

Our Technology for the Biodegradation of Plastic Products

The technology is an additive which, when combined in small quantities with any of the popular plastic resins, renders the end products biodegradable while maintaining their other desired characteristics. It is sold as ECM MasterBatch Pellets and our Company has developed the technology to the point where most plastic products manufacturers can use the additive without having to modify their existing methods of production any more than if they were changing the product's color. The resulting plastic products exhibit the same desired mechanical properties, have effectively similar shelf-lives, and yet, when disposed of, are able to be metabolized into biomass by the communities of microorganisms commonly found almost everywhere on this planet.

This biodegradation process can take place aerobically and anaerobically. It can take place with or without the presence of light. These factors allow for biodegradation even in landfill conditions which are normally inconducive to any degradation of other technologies. Our technology differs significantly from other "degradable plastics" emerging in the market today because it does not attempt to replace the currently popular plastic resin formulations but instead enhances them by rendering them biodegradable.

Recognizing the environmental concerns related to plastics and the market potential, the corporate and scientific communities have long sought to develop degradable plastics. However, the Company believes that degradable plastics introduced to date possess several weaknesses that have prevented wide-spread acceptance in the marketplace. Photo-degradable products, for example, do not degrade in landfills due to the lack of sunlight (they are typically covered with another layer of trash before the degradation can occur). At the same time these photo-degradable products present difficult circumstances for storage before use due to their reactivity to light. Similarly, plastic products manufactured with PLA and such "renewable" replacement resins fail to biodegrade as litter or in a landfill, are very expensive to manufacture, and often do not achieve the requisite physical properties.

ECM's technology is a process which enables the microorganisms in the environment to metabolize the molecular structure of plastic products into humus that is beneficial to the environment. Our process utilizes several proprietary compounds that are combined into a masterbatch pellet that is easily added to plastic resins using existing technology.

ECM engaged several renowned testing laboratories to independently establish the biodegradability of plastic products made with ECM's additives. The tests concluded that the products were fully biodegradable under both aerobic and anaerobic conditions. In addition, the tests concluded that their biodegradation did not produce any toxic residue harmful to living organisms in land or water.

Technology Explanation

The plastic products made with our additives will break down in nearly all landfills or wherever else they may end up. All sorts of factors determine the amount of microbes available in the soil and the soil conditions determine the rate of degradation. The plastic products made with ECM technology basically rely on the microbes in the soil to react with the additives and form communities, biofilms, which create the enzymes and acids that can attack the long-chain hydrocarbon molecules and break them down to the point that the microbes' natural acids and enzymes are then effective and the microbes can metabolize the simple hydrocarbons with CO₂ and water or methane being the waste products. This process continues until all the plastic product is full biodegraded.

Material treated with ECM has been tested and proved as biodegradable and safe for the environment by using the following:

- ASTM D5209 "Standard Test Method for Determining the Aerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewage Sludge";
- ISO 14855 / ASTM D5338 "Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials under Controlled Composting Conditions"; and
- ASTM 5511 "Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions".

Where will it biodegrade?

- Home composting
- Commercial composting
- Landfills
- Buried in, or in contact with the soil
- Erosion / Agricultural netting & film
- Litter

Where won't it degrade?

- Warehouses
- Store shelves
- Offices & Home

ECM BioFilms, Inc.

Victoria Place - Suite 225, 100 South Park Place, Painesville, Ohio 44077 U.S.A.

Phone: 440.350.1400 · Toll Free in U.S.A.: 800.220.2792 · Fax: 440.350.1444

Email: biodeg@ecmbiofilms.com · Website: ecmbiofilms.com