Current Scenario Of Water Quality Status Of Indrayani River At Pune District, Maharashtra

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Abstract: At present, contaminated water bodies becomes a global environmental issue. In current situations, it receives a escalating interest throughout the world, because of its adverse impacts on human health, aquatic floara and fauna and on all over quality of healthy environment. Along with increased urbanization and industrialization use of water is also increased all over. Most of the areas from urban and rural area receives polluted drinking water. Present study focus on the water quality status of Indrayani river in district Pune. To monitor the water quality status of this river, some important parameters were analyzed such as, pH, Dissolved oxygen, Biological Oxygen Demand, conductivity, Total Solids, Total Dissolved Solids etc. the results from this study indicates that the continuous water quality monitoring is necessary in study area.

***Index Terms* – Water quality, Dissolved oxygen, domestic waste, industrial effluent**

I. INTRODUCTION

Water is very important natural resource for all living biota and it occupy 70% of earth surface area which is generally used for different purposes such as, agriculture, drinking, industrial, domestic and aquaculture (Appvu et al,2016). The rapid increase in world population rise does not match with the source of fresh water (Patil et al,2019). Water quality can be determined by analyzing physical, biological and chemical characteristics. Maharashtra state riched with various important rivers such as, Surya, Ulhas, Patalganga, Vaitarna, etc. most of the agricultural and domestic areas are dependent on rivers to fulfil their water requirements. But today, water quality of rivers is declined day by day due to various activities caused by human beings.

Generally river water contaminated with untreated sewage, industrial effluent, agricultural runoff, domestic waste water and solid waste disposal. According to WHO, 46,00,000 childhood deaths and 600 million cases are reported per year. Along with that the problem of eutrophication is observed because of high concentration of phophates and nitrates (Kumar et al,2018). It was observed that the wastewater released from towns and run off from agricultural fields has highest nutrient inputs and increased from last few decades. Discharge of pollutants in rivers affects the water quality and living organisms including fish community. It resulted in to degradation of their habitat (Pawar et al, 2011). Some major issues were observed related to degraded water quality such as, high nutrient content, decrease in dissolved oxygen, reduced fish population and high percentage of coliform bacteria. Depleted dissolved oxygen level causes increase in fish mortality rate (Manitcharoen et al, 2020). Leaching of agrochemicals, industrialization and urbanization causes a serious threats to our river and lakes (Bhalla et al,2013). The health of aquatic water bodies and their biological diversity is related with components of ecosystem (Gorde et al, 2013). Insufficient infrastructure services from collection to transportation and treatment, disposal of domestic sewage resulted in increased water pollution and caused health hazards (Nayak et al, 2016). It is reported that 70% of surface water in India is unsafe for consumption and monitoring of water quality of water resources becomes very important (Teri, 2021-22). By analyzing water quality parameters we can judge the water quality and continuous monitoring is necessary at regular time interval (Jadhav et al, 2020).

It is necessary to monitor the status of water contamination and water quality of rivers of our nation to assess their productivity, utilization and capacity (Thorat et al, 2020). In this work done, the study carried out by considering following objectives –

1. To assess the water quality of Indrayani river at which flows through the pilgrimage centers of Dehu and Alandi in Pune division.
2. To identify the sources of pollution and type of waste discharged.

The selected sites are different spots at Indrayani river. The Indrayani river originates in Kurvande village near Lonavala, Maharashtra, India and it flows east to meet the river Bhima through the pilgrimage center of Dehu and Alandi.

Material and methods

Collection of smaples were carried out from different sites of Indrayani river of Dehu- Alandi, Pune district. The samples were collected during the month of August 2023. Total five sites were studied with nearly about 10 km distance in each site from the first site of selection. Type of waste also observed for that particular distance starting from collection point. All standard procedures were used for the determination of physico-chemical parameters of water samples collected from decided sites of the river area. Each water sample is collected in one litre plastic container and preserved carefully. Dissolved oxygen was fixed on site for further analysis in laboratory. Water quality determined by analyzing parameters – pH, Conductivity, dissolved oxygen, Biological oxygen demand, total solids, total dissolved solids, Alkalinity, Hardness, turbidity, E.coli.

pH is very important parameter and determined by electrometric method by using pH meter. Alkalinity of water is due to hydroxides, carbonates and bicarbonates of elements such as calcium, magnesium, sodium and determined by titration method. The water having high solids is also unsuitable for use. Total solids and total dissolved solids determined by filtration and evaporation of water sample. Dissolved oxygen levels determined by Iodometric method. Biological oxygen demand also analyzed to determine organic load. Analysis for hardness carried out by using reagents such as Ammonia buffer solution, Erichrome Black T indicator, and standard EDTA solution.

Result and Discussion

Table 1

Sr.No.	Sampling sites	Distance from 1st sampling site	Threats to selected site
1	Site 1	0 km	Disposal of plastic waste, religious waste, bathing activities
2	Site 2	10 km	Single use plastic bags, plastic bottles, cloth washing
3	Site 3	20 km	Religious waste, washing of vehicles, livestock
4	Site 4	30 km	Agricultural runoff, washing of cattles, plastic waste
5	Site 5	40 km	Single use plastic bags, plastic bottles, cloth washing, vehicles

Table 2

Parameters	Site 1	Site 2	Site 3	Site 4	Site 5
pH	7.7	8.2	8.5	8.8	7.9
DO	2.3	3.6	5.3	7.2	6.9
BOD	36	52	5.4	39	21
Total solids	250	472	681	175	90
Alkalinity	100	120	128	92	115
Total dissolved solids	80	92	413	218	98
Hardness	120	162	156	182	126
Turbidity	9.7	15.36	8.2	21.36	10.2
E.Coli	20	24	28	18	26

pH is very important indicator of changing water quality. It can be affect by chemicals contamination in water. Continuous variations in pH value adversely effects on aquatic life. In the present study, it ranges from 7.7 to 8.8. Standard range as per WHO guidelines is 6.5 to 8.5. Dissolved oxygen is necessary to assess the quality of water and it is the basis of BOD test to determine pollution potential of waste. Dissolved oxygen ranged between 2.3 to 7.2 mg/L. Biological oxygen demand is important to determine the load of pollution in water. It is the amount of oxygen required by bacteria for stabilizing decomposable organic matter. It ranges between 5.4 mg/L to 52 mg/L. the values of alkalinity ranges between 92 mg/L to128 mg/L. Total dissolved solids are analyzed by taking weight of residue on evaporation after drying. The water with high percentage of solids is unsuitable for industrial use also. Total dissolved solids ranges between 80 mg/L to 413 mg/L and total solids ranges between 90 mg/L to 681mg/L. Turbidity is because of occurrence of suspended matters like clay and silt. It is important from aesthetic use also. It ranges from 8.2 NTU to 21.36 NTU. Total hardness ranged between 117 mg/L to 182 mg/L. The hardness content was observed because of soaps and detergents used for washing cloth by the people residing in that study area. Bacteriological analysis of water shows the presence of E.Coli bacteria count from 18 to 28. It is helpful to evaluate the potability of water.

Conclusion

In this work done, we analyze water quality parameters to determine the water quality status and pollution load of selected sites. This river mainly flows through pilgrimage area, so it was observed that the river water mainly polluted because of disposal of solid waste, plastic dumping and waste water released from residential areas, washing of clothes, cattle. Excess concentration of BOD, Turbidity caused increased the level of pollution. Dissolved oxygen level is below the Indian standards at site 1. It is also observed that, water quality is degraded day by day due to increased interference of human activities. There is need of continuous monitoring of water quality and public awareness regarding direct disposal of waste in river water in study area.

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