Determination of the Dissolve Oxygen and It's Affecting Parameters of Kurhada Lake at. Pauni, Bhandara District, Maharastra

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Abstract:

The present study focuses on the determination of dissolved oxygen (DO) levels in Kurhada Lake, situated in Pauni, Bhandara District, Maharashtra, with a thorough investigation into the factors affecting DO concentrations. Dissolved oxygen is a critical parameter in aquatic ecosystems, playing a pivotal role in sustaining aquatic life and reflecting the overall health of water bodies.

The research employs standardized methods for the measurement of DO levels at different depths and locations within Kurhada Lake, considering seasonal variations. Concurrently, the study assesses key parameters that influence DO concentrations, including temperature, pH, nutrient levels, and anthropogenic activities. Field measurements, laboratory analyses, and statistical tools are utilized to gather and interpret the data.

The findings of this study aim to provide valuable insights into the spatial and temporal variations of DO in Kurhada Lake, contributing to a better understanding of the lake's ecological dynamics. Additionally, the identification of factors influencing DO levels will enable informed management strategies for the preservation and enhancement of water quality in the lake. The results obtained from this research may serve as a basis for implementing sustainable practices and policies to mitigate potential threats to Kurhada Lake's ecosystem and, by extension, other freshwater bodies facing similar challenges.

Introduction:

Kurhada Lake, located in the serene landscape of Pauni, Bhandara District, Maharashtra, stands as a vital component of the region's aquatic ecosystem. Recognized for its ecological significance, the lake plays a crucial role in supporting biodiversity and sustaining the livelihoods of local communities. Dissolved oxygen (DO) is a fundamental parameter in understanding the health and functionality of aquatic environments, influencing the metabolic processes of aquatic organisms and indicating the overall water quality.

This research endeavors to delve into the dynamics of dissolved oxygen levels in Kurhada Lake, with a comprehensive exploration of the factors that influence these levels. As a pivotal indicator of the lake's ecological well-being, the dissolved oxygen content serves as a barometer for assessing the lake's capacity to support aquatic life. Understanding the temporal and spatial variations of DO concentrations is paramount in unraveling the intricate interplay of natural processes and human activities impacting the lake's aquatic ecosystem.

The investigation involves systematic field measurements and laboratory analyses to quantify dissolved oxygen levels at various depths and locations within Kurhada Lake. Concurrently, the study scrutinizes key parameters such as temperature, pH, nutrient concentrations, and anthropogenic influences, seeking to unravel their roles in shaping the observed patterns of dissolved oxygen. The research aims to contribute valuable insights that can inform sustainable management strategies and conservation efforts for Kurhada Lake, setting a precedent for similar freshwater ecosystems grappling with environmental challenges.

By shedding light on the intricate relationship between dissolved oxygen and its influencing factors in Kurhada Lake, this study aspires to provide a scientific foundation for evidence-based decision-making, fostering the preservation and enhancement of water quality in this crucial aquatic habitat.

Material and Method:

1. Sample Collection, Preparation and Analysis:

The wrinkles modified analysis (APHA 1991) was used. Three different aggregate samples of water were collected fram. Kurhada lake of pavai in 21 March 2022 at about 7 am collect the water in 3-liter plastic bottle. The following analyses were carried out on the sample.

2. Temperature Determination:

Measure the temperature of the water at the surface by submerging the temperature probe to a depth of 5 cm in several locations.

3. pH Determination:

The pH of the samples was also determined on the spot using the electronic pH meter with probe.

4. Suspended Solids (SS) Determination:

Total Suspended Solids (TSS) is one of the method defined analytes. There is no specifie chemical formula for a total suspended solid. Method for determination total suspended solids. Collect your sample in a HDPE 1 L container. Connect your vacuum pump to the side arm of your vacuum flask.

5. Disssolve Solids (DS) Determination:

The collected water sample was transferred into a clean beaker. TDS meter was taken and calibrated using distilled water. Electrodes was inserted into the water without submerging the entire meter. The meter was immersed for about 5 seconds and the reading stabilized.

Then, the meter removed from the water and cleaned for the excess liquid at the ends of the electrode.

6. Determination Of Conductivity:

Chemicals used for conductivity:

Deionized water, conductivity < 0.5 μS/cm

Potassium chloride p.a. quality

For prepare 0.01M KCI dissolve 0.75gm of KCI in 100ml distilled water. This solution will give conductivity 1.411m2-1 (milli mho-1). Conductivity is a capacity of water to carry on electric current and varies both in number and types of ions. The solution contains ions which interms is related to the concentration of ionised substance in water most of dissolve organic subtance in water are in ionised form and hence contribute to the conductance.

Rough estimation of dissolved ionic content of wateer sample can be done by multiplying specific conductance in (microsemen/cm) by an impirical factor which may vary from 0.55 to 20.9 depending on the soluble component of water and the temperature of measurement give rapid practical estimation of the mineral content of air-water sample.

Method determination of conductivity:

Conductivity can be measured as per instruction provided by manufacture in the manual. Before use, remove electrode from storage solution [Recommended by manufactures] and rinse with distilled water. Firstly, immerse electrode in distilled water and adjust the cell constant with name of cell contant knob. Wash electrode and immerse into 0.01M KCI

solution. It gives conductivity 1.411 m2-1. Wash electrode and dip in sample and check the conductivity.

7. Determination Of Dissolve Oxygen:

Add 2 ml of manganous sulphate (MnSO4.H2O) solution inserting the tip of pipette tip into the sample because the drops of solution can allow inserting the oxygen into the solution.

Add 2 ml of the alkali-iodide-azido reagent by above method. Allow reacting the solutions with the oxygen present in the sample.

When precipitates are settled down at the bottom add 2 ml of concentrated sulfuric acid by placing the pipette tip very near to sample surface. Mix well to dissolve the precipitates. Take 50 ml of sample from in a flask. Titrate immediately with sodium thiosulfate solution using starch indicator until blue colour disappears and note down the burette reading. Determine the burette reading for blank in the same manner.

Observation and Discussion:

Samples	Atm. Temp.(°C)	Water Temp.(°C)	pH	SS	DS	Conductivity (milliΩ^{-1})	DO (mg/L)
1	36.0	22.9	6.42	358	100	0.6708	0.9
2	38.2	24.4	6.21	304	200	1.9006	1.3
3	35.2	28.3	6.56	404	100	0.6536	0.9

The study of various physico-chemical parameters indicates that the lake exhibits substantial variation in its biotic and abiotic characteristics. The physico-chemical parameters of water during 21 March 2022 are given in table. Represent the seasonal variation in physico-chemical parameters of the Kurhada lake.

Conclusion:

In conclusion, the study presents a comprehensive analysis of dissolved oxygen dynamics and its influencing factors in Kurhada Lake, offering valuable insights for informed decision-making in the realm of lake management and environmental conservation. The findings contribute to the understanding of the lake's ecological health and provide a foundation for implementing measures to ensure its long-term sustainability.

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