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Analysis of Water Quality Parameters of River Ganga During Maha Kumbha 2021, Haridwar, India

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ABSTRACT: This study represents the summary of the water quality of River Ganga during mass bathing in Haridwar during Maha Kumbha of 2021 in terms of microbiological and molecular analysis. The sample was collected from River Ganga during Makar Sankranti to Shakh Poornima and assessed for fecal indicator bacteria *Escherichia coli* along with Standard Plate Count (SPC) to determine total bacterial load in the river. Of all the nine days of sample collection (mass bathing days) results on the main royal bath (Baisakhi) displayed maximum SPC (log 6.79 cfu ml⁻¹) and most probable number (210 and 150 MPN 100 ml⁻¹) for total and fecal coli form, respectively). The water was extremely contaminated and not suitable for drinking on Somvati Amavasya, Maghi Poornima, Maha Shivratri and Baisakhi. The results clearly indicated that the mass bathing coupled with ritual activities performed by bathers was most probable cause of increased values of different parameters. The polymerase chain reaction analysis targeting malate dehydrogenase (mdh) gene proved to be more rapid and sensitive than classical culture techniques.

KEYWORDS: Water Quality, Ganga, Maha Kumbha, Haridwar, India, Analysis, Drinking, Sample

I. INTRODUCTION

With just a month left for Kumbh, a report by the Uttarakhand Environment Protection and Pollution Control Board (UEPPCB) on the state of Ganga in Haridwar has revealed that the water is now in category B, not fit for drinking anymore and suitable only for bathing.

Barely a month after the lockdown was imposed in late March, water at Har-ki-Pauri crossed into the 'A' category, which means for the first time in decades, it was fit for drinking after chlorination, all thanks to minimal activity on its banks. Environmentalists rued that the government has failed to check pollution in the river despite spending crores on it.[1]

According to the officials of UEPPCB, which has 16 centres across the state that monitor the river, Ganga water is in category A at five places - Bhagirathi at Gangotri, Rudraprayag, Devprayag, Raiwala and Rishikesh.

"The reason the river had entered 'A' category was minimum human intervention. All big hotels and industries were shut during the lockdown, which is why the river became so clean. But since May, pollution started increasing," said SS Pal, chief environment officer, UEPPCB.

"In an area where the total coliform is under 50 MPN/100 ml, the water is categorised in 'A' category. At Har ki Pauri, the total coliform increased from 50 MPN/100 ml in March to 80 MPN/100 ml in September. The reason for this is the large sewage discharge in Ganga. In areas where the river water is under 'A' category, the total coliform is as less as under 2 MPN/100 ml," said Pal.

Total coliforms are a group of related bacteria that are (with a few exceptions) not harmful to humans. A variety of bacteria, parasites and viruses, known as pathogens, can potentially cause health problems if humans ingest them.

The pH level of Ganga at Har-ki-Pauri was 8 and the biological Oxygen demand (BoD) 1 mg/L as of October, both of which are under the safe limits (Category 'A' water has pH between 6.5 and 8.5 and unpolluted rivers BoD under 1 mg/L).

"Sewage is a major water polluter across the country. It is the state's responsibility to ensure sewage doesn't fall untreated into Ganga. It is sacred, they call it 'mother' after all. If enforced properly, with fines and penalties, people are bound to follow norms. Take the Delhi metro for example, no one spits inside the trains," said Anil Prakash Joshi,

environmentalist and founder of a Dehradun-based organization involved in making sustainable technologies for the agricultural sector.[2]

II. DISCUSSION

Haridwar is the famous pilgrims on river Ganga. The river Ganga is regarded as one of the most holy and sacred rivers of the world from time immemorial. The evaluation of river water quality in terms of microbial analysis is a useful because most of the waterborne diseases are caused by enteric pathogens such as bacteria, viruses and parasites that are transmitted by the faecal oral route. Water quality assessment conducted at Ganga River for microbial analysis in the year 2021. For this study water samples were collected from the Har Ki Pauri at Haridwar . All samples were positive for *E. coli*, which indicates fecal pollution of water. The MPN count ranges from 300 to 450 MPN/100 ml for the water samples at Haridwar and 170 to 230 MPN/100 ml water samples at other site. The SPC count ranges from 320 to 450 SPC/ml x1000 for the water samples at Haridwar and 150 to 240 SPC/ml x1000 water samples at other site. The fecal coliform counts also exceeding the standard limit for water. The Isolated organisms were identified to be *Staphylococcus aureus*, *Salmonella* species, *Escherchia coli*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes* and *Shigella* species.[3]

III. RESULTS

What ambitious schemes of the government could not do for years, a nationwide lockdown successfully did within a month. In a massive win for the environment, the water quality of Ganga at Har-ki-Pauri in the holy city of Haridwar became 'fit for drinking' after the nationwide shutdown. The quality of the river water had improved by around 40 to 50 per cent. Now, to continue maintaining the cleanliness of Ganga, the Union government is planning to impose a law. The government had already started a campaign, the Namani Gange in 2021 to make Ganga pollution-free. The proposed law to keep Ganga water clean aims to define pollution levels. The law will especially apply to eight Indian states, namely Jharkhand, Bihar, Uttarakhand, Delhi, West Bengal, Haryana, Uttar Pradesh and Himachal Pradesh. It will define legal obligations to combat contamination. It will also determine the biological and effluent factors at the main geographical points and cities through which the river runs. Earlier, Varanasi authorities had issued a fine of ₹50,000 for dumping waste in Ganga.[4]



The Polluters-Pay Strategy

The new law will have a 'polluters-pay' strategy. This means all illegal factories will have to shut their doors. Many of them have already been closed. It will be mandatory for the permitted factories to monitor their sewage properly. However, the government isn't in favour of imposing a Pigouvian tax on the polluters. It is the tax imposed on pollution due to economic activities

