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Study of Physicochemical Parameters of the Rivers in India: A Review

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Abstract

From the ancient days it is well known that mostly human civilization is developed on the banks of the rivers. Human beings choose the river banks for the settlements as river are providing vital and mandatory natural resource the water for their daily needs and development. Keeping in mind this immense importance of the rivers, it is necessary to know its water quality. The physicochemical parameters are some of major indicators of the water quality.

Keywords: Human civilization; natural resource; Physicochemical; major indicators; water quality

1. Introduction

Water is very Important for the survival of the living being. Without water livelihood of the living organisms is not possible. For the survival and overall sustainable development of the mankind and the other living organism's water of good quality is necessary. All over the world rivers are the major source of the water therefore it is important to know its quality. The aim of this research work is to take review of the work done by the researchers on this topic in India. Ganga and Yamuna are the major rivers in northern part of India. Narmada is major river in central India. In southern states of India Godavari, Krushna and Kaveri are the major rivers. Main natural fresh water resources are the rivers. These rivers along with their tributaries are supplying the water to all the states of India. Agricultural lakes, Agricultural ponds are filled with river water and along with network of canals the river water is circulated. Such type of network for supplying river water

helps the agricultural sector which is still a major sector for employment generation and for our agro based economy.

2. Material and Method/Literature review

Number of researchers have carried out the work on this topic. In the present-day study review is taken of the study of physicochemical done by some research papers published in various online research journals from 2020 to 2024.

Dandawate (2022) have carried out physicochemical analysis of Pravara River water and its impact on human health in Sangamner tehsil. The results were compared with three standards namely BIS, WHO and ISI. Effect of industrial waste, municipality sewage and agriculture runoff on the river water were investigated. It is found that this water body is not suitable for drinking so possible remedial methods should be adopted for this water resource for improving its quality. The source of pollutant is local open domestic sewage coming from sewage pipes. Agricultural runoff containing fertilizers, pesticides and insecticides. It is suggested that the water should not be used for drinking and irrigation purposes without proper treatment as the river water is polluted. Sangani et al., (2021) have studied the selected hydrological parameters and analyzed the water quality index of Ambica River in Gujrat. They found that the water quality of the Ambica river is poor. The possible causes of deterioration of the water quality may be anthropogenic activities, unprotected river sites and runoff the catchment area. Without proper treatments the Ambica River water is not suitable for domestic usage. It is recommended that for the betterment of the river the domestic sewage or the industrial dumping must be stopped, public awareness and participation may involve in cleaning and protection of the river.

Shirdhonkar (2022) at Mandleshwar in Madhya Pradesh of India have studied the physicochemical parameters of Narmada River water. After examining the water parameters in the lab it was concluded that the water quality is suitable and safe for drinking and irrigation and all other useful purposes. At Budhanath ghat in Bihar the assessment of physicochemical parameters and correlation coefficient of River Ganga water was carried out by Mishra et al., (2022). Their study showed that the summer, rainy and winter seasons shown different seasonal fluctuations in various physicochemical parameters. They suggested that there is need of increasing awareness among the people to maintain the high river water quality and purity level. For improving the water quality there should be constant monitoring of pollution and methods should be applied for removing the water pollution at Budhanath Ghat of Bhagalpur in Bihar. In the Damoh district of Madhya Pradesh physicochemical analysis of the water of Sonar River was done by Ahirwal (2022). From the experimental results it is concluded that the water quality is good and most of the parameters were within the limits set by WHO and Bureau of Indian Standard (BIS). At present the river is suitable for irrigation and fisheries purpose. As water is used for drinking purpose to avoid contamination it is suggested that the proper measures are necessary.

