

# Analysis of River Water Quality with Special Reference to Nitrate Concentration of Indrayani River, Pune

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**Abstract**— Indrayani River water analysis was carried out in the period from February 2015 to January 2016 to evaluate the various water quality parameters. The monthly values of nine water quality parameters viz., pH, Dissolved Oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, Chlorides, Nitrate, Calcium, Magnesium and Hardness etc. were used. The aim of the work under the title is to analyze the river by dividing it into various sampling station. The present study also identifies the critical pollutants affecting the river water quality during its course through the city. Detailed research and analysis is needed to evaluate different process and mechanism involved in polluting water. It was found that the water quality ranged from satisfactory to marginal category at major sampling stations. This information will be helpful for users of the river water.

**Keywords**— Water Quality Parameters, Indrayani River, Pollutants.

## I. INTRODUCTION

Water is a universal solvent. It is observed in a liquid form at ambient conditions. Water is one of the most important compounds to the living system on the earth. The quality of water can be decided on the basis of its physical, chemical and biological properties. [2,6] Now a day's water gets polluted due to increased human activities; increased industrializations and excessive use of fertilizers to get more productivity in the agricultural area is also one of the reasons of water pollution [3]. Hence, it is essential to check the quality of water at regular time span, which is going to be used for domestic as well as irrigation purposes. As per the reports given by WHO [28] and similar authorities, majority of the diseases in human are coming from water. Water suitable for drinking is most important thing in humans and other living animals. Surface water is one of the major sources of drinking water in rural as well as urban area [4]. Due to the agricultural run-off and industrial waste the quality of water is going to change drastically [21]. If the ground water is contaminated then its quality cannot get the original taste of pure water even though we stop the entry of pollution causing parameters [25].

In the fast development of any country, the availability of good quality of water for domestic and agricultural use plays an important role. But, due to increased urbanization and industrialization demand and supply of fresh water is a

difficult task in front of government organizations [5,7]. The humans and aquatic life is threatened by the discharge of untreated waste water and unscientific disposal of solid wastes which are polluting the entire water body. If amount of nitrogen is increased, the plants become more attractive (greenish) to insects. Generally, this case is observed in sugarcane belt [20]. As to get more yield farmers use more amount of fertilizers. The unused nitrogen goes to rivers through agricultural run-off. In drinking waters if the nitrogen is beyond permissible limit can pose serious health problems [8-11]. In this work an attempt is made to present the obtained results in the quality of Indrayani river water for domestic and agricultural purposes [12,13].

## II. STUDY AREA

The Indrayani River originates in Kurvande Village near Lonavala; a hillstation in the Sahyadri mountains of Maharashtra. River flows east from there to meet the Bhima river through Hindu pilgrimage centers of Dehu and Alandi. It flows mostly north of Pune. It is termed as a holy river. As on the bank of river Hindu pilgrimage centers of Dehu and Alandi are situated.

