



Physico Chemical Properties Of Water Of Narmada River At Madhya Pradesh, India

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Article History	Abstract
Received 2.2.2022 Revised 19.4.2022 Accepted 20.6.2022	The Narmada, also called Rewa is a river in central India and the fifth largest river in the Indian subcontinent. The bank of Narmada river is covered by tribal people and their daily wastes are drained into this holy river, which alters the Physico-chemical parameters of the river. Limnological study was carried out for the period one year from October to September to enumerate the various physico-chemical parameters of Narmada River. Water samples were collected from sampling stations every month and were analyzed as per standard methods. Minimum value of Temperature, pH and DO were recorded in January and February month and maximum value in June-July months. The results of present study indicate that physico- chemical parameters of Narmada River are within WHO limits.
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Introduction:

India is a unique country with great cultural diversity associated with all kinds of climates, rich flora and fauna. In spite of enormous volume of hydrosphere only a small portion of it is actually available as resource. More than 97% occurs in the form of sea, whose salinity makes it useless, while fresh water makes up only 2.6%.

Water is a basic need of life and is the foundation for human survival and development. Water is the most common substance on earth, covering seven tenths of the world's surface, and that is why earth is also called the blue planet. Life first started in water and 96% of the composition of all living cells is water. Water is one of the prime needs of life. We can hardly live for few days without water. Since time immemorial freshwater has always been of vital importance to man as his early habitations were within easy reach of rivers, tanks, dams, ponds and lakes. The importance of freshwater resources, their conservation and utilization has attained almost utmost importance during the present time.

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Water pollution, including siltation, is endemic to almost all inhabited parts of the world and is consistently ranked as one of the major threats to freshwater ecosystems (Richter et al., 1997). Habitat loss and habitat degradation are also major reasons for worldwide biodiversity loss in aquatic ecosystems, and are caused by a multitude of anthropogenic disturbances (Allan and Flecker, 1993; Richter 1997). The threat of global climate change is pervasive across all of the Earth's ecosystems, and is also often cited as a major threat to freshwater biodiversity (Sala et al., 2000; Strayer and Dudgeon, 2010). The objectives of the present study

are to study the various parameters of the Narmada River and to suggest measure to minimize the pollution, which is increasing due to anthropogenic activities.

Material and Methods:

Description of Study Area

The water samples were collected from the selected sampling stations in the Narmada River,

Sampling stations:

Physico chemical analysis of water

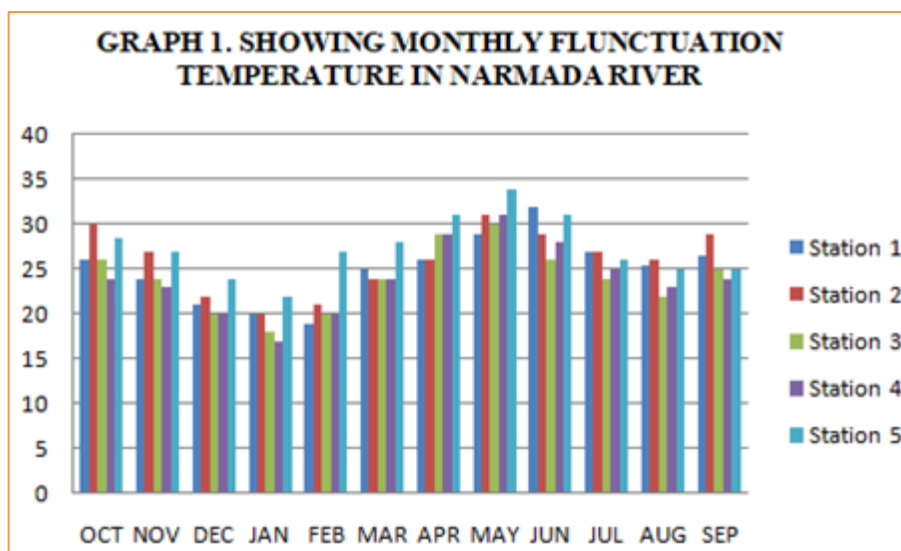
In the analysis of the Physico-chemical properties of water, standard methods prescribed in limnological literature were used.

