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Physiochemical Analysis of Sewage Fed Water in Gandak River in Vaishali District near Hajipur and its Impact on Biodiversity

[1]Gyan Jyoti* and [2]Dr. Vijay Kumar

Author's Affiliation:
[1]Research Scholar, P.G. Department of zoology, R.N College (BRABU Muzaffarpur), Hajipur, Bihar 844101, India
[2]Associate Professor, P.G. Department of zoology, R.N College (BRABU Muzaffarpur), Hajipur, Bihar 844101, India

***Corresponding Author:**
Gyan Jyoti
Research Scholar, P.G. Department of zoology, R.N College (BRABU Muzaffarpur), Hajipur, Bihar 844101, India
E-mail: jahanavinjyoti@gmail.com

ABSTRACT
The Gandak River, also known as the Narayani and Gandak, is a large river in Nepal and a left-bank tributary to the Ganga in India. Hajipur is located in west central Bihar, northeastern India. It is located on the Gandak River, just north of the confluence of the Ganges. The city is located on the northern Bihar Plains, which is are section of the Middle Ganga Plain. The Gandak River has a total drainage basin area of 29750 sq km. During the investigation, the researcher tried to find out the Physiochemical Analysis of water across three years. Four sampling sites were selected located at the bank of Gandak River at Hajipur, Vaishali, Bihar. The study was carried out for a period of three season and total 10 samples were done during this period. Results revealed that in inlet PH varied from 7.1 0 to 8.70 in outlet 6.02 to 8.1, total solid inlet varied from 752 mg/l to 898 mg/l and in outlet from 508 mg/l to 739 mg/l. The total hardness in inlet was found between 211mg/l to 244 mg/l and in outlet from 179 mg/l to 209 mg/l. Cholride in inlet varied from 96.4 mg/l to 112.8 mg/l and in outlet 44.3 mg/l to 56.1mg/l, alkalinity values in inlet was found between 178 mg/l to 210 mg/l and in outlet from 153 mg/l to 204 mg/. Dissolved oxygen in inlet was found between 0.69 mg/l to 1.95 mg/l and in outlet from 4.04 mg/l to 6.20 mg/l. Biochemical oxygen demand in inlet ranges from 91 mg/l to 130 mg/l and in outlet from 4.2 mg/l to8.6mg/l, Chemical oxygen demand in inlet ranges from 230 mg/l to 251 mg/l and in outlet from 16 mg/l to 31 mg/l. This study showed that the Gandak river water is in good condition.

KEYWORDS: *Physiochemical parameter, Narayani River, BOD.*

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INTRODUCTION

In India, spite of the fact that the industrial revolution has enabled Humans towards mother over the last centuries, aquatic contamination by industrial sewage has been one of the most vulnerable environmental concerns (Roy et al., 2022). The technological revolution has resulted in the growth and spread of heavy industrialisation, which has resulted in industrial pollution. Various harmful

processes the water comes into contact these are chemicals, heavy metals, inorganic waste and even organic sludge (Mazhar et al., 2021; Roy & Shamim, 2020). These are dumb into rivers or other bodies of water resulting in the accumulation of harmful waste. These harmful chemicals are dangerous to the environment, human animals and even aquatic life. Hajipur is one of the cities who is situated on the bank of the river. Hajipur is Bihar's 16th most populated city and the second fastest growing city, after Patna. As of the 2011 peer census, the total population was 1.47 lakh. Bihar's Vaishali district is seeing expansion. Hajipur city covers 19.64 square kilometres (7.58 square miles).