Maurya et al., (2023) have studied the Sarayu River water by analyzing of water quality using different physicochemical parameters. They found that the bacterial count was higher in rainy season followed by summer and winter seasons. The finding of their study can be useful to monitor the water quality in different seasons, for drinking and irrigation purposes. They have observed the seasonal variations in various physicochemical parameters of the Sarayu River and the Water Quality Index was determined. Soni (2023) have analyzed the water quality of Vyarma river in Damoh district using physicochemical parameters. The study showed that the majority of the physicochemical properties of river water samples were within the ranges established by organizations like WHO and Bureo of Indian Standard (BIS). The results of data for TDS showed that the water of maximum study area is highly contaminated with total solids. Due to high concentration of TDS the water losses its quality and reduces the dissolved oxygen in water. The experimental results of the Vyarma River water quality investigation, the water quality is good with the exception of minor

variance all physicochemical parameters were within the acceptable limits therefore it can be used for drinking; suitable precautions are required to prevent pollution. The study indicate that the river is currently useful for fishing and irrigation purposes.

Yaduwanshi and Ghidiyal (2023) have done comparative study of physicochemical parameters of Ganga and Yamuna Rivers at Allahabad. They found that the most of the assed parameters were found to be above than permissible limits of WHO showing high pollution in rivers. During the study period it is concluded that the water quality of Ganga and Yamuna River is not suitable for drinking purpose. At Rewa in Madhya Pradesh, Dwivedi et al., (2023) have studied the different hydrobiological parameters of Beehar River. They discovered that the natural chemical makeup, including the amount of trace elements of the water does not harm or limit the living creatures in the water. Rajshekhar and Vijaykumar (2023) have assessed the water quality of the Bhima River for drinking purpose by Water Quality Index. They found that the overall water quality of the river is poor and unsafe for drinking. Large scale human activities such as discharge of household sewage and effluent may be responsible for this.

Monitoring and assessment of Subernarekha River water quality using Water Quality Index was done by Dahanga and Nath (2024). They observed that the life and livelihood of the tribal communities and fisherman communities residing on the riverbank is affected by river pollution. As per the Water Quality Index of the river water the river water quality is excellent to acceptable limit except in the month of April. The river water from the originating point is categorized as excellent, however the possible reason for slight variation in water quality index at other sampling site beyond the originating point is anthropogenic activities. Shrivastava et al., (2024) have carried out the assessment of the physical and chemical parameters of the Murna River and Spatial variation in water quality across different sampling sites. They have selected three sampling sites Kalyanpur Shahdol(S1), MPEB Shahdol (S2) and Sohapor Shahdol (S3). They found that there is varying degree of pollution and mineral content in different sections of the Murna River, with S_1 and S_2 relatively pristine and S_3 showing significant pollution and mineral content, likely from anthropogenic and geological sources. The study reveals that the water of river Murna is deteriorated very badly due to addition of urban waste and domestic sewage which enters the river from both the banks. Direct discharge of human and animal waste and also affects the health of the people downstream where water is used for bathing, washing and sometimes drinking purposes.

Bisht and Mehra (2022) have done correlation study on physicochemical parameters on water quality of Gaula River at Haldwani in Nainital in Uttarkhand. They observed that the values of the various parameters were almost under the permissible limit determined by WHO and Bureo of Indian Standards except turbidity which is slightly high during monsoon season. It is concluded that the water of Gaula River is fit for drinking purpose yet it need treatment to reduce the contamination especially turbidity content. In Bihar at East Champaran evaluation of water quality of Budhi Gandak River was done by Sharma and Ojha (2024). Their findings reflect that most of the water quality parameters are in the acceptable limits in accordance with WHO standards. They concluded that the water quality of Budhi Gandak River at Mehsi and Lalmetia place is permissible and suitable for drinking, bathing and even survival of aquatic life. Jharia et al., (2024) have assessed the physical and chemical parameters of the Sone River in Madhya Pradesh in India. They found that the water quality deteriorates downstream from the origin point and at Bansagar most significant pollution is observed. The findings suggests that substantial anthropogenic impact and sediment accumulation is responsible for the decrease in water quality. The findings also highlight significant spatial variations in water quality parameters along the Sone River indicating localized influences of natural and anthropogenic activities. For sustainable use of sone river water continuous monitoring and comprehensive river basin management

are essential to protect and restore the health of the river so that it can support diverse ecological functions and provide clean water for surrounding communities.

3. Conclusion

From the present review the study reveals that most of the rivers near human settlements are polluted. The water can be used for drinking purpose only after proper treatment it is suggested that the government authorities and NGOs are expected to increased their efforts for increasing the awareness about sustainable use of river water among the people.

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