Parameters like Temperature, pH and transparency were determined at the site, while other parameters like Dissolved Oxygen, BOD, Total Hardness, Sulphate and Nitrate were determined in the laboratory. The Physico- Chemical parameters of water were determined as per standard methods of APHA (2002), Welch (1998), Golterman (1991).

Results and Discussion

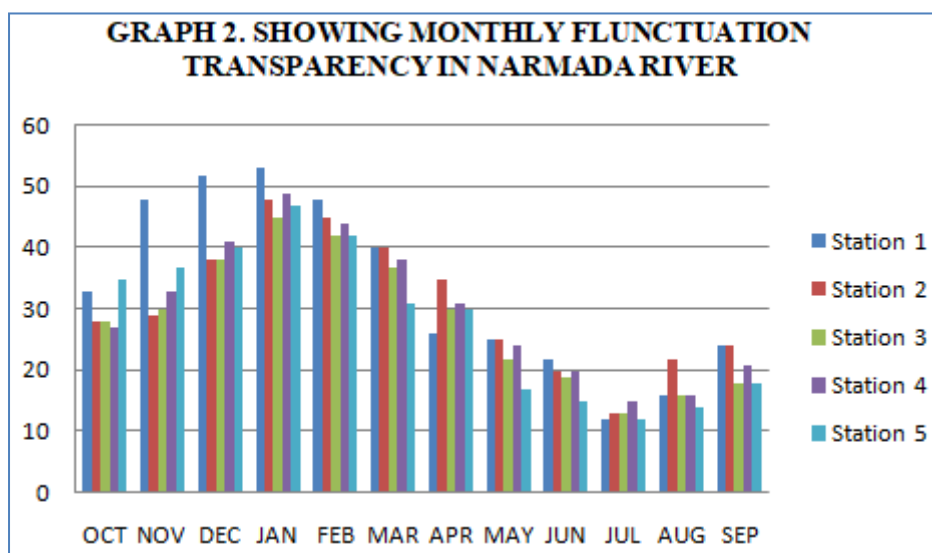
Water Temperature

The oxidation of organic matter is highly influenced by the temperature of water. Temperature of river water depends upon the season, climatic zone, where river is flowing, time of sampling and also upon the temperature of the effluents, which are being added in the river. During October 2018 to September 2019 water temperature was recorded from 18° C to 32° C. The minimum temperature of 18o C was recorded at Station-I in January 2019 and maximum temperature 32 o C was recorded in station-I in June. The same observations were also reported by Sharma et al (2011) and Shraddha et al (2008) in Narmada River. Shraddha et al (2008) while studying the hydrological parameters of Narmada River at Hoshangabad recorded water temperature between 18.6°C to 33.4°C.



