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Water quality monitoring of Tamsa River at Azamgarh (U.P.)

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Abstract

Due to unproportional growth of population and industries, water quality of Tamsa river is degrading at a faster rate day by day therefore, regular monitoring of river Tamsa is essential. With this aims various studied has been conducted in the past on the fresh water. In the present investigation water quality monitoring of river Tamsa at Azamgarh (U.P.) was studied at different sampling sites during the winter, rainy and summer seasons 2021. The various physical properties pH, turbidity, TDS, D.O., and BOD supplemented with the bio-contaminants put the suitability of water for different purposes.

Keywords: APHA, pH, Turbidity, TDS, D.O., BOD

1. Introductions

Surface water is considered one of the fundamental natural resources for both human survival and development-related activities (Salem, 2021) ^[1]. Therefore, maintaining good surface water quality is critical for sustainable development and human health security (Tripathi and Singal, 2019; Uddin *et al.*, 2022a) ^[2-3]. However, in recent decades, surface water quality has deteriorated as surface waters become more vulnerable to contaminants from natural and anthropogenic sources such as industrial wastewater, discarded household waste and irrigation runoff. (Asha *et al.*, 2020, Rahman *et al.*, 2021, Uddin *et al.*, 2022b) ^[4-6].

Monitoring programs are usually mandated to measure physical, chemical and biological indicators of water quality in order to obtain a comprehensive assessment of spatio-temporal variability of surface water quality (Siddique *et al.*, 2022) ^[7].

Water is one of the most important elements for all living things. Therefore, we cannot ignore the importance of water compared to other resources. In general, water is a very useful resource. Water from the Tamsa River is used for domestic, agricultural and residential purposes. Unfortunately, it is polluted by many sources. The aim of the investigation was the local and periodic variation of physical water parameters.

A scientist and researcher, he ignores the fact that small rivers such as the Ton River cover a considerable area, and has been declining to study water pollution problems in the country's major rivers and urban areas. I am actively interested. In addition, local issues such as health and hygiene, corrosion of metals, and water hardness can be addressed by examining local site contamination. The above facts inspired researchers to pick up this paper in relation to water pollution and its removal.

2. Study site

Azamgarh is situated on the eastern part of Uttar Pradesh. At 26.068°N 83.184°E. The district is bounded by Mau district in the East, Gorakhpur in the North, Ghazipur in the South-East, Jaunpur in the South- West, Sultanpur in the West and Ambedkar Nagar in the North West. The district of Azamgarh lying south of the Ghaghra river. The administrative headquarter of Azamgarh is on Lucknow-Baliya state highway, 269 km. from capital Lucknow. Azamgarh is a city in the Indian state of Uttar Pradesh. It is the headquarters of Azamgarh division, which consists of three districts Azamgarh, Mau and Ballia. Azamgarh is situated on the bank of Tamsa River.

Tamsa is a 151.4 kilometer long river that originates in Gram Panchayat Basodhi in village Lakhnipur, Ayodhya district of Uttar Pradesh. Tamsa river is of immense cultural significance as it is believed that Lord Ram spent the first night on its banks after his exile from Ayodhya.

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The river also finds mention in Ramcharitmanas of Tulsidas among other spiritual texts and tourists still throng Gora ghat in Bikapur tehsil with reverence. On the north of Tamsa flows Ghaghra and on the south river Gomti, as two separate streams. Tamsa is the main route of outflow of

water from the area lying in between these two rivers. From Ayodhya, Tamsa flows into district Ambedkarnagar and merges into Visuhi river at Katheri village. Within Ayodhya, the river flows through 77 Gram Panchayats in 10 blocks.

