RNS Number : 4896E
Symphony Environmental Tech. PLC
10 April 2025

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SYMPHONY ENVIRONMENTAL TECHNOLOGIES PLC
("Symphony", the "Company" or the "Group")

Extended Scientific Study on Microplastics in Soil

Symphony Environmental Technologies Plc (AIM:SYM), the global specialists in technologies that make plastic and rubber products smarter, safer, and more sustainable, announce the results of a continued study by Intertek of plastic made with Symphony's d2w technology, following the results reported on 11 March 2025.

Because of the global interest in microplastics and the importance of the study, Intertek has carried out a detailed assessment of the samples of polyethylene (PE) and polypropylene (PP) that were subjected to testing according to the ASTM D6954 protocol-an international standard for evaluating the environmental degradation of plastics through a combination of oxidation and biodegradation.

The samples underwent photodegradation (Tier 1), during which their molecular weights reduced to below 5,000 Daltons (2,200 for PE and 4,900 for PP) These photo-oxidised samples were then exposed to biodegradation under controlled composting conditions (Tier 2) resulting in 94.55% biodegradation in the case of PE and 92.76% biodegradation in the case of PP.

The resulting biomass from the biodegradation phase was assessed in accordance with OECD Test Guidelines 207 and 208 (Tier 3), and no adverse effects were observed on seedling germination or earthworm survival.

Results of the chemical and residue analysis conducted on the 50 grams of biomass which remained after completion of ASTM D6954 testing, revealed the presence of one and two oxidised particles resembling PE and PP respectively. These findings may indicate incomplete mineralisation or they could have been low-molecular-weight oligomers formed during the degradation process that no longer retain the physical characteristics of conventional plastics. A polymer material with a molecular weight of less than 5,000 Daltons typically loses its tensile strength and barrier properties, it is also hydrophilic and biodegradable and therefore not persistent.

Symphony's CEO, Michael Laurier said "This is an excellent result, and shows that plastics upgraded with d2w technology are very useful for reducing microplastics and reducing the prevalence and accumulation of plastics in the environment. We are grateful to Intertek for performing a very thorough and extended investigation."

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Microplastics - Information

Microplastics are seen today as the main problem with plastics. See https://www.biodeg.org/subjects-of-interest/microplastics/ They are tiny pieces of plastic, which are being found on land, in the sea, and now even in the air we breathe and the water we drink. Some of the microplastics are coming from man-made fibres, and recycling and composting can also be a source of microplastics, but most of the microplastics found in the environment are caused by the fragmentation of ordinary plastic. There are

also fragments from tyres, but these are of rubber, not plastic.

Exposure to weathering in the environment causes the degradation of ordinary plastic articles, leading to embrittlement and fragmentation in as little as 4-8 weeks, particularly when exposed to sunlight, on land or when floating on the ocean.

The problem is that although ordinary plastics are degrading, they persist in the environment for a long time because their molecular weight is too high for biodegradation. They then get smaller and smaller until they are small enough to get into our bodies. This persistent particulate litter can take decades to degrade sufficiently to permit biodegradation.

This is why d2w biodegradable plastic was invented. Professor Ignacy Jakubowicz, one of the world's leading polymer scientists, has described the process as follows: "The degradation process is not only a fragmentation, but is an entire change of the material from a high molecular-weight polymer to monomeric and oligomeric fragments, and from hydrocarbon molecules to oxygen-containing molecules which can be bioassimilated."

The prodegradant catalyst in the d2w masterbatch not only accelerates oxidative degradation and reduction of molecular weight but also - critically - removes the dependence of this process on sunlight so that, unlike conventional plastics or photo-degradable plastics, degradation will continue in darkness - until biodegradability is achieved.

In September 2024, scientists at Lambton Manufacturing Innovation Centre in Ontario, Canada, reported on biodegradable plastic and concluded that oxo-degradable plastics (i.e. ordinary plastics) create microplastics, but oxo-biodegradable plastics do not. They said:

"Oxo-biodegradable plastics are both bioplastics and biodegradable plastics. They consist of a conventional plastic containing a masterbatch. The masterbatches cause the molecular chains to be dismantled by oxidation so that the material is no longer a plastic and becomes biodegradable. Light and heat will accelerate the process, but it will continue even in dark, cold conditions. Moisture is not necessary for oxidation and does not prevent it."

"Ordinary plastic and oxo-biodegradable plastic lose their strength and fall apart at about the same time when exposed to sunlight, but the fragments of ordinary plastic have a molecular weight which is much too high for biodegradation."

"In summary, it is clear that if plastic products are made with an oxo-biodegradable masterbatch and get into the open environment intentionally or by accident, the molecular weight of the plastic will reduce much more quickly and it will become a waxy substance which is no longer a plastic. It will then have become a source of nutrition for naturally occurring micro-organisms."

The European Chemicals Agency ("ECHA") were asked to study this type of plastic in December 2017. They made a Call for Evidence, and they advised after 10 months that they were not convinced that it creates microplastics. Symphony agrees with them and has seen no evidence that microplastics from oxo-biodegradable plastic have ever been found in the environment.

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