

Comparative Study of DO, BOD and COD of Indrayani River Water, Pune (Maharashtra)

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ABSTRACT

Indrayani river originates near Lonavala near Pune in Maharashtra. It meets to Bhima river and flows through Hindu pilgrimage centers of Dehu and Alandi. The waste from surrounding localities, industrial effluents located on the bank of river and agricultural run-off is directly mixed with river body. Due to which river water is highly polluted, basically from November to rainy season, the river water is not suitable at some places. Hence, to evaluate the water quality and to study the comparison of DO, BOD and COD this study was carried out.

Key words : Indrayani river, Industrial effluents, Agricultural run-off, etc.

Introduction

To protect the natural water resources, more studies on river water quality in and around any city should be carried out on the priority basis. It will be one of the important steps in this one of the very essential issue. So many factors are responsible for the deterioration of the water quality now a days. If we try to find out various water polluting factors, firstly sewage water, industrial effluents and agricultural run-off come to the mind. Due to direct mixing of these types of nutrients in to the river body results in depletion of oxygen. We all are well-known that oxygen level inside the water is having critical importance. As per the literature survey the oxygen level should be 5- 7 mg/l at the temperature 25-27 °C (Kleli, 1957; Mathew Koshy *et al.*, 2000).

If we consider the total scenario of river water pollution, Maharashtra has maximum number of polluted river stretches in the country. Untreated sewage discharge in rivers is one of the major reasons for polluted river stretches in the state. Here in case of Indrayani river, the level of dissolved oxygen decreased up to 2 mg/l at some locations. This is because there are several locations on the Bay of Indrayani River from where the polluted water was left directly inside the river. At some points a thick layer of toxic foam is observed which was floating on the river water. This was reported by residents. It was appearing like a snow, the froth is full of industrial and residential waste. Residents reported that industrial effluents from industrial units within PCMC limits are being released continuously in to river body at multiple places.

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Experimental

For this study seven sampling stations were selected. While selecting a sample stations care was taken that selected sampling stations should be self explanatory means they should give maximum pollution load. The study was carried out in the year 2017-18. The samples were collected in the morning time between 09.00 to 11.00 am. The samples were collected in two litre plastic bags. Before the collection of samples bags were sterilized with distilled water. Standard testing methods given by APHA (1985) and Trivedy (1984) (Trivedy and Goel, 1984; Jadhav and Jadhav, 2013), were followed these collected water samples.



Fig. 1. Foam formation on the surface of water body due to industrial effluents.

Results and Discussion

Here, we have worked on Indrayani river water for the period of November 2017 to May 2018. While studying the river at seven sampling stations nine parameters are studied. But except chloride rest of the parameters are within the permissible limit given by WHO (Jadhav *et al.*, 2013); BIS, 1991; Jadhav and Jadhav, 2021). Our major aim of this



Fig. 2. Mixing of unwanted waste in to river body

work is to do the comparative study of DO, BOD and COD.

DO is a measure of oxygen present in the river body. Means this much amount of oxygen is available to living aquatic organisms. Depending upon the oxygen level, the quality of river or lake water is decided (Sawane *et al.*, 2004; Tiwari, 2004). Healthy water should have oxygen concentration in the range of 6.5 to 8.00 mg/l (Chauhan, 1998). COD or Chemical Oxygen Demand is nothing but the total measurement of all the chemicals present inside the water body.

Biochemical Oxygen Demand (BOD) gives an idea about how much amount of oxygen is consumed by the bacteria and other microorganisms when they decompose organic matter under aerobic conditions (Sangpal *et al.*, 2011; Singh and Rai, 2003), but all these are observed at a specified temperature.

If the river water is used for drinking purposes, the acceptable limit of Chemical Oxygen Demand (COD) is 4 mg/l. If the concentration of organic material increases, the COD value also gets increases. Generally, water with high COD value typically contains high levels of decaying plant matter, human waste or industrial effluents (Mishra, *et al.*,

OBSERVATION TABLE

Parameter	Nov 2017	Dec2017	Jan 2018	Feb2018	March2018	April2018	May2018
pH	7.6	7.4	8.1	7.3	7.4	6.8	6.9
DO	3.3	4.2	4.7	5.8	5.6	5.4	5.1
BOD	4.3	4.4	8.4	6.2	6.1	6.5	8.6
COD	146	118	121	123	130	146	184
Chloride	148	116	123	121	129	143	181
Nitrate	29	31	30	17	19	23	21
Sulphate	21	31	29	33	31	30	32
Calcium	63	65	61	44	51	39	37
Magnesium	29	32	27	33	28	27	20

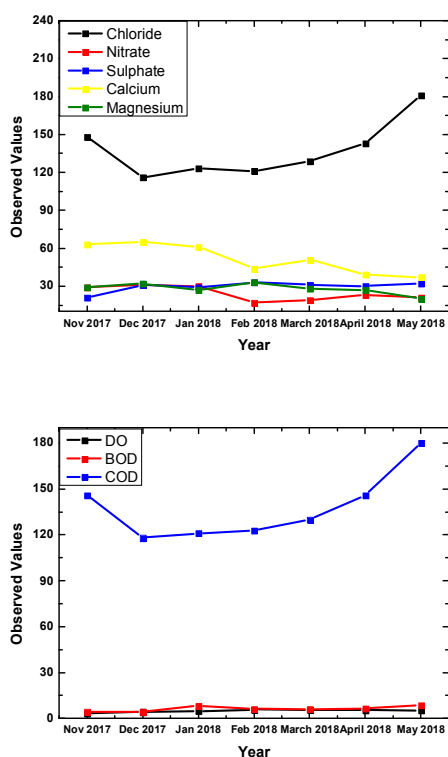


Fig. 3. Graphical Presentation of all the parameters

2000). Hence, if COD value is higher this means more amount of oxidisable organic material in the water sample (Mushekar, 2011), which reduce DO percentage and leads anaerobic conditions, and is not good for aquatic life.

Conclusion

By studying the oxygen related parameters, i.e. DO, BOD and COD. It is clear that, the COD concentration for this water analysis is more. This means that the river is having organic load in the form of waste and industrial effluents. Hence, for human consumption the river is not suitable as far as COD point of view. Generally, BOD of clean fresh water is 2 mg/l. If this value exceeds to 5 mg/l, which indicates some sort of contamination. Hence, aerobic microorganisms live by decomposing organic matters. Here, the amount of oxygen used is proportional to their number and metabolic rate. Hence, more the number of organisms in the water body, the more would be requirement of dissolved oxygen in the water body. DO is influenced by temperature and type of water body. A river which is constantly streaming dissolves more oxygen as compare to ponds and reservoirs.

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