



THE EU SINGLE-USE PLASTICS DIRECTIVE 2019/904

(Disclaimer: The BPA does not give legal advice, and readers should rely only on the advice of their own lawyers).

On 8th July 2025 Symphony Environmental Technologies Plc (a leading member of the BPA) received confirmation as follows from the Environmental Protection Agency of the Republic of Ireland, a member-state of the European Union:

“[Symphony’s d2w oxo-biodegradable] technology has been scientifically demonstrated to undergo full biodegradation without leaving behind persistent microplastics or toxic residues. This conclusion is supported by independent studies and aligns with the objectives of the Directive to reduce plastic pollution and promote sustainable alternatives.”

The EPA of Ireland were then contacted by the promoters of “compostable” plastic. They did not change their view on the science, but decided to interpret the EU Commission Guidelines to bring d2w plastics within the Art. 5 prohibition, even though they accept that the Guidelines are not legally binding, and that they were written without the benefit of the scientific evidence available to the EPA.

The BPA considers that the Guidelines are demonstrably incorrect. Moreover, they have no relevance outside the EU, as the SUP Directive has no legal validity there.

BACKGROUND

The prohibition of “oxo-degradable” plastic was not in Article 5 of the draft Directive submitted to the EU Parliament by the EU Commission.

The Commission had asked their scientific experts, the European Chemicals Agency (ECHA), to study oxo-biodegradable plastic, but they had not yet completed their studies and submitted their report.

Instead of waiting for ECHA to report, the Environment Committee (who are not scientific experts) amended the draft Article 5 to include a ban on what they described as “oxo-degradable” plastic. None of the reports to that Committee from their own Rapporteurs had given any justification for a ban.

The reasons for the ban are set out in Recital 15 “that type of plastic (a) does not properly biodegrade and (b) thus contributes to microplastic pollution in the environment, (c) is not compostable, (d) negatively affects the recycling of conventional plastic and (e) fails to deliver a proven environmental benefit. The ban would not therefore apply to a type of plastic which does not have these characteristics.

As to (a) Biodegradation - the EU has never defined what it means by “properly” biodegrade, and has never said what it would regard as a reasonable timescale for biodegradation.

We have six reports of scientific studies performed in February 2025 by Intertek (in laboratories accredited to ISO 17025) on samples of plastic containing Symphony’s d2w oxo-biodegradable masterbatch, which had proved biodegradation of 94.55% in the case of polyethylene (PE) and 92.76% in the case of polypropylene (PP). These studies had therefore shown that there was very little if any plastic left which could become microplastics.

(100% carbon-evolution would never be achieved because the rest of the organic carbon above the 94.55% in PE and 92.76% in PP is used by microorganisms for their energy requirements and to build their cell-structure. The hydrogen from the original PE and PP converts into water).

These studies had also included tests according to OECD 207 and 208, showing no adverse effects on plants or earthworms, and tests showing the absence of any metals above permitted levels.

OXOMAR - The most thorough scientific work is the four-year OXOMAR study sponsored by the French government at the French marine laboratory. www.biodeg.org/wp-content/uploads/2021/07/Final-report-OXOMAR-10032021.pdf

The scientists said: “We have obtained congruent results from our multidisciplinary approach that clearly shows that Oxo-biodegradable plastics biodegrade in seawater and do so with a significantly higher efficiency than conventional plastics. The oxidation level obtained due to the d2w prodegradant catalyst was found to be of crucial importance in the degradation process.”

As to (b) Microplastics - conventional plastics will fragment when exposed to sunlight, and they are the principal source of microplastic pollution in the environment, but they are not banned. Bio-based plastics will also create microplastics and are not banned. By contrast, oxo-biodegradable plastics will convert not into fragments of plastic but into waxy substances which are biodegradable. See <https://www.biodeg.org/subjects-of-interest/microplastics/>

Intertek were nevertheless asked to examine the soil/compost in which the biodegradation had taken place, and they provided a report dated 7th March 2025 that no microplastics had been found.

However, in view of the importance of these findings, Intertek carried out a further detailed assessment of the data and reported on 17th March that they had found one particle in the case of PE and two particles in the case of PP. They found a molecular weight of 4,900 Daltons in the case of PP, and 2,200 in the case of PE so if they were remnants of the test materials at all, they were not microplastics but low-molecular-weight oligomers or short-chain polymer fragments which were biodegradable.

If the PE and PP samples had not contained d2w and had simply fragmented under the influence of sunlight and stress, it is to be expected that many thousands of particles

would have been found. Accordingly, even if the particles actually found by Intertek were particles of the PE and PP samples, the fact that hardly any were created is an excellent result, and reinforces the view that d2w is a very useful technology for reducing the prevalence of microplastics in the environment.

On 22nd August 2018 the European Chemicals Agency (ECHA) advised the EU Commission that: “Irrespective of their source, microplastics are persistent and universal pollutants. When products containing them are used, microplastics can be released to the environment where they stay for centuries, *as they do not biodegrade*.” So if they do biodegrade they are not microplastics

<https://echa.europa.eu/documents/10162/db081bde-ea3e-ab53-3135-8aaffe66d0cb>

On 30th October 2018 ECHA advised the Biodegradable Plastics Association that it was not convinced that oxo-biodegradable plastic creates microplastics.