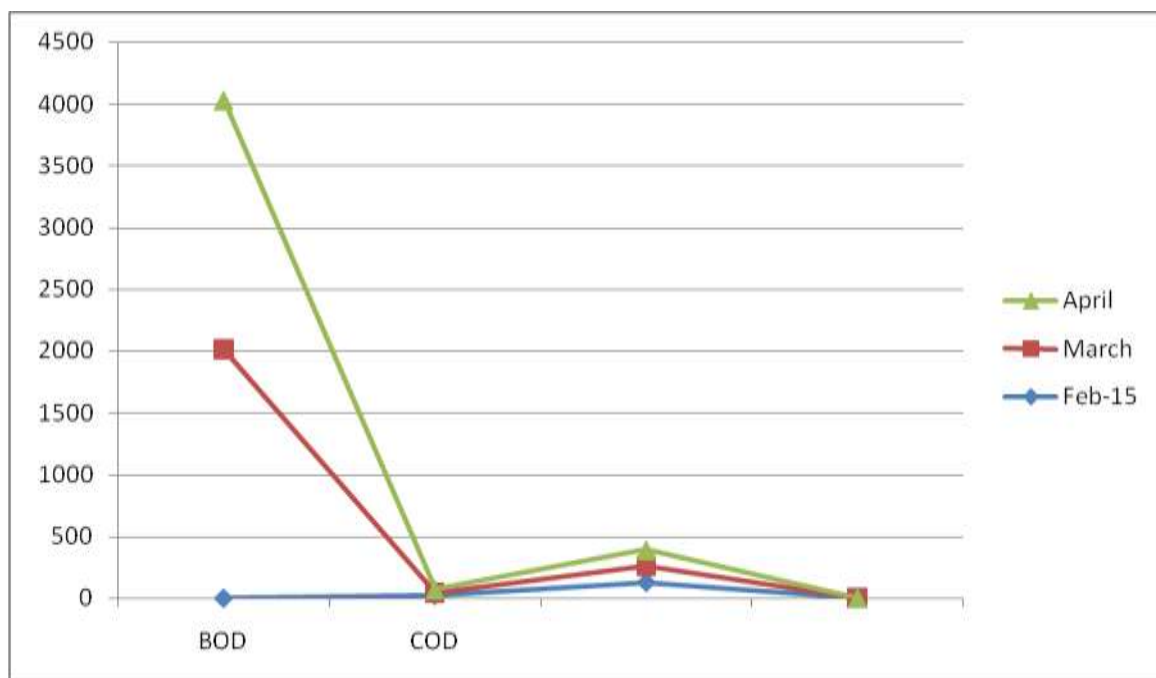
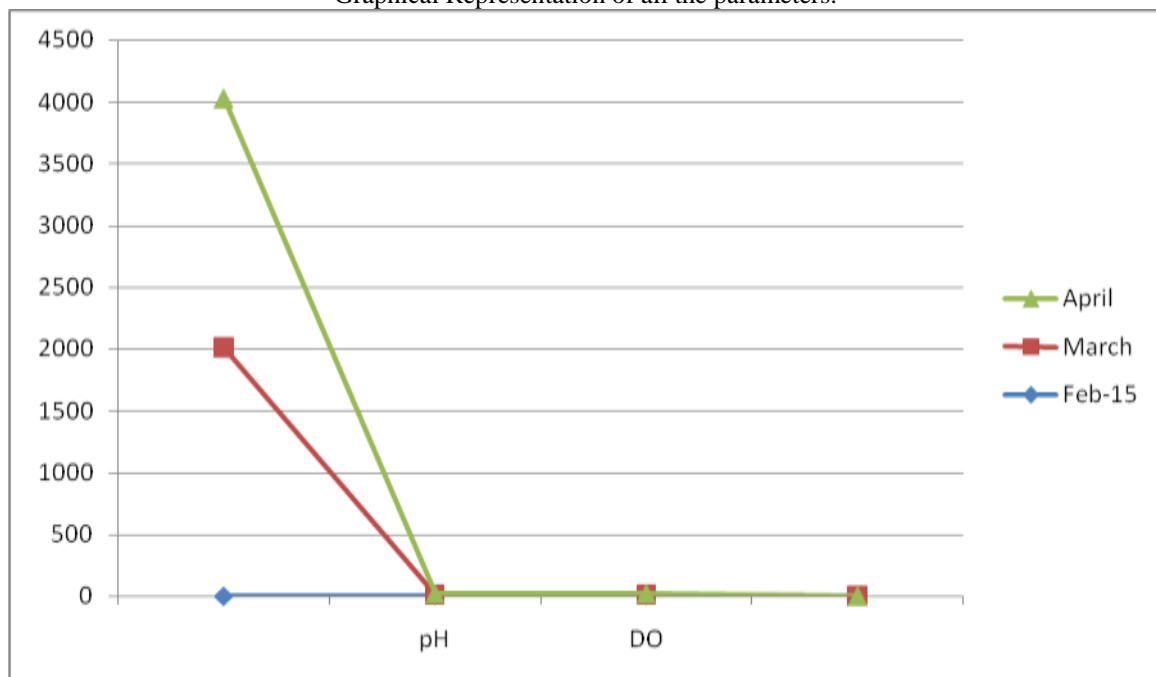
## III. MATERIALS AND METHODS