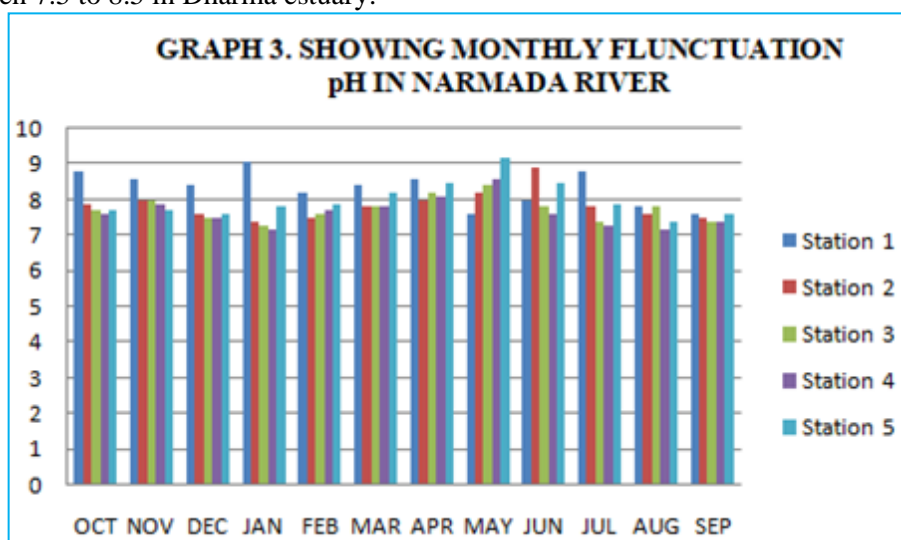
Transparency

Transparency is a characteristic of water that varies with the combined effect of colour and turbidity. It measures the depth to which light penetrates in the water body. In the present study the value of transparency varied from 12 cm to 53cm (Graph-3), the maximum transparency was recorded at S1. The transparency of the river was found to be lowest (12 cm) during rainy season and highest (53 cm) in winter. Reduced transparency during rainy season may be due to erosion of soil carried by runoff from the catchment areas. Jain and Sharma (2000) also reported lowest transparency in rainy season and maximum in winter.



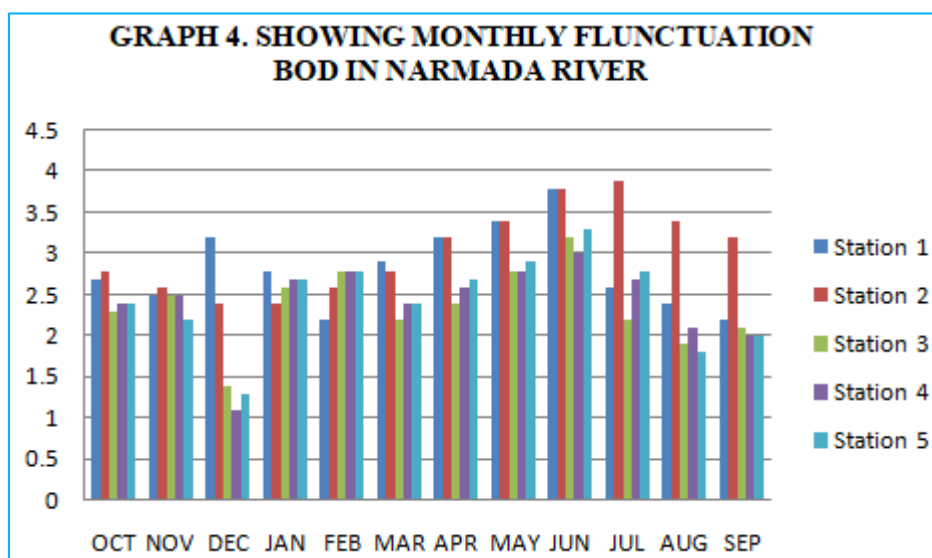
pH

pH is an important parameter which is important in evaluation the acid base balance of water. Natural waters generally have been found to range from 5.5 to 8.6 because of the presence of bicarbonates and carbonates of alkaline earth metals. Drinking water with a pH range from 6.5 to 8.3 has been necessary. During October 2019 to September 2019 pH showed variation between 7.4 to 9.2. The minimum pH of 7.4 was recorded at station-V Aug 2019 and maximum of 9.2 at station-V May 2019 (Graph 2). Sharma et al (2011) observed pH fluctuation between 7.6 to 9.9 in Hoshangabad area of Narmada River. Prasanna and Ranjan (2010) observed pH value between 7.5 to 8.5 in Dharma estuary.



