammonia	1.00	1.20	0.80
Sulphide	40.00	60.00	50.00
Sulphate	0.75	1.00	0.85
Chloride	25.00	30.00	22.00
Phosphate	0.45	0.80	0.70

Values are expressed in mg/l, except pH, water temperature in (^{0}C) and transparency (cm)

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