

# **Impact of Dissolved Oxygen in Pre and Post Lockdown in Ganga and Yamuna River**

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## **ABSTRACT**

A number of the vital important parameters for assessing the water grade like DO (Dissolved Oxygen), were monitored at exceptional locations in a few foremost Indian rivers. The results received from data that take a look at well-known shows that the vital parameters had growing values in some monitoring locations, decreasing values, and no variant in values at some other locations. It's far endorsed to have better values of DO. There was no discharge of industrial wastes, motels/restaurants waste, immersing of idols in the course of spiritual festivals, and so forth., to the rivers in the course of the COVID-19 lockdown. Therefore, enforcement of strict policies via the government of India for disposal of wastes constituted of industrial & home activities can extensively reduce the water pollution levels within the Indian river Ganga and Yamuna

**KEYWORDS;** DO, COVID, Ganga, Yamuna

## **INTRODUCTION**

COVID-19 stands for Corona Virus Infectious disease, whose 12 months of occurrence is 2019. it's miles due to the pathogen intense Acute respiratory Syndrome Corona Virus-2 (SARSCOV-2) belonging to the  $\beta$ -subgroup of the Corona virus own family. The sickness became first identified in Wuhan town, Hubei province of China, which later spread its tentacles to over 220 nations and territories round the sector. The government of India imposed a national lockdown in the middle of the night of 24th March to restrict the unfolding of the deadly Corona virus disease Covid-19. The arena fitness company (WHO) declared it a worldwide pandemic of worldwide concern on 30th Jan 2020. It's far determined that human-to-human transmission is specially with the aid of near contact with an inflamed man or woman thru coughing, sneezing, breathing droplets but, there are instances suggested of transmission through viral dropping via feces [1,2]. Some of the commonplace signs of COVID-19 infection are fever, headache, fatigue, dry cough, respiratory distress, vomiting, diarrhea, and so on. Water pollutants is a first- rate worldwide problem that gives upward push to water-borne illnesses consisting of cholera, typhoid, hepatitis, etc.,[3,4]. As according to estimates, each year. globally, around 1.7 million youngsters beneath five years of age die, and 38 million Indians suffer from numerous water- borne illnesses. Before the COVID-19 lockdown, most important Indian rivers and lakes had been closely polluted because of human activities and getting hard to be handled [5, 6]. As mentioned with the aid of the vital pollutants manage Board (CPCB) of India, forty million litres of wastewater enter the rivers and different water bodies every day. The simplest 37% is handled correctly [7]. The rapid urbanization has induced infection of 70% of freshwater resources in India making them undeserving for consumption.

The imposition of lockdown to comprise the spread of the virus led to restrictions on public transportation, business and business sports that positively impacted the surroundings and were a blessing in hide to Mother Nature [8-10]. Development in water quality throughout the river water surroundings because of decreased monetary activities resulted in much less pollution discharged to the rivers [11-13]. Ganga river water has proven full-size development throughout the COVID-19 lockdown and has become suitable for bathing at most monitoring stations. The enforcement of national lockdown also advanced the health of other main Indian rivers.

## **SITE SELECTION**

The investigators on the river Ganga (ganga) from different ghats like; bithoor,bharav,jajmau kanpur and Yamuna (kesighat vrindavan) All samples were sampled from 2018 to June 2020. DO was studied in the field and the rest were done in the laboratory

## **METHODOLOGY**

### **Dissolved Oxygen (DO)**

The DO values usually remain lower than those of the system, where the rate of photosynthesis is high. (Banerjee U.S. and Gupta S., 2012) incurrence with the observations of other investigators. (Mishra A., Mukherjee A. and Tripathi B.D 2009)

DO is an important water quality analysis parameter indicating level of water quality and organic pollution in the water body.( Wetzel R.G. and Likens G.E, 2006)The value of DO is remarkably significant in determining the water quality criteria of an aquatic system. DO value is usually lower in the system where the rate of respiration and organic decomposition is high than the system where the rate of photosynthesis is higher. Largest values of DO in winter might be due to the fact that the solubility of DO increases with the decrease in water temperature. DO levels are important in the natural self-purification capacity of the river. (Zeb B.S., Malik A.H., Waseem A. and Mahmood Q.2011)