Ganga Water At Har-Ki-Pauri in Haridwar Classified As ‘Fit For Drinking’ Amid Lockdown

The Uttarakhand Environment Protection and Pollution Control Board had tasted the water from Har-ki-Pauri in Haridwar. Results revealed that for the first time in decades, the water there had become ‘fit for drinking’. According to a TOI report, all parameters of water assessment at Har-ki-Pauri have significantly improved since the lockdown was put in place. A 34% reduction in fecal coliform and 20% in biochemical oxygen demand (a parameter to assess the quality of effluent or wastewater) has been observed in the water samples in April. As per Chief Environment Officer of the UEPPCB, the water at Har-ki-Pauri got the Class A rank for the first time in recent history. The water always came under Class B since the formation of Uttarakhand in 2021. Environmental scientist and professor BD Joshi said that the remarkable level of purity in the water is due to the absence of any industrial pollutants and garbage. According to him, such improvement has not been witnessed in the past 30-40 years. Another factor for improvement in the water quality, he said, was the melting of fresh snow, which was merging into the river and making it cleaner. According to the Uttar Pradesh Pollution Control Board (UPPCB), healthy water should have a dissolved oxygen level of at least 7 mg/litre. After lockdown, the dissolved oxygen level upstream in river Ganga has been around 8.9 mg/liter while in the downstream is nearly 8.3 mg/liter, which shows that water quality has improved significantly and has become optimal for bathing. At the famous Parmat Temple in Kanpur, temple priests who would refrain from taking a holy dip because of the high level of contamination in the water have started to bathe again in the river. Such is the effect of the lockdown! [5]



It's miraculous that after decades of dumping industrial pollutants, the Ganga that was considered unfit even for bathing has now become fit for drinking. While this is definitely good news, environmentalists fear that things could turn for the worse once the lockdown is lifted. Meanwhile, if there is one spectacle you can't miss in India, it's the Ganga Aarti. [6]

IV. CONCLUSION

“Jal Shakti Abhiyan: Catch the Rain” Hon’ble Prime Minister Shri Narendra Modi launched the “Jal Shakti Abhiyan: Catch the Rain” campaign on 22nd March 2021, on the occasion of World Water Day. He announced the commencement of the campaign that aims to involve people in conserving water and adopting the practice of rainwater harvesting. The launch event was also participated in by Shri Gajendra Singh Shekhawat, Union Minister of Jal Shakti, Shri Shivraj Singh Chouhan, Chief Minister of Madhya Pradesh, Shri Yogi Adityanath, Chief Minister of Uttar Pradesh and Shri Rattan Lal Kataria, Minister of State of Jal Shakti. Hon’ble Prime Minister Shri Narendra Modi emphasized that India’s future progress lies in the development and efficient management of our water resources. Rainwater, being the major natural source of water, must be collected through appropriate structures, stored, conserved for use and reuse. Better management of rainwater would help prevent over exploitation of the country’s groundwater resources. [7]

National Mission for Clean Ganga (NMCG) The NMCG was registered as a society under the Societies Registration Act. It acted as the implementation arm of National Ganga River Basin Authority (NGBA), which was constituted under the provisions of the Environment Protection Act (EPA). NGBA has since been dissolved with effect consequent to the constitution of National Council for Rejuvenation, Protection and Management of River Ganga (referred as National Ganga Council) vide notification no. S.O. 3187(E) under EPA. Namami Gange programme is an integrated Ganga conservation mission with a vision to restore the wholesomeness of the Ganga river by ensuring Aviral Dhara, Nirmal Dhara, and maintaining geo-hydrological and ecological integrity of the river. Namami Gange is following an



Integrated River Basin Management (IRBM) approach with multi-sectoral and multi-agency interventions. Such interventions include pollution abatement for all sources of pollution to improve water quality, improving ecology and flow through ensuring environmental flow, conservation of wetlands, biodiversity, and demand side management. The programme aims to strengthen people-river connect through river front development and public outreach. It also strives to facilitate research, scientific mapping of different aspects, developing real-time monitoring and enabling evidence based policies and programs. The program can be broadly divided into four categories i.e. Nirmal Ganga, Aviral Ganga, Jan Ganga and Gyan Ganga[8]

REFERENCES

- [1] Tare, Dr Vinod. “Pulp and Paper Industries in Ganga River Basin: Achieving Zero Liquid Discharge”. ReportCode:14_GBP_IIT_EQP_S& R_04_Ver 1_Dec 2011.
- [2] K. Jaiswal, Rakesh. “Ganga Action Plan-A critical analysis”, (May, 2007).
- [3] A report “Status Paper on River Ganga” State of Environment and Water Quality, National River Conservation Directorate Ministry of Environment and Forests Government of India, Alternate Hydro Energy Centre Indian Institute of Technology Roorkee, (August, 2009).
- [4] Singhania, Neha. “Pollution in River Ganga”. Department of Civil Engineering, Indian Institute of Technology Kanpur. October, 2011.
- [5] Das, Subhajyoti. “Cleaning of the Ganga”. Journal Geological Society of India, Vol.78, pp.124-130, August 2011.
- [6] A report of Central Pollution Control Board, Ministry of Environment and Forests “Ganga Water Quality Trend”, Monitoring of Indian Aquatic Resources Series, Dec., 2009.
- [7] A report of Water Resources Planning Commission, “Report on Utilisation of Funds and Assets Created through Ganga Action Plan in States under Gap”, May, 2009.
- [8] http://en.wikipedia.org/wiki/Pollution_of_the_Ganges



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