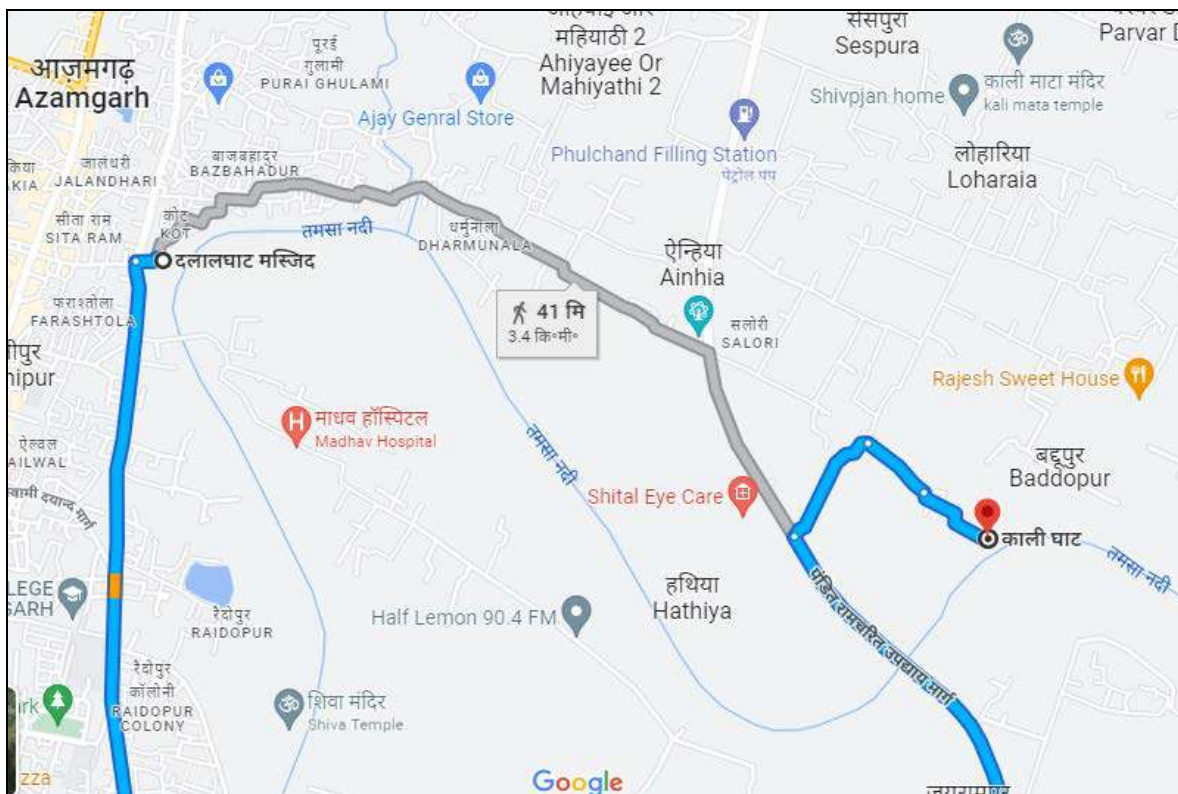


Fig 1: Map showing study site.

3. Materials and Methods

The two sampling stations were marked out for the collection of water samples. They are site A which is situated Dalalghat Masjid and site B situated Kalighat. According to APHA (2000) [8], Singh (2006) [9], Singh (2009) [10] and Dey (2000) [11] the following methods are applied.

pH is measured by digital pH meter. Turbidity determined by digital turbidity meter. Total dissolved solids can be determined by evaporating a barium chloride solution in trace amount of residue. Dissolved oxygen (DO) was determined by Winkler method. Biological oxygen demand (BOD) determined by 5 days BOD test.

4. Result and Discussions

The data regarding the pH of site A and B show in table 1 almost invariance maintaining neutrality of water through the year 2021. The Turbidity of all sites is increasing with time. The turbidity is highest at a level of 268.7. The dissolved solid concentration in Tamsa river in Azamgarh district increases from entry towards the exit point this is in

the form of inorganic and organic particles of immiscible liquid. Dissolved oxygen (DO) is one of the most important parameters in water quality studies. The levels of dissolved oxygen (DO) and the Biological oxygen demand (BOD) vary from sites A to B. It influences the disarticulation and abundances of algae population and is important in bringing about various biochemical changes.

The Dissolved oxygen (DO) level decreases as one moves from site A towards the site B. Contrary to it, the Biological oxygen demand increases from site A towards the site B. The levels of BOD indicate the magnitude of pollution. Maximum BOD value were observed 0.988 at site A summer season. The above result have been also reported by Singh and Malik (2004) [12]. The tolerance limit of BOD in surface water is 5 mg/L for aquatic life and it reflects the amount of unstable organic matters in waterbodies (WHO 2017) [13]. Higher BOD loading usually implies the presence of organic pollutants from untreated industrial wastewater and domestic wastes (Saifullah *et al.*, 2016) [14].

Tamsa River at Azamgarh (U.P.)

Table 1: Physico-chemical analysis of Tamsa river of water at different sites in Azamgarh (U.P.) Duration winter, rainy and summer seasons 2021.