As to (c) – compostability. Conventional plastics are not compostable but they are not banned, and there is no reason to ban a plastic on the ground that it is not compostable. Nevertheless, oxo-biodegradable plastics have been independently tested according to ISO 14855, and also in real-world industrial composting, and found to be compostable. In any event, the plastics marketed as “compostable” do not convert into compost – they convert into CO₂ and have no useful role in the composting process – see

<https://www.biodeg.org/subjects-of-interest/composting/>

As to (d) recycling, it is well known that bio-based “compostable” plastic will contaminate a recycling stream, but it is not banned. By contrast, oxo-biodegradable plastic has been safely recycled for many years, including by the largest bread manufacturer in the Western world, and there are reports from three expert test-houses which confirm recyclability See <https://www.biodeg.org/subjects-of-interest/recycling-2/>

As to (e) environmental benefit - if an oxo-biodegradable plastic is tested to biodegrade in the open environment without leaving microplastics, and thereby reduces the overall burden of plastic pollution, it delivers an obvious environmental benefit.

ARTICLE 3(3) definition

“Oxo-degradation” is defined by the EU Standards experts (CEN) in TR15351 as “degradation resulting from oxidative cleavage of macromolecules.” This describes plastics, which abiotically degrade by oxidation in the open environment and create microplastics, but do not become biodegradable, except over a very long period of time.

Instead of using the scientifically accurate definition of oxo-degradation, the EU parliamentary Committee invented its own definition, which has caused confusion. In Art 3(3) of the SUP Directive oxo-degradable plastic is defined as “plastic materials that include additives which, through oxidation, lead (i) to the fragmentation of the plastic material into micro-fragments or (ii) to chemical decomposition.”

The definition in Art. 3(3) is not only unscientific, but bears no relation to the reasons for the ban given in Recital 15. It focusses only on (i) chemical decomposition, and (ii) micro-fragments

It is well known that conventional plastics often contain additives such as colorants which cause them to oxidise and fragment into microplastics. The definition in Art 3(3)

does not say that the additives must have been deliberately added for the purpose of causing oxidation, and the definition therefore applies to a wide range of conventional plastics.

In the case of oxo-biodegradable plastic, the degradation is caused by the reduction in the molecular weight of the polymer, and Symphony have evidence from their own scientists and from Professor Jakubowicz of Sweden, one of the world's leading polymer scientists, that this is not chemical decomposition.

There is also scientific evidence from Jordi Labs, a specialist laboratory in the United States that (a) oxidation would occur in the absence of the d2w masterbatch, and the masterbatch does not therefore lead through oxidation to the fragmentation of the material – it simply controls the rate of oxidation, and (b) oxidation does not result in chemical decomposition.

This laboratory specializes in polymer analysis and has more than 40 years' experience performing regulatory, quality control and failure testing. They are one of the few laboratories in the United States specialized in this type of testing.

THE EUROPEAN COURT

Because the confusion caused by the European Parliament had impacted on the market for Symphony's products, Symphony sued the European Union in its own court, claiming compensation. Symphony argued that Articles 5 and 3(3) were not valid, because the EU Parliament had failed to have due regard to the scientific evidence, and had disregarded the procedure laid down by the REACH Regulation. It should be noted that the court was asked to decide whether Articles 5 and 3(3) were legally valid - not whether oxo-biodegradable plastic was or was not within the prohibition.

The court simply said that whether or not the EU Institutions had made a correct technical assessment, they had not exceeded the limits of their legislative discretion.

This is surprising because the court accepted that "the scientific assessment should be based on the best scientific data available" but the legislators had not waited for the results of an investigation into the technology which their own expert advisers, the EU Chemicals Agency, were actually doing at the time. There is still no dossier from the Chemicals Agency to support any such ban. Also, the legislators had failed to make any impact assessment at all.

In addition, the court said that expert evidence paid for by Symphony "has little probative value." However, as expert witnesses and laboratories have to be paid, how is a Claimant against the EU to adduce any expert evidence before their courts which has any "probative value?" This places the Claimant at an impossible disadvantage, and undermines the credibility of the EU Court. For a detailed analysis of the judgment see www.biodeg.org/wp-content/uploads/2026/05/Comment-on-EU-Judgment-MS-10.2.24.pdf

CONCLUSION

Oxo-biodegradable plastic falls outside the definitions contained in Recital 15 and Articles 5 and 3(3) of the Single-use Plastics Directive 2019/904 and is not prohibited in the EU.

This accords with written advice received by Symphony Environmental Technologies Plc from Joshua Holmes KC of Monckton Chambers, London, a specialist in EU law who represented Symphony at the EU court, that: “oxo-biodegradable plastic: falls outside the definition of oxo-degradable plastic contained in Article 3(3); and is therefore not subject to the Article 5 Prohibition.”