Oxo-biodegradable Plastics

Compliance with Single-Use Plastics Directive

Writing in The Spectator, Matt Ridley attacked the stifling of innovation by the EU, (which is one of the reasons why Britain terminated its membership). “Vast vested interests” he says, “are ranged against innovation in Brussels, where big business and big pressure groups swarm all over the Commission and Parliament.”

A clear example of this is the EU legislation against “oxo-degradable” plastic which was passed without any dossier from the European Chemicals Agency showing any cause for concern about this type of plastic. Never before has an ECHA investigation been circumvented by legislation.

In making the SUP Directive 2019/904 the EU Parliament caused confusion by failing to distinguish clearly between oxo-degradable and oxo-biodegradable plastic. Confusion is due to the fact that the prohibition of ‘oxo-degradable plastic’ and its definition in the legislation were not a considered view of the Commission included in its draft of the Directive, but were inserted at a late stage in the Environment Committee of the Parliament as a result of lobbying.

In the EU, the REACH Regulation 1907/2006 sets out procedures for the evaluation of substances before they can be banned. These are set out in Articles 68-73 and are designed to ensure that there is a proper scientific assessment and as a safeguard against arbitrary legislation. In this case those Regulations were circumvented.

There was no Environmental Impact Statement or Socio-economic Analysis. There had been three reports to the Committee by their own Rapporteurs on the subject of Single-use Plastics, but none of them made a case for banning oxo-degradable or oxo-biodegradable plastic. Further, the Committee failed to await the results of a scientific study being done at the time by the European Chemicals Agency; and the Commission prematurely terminated that study. On 30th October 2018 the Agency informed the BPA that they had not been convinced that microplastics were formed.

On 7th July 2025 the Environmental Protection Agency of the Republic of Ireland (an EU member-state) confirmed in writing to Symphony Environmental that “The d2w technology has been scientifically demonstrated to undergo full biodegradation without leaving behind persistent microplastics or toxic residues. This conclusion is supported by independent studies.” including in particular the French “Oxomar” study, which proved that oxo-biodegradable plastics are not the same as “oxo-degradable” plastics and that “they biodegrade in seawater and do so with a significantly higher efficiency than conventional plastics.” See www.biodeg.org/wp-content/uploads/2021/07/Final-report-OXOMAR-10032021.pdf

The EPA has not changed its position on the science, but has concluded that products made with d2w technology are nevertheless to be regarded as “oxo-degradable” plastic for the purposes of Reg. 5 of the Single-use Plastics Directive 2019/904. Reliance is placed on the Guidelines issued by the EU Commission (2021/C 216/01) which the EPA accepts are not legally-binding.

We have examined the Guidelines and have concluded for the following reasons that they are also mistaken.

The Guidelines say “Article 5 of the Directive ….. makes no distinction between oxo-degradable plastic that is biodegradable and oxo-degradable plastic that is not biodegradable.” This is true – because Article 5 does not mention biodegradable plastic at all. That does not however mean that oxo-biodegradable plastic does not exist.

Its existence is recognised by the European standards body CEN in TR15351 as follows:

(a) “Oxo-degradation” is “degradation identified as resulting from oxidative cleavage of macromolecules.” This describes ordinary plastic, (which does not contain an intentionally-added prodegradant catalyst). It will abiotically degrade by oxidation in the open environment and create microplastics, but does not become biodegradable except over a long period of time.

(b) By contrast “oxo-biodegradation is defined as “degradation resulting from oxidative and cell-mediated phenomena, either simultaneously or successively”. This means that the plastic (which does contain a prodegradant catalyst) degrades rapidly by oxidation until its molecular weight is low enough to be accessible to bacteria and fungi, who then recycle it back into nature.

Recital 15 of the SUP Directive provides that “The restrictions on placing on the market introduced in this Directive should also cover products made from “oxo-degradable” plastic, as that type of plastic does not properly biodegrade and thus contributes to microplastic pollution in the environment.” It follows from this that a type of plastic, (such as d2w biodegradable plastic), which is scientifically proved to properly biodegrade and not create microplastics, is not “oxo-degradable” plastic for the purposes of the Directive. The Guidelines are therefore mistaken, and in conflict with Recital 15. The quality of biodegradability is an essential characteristic.

In addition, ‘oxo-degradable plastic’ is defined by Art. 3(3) of the Single-use Plastics Directive 2019/904, which would be in conflict with Recital 15 of the same Directive, and the CEN definition quoted above if they applied to plastic which is proved to properly biodegrade and not create microplastics. ‘Oxo-degradable plastic’ is defined in Art. 3(3) as “plastic materials that include additives which, through oxidation, lead to the fragmentation of the plastic material into micro-fragments or to chemical decomposition”

The EPA of Ireland and the EU Commission have been provided with scientific evidence that plastic materials made with d2w do not contain additives which, through oxidation, lead (a) to the fragmentation of the plastic material into micro-fragments or (b) to chemical decomposition.”

One of the purposes of the SUP Directive is to reduce the amount of single-use plastic products, and especially those commonly found on beaches. That is why the Directive contains a list of such products, which are banned whether they are oxo-degradable or not. There was no reason to add any restriction which could apply only to oxo-biodegradable plastic products, for if they are single-use products on the list they are banned anyway.

There is no evidence that oxo-biodegradable plastic products not mentioned on the list have ever been found on beaches, and it is clear that it is better for Europe's environment for plastic to be made so that it quickly biodegrades leaving no microplastics or toxic residues, instead of lying or floating around for decades and creating microplastics.

The Directive had been challenged by Symphony Environmental in the European Court in Luxembourg, because the confusion caused by the Directive had affected its business and Symphony claimed compensation. The court did not say that the EU had made a correct assessment of the technology, but it refused to award compensation simply because it held that the legislators had not exceeded the limits of their discretion.

This was a surprising conclusion because, as mentioned above the legislators had not followed the procedure prescribed by the REACH Regulation Arts 68-73; had failed to make an environmental impact assessment or socio-economic analysis; had failed to await the results of a scientific study being done at the time by the European Chemicals Agency; which had been prematurely terminated.

Even more surprising was that the court refused to attach weight to scientific evidence obtained by Symphony from international test houses because they had paid for it, without explaining how it was possible to obtain a report from such test houses without paying for it. Worse still the court then proceeded to place reliance on evidence from Eunomia for which the Commission had paid.