The city is organized into 39 wards. Hajipur is on the Ganga's north bank, while Patna is on the south; the Gandhi Setu links the two cities. Another bridge, the Digha-Sonpur Bridge, that spans the Ganga north-west of Patna, reduces the distance. Water pollution in Hajipur is a critical issue, exacerbated by untreated industrial waste entering local water bodies (Roy, 2020; Roy & Shamim, 2020). This pollution not only affects the quality of drinking water but also disrupts aquatic ecosystems and threatens the livelihoods of communities relying on these water sources (Anjusha et al., 2020). The water quality index in this region has raised concerns, reflecting the detrimental effects of industrial pollution on the aquatic ecosystem and public health (Matta et al., 2022). The water quality index in this region has raised concerns, reflecting the detrimental effects of industrial pollution on the aquatic ecosystem and public health (Mishra et al., 2024; Roy & Shamim, 2021; Javed et al., 2020).

LOCATION OF SAMPLING POINTS

Four sampling points were selected in Hajipur to monitor the physiochemical characteristics of the water of the Gandak River. These are club Ghat sidhi ghat kaushalya Ghat konhara Ghat.

EXPERIMENTAL

Water samples were collected from selected sites once a week during the year at fixed intervals between 8 to 10 a.m. Calcium, chloride, magnesium, hardness and COD were analysed by the standard method prescribed by APHA 1995. Samples are properly diluted for the BOD analysis. The first step is to take dissolved oxygen levels. Following six days of incubation at 21℃ +/- 1℃, Dissolved Oxygen values are collected again, and calculations are conducted based on the variation between these values and those taken before incubation. The pH, TDS, and DO were measured using the VSI-06 water analyzer kit.

RESULT AND DISCUSSION

Temperature persent in the river water of Konhara Ghat is 29°C, kaushalya Ghat 31°C, Sidhi Ghat 29°C, Club Ghat 27°C. Colour of the water sample is approx greater than one at every site of the river. Odour of every point is agreeable. Taste of the water sample which has been taken is also agreeable. PH is changes according to site at Konhara Ghat 7.0, Kaushalya Ghat 7.3, Sidhi Ghat 7.1 and Club Ghat 7.3. Turbidity of Konhara Ghat water sample is 0.4; kaushlyaghat water sample is 0.1; Sidhi Ghat water sample 0.5; Club Ghat water sample is 0.3. TDS in ppm is persent in river water of Konhara Ghat is 160; Kaushalya Ghat is 168; Sidhi Ghat is 157; Club Ghat is 164. Dissolved oxygen (ppm) of obtained sample is respectively 6.3, 6.1, 6.4 and 6.2. Dissolved Carbon dioxide (ppm) is comparatively 39, 40, 38, and 41. Alkanlinity (ppm) persent in Konhara Ghat is 9.4; Kaushalya Ghat is 9.6; Sidhi Ghat is 9.8; Club Ghat is 9.1. Chloride (ppm) obtained from sample is 57, 59, 54

and 56. Calcium (ppm) persent in river water sample is 6.8, 6.7, 6.9, and 6.9. Barium in (ppm) nil at every site. Magnesium persent at (ppm) is 2.4, 2.5, 2.6, and Total Hardness (ppm) at Konhara Ghat is 5, Kaushalya Ghat is 7, Sidhi Ghat is 6 and Club Ghat is 5. Copper (ppm) is nil in every site. Sulphate (ppm) obtained in Konhara Ghat is 9; Kaushalya Ghat is 7; Sidhi Ghat is 6 and Club Ghat is 8. No of Zooplanktons persent in Konhara Ghat is 10; Kaushalya Ghat is 8; Sidhi Ghat is 9; Club Ghat is 6. Phytoplanktones (mg/l) persent in 0.01, 0.03, 0.02 and 0.01. Amount of Caliform Bacteria obtained during experiment at respective site is 100, 56, 44, 76 and 85.

CONCLUSION

This review article summarisation the current situation of gandak river in Hajipur Vaishali India.The findings of experiment clearly indicate that all the parameter are under the maximum permissible limit standard standardised by WHO. Sequentially the water quality of Gandak River near Hajipur subdivision is permissible and suitable for drinking bathing and even for survival of aquatic life.

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