

TECHNOLOGY OVERVIEW - BOD (Biochemical Oxygen Demand) Test

Why is it important to determine BOD in water?

The Biochemical Oxygen Demand (BOD) test aims to determine the concentration of oxidizable and biodegradable organic compounds in (mainly heavily polluted) water. The BOD test is widely used to determine the degree to which a waste stream will contribute to pollution of receiving waters by depriving organisms in those waters (fish) of their source of oxygen. The BOD test is of prime importance in regulatory programs and in determining the overall health of receiving waters. Because of the 5-day lag, BOD5 results are seldom of any use for real time process adjustment or decision making.

The principle of the rapid BOD test

The active reagent is a freeze-dried preparation of either *Vibrio fischeri* or *Vibrio harveyi*. The non-assimilable organic compounds in water (including carbohydrates, proteins, and complex nutrients) are first hydrolyzed by a mild acid pre-treatment. This treatment breaks down polymers into assimilable oligomers and monomers. Once exposed to the treated water sample, the hydrated bacteria will undergo prompt induction of luminescence providing the sample contains assimilable organic compounds.

Luminescence increases with time, with an intensity dependent on the concentration of the organic compound. Sub-ppm concentrations of different kinds of organic compounds can be determined within 2-3 hours. The testing procedure is simple as well: Only 1mL of sample is necessary to run the assay, making collection, storage, and disposal of sample material easy and non expensive.

Comparative studies have found a high correlation between the standard 5 days long procedure and the CheckLight BOD test (Figure 1).

What is unique about CheckLight's BOD test?

CheckLight developed a unique technology for determination of BOD in water in a **3-4 hours** long procedure. In addition to the clear advantages of rapidity and simplicity, the test has additional benefits:

CheckLight Ltd.

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1. Acid hydrolysis of the tested water converts all the water flora into biodegradable nutrients (a potential oxygen consuming nutrient source not measured in the standard BOD method).
2. The test determines only the consumption of O_2 due to bio-oxidation of organic carbon sources (rather than reduced inorganic compounds utilized by some litho-autotrophic bacteria).
3. The high sensitivity of the test allows extensive dilution of the sampled water before testing, thus eliminating possible inhibitory effects stemming from sample turbidity or the presence of toxic agents.

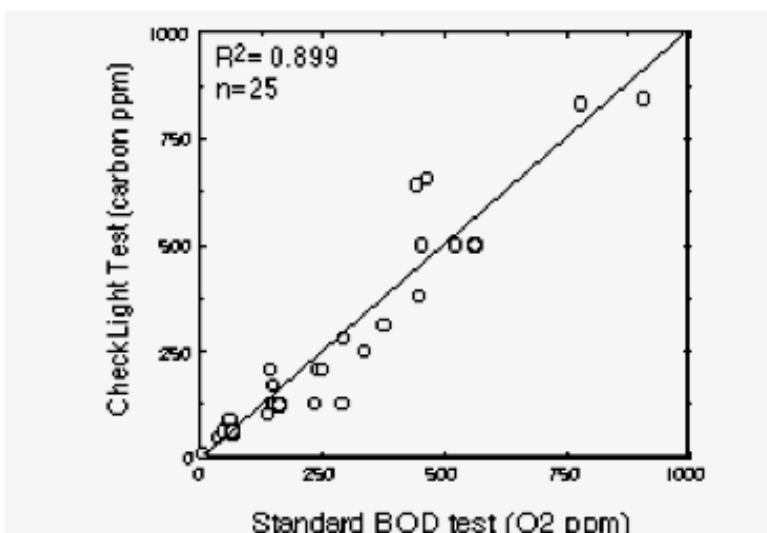


Figure 1: Correlation between the standard 5 days long BOD test and the CheckLight test.
 $R^2 = 0.899$ $n = 25$

Acquiring this vital information in real time enables timely corrective measures in waste water processing, lowering running costs, and elimination of risk of heavy fines due to BOD limit excess.

The test can serve as a powerful tool in municipal and industrial waste water monitoring units in plants & environmental supervising authorities.

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