

Response to DEFRA call for evidence: Review of Pro-Oxidant Additive Containing (PAC) plastics, commonly referred to as ‘oxo-degradable’ or ‘oxo-biodegradable’ plastics.

Submission details:

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RECOUP recommends that the UK Government introduces the following actions:

- **In terms of English policy, RECOUP calls upon the UK government to ban pro-oxidant additive containing (PAC) plastics in England at least in line with Welsh timescales by 2026, if not sooner.**
- **We also call to have a UK-wide consistency of banning pro-oxidant additive containing (PAC) plastics across all four nations of the UK Single Market.**

RECOUP has worked alongside the BBIA and industry partners on this topic and this position will similarly reflect those responses.

For the last 20 years or more, so-called oxo-degradable, oxo-biodegradable, and more recently biotransformation additives, now known as PAC plastics, have been marketed by a number of companies as a solution to the problem of littering of polyethylene and polypropylene plastics. The additives are claimed to accelerate the breakdown these plastics in the open environment to the extent that they can undergo complete biodegradation in soil, and in some cases aquatic environments. Further, it is claimed that during their breakdown in the outdoors such products do not give rise to microplastics and do not pose a toxicity issue. Finally, it is asserted that these products do not affect quality and stability when added to the normal polyolefin recycling stream.

There is an extensive scientific literature studying these additive plastics, which has been independently reviewed by Eunomia (2018) and more recently by UCL (2023). These reviews conclude that there remains substantial uncertainty around all the claims made for these materials by the PAC manufacturers. Notably, achieving full terrestrial biodegradation of such littered products in the UK and similar climates is particularly challenging, and there is currently no convincing evidence that this will be achieved under real-world conditions and in reasonable timeframes. Microplastics are likely to be present during the breakdown of littered PAC plastics, or in PAC plastic films for agricultural uses such as mulch films. There is incomplete evidence as to the non-toxicity of PAC plastics and their breakdown products in the open environment.

There is great concern in the recycling industry that increasing use of PAC plastics will lead to downgrading the quality of the (polyolefin) recycling stream. There is a risk that partially degraded PAC polymers enter the recycling stream, and additionally that pro-oxidant catalysts will be introduced into the stream. Indeed, there is evidence of polymer degradation during extrusion in one PAC material manufacturer’s own published data. Of equal importance, is the

perception of the quality of products made with recycled plastic, and the effect on the market, should it become known that PAC material could enter the plastic recycling stream. These concerns are reflected in industry recyclability guidance, such as RECOUP's 'Recyclability by Design'. Applications of any type of product which biodegrades needs to be in areas where it will be prevented from entering the recycling stream, as they cannot be easily identified and separated from conventional plastics. The presence of these materials in the recycling stream will adversely affect the quality and marketability of the resulting products.

In September 2022, the BSI published a publicly available specification, PAS 9017, which aimed to establish a test protocol relating to the potential biodegradation of PAC plastics in the open, terrestrial environment: PAS 9017: 2020 Plastics – Biodegradation of polyolefins in an open-air terrestrial environment – Specification. The technical suitability of PAS 9017 protocol has been repeatedly questioned by a range of industry stakeholders. The BBIA itself submitted a critique of PAS 9017 when it was reviewed by the BSI in Sept 2022, along with other industry bodies, (see Appendix).

Biodegradable and PAC plastics are not a solution to litter and there are further concerns that items labelled as 'biodegradable' may encourage people to litter. Because PAC plastics cannot be recycled and cannot be composted, and because they add no benefit to incineration or landfill, the only benefit they can offer a brand owner who uses them is that the material can be littered which is, of course, an illegal activity. Degradation of PACs takes place over many months, if at all. Discarded packaging becomes litter immediately.

The EU has banned the use of PAC plastics since 2019, and very recently found against a legal challenge from a PAC manufacturer, Symphony Environmental. In the continuing absence of convincing scientific evidence to underpin the claims around PAC plastics, there is a strong case for the UK to introduce a similar restriction.

Wales is already well on the road to banning pro-oxidant additive containing (PAC) plastics by spring 2026, as per Phase 2 of the Wales is already well on the road to banning pro-oxidant additive containing (PAC) plastics by 2026.

We conclude that, literature shows that most PAC plastics studied showed biodegradability values in the range 5–60% and would not pass the criteria for biodegradability set in the new PAS 9017:2020. Possible formation of microplastics and cross-linking have been highlighted both by field studies and laboratory studies. Systematic ecotoxicity studies are needed to assess the possible effect of PAC additives and microplastics on the environment and biological organisms.

In addition, there are numerous unanswered questions related to the validity of PAS 9017, some of which have been detailed above. These are particularly relevant to the applicability of the PAS as it stands in UK and central and northern Europe. These issues urgently need to be addressed as part of any revision process.