Parameters	Winter season		Summer season		Rainy season		CPCB/BIS/IS/WHO
	Site A	Site B	Site A	Site B	Site A	Site B	
pH	6.8	6.5	6.6	6.1	7.2	7.8	6.5-8.5
Turbidity	116.8	128.5	110.7	123.6	226.4	268.7	1-5
DO	0.896	0.811	0.986	0.823	0.880	0.850	5-8
TDS	256.4	284.2	210.8	230.4	404.1	424.6	500-2000
BOD	0.864	0.814	0.988	0.938	0.870	0.828	5

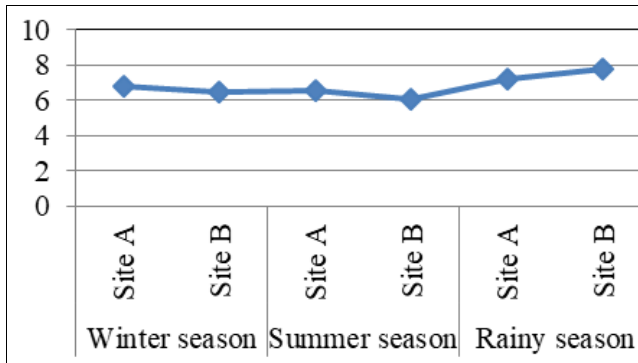


Fig 2: pH at the Tamsa river at Azamgarh

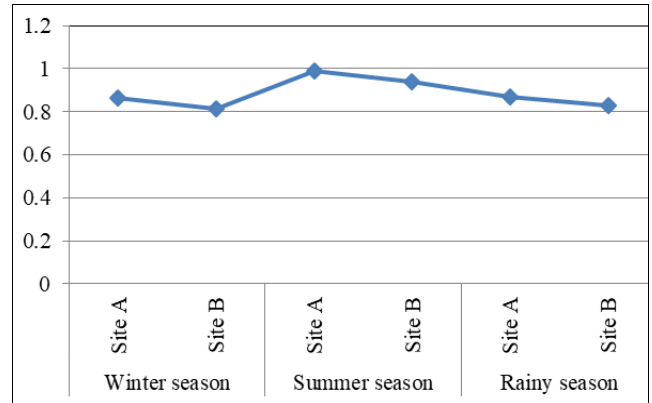


Fig 6: BOD at the Tamsa river at Azamgarh

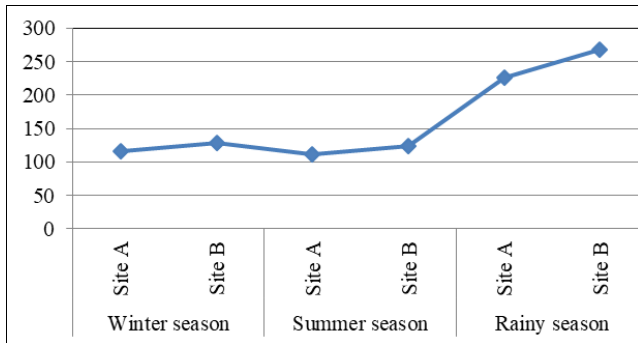


Fig 3: Turbidity at the Tamsa river at Azamgarh

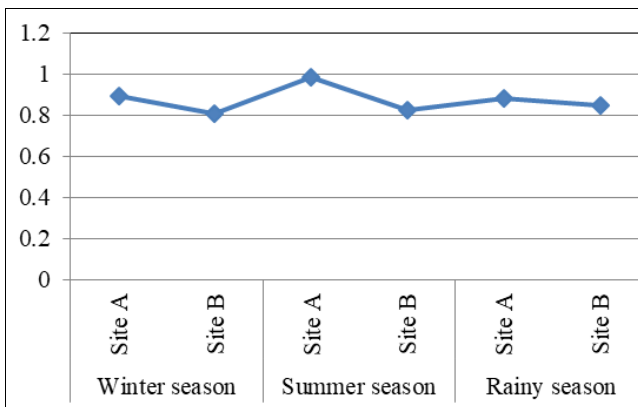


Fig 4: DO at the Tamsa river at Azamgarh

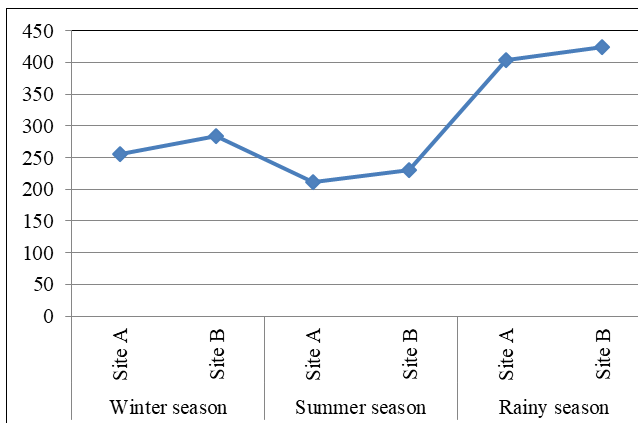


Fig 5: TDS at the Tamsa river at Azamgarh

5. Conclusion

The data reveal a fact that Tamsa river in this belt has a high self purification power for pollutants which may be attributed to the nature of wild aquatics, texture and structure of the basement soil of the river. The existence of turning point in a nearby site may partially be elevating the self purification character of river.

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