

Eco Golf Balls, Why are they biodegradable?

The Eco Golf Balls are made from wood.

Biodegradation is the chemical dissolution of materials by bacteria or other biological means. Although often conflated, biodegradable is distinct in meaning from [compostable](#). While biodegradable simply means to be consumed by microorganisms and return to compounds found in nature, "compostable" makes the specific demand that the object break down in a compost pile. The term is often used in relation to ecology, waste management, biomedicine, and the natural environment ([bioremediation](#)) and is now commonly associated with environmentally friendly products that are capable of decomposing back into natural elements. Organic material can be degraded [aerobically](#) with [oxygen](#), or [anaerobically](#), without oxygen. [Biosurfactant](#), an extracellular surfactant secreted by microorganisms, enhances the biodegradation process.

Biodegradable matter is generally [organic material](#) such as plant and animal matter and other substances originating from living organisms, or artificial materials that are similar enough to plant and animal matter to be put to use by microorganisms. Some [microorganisms](#) have a naturally occurring, microbial catabolic diversity to degrade, transform or accumulate a huge range of compounds including [hydrocarbons](#) (e.g. oil), [polychlorinated biphenyls](#) (PCBs), [polyaromatic hydrocarbons](#) (PAHs), pharmaceutical substances, [radionuclides](#), [pesticides](#), and metals. Decomposition of biodegradable substances may include both biological and [abiotic](#) steps. Products that contain biodegradable matter and non-biodegradable matter are often marketed as biodegradable.

The Eco Golf Ball will biodegrade in salt or fresh water. The time line resembles the following.

1. 24-48 hours. Float on the surface of the water.
2. 3-5 days. The balls will absorb with water and become more dense, thus sinking.
3. 30-90 days. The ball will become consumed by micro organisms and return to compounds found in nature.
4. 120-150 days. Total degradation.

TEST METHODS FOR BIODEGRADATION

As major ingredients in detergents worldwide, surfactants can enter the environment in small amounts after sewage or septic system treatment. Tests for biodegradation are used to predict how quickly and completely products/chemicals will break d own in the environment. However,

these tests can underestimate a chemical's ability to biodegrade if they do not examine real-world factors, such as the effects of wastewater treatment or microorganism acclimation. Because biodegradability is widely recognized as an indicator of environmental safety, it is critical that realistic test conditions be used to determine biodegradability.

- The Organization for Economic Cooperation and Development (OECD) is leading international efforts to standardize biodegradation test methods. The OECD has published six tests on ready biodegradability, including 301C: The Modified MITI Test (I); four tests on inherent biodegradability; and one simulation test for aerobic sewage treatment.(1,2)
- A pending European Community (EC) directive to determine criteria for ultimate biodegradation proposes use of the OECD ready biodegradability tests. However, European detergent producers (AIS) and suppliers (CESIO) believe that these tests are not an accurate indicator of natural environments and have proposed using a continuous activated sludge test for environmental risk assessment. This method allows bacterial acclimation and, therefore, is more characteristic of real world environmental conditions.(1)
- Most controversial is the Modified MITI Test (I) for ready biodegradation, which specifies conditions for detergent ingredients that include abnormally high test substance concentrations and very little time for microorganisms to acclimate to test conditions. This test has been criticized because the methodology specifies conditions that do not occur in nature, and thus is an unreliable predictor of environmental fate.(3)
- Commercial linear alkylbenzene sulfonate (LAS) passes all OECD tests except for the Modified MITI Test (I).(4,5) Like most tests for ready biodegradability, the Modified MITI Test (I) is designated to quickly estimate the rate of biodegradation.(6)
- According to OECD guidelines, negative results on screening tests do not indicate that a compound will not biodegrade in the environment. Rather, such results mean that establishing biodegradability will require more comprehensive testing, such as the inherent biodegradability tests or the sewage treatment simulation tests. Commercial LAS passes all OECD tests for inherent biodegradability as well as the OECD Simulation Test.(4,5)

- As a result, LAS is classified as "readily biodegradable," according to both the OECD guidelines and the EC's registration terminology for new chemicals.(7)
- Both the OECD tests and the Modified Gledhill Test are referenced in the premanufacturing notification requirements of the U.S. Toxic Substance Control Act (TSCA) of 1976. Commercial LAS passes the Modified Gledhill Test. (4,5)
- Commercial LAS also passes the shake-flask and semi-continuous activated sludge (SCAS) tests of the U.S. Soap and Detergent Association and the American Society for Testing and Materials.(1,4,5)
- Used in detergents worldwide, LAS is clearly shown through reliable test methods to biodegrade rapidly and completely in the environment. This finding is further supported through real-world monitoring and 30 years of safe use .

KEY REFERENCES

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