

**REPORT**

**Studies on Physico-chemical Characteristics of Lentic and Lotic Water Bodies of River Mahananda at Jhaua, Katihar (Bihar)**

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This paper is an attempt to investigate the pollutional level of the river Mahananda at Jhaua for some physico-chemical parameters like temperature, pH, alkalinity, heavy metals, total hardness, etc. The results show significant variation in these parameters but the pollutional level of the water is minimum at Jhaua.

**Key Words:** Physico-chemical, Lentic and lotic water bodies, Mahananda river, Jhaua.

**INTRODUCTION**

Due to high industrial discharge of sewage, pesticides from fields, effluents from industries, the lentic water resources such as rivers, ponds, lakes, etc. and lotic water bodies of such rivers are being polluted day by day. Due to pollution of water bodies, not only the ecosystem is affected but there is also deterioration in the quality of water which is used for human and animal consumption. A number of diseases spread in human beings and animals, particularly affecting fish and fish production.

The physico-chemical studies of water bodies reveal interaction of parameters influencing the quality and productivity of the ecosystems. In the present investigation an attempt has been made to assess the variation in the physico-chemical parameters of lentic and lotic water systems of the river Mahananda at Jhaua, Katihar.

Mahnanda is one of the major rivers of Bihar which originates 6 km north of Kerseyang in Darjeeling district of West Bengal on the Himalayan range close to Chimale at a height of 2,062 metres. The river starts its 376 km long journey to the Ganga. The total catchment of the river is about 24,737 sq. km, out of which 5,293 sq. km are located in Nepal, 6,677 sq. km in West Bengal and 7,957 sq. km in Bihar. The rest of the catchment is located in Bangladesh where the river ultimately falls in the Ganga (Padma) near Godagiri Ghat.

The river bifurcates into two streams near Bagdob. The right portion is known as Jhaua branch, traverses through Jhaua (35 km east of Katihar Jn. on Katihar-Siliguri M.G. railway line), Siktia, Pranpur, Labha, Gobindpur and joins the Ganga near chowkia paharpur in the District of Katihar, Bihar.

The left branch known as Barsoi branch bifurcates near Barsoi (Katihar). The Babakola, the Shivkola, the Manakhola, the Mechi, the Chenga, the Dowk, the Kankai, the Panar, the Gamari, the Tangon, the Srimali, the Sudhani, the Nager and the Kulik etc. are some of its important tributaries. After entering the plains near Siliguri, the river flows almost on flat land till it crosses the Barhi-Guwahati National Highway-31 near Dhengaraghat.

## EXPERIMENTAL

In the present study, the samples of water were taken for the lentic systems from the ditches near Mahananda embankment at Jhaua Railway line and for lotic systems the river Mahananda at Jhaua, Distt. Katihar (Bihar) between the period from March 2001 to February 2003.

The tests of different parameters were conducted at Bose Institute, Kolkata, and P.G. Department of Chemistry, D.S. College, Katihar.

## RESULTS AND DISCUSSION

The ditches (lentic) are simple depressions fed by rain and flood water of river Mahananda. The ecology of the ditches greatly differs from the ecology of lotic water of the river Mahananda.

It is well known that the physico-chemical characteristics of water play an important role in determining the status of the aquatic ecosystems and the climate conditions of the area also influence the parameters to a great extent. The water temperature varied from 19.5°C to 26.7°C for lentic and from 20.1°C to 27.0°C for lotic water, while pH of lentic water varied from 6.6 to 7.1 and from 6.6 to 7.2 for lotic water<sup>2-4</sup>.

The chloride varied between 9.8 mg/L and 10.09 mg/L for lentic system and between 9.09 mg/L and 10.99 mg/L for lotic systems.

The total hardness for lentic water varied from 43.3 mg/L to 63.48 mg/L and for lotic water it varied from 20.20 mg/L to 35.00 mg/L.

The lentic and lotic water systems of Mahananda showed no sign of presence of Na, K, Pb and Cd.

The concentration of iron varied from 2.01 mg/L to 2.04 mg/L for lentic water and from 0.00 mg/L to 2.65 mg/L for lotic water.

The nitrates of lentic water varied between 35.0 mg/L and 35.6 mg/L while those of lotic water varied from 35.04 mg/L to 35.58 mg/L.

The phosphates varied between 2 mg/L and 3.85 mg/L for lentic and between 1.58 mg/L and 2.48 mg/L for lotic water system, while the sulphates varied between 5.70 mg/L and 5.76 mg/L for lentic and between 5.71 mg/L and 5.76 mg/L for lotic water.

The concentration of fluoride varied between 0.22 mg/L and 0.24 mg/L for lentic and between 0.23 mg/L and 0.26 mg/L for lotic water. The result of As was found below the permissible limit.

From these results it is seen that the lentic and lotic water systems are significantly different from each other in respect of temperature, pH, total hardness, chloride, nitrate, phosphate and sulphate, etc.

From the physico-chemical studies of the river Mahananda it is clear that the presence of chloride, sulphate, phosphate, nitrate ions is within permissible limits and causes no significant effect on the potability of the water of Mahananda<sup>5, 6</sup>.

Heavy metals like Na, K, Pb and Cd are almost nil and Ca and Mg are within permissible limits and cause no adverse effect on health.

The concentration of fluoride ions is also very low and within permissible limits. However, the concentration of Fe is found to be above the permissible limit (permissible limit 0.33 ppm) and may cause adverse effect<sup>7, 8</sup>.

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