Biochemical Oxygen Demand (BOD) Monitor

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What is BOD?

The amount of dissolved O_2 used by microorganisms in the biological process of metabolizing organic matter in water.

- The more organic matter there is, the greater the BOD
- The greater the BOD, the lower the amount of dissolved oxygen available for higher animals such as fishes.

Significance of BOD

- Determines the degree of water pollution.
- It is the most important measurement made in the operation of a sewage treatment plant by which the efficiency and effectiveness of sewage treatment can be judged.
- To study and control organic matter pollution, millions of BOD tests are performed.

Principles of Operation

a. Dilution method

b. Manometric method

- Measurement of BOD by the manometric method is easier because the oxygen consumed is measured directly rather than with chemical analysis.
- Because the sample is usually tested in its original state (not diluted), its behavior more closely parallels that of the waste in an actual sewage treatment plant.
- As the oxygen in the sample is used up, more will dissolve into the water from the air space over it.
- The manometer measures the drop in air pressure in the bottle.
- This continuous indication of the amount of oxygen uptake by the sample is an important feature of the manometric method.
- By graphing the results, you can find the rate of oxygen uptake at any time and thereby gain considerable insight into the nature of the sample.

The Hach BODTrak II Apparatus

The BODTrak Apparatus operates unattended and provides analysts with a convenient method for tracking the 5-, 7-, or 10-day BOD test.

- The BODTrak Apparatus measures the drop in pressure and displays results directly as mg/L BOD.
- During the test period (usually five days) the sample is continually agitated by a magnetic stirring bar.
- The electromagnetic stirring mechanism provides adequate agitation to effectively maintain rapid transfer of oxygen from the liquid sample to the air above.
- Carbon dioxide is produced by the oxidation of organic matter and must be removed from the system so that the pressure difference observed is proportional only to the amount of oxygen used. This is accomplished by the addition of a few crystals of lithium hydroxide in the seal cup of each sample bottle.
- The BODTrak Apparatus is free of leaks and has an effective carbon dioxide absorption system. The instrument also has accurate pressure sensors for reading pressure changes.

Interpretation of results

1. The BOD reading should be increasing on each succeeding day of the test.

2. The rate of increase of readings on successive days should be decreasing, at least for the first five days.

BOD Curves

Figure 7 shows some examples of BOD curves that might be found.

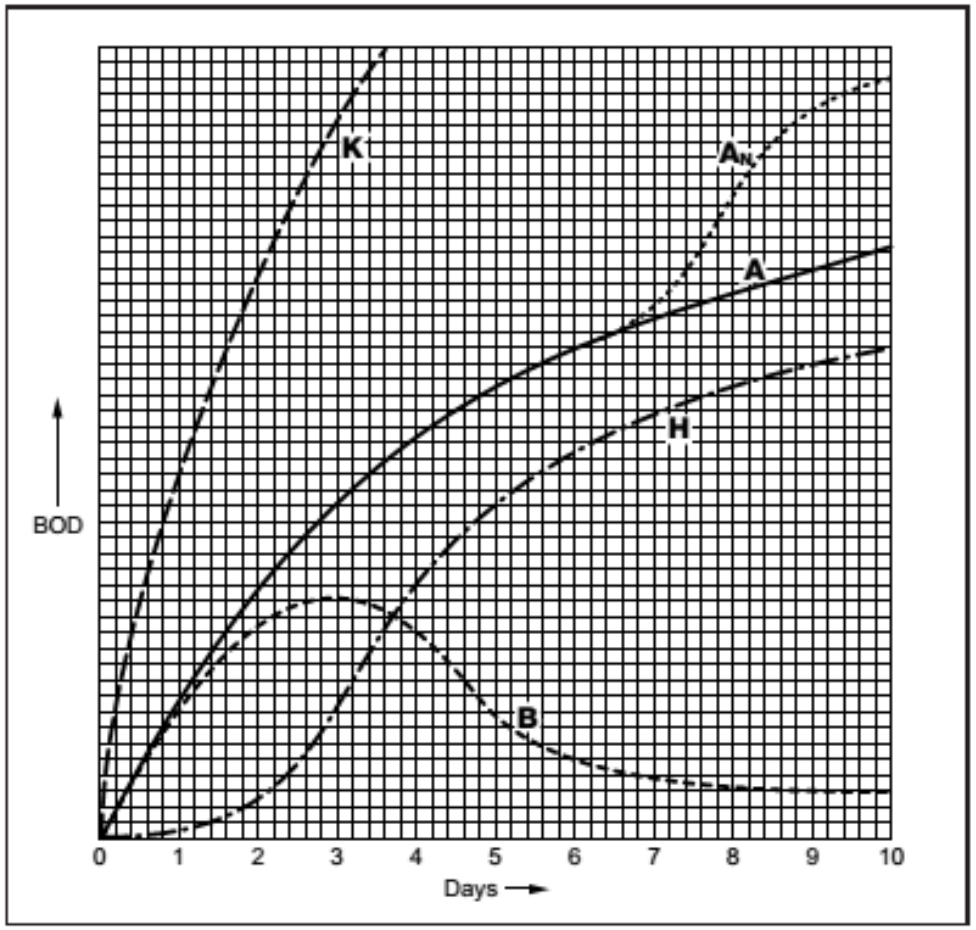

Figure 7. Example of BOD curves

Reliability

- The BOD test measures only the oxygen taken up by wastewater during the biological oxidation of organic matter present.
- The test measures only the approximate amount of oxygen that will be required (absorbed or consumed) by a polluted water when it is exposed to air or oxygen for an extended period of time.
- Therefore, a BOD test is a highly unreliable means of determining the amount of organic matter present in water.

Thanks.