

Editorial

Chemical oxygen demand and its applications

Ozzie LaDuke*

Department of Environmental Science, University of Ibadan, Ibadan, Nigeria

Received: 17-Jan-2022, Manuscript No. AJES-22-56979; Editor assigned: 19-Jan-2022, Pre QC No. AJES-22-56979 (PQ); Reviewed: 17-Mar-2022, QC No. AJES-22-56979; Revised: 28-Mar-2022, Manuscript No. AJES-22-56979 (R); Published: 05-Apr-2022.

EDITORIAL

Chemical oxygen demand is the amount of oxygen needed to oxidize the organic matter present in water. Chemical oxygen demand testing is used to determine the amount of oxidation that will occur and the amount of organic matter in a water sample. Chemical oxygen demand testing is also used to determine the amount of inorganic chemicals in a sample.

Importance of COD

COD is an important water quality parameter and is used in a wide range of applications, including:

- In wastewater treatment, the Chemical Oxygen Demand (COD) is an important measurement for the amount of oxygen that is required to break down pollutants (organic substances) in water.
- The chemical oxygen demand can be measured using different methods, direct or indirect. Regularly the COD value is determined by means of samples that are analysed using laboratory test methods. These off-line methods can be time consuming while the COD value is an essential parameter in the biological treatment process.
- Fortunately, there are some alternatives available to laboratory test methods, for example automated COD analyser systems. These on-line instruments are used in a sample stream of the wastewater process and are automatically providing a number of measurements in a period of time. Compared to off-line measurement this method is much quicker providing an easier way to analyse the chemical oxygen demand. However, on-line analysers are normally used in a bypass of the process stream which makes this an indirect measuring method.

Applications for Chemical oxygen demand

The Chemical Oxygen Demand (COD) is a measure of water and wastewater quality. The COD test is often used to monitor Water treatment plant efficiency. This test is based on the fact that a strong oxidizing agent, under acidic conditions, can fully oxidize almost any organic compound to carbon dioxide. The COD is the amount of oxygen consumed to chemically oxidize organic water contaminants to inorganic end products.

The COD is often measured using a strong oxidant (e.g. potassium dichromate, potassium iodate, potassium permanganate) under acidic conditions. A known excess amount of the oxidant is added to the sample. Once oxidation is complete, the concentration of organics in the sample is calculated by measuring the amount of oxidant remaining in the solution. This is usually done by titration, using an indicator solution. COD is expressed in mg/L, which indicates the mass of oxygen consumed per liter of solution.

The COD test only requires 2-3 hours, while the Biochemical (or Biological) Oxygen Demand (BOD) test requires 5 days. It measures all organic contaminants, including those that are not biodegradable. There is a relationship between BOD and COD for each specific sample, but it must be established empirically.

COD test results can then be used to estimate the BOD of a given sample. Unlike for the BOD test, toxic compounds (such as heavy metals and cyanides) in the samples to be analyzed do not have an effect on the oxidants used in the COD test. Therefore, the COD test can be used to measure the strength of wastes that are too toxic for the BOD test. Some organic molecules (e.g., benzene, pyridine) are relatively resistant to dichromate oxidation and may give a falsely low COD.

*Corresponding author. Ozzie LaDuke, ladukeozzie85@edu.ng.