

Determination of Anaerobic Biodegradation ASTM D-5526 Results

For the following article:



BIOflex® FL an advertising media for indoor or outdoor applications.

Executive Summary

BIOflex® FL film #7450 provided was tested for biodegradation according to ASTM procedure D-5526-94 — *Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions*. The test was conducted at 35°C for 104 days, at three moisture levels in an inoculum substrate prepared from municipal solid waste. *Apparent net decomposition* of the test material was calculated from the cumulative biogas-carbon evolved from the test vessels after subtracting the biogas-carbon evolved from the blank inoculum substrate at the same dry-matter level.

Apparent net decomposition of the BIOflex FL material at the end of the test period at the 45% dry-matter (DM) test conditions was 14.5%. BIOflex FL decomposition at 35% DM rose to 18% at day-35, then declined steadily to negative values, indicating inhibition of the inoculum substrate decomposition at that point. Biogas evolution from the BIOflex FL vessels at 60% DM was slower than the corresponding blanks for the first 60 days, with cumulative net decomposition of negative 9% indicating slight inhibition of the inoculum substrate.

The cellulose powder reference material showed 16% net decomposition in the 60% DM conditions, and net negative decomposition (apparent inhibition) at 35% and 45% DM.

Biogas evolution from the blanks indicated that total decomposition of the organic carbon in the inoculum substrate was 21%, 28%, and 18% in the 35%, 45%, and 60% dry-matter conditions, respectively.

Conclusion

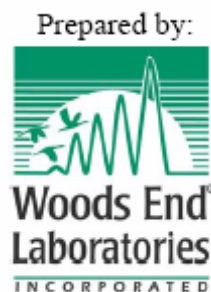
Addition of BIOflex FL to a landfill does not interfere with its digestion of other materials. Woods End data per ISO 13641-1 indicate that it improves this ability.

BIOflex FL contains no detectable heavy metals and no zinc (which is ecotoxic). The plasticizer used is derived from a natural product and is completely consumed by the landfill. In an anaerobic landfill, BIOflex FL loses molecular weight to the point where microbes can consume it. No detectable monomer is formed.

The Woods End ASTM D5526 data show that the ratio of the fraction of organic carbon and hydrogen from BIOflex FL release to the air, and the fraction delivered to the solid biomass varies with landfill conditions, such as temperature and water content. The fraction released to the air is mostly methane, which can be harvested for fuel, along with the methane released by other components of the landfill, such as paper. Variability in the ratio of end product to the air and to the biomass is also typical of other land-filled materials, such as paper.

Most of the chlorine content of BIOflex FL is converted by the landfill to soluble chloride, which improves its value as fertilizer. A small fraction is taken up by the biomass as one of the essential trace elements. The minor amount of refined calcium carbonate in BIOflex FL also adds to fertilizer value in the landfill.

For a complete copy of the ASTM D-5526 please contact your Ultraflex Sales Representative.



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