PolySeed®

Technical Report

Biological Oxygen Demand BOD

BOD Simply Put

When organic materials find its way into water it will decay. Examples of organic material are things like raw sewage, organic chemicals, or even a dead animal. The decaying process is the oxidation of the organic compounds by aerobic bacteria, (oxygen-consuming bacteria) into simpler molecules like carbon dioxide and water.

The decaying process must use dissolved oxygen (DO) from the water. The amount of oxygen needed to oxidize the organic material is called Biological Oxygen Demand (BOD). The BOD is measured in parts per million (ppm) of oxygen needed. The decaying process tends to make the BOD high which means too much oxygen was used. When this happens, it will not leave enough oxygen for fish to live, then fish kills occur which will lead to an even higher BOD.

In some extreme cases there is not enough oxygen for the aerobic bacteria to live, so another group of bacteria called anaerobic bacteria takes over the job of decomposing the organic material. Instead of getting it's oxygen from water, anaerobic bacteria uses oxygen that is in the organic compounds. Anaerobic bacteria will reduce the waste instead of oxidizing it. This tends to lower the BOD. The bad thing about reducing the waste is the anaerobic bacteria decomposes the organic matter into foul-smelling compounds like hydrogen sulfide (H2S), amines, and ammonia.

There are two ways that humans inadvertently drive up biological oxygen demand. First, too much organic material is dumped into a river or lake from paper mills, food processing plants, wastewater treatment plants, etc. Second, fertilizers in the form of nitrates and phosphates flow into a river from agricultural and urban runoff and then stimulate the overgrowth of plants and algae. Once this organic matter (plants, algae, human, food, and animal waste, yard clippings and saw dust) begin to decompose, it sucks the oxygen out of the water.

In 1972 the government passed a law commonly known as the "clean water act". The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave EPA (Environmental Protection Agency) the authority to start pollution control programs such as setting wastewater standards for industry. Chemical industries and waste-water plants must treat (usually with oxidization) their waste before releasing them into the water to stop overloading the BOD of waterways. This is where the biological oxygen demand (BOD) water test falls into play. It is used to determine how much oxygen is being used by aerobic bacteria in the water to decompose organic matter. Therefore, giving you an idea of how much BOD you are releasing into the water.

~Author Unknown