1. Winkler's Idometric method

### **Reagents**

The following reagents were used

- Sodium thiosulphate 0.025 N 24.82 gm of  $\text{Na}_2\text{S}_2\text{O}_3$ .  $\text{H}_2\text{O}$  was boiled to dissolve and diluted to 1 lit. to prepare 0.1 N stock solution 0.4 gm of borax or pallets of NaOH were added as stabilizers. To prepare 0.025 N solution stocksolutions (0.1N) was diluted 4 times and then kept in a brown glass stoppered bottle.
- Alkaline potassium iodine solution
- 100 gm of KOH and 50 gm of KI were dissolved in 200 ml of distilled water.
- Manganous sulphate solution
- 100 gm of  $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$  was dissolved in 200 ml. of distilled water and then filtered.
- Starch solution
- 1 gm of starch was dissolved in 100 ml of warm (80°C- 90°C) distilled water and a few drops of formaldehyde solution were added.
- Sulphuric Acid
- $\text{H}_2\text{SO}_4$  conc

**Procedure**

A glass stoppered bottle also known as BOD bottle is taken of volume 100-300 ml and the sample is poured in the same with caution so as to avoid any kind of bubble trapping in the bottle after the stopper is placed. 1 ml of MnSO<sub>4</sub>, and 1 ml of alkaline KI A solution was added to a 300 ml sample well below the surface with the help of separate pipettes. Brown precipitate will appear which indicates the presence of oxygen. After placing the stopper, the contents were shaken well by inverting the bottle repeatedly. Precipitation was allowed to settle down. 1-2 ml. of concentrated H<sub>2</sub>SO<sub>4</sub>, was added to shake well. A whole content was removed in a conical flask for titration to avoid bubbling caused by oxygen. Within one hour sodium thiosulphate solution is used for dissolution of precipitate by the process of titration using a little starch as indicator which results in changing the initial dark blue black colour to colorless at the endpoint.

**Calculation**

(ml x N) of titrant x 8 x 1000 Dissolved oxygen (mg/l) =.....

V<sub>2</sub> (V,-v) / V<sub>2</sub>

Where

V<sub>1</sub>=Volume of sample bottle after placing the stopper V<sub>2</sub>=Volume of the part of the contents titrated.

V=Volume of MnSO<sub>4</sub> and KI added

**OBSERVATION**

Table 1: dissolved oxygen quality of 2018, 2019 and 2020 of River Ganga Kanpur

| Station name | Year | DO(mg/l) |
|--------------|------|----------|
| Bithoor      | 2018 | 8.2      |
|              | 2019 | 7.7      |
|              | 2020 | 8.9      |
| Bharav Ghat  | 2018 | 7.7      |
|              | 2019 | 7.9      |
|              | 2020 | 8.5      |
| Jajmu Ghat   | 2018 | 6.7      |
|              | 2019 | 7.1      |
|              | 2020 | 7.5      |