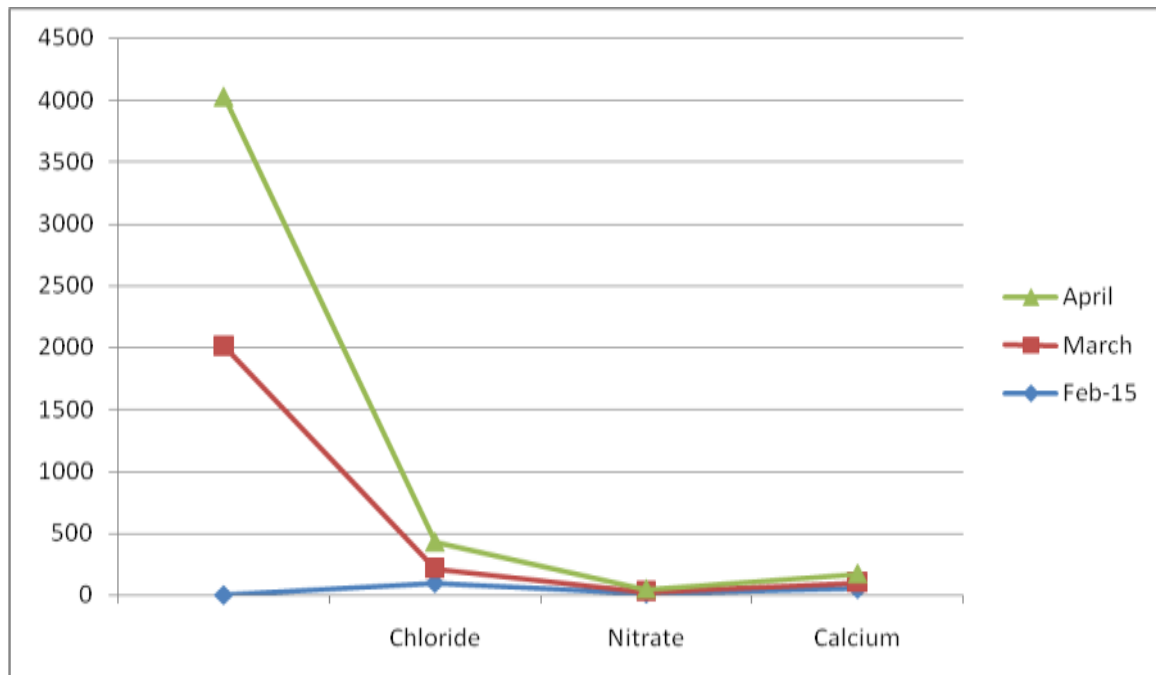
**Water Sampling:** The water samples were collected as per the standard methods given by APHA (1995) [1] in the period from February 2015 to January 2016. Total nine water samples were collected from the river. These samples are collected in two litter plastic bottles, which were washed and rinsed with distilled water before the collection of water samples. Separate samples are collected for dissolved oxygen. After the collection of samples they are analyzed immediately for various parameters or preserved safely by taking suitable precautions to avoid deterioration.

IV. OBSERVATION TABLE

Parameters	Feb 2015	March 2015	April 2015	May 2015	June 2015	Oct. 2015	Nov. 2015	Dec. 2015	Jan. 2016
pH	6.5	6.6	5.8	5.7	6.3	6.9	7.01	7.00	6.9
DO	6.3	6.2	6.3	7.2	6.4	6.6	6.4	6.5	6.6
BOD	23	22	24	30	26	29	23.9	26	27
COD	128	133	128	244	117	132	151	126	124
Chloride	96	121	213	241	169	132	138	141	148
Nitrate	12	17	21	23	28	37	35	38	26
Calcium	48	57	68	73	59	79	63	62	66
Magnesium	22	20	27	29	26	36	39	38	42
Hardness	121	167	154	160	149	162	158	146	153

Graphical Representation of all the parameters.





### V. RESULTS AND DISCUSSION

pH is an important factor. The suitability of water for various purposes is dependent on the pH. In this study pH was found alkaline; it might be due to the discharge of domestic effluents which are mixed in the river body [14,15]. Dissolved oxygen is important for the aquatic organisms. Free oxygen is essential for the respiration process. Here, the DO levels are observed in the range of 6.2 -- 7.2 mg/l. This shows that the quality of water is average. Oxygen required for the aerobic organisms is nothing but biological oxygen demand [16]. Natural waters will have BOD, 5 mg/l or less. If BOD is increased oxygen is depleted in the river body; hence, lesser amount of oxygen is available for the aquatic life [17]. The COD gives an idea about the organic matter in the water body [18,19].

High amount of chlorides in the water body indicates the pollution levels due to organic waste or industrial waste [20,23]. Basically chlorides occur in water naturally. The chloride levels in the present work are maximum in summer. To assess the biological productivity of water determination of nitrogen is important [24]. If the amount of nitrogen and phosphorus is increased, it leads to Eutrophication [26, 27]. Here, in this work the amount of nitrogen is more, and it may be due to nitrogenous fertilizers and sewage water. Calcium, magnesium and hardness are the important factors while determining the suitability of river water for domestic as well as irrigation purposes [22].

### VI. CONCLUSION

Thus the present study was concluded that river water of a study area was not highly polluted in respect to physico-chemical assessment. But at some sampling stations the river water is contaminated due to addition of unwanted parameters and disposal of wastes, which require continuous monitoring

and treatment process if the water is to be used for domestic and irrigation purposes. The major sources of nitrate pollution in river water were excessive use of nitrogenous fertilizer, organic waste and untreated sewage water. Nitrate pollution has become one of the key environment issues because of its implications on human and animal health.

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