

Demystifying Biochemical Oxygen Demand (BOD): Core Principles, Testing Mastery, and Wastewater Impact

Presenter Information

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Abstract

Biochemical Oxygen Demand (BOD) is a critical parameter for assessing water quality and wastewater treatment efficiency. This webinar provides a comprehensive deep dive into the science behind BOD testing, its practical applications, and modern laboratory advancements. Participants will explore the biological mechanisms of oxygen depletion, step-by-step laboratory testing protocols, and strategies to troubleshoot common calculation errors. We will also discuss how automation can streamline the testing process, eliminate human error, and enhance data traceability. Designed for environmental professionals and lab technicians, this session equips attendees with the actionable knowledge needed to improve data accuracy and process control. A 15-minute Q&A session will be held at the end of the presentation.

Webinar Outline

1. Introduction to BOD and Water Quality

- Definition of Biochemical Oxygen Demand.
- Why dissolved oxygen matters to aquatic life.
- The relationship between organic loading and environmental pollution.
- Comparing BOD with Chemical Oxygen Demand (COD) and Total Organic Carbon (TOC).

2. The Science of the Test: Kinetics and Pathways

- Carbonaceous vs. Nitrogenous BOD (CBOD vs. NBOD).
- Microorganisms and the breakdown of organic matter.
- Understanding the standard 5-day incubation period (BOD₅).

3. Step-by-Step Laboratory Methodology

- Equipment and reagents required for testing.
- Preparing dilution water and nutrient buffers.
- The critical role of seed microorganisms and dechlorination.
- Dissolved oxygen (DO) measurement methods: Winkler titration, membrane, and optical probes.

4. Calculations, QA/QC, and Troubleshooting

- The mathematical formula for calculating final BOD results.
- Setting up proper blanks, seeds, and glucose-glutamic acid (GGA) controls.
- Identifying and fixing common testing errors (e.g., toxic interference, improper depletion).
- Maintaining strict quality assurance standards for regulatory reporting.

5. Enhancing Efficiency Through BOD Automation

- Introduction to robotic BOD analyzers and automated systems.
- Automated liquid handling: Sample diluting, seeding, and inhibitor addition.
- Automated probe movement, calibration, and optical dissolved oxygen (DO) measurements.
- Benefits of automation: Higher throughput, reduced ergonomics strain, and minimized human error.
- Software integration: Direct data transfer to Laboratory Information Management Systems (LIMS).

6. Interactive Q&A Session

- Open forum for attendee technical questions and troubleshooting scenarios.
- **Duration:** 15 minutes.