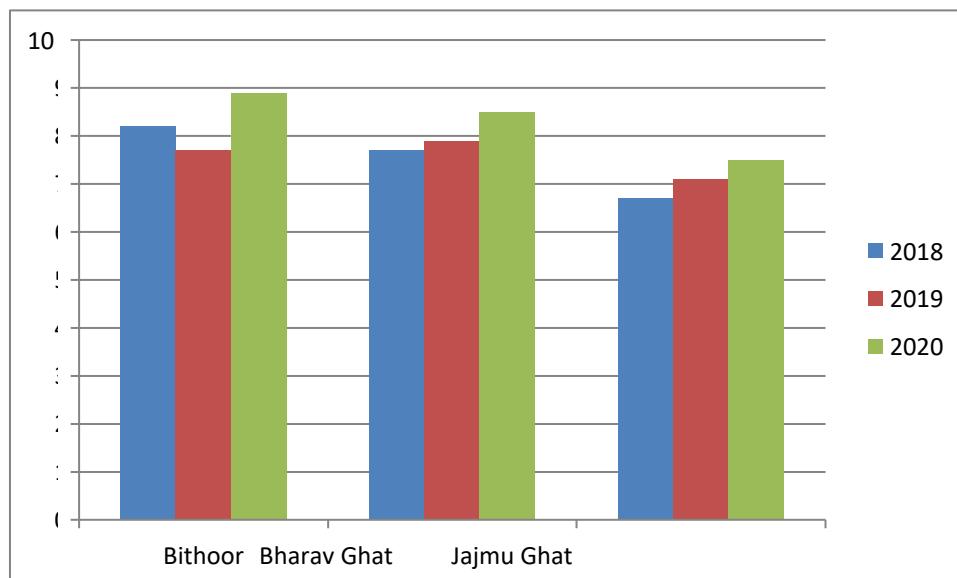
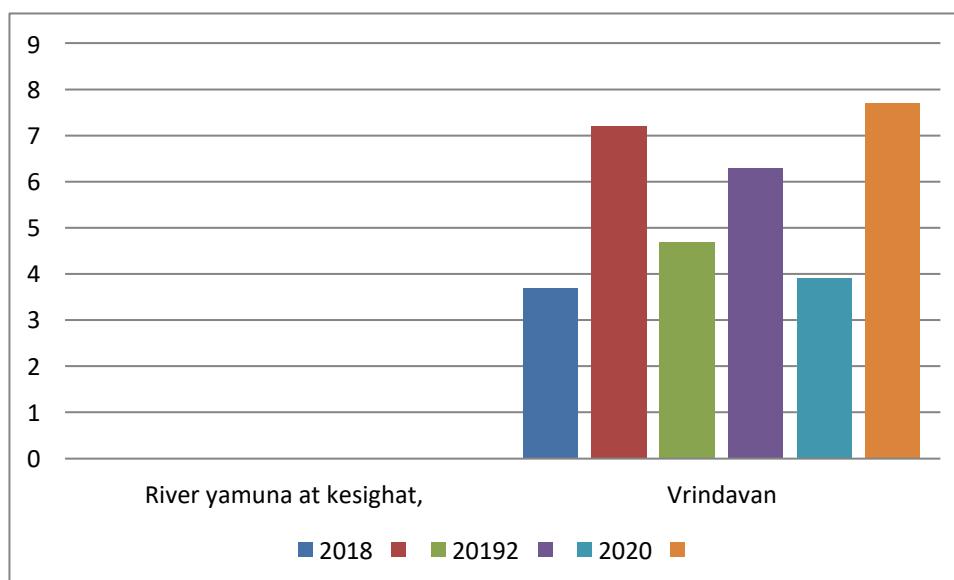


Table 2: dissolved oxygen quality of 2018, 2019 and 2020 of River Yamuna vrindanan

| Station name                           | year | DO(mg/l) |     |
|--|------|----------|-----|
|  |      | min      | Max |
| River yamuna at kesighat,<br>Vrindavan | 2018 | 3.7      | 7.2 |
|  | 2019 | 4.7      | 6.3 |
|  | 2020 | 3.9      | 7.7 |



## RESULT AND DISCUSSION

A decrease in DO is due to an increment in biological and photosynthetic activities. DO test is one of the most important indicators of pollution in river water. The decrease in DO is due to an increase in biological and photosynthetic activities (Bhardwaj, 2005). In the system where the rate of respiration and organic decomposition is high, the value for dissolved oxygen remains lower than that of a system where the rate of photosynthesis is high. High pollution loads may also decrease dissolved oxygen value. The imposition of lockdown to manipulate the spread of the Corona virus has

resulted in a huge reduction in water pollutants degrees of the Ganga River by using 25 to 30%. the biggest and quite contaminated river runs in northern parts of India. In common, the DO concentration extended through 20 to 30% based totally on the studies conducted to screen the water pollutants stages of the sacred riverIn Vrindavan (UP), the river Yamuna was monitored. Increasing values of DO were observed in locations,

## CONCLUSION

In this manuscript, the authors tried to address the effect of COVID-19 on water pollutants in Indian rivers. The crucial parameters for assessing the water best DO in some massive Indian rivers at some point of pre-lockdown and lockdown are studied in this work. The pollution tiers reduced inside the essential Indian rivers due to the Covid-19 lockdown, thereby showing an exquisite improvement in water satisfactory due to a whole halt to tourism, pilgrimage, and commercial sports. However, home sewage contributed to the pollution of the water bodies. The findings recommend that the important parameters monitored at some point of the lockdown duration showed fine degrees. Those modifications can be temporary because, after the lockdown, business and human sports will increase, due to which extra pollutants will be discharged to the water bodies. Therefore, it's important for governments in preferred/ individuals particularly, to study from the environmental effect due to lockdown and undertake proper measures to lessen pollutants on a long-time period foundation for the welfare of society.

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