Certificate

Nr. 0423032012RS

Add-X Biotech

Klangfägsgatan 16
SE - 426 52 Västra Frölunda
Sweden
VAT: SE55628958200100

This is to Certify that the company

SZR Lekso-Plast 21201 Rumenka Vojvode Putnika 8, Republic of Serbia

is an authorized converter of the Oxo-Biodegradable Additive AddiFlex®

The following verifications of the technical specifications and performance of the AddiFlex® additive are hereby certified. And this is the case as of an addition level of 1%. The degradation period is always depending as well on the let down material and the film thickness used.

AddiFlex® is an oxo-biodegradable additive which renders polyolefins oxo - biodegradable .

The oxo-biodegradability is defined as degradation resulting from oxidative cleavage of macromolecules followed by biodegradtion

Source: PD CEN/TR 15351:2006,5.2

The Add-X oxo-biodegradable technology is designed to ensure satisfactory performance in storage and use followed by degradation and biodegradation in appropriate environments. In addition different degrees of oxidative photodegradation can be built in. The technology is used with conventional polyolefins, such as polyethylene and polypropylene.

Depending on the particular grade of Add-X's AddiFlex® additive there can be three mechanisms involved in the total bio-assimilation of products containing the additives:

- The oxidation of the polyolefin
- The microbial digestion of the directly biodegradable polymer (where added)
- The microbial digestion of the low molecular weight products from the oxidation

Although these mechanisms can be studied separately they usually occur simultaneously and there is often synergy between them.

The polyolefin products modified with the additive AddiFlex® will be oxo-biodegraded to CO_2, water, and biomass.

A method of chemically studying the oxidation process is to measure the concentration of the molecules resulting from the reaction. Typically this is done using FTIR (Fourier Transform Infra Red) and measuring the carbonyl group formation. The carbonyl group occurs in oxidation products such as aldehydes, ketones, esters, fatty acids and lactones and this group is chosen because of the strength of its absorption in the infra red. This was verified by the research of CNEP (Centre National d'Evaluation de Photoprotection) in Clermont Ferrand by Professor Lemaire. Report: influence of AddiFlex® on the photooxidation and thermo oxidation of HDPE films.

Following the complete degradation of the additive there are no harmful residues.

The biodegradation additive AddiFlex® fulfils the demand of the: European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste according to Article 11 Concentration levels of heavy metals present in packaging: 1. Member States shall ensure that the sum of concentration levels of lead, cadmium, mercury and hexavalent chromium present in packaging or packaging components shall not exceed the following: 100 ppm by weight five years after the date referred to in Article 22. AddiFlex® does not exceed those levels.

AddiFlex® does not add sulphur, nickel or cobalt or any salt related to those mentioned metals to the let down polymers. Evidence: The statement from SP toxicity of polyolefins containing AddiFlex®

The bio-degradation of AddiFlex® modified PE was demonstrated in the research done by Prof. Jakubowicz, SP and Dr. Kaiser, EMPA (ELSEVIER: Evaluation and degradability of biodegradable polyethylene) using the test methods as prescribed in ISO 14855 and prEN 14046 and according to ASTM D 6400. And is therefore in compliance with ASTM D6954 Standard Guide for exposing and testing plastics that degrade by a combination of oxidation and biodegradation.

The plant growth test and the ecotoxicity effects have been studied with positive results above 100% according the EN 13432 (Requirements for packaging recoverable through composting and biodegradation) and the Standard OECD 208 (Terrestrial plants, growth test) Evidence: EMPA test report Nr. 422809.

The AddiFlex® effect on the biotic degradation was demonstrated by Prof. Jakubowicz: Evaluation and degradability of biodegradable polyethylene and disintegration of a polypropylene-based film under simulated composting conditions SP.

The additive is safe to be used in direct contact with food products, in accordance with the stipulations from Directive 2002/72/CE regarding the materials approved to enter in contact with food products. Evidence: KELLER & HECKMAN AddiFlex HES Degradable Additive,September 2011, the HEALTH CANADA approval re Addiflex HES Jan. 2009, and the CAMBRIDGE migration test October 2008 (ref. 480342B-08).

However , the manufacturers of products intended to be in contact with food products have to assure that all the other materials used, meet this standard

Markus Jörgenser
VD / CEO

Eugen Karl Mössner
CTO

Add-X Biotech
Technology naturally

BPF Member of the British Plastics Federation

NORM PACK

AddiFlex® *Nature's solution for plastic waste*