

Glossary of Biobased – Biocomposites - Biopolymers

BIODEGRADABLE

If, under the right conditions, the microbes in the environment can break down a material and use it as a food source, that material is called *biodegradable*. Biodegradation is a process that can take place in many environments, including soils, compost sites, water treatment facilities, marine environments, and even the human body. This process converts carbon into energy and maintains life.

For plastics to biodegrade, they must go through a 2-step process. 1st the long polymer chains are shortened at the carbon bonds. This process can be started by heat, moisture, microbial enzymes, or other environmental conditions, depending upon the polymer. This is called 'degradation' and the plastics become weak and fragment easily. The 2nd step takes place when the shorter carbon chains pass through the cell walls of the microbes and are used as an energy source. This is biodegradation when the carbon chains are used as a food source and converted into water, biomass, carbon dioxide, or methane.

BIOBASED

Biobased and renewable refer to sources of the raw materials for products. They do not mean the same thing and cannot be used interchangeably. The fact is the not all materials that come from renewable or biobased feedstocks are biodegradable. Manufacturers, and others, need to refer to ASTM tests to pinpoint the percentage of a product that comes from biobased resources. Wood, corn, soybeans and grasses are all forms of renewable feedstocks.

ASTM defines a biobased material as *"an organic material in which carbon is derived from a renewable resource via biological processes. Biobased materials include all plant and animal mass derived from carbon dioxide recently fixed via photosynthesis, per definition of a renewable resource."*

Products that designed to be compostable should meet ASTM Standard D6400 (Compostable Plastics) or ASTM D6868 (Compostable Packaging).

BIOCOMPOSITES

A material formed by a matrix (resin) and a reinforcement of natural fibers (usually derived from plants or cellulose). Biocomposites are characterized by the fact that: the petrochemical is replaced by a plant resin and/or the bolsters (fiberglass, carbon fiber or talc) are replaced by natural fiber (wood, hemp, flax, sisal, corn, kenaf...)

BIOPLASTICS

This is a term used to define two different kinds of plastics:

- a. Plastics based on renewable resources (the focus is the origin of the raw material used)
- b. Biodegradable and compostable plastics according to ASTM D6400 (the focus is on the compostability of the final product).

BIOMASS or RENEWABLE RESOURCES

Any organic material that is available on a renewable and sustainable basis. Agriculture raw materials like corn, wheat, rice, sunflower, oats, flax, and cotton, which is not used for food or feed, but as raw materials for industrial products or to generate energy. Others are kenaf, switchgrass, jute, hemp, etc.

SUSTAINABLE

An attempt to provide the best outcomes for the human and natural environments both now and into the indefinite future. Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

SUSTAINABILITY

Has three dimensions: economic, social and environmental. This has been known as "the triple bottom line of sustainability." This means that sustainable development involves the simultaneous pursuit of economic prosperity, environmental protection and social equity. It's about making products useful to markets and, at the same time, having societal benefits and lower environmental impact than the alternatives currently available.

CELLULOSE

Polymeric molecule with very high molecular weight (biopolymer, monomer is Glucose, industrial production from wood, corn or cotton, to manufacture paper, plastics and fibers.

Information is also accessible on our web site at www.mcgbiocomposites.com.