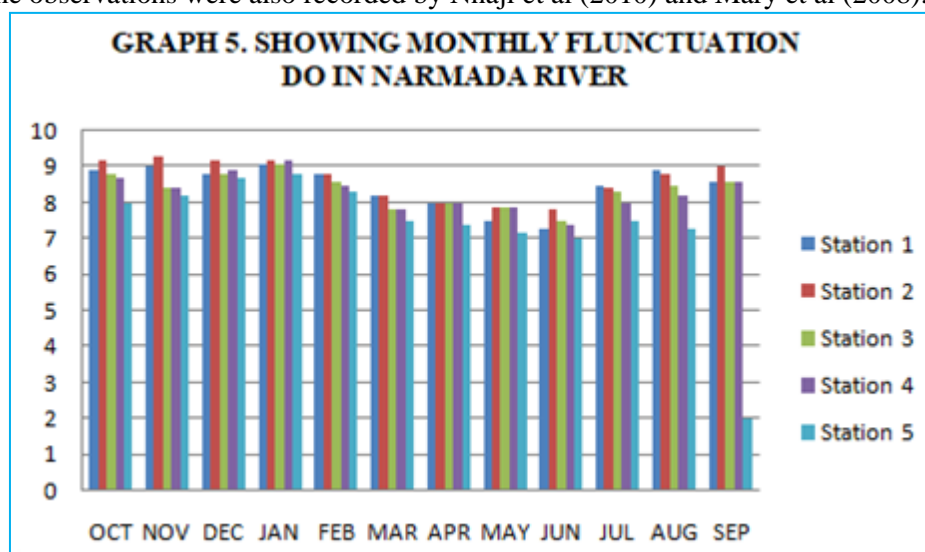
BIOCHEMICAL OXYGEN DEMAND

The biochemical oxygen demand, abbreviated as BOD, is a test for measuring the amount of biodegradable organic material present in a sample of water. In present study the BOD was ranged between 1.1 mg/l to 3.9 mg/l with minimum at S4 in the month of Dec 2018 and maximum at S2 in the month of July 2019 (Graph-4). In the present study usually the BOD values were obtained maximum in summer months at all sampling stations, which might be due to high temperature, this inurn promotes microbial activities and minimum BOD values obtained in winter might be due to low temperature and sufficient amount of water in the river. Similar observations were confirmed by many other workers such as Pathak and Mudgal (2005), Khanna (2003).



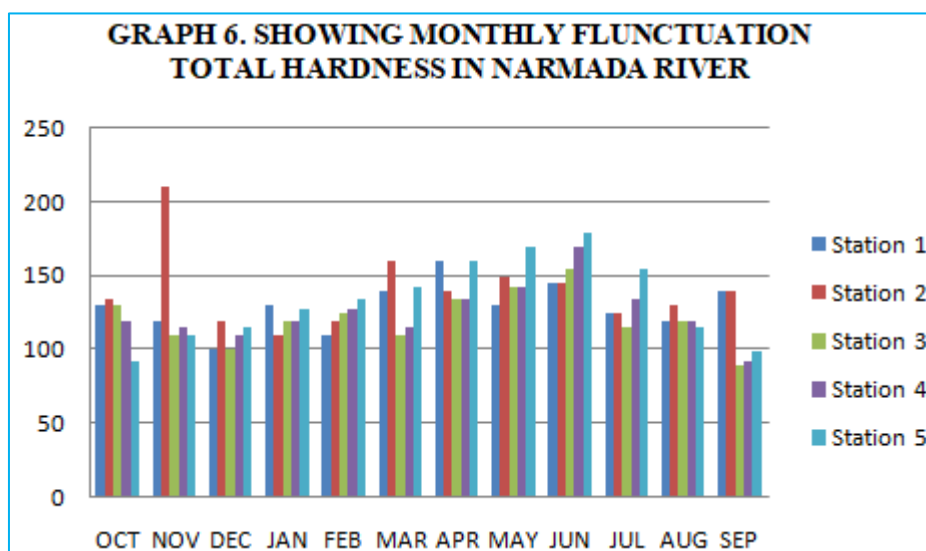
Dissolved Oxygen

Dissolved oxygen is paramount importance to all living organisms and is considered to be the lone factor, which to a greater extent can revealed the nature of whole aquatic system. During the present study the dissolved oxygen showed variation from 7.0 mg/l to 9.2 mg/l. The minimum dissolved oxygen of 7.0 mg/l was recorded at station-I in June 2019 and maximum of 9.2 mg/l at station-IV in January 2019 respectively (Graph 4). Same observations were also recorded by Nnaji et al (2010) and Mary et al (2008).

