

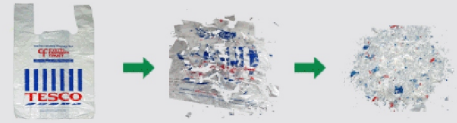
biolefin

biodegradable polyolefin

NATIONAL
SHRINKWRAP

1

Degradation



2

Biodegradation



3

Return to Nature

Photosynthesis



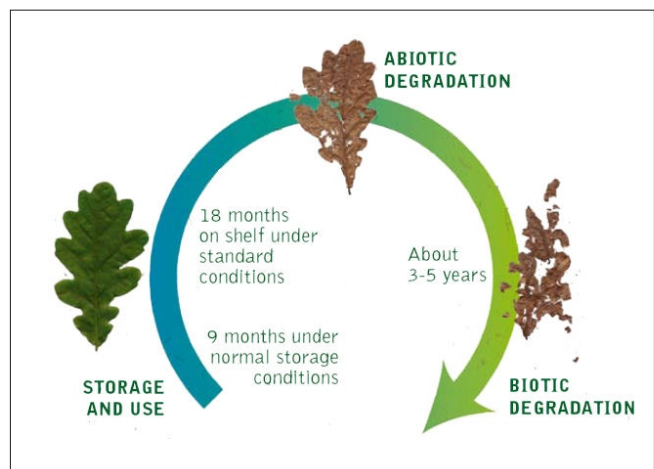
Protecting Your Product, Your Customers, Your World

Biolefin is an Oxo-biodegradable plastic: a degradable plastic in which the degradation results from the action of naturally occurring microorganisms such as bacteria, fungi, and algae. Oxo-biodegradation is recognized as a two-stage process.

Biolefin is formulated to be totally degradable in the environment. At the end of its useful life, it fragments and oxidizes by the effect of light and heat. It then becomes assimilable by soil micro-organisms, and eventually disappears, leaving only water, carbon dioxide and biomass.

Oxo-biodegradable plastics do not simply disintegrate into smaller pieces of plastic that pollute the environment. Oxo-biodegradable plastics use a technology that is based on the well understood but slow reaction of conventional plastics with the oxygen in the air. The incorporation of Totally Degradable Plastic Additives (TDPA) accelerates this reaction in a very controlled way. This causes the products to physically disintegrate in an

acceptable time period when they are exposed to air and sunlight or heat. The products of this degradation, which continues after physical changes to the film are seen, are not just small pieces of the original plastic but are chemically completely different. They are significantly oxidized, denser and hydrophilic. These degradation products are highly susceptible to biodegradation by microorganisms that are naturally present in the environment and their biodegradation has been demonstrated in independent peer-reviewed studies. This allows the return of the original plastic to the eco-cycle. Biodegradation occurs over a period of 1-3 years, comparable with most natural materials and completely satisfactory from an environmental viewpoint.



Plastic incorporating EPI additives fit into the natural biocycle.

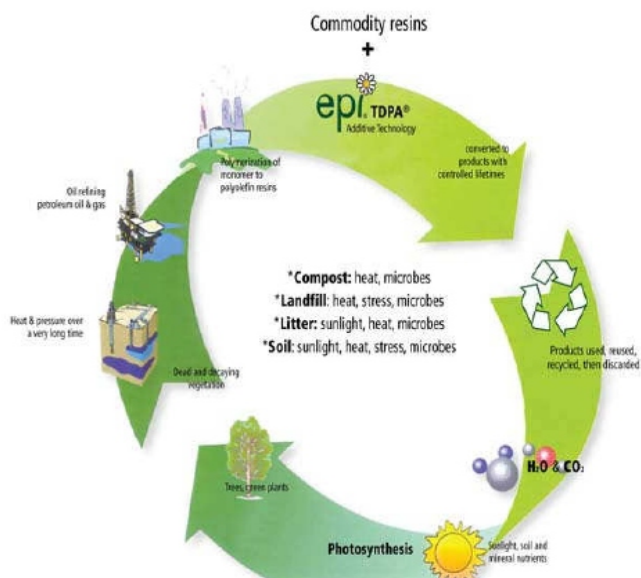


Illustration of photo and thermal degradation of a shopping bag incorporating EPI's TDPA® Additive (top row) vs. a bag without EPI's TDPA™ Additive (bottom row). Test procedures follow ASTM D5272 "Outdoor Exposure Testing of Photo Degradable Plastics" Guidelines.

I. COMPOSITION

Components Material CAS %
 ETHYLENE -POLYPROPYLENE 30 to 45
 POLYETHYLENE 9002-88-4 50 to 65
 ADDITIVES <5

II. HAZARDS

IDENTIFICATION

SKIN: not hazardous
 EYES: not hazardous
 INHALATION: not a route of exposure
 INGESTION: not a route of exposure
 No components are hazardous
 None of the components present in this material are listed by IARC, NTP, OSHA as a carcinogen.

III. FIRST AID MEASURES

INHALATION

No specific intervention is indicated as the compound is not likely to be hazardous by inhalation.

SKIN CONTACT

The compound is not likely to be hazardous by skin contact. The predominant gases produced during normal hot wire cutting and shrinking operations are low molecular weight hydrocarbons, carbon dioxide, carbon monoxide, water, and hydrocarbon oxidation products including organic acids, aldehydes, and alcohols. The amount of each is low. Nevertheless, local ventilation is recommended. At temperatures above 617°F fumes irritating to the eyes, nose, and throat may be produced.

EYE CONTACT

This product is an inert solid. If in eye, remove as one would any foreign object.

INGESTION

First aid is normally not required.

IV. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls
 No special precaution during normal use of the product.
 Use static controls.
 Ventilation requirements: provide adequate ventilation or local exhaust to remove fumes when performing high-temperature processing such as sealing or hotwire cutting.

PERSONAL PROTECTIVE EQUIPMENT:

SKIN PROTECTION: not required
 EYE PROTECTION: not required
 RESPIRATION PROTECTION: not normally required. If smoke or fumes are generated during processing, use adequate ventilation or wear appropriate approved respiratory protection (not normally required).

% Volatiles : Negligible
 Solubility in Water : Negligible
 Odor : None
 Melting point : 212 – 280 °F
 Specific gravity : 0.91

V. STABILITY AND REACTIVITY

Chemical Stability: stable.
 Incompatibility with Other Materials: none reasonably foreseeable.
 Decomposition temp: 617 F (325°C)
 Hazardous gases or vapors can be released, during combustion, including carbon monoxide, hydrocarbon oxidation products, including, organic acids, aldehydes, alcohols.

VI. TOXICOLOGICAL INFORMATION

Negligible hazard at ambient temperature for inhalation, skin contact, eye contact and ingestion.

VII. ECOLOGICAL INFORMATION

AQUATIC TOXICITY:
 No information is available. Toxicity is expected to be low, based on insolubility in water.

VIII. DISPOSAL CONSIDERATIONS

Waste Disposal
 Options for disposal are recycling, incineration with energy recovery, and landfill. Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.