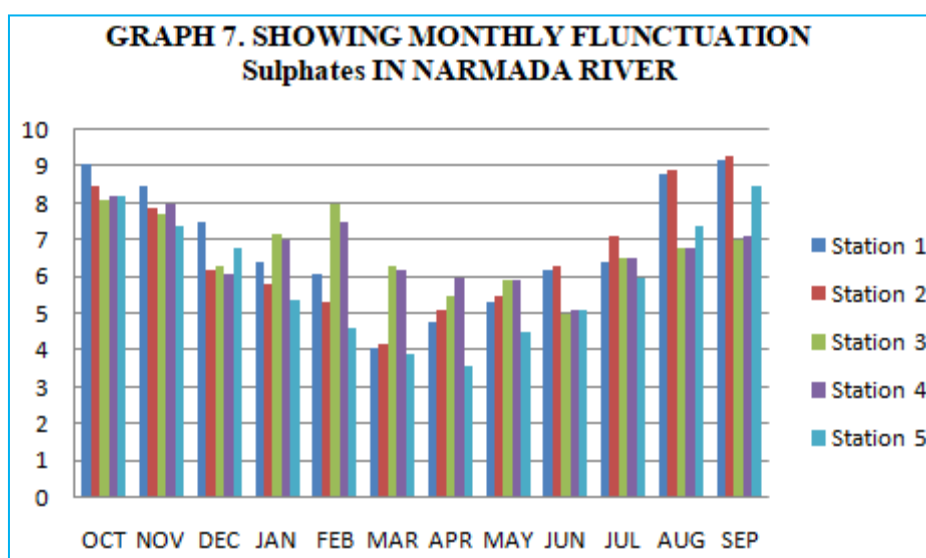


Total hardness:

Total hardness is the parameter of water quality used to describe the effect of dissolved minerals (mostly Ca and Mg), determining suitability of water for domestic, industrial and drinking purposes and attributed to presence of bicarbonates, sulphates, chloride and nitrates of calcium and Magnesium (Taylor 1949). The observation of total hardness reveals that the monthly variation in the water samples of Narmada river ranged between 90 mg/l to 210 mg/l with minimum at S3 in the month of Sep 2019 and Maximum at S2 in the month of November 2018 (Graph 6). The lower values of hardness in post monsoon might be due to settlement of anions and cations.



Sulphate: Sulphates are found appreciably in all natural waters, particularly those with high salt content. Besides industrial pollution and domestic sewage, biological oxidations of reduced sulphur species also add to sulphate content. Soluble in water, it imparts hardness with other cations. Sulphate causes scaling in industrial water supplies, and odour and corrosion problems due to its reduction to hydrogen sulphide. The observation of sulphate reveals that the monthly variation ranged between 3.6 mg/l and 9.3 mg/l. Minimum sulphate was recorded at S5 in the month of April 2019 and maximum was recorded at S1 and S2 in the month of September 2019 (Graph 7). Similar fluctuation in sulphate values were reported by Sharma et al (2004) in Yashvant Sagar reservoir India.



Conclusion

In the present study many physicochemical parameters and its characteristic behavior of a river water samples in different months and different sampling stations, the water quality of river is deteriorated due to domestic, industrial effluents direct discharge in to river and various human activities along the banks of the river. From the above study, it may conclude that except little variation, all the physico-chemical parameters were in permissible limit at the study site of the Narmada River. Minimum value of Temperature, pH and DO were recorded in January and February month and maximum value in June-July months. The results of present study indicate that physico- chemical parameters of Narmada River are within WHO limits. A continuous monitoring of the physico-chemical, parameters of this river is needed for drinking, agriculture, industrial, outdoor bathing etc. The Water Quality Indices are among the most effective ways to communicate the information on water quality trends to the general public or to the policy makers and water

quality management. The information obtained from this research can help decision-makers in proper management and protection of the Narmada River.

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