OXO-BIODEGRADABLE PLASTICS ASSOCIATION

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EVIDENCE TO THE ENVIRONMENTAL AUDIT COMMITTEE INQUIRY ON PLASTIC BAGS

9th DECEMBER 2013

INTRODUCTION

1. The Oxo-biodegradable Plastics Association (OPA) is a not-for-profit Association whose objects are to explain and promote the concept of oxo-biodegradability of plastics and the science and technology relating thereto.[1] It represents manufacturers, traders, and commercial users of oxo-biodegradable plastics based in 65 countries around the world.

2. The Association has encountered a lot of confusion caused by public statements made by people who are experts in polymers, or in recycling, or in environmental science, but are not experts in oxo-biodegradable polymers. The OPA therefore welcomes the opportunity to give written evidence to the Committee, and has offered to provide an expert in oxo-biodegradable technology and an expert in recycling of oxo-biodegradable plastics, to give oral evidence.

3. The British Plastics Federation and PlasRecycle do not represent the oxo-biodegradable plastics industry and are not experts in oxo-biodegradable plastics.

DECLARATION OF INTEREST

None.

EVIDENCE

4. The OPA considers in detail item 3 of the Terms of Reference, namely "the impact on the use of biodegradable bags and the impact on plastics recycling." It also offers evidence on the other issues specified in the Committee's Terms of Reference

Item 3 – Biodegradable Bags

5. Lightweight plastic shopping bags offer a very useful and low-cost way to carry food and other goods and to protect them from contamination. They can carry 2,500 times their own weight and stay strong when wet. A typical plastic carrier bag uses 70% less plastic today than 20 years ago.

6. There appear to be three reasons for seeking to reduce the use of such bags by means of a 5p levy:

    a. That the bags can be easily carried by the wind into the open environment, where they cannot realistically be collected and where they could lie or float around for many decades
    b. That oil is a finite resource, and should not be extracted to make plastic
    c. That the bags are "symptomatic of a throw-away society"

As to 6(a) - LITTER

7. Oxo-biodegradable plastic is designed according to ASTM D6954[2] to degrade and then biodegrade at the end of its useful life in the open environment in the presence of oxygen in whatever approximate timescale is desired. It is

[1] For an outline paper on the Relevance of Degradable Plastic, See Annex

[2] http://webstore.ansi.org/FindStandards.aspx?SearchString=ASTM+D6954-04(2013)&SearchOption=0&PageNum=0&SearchTermsArray=null%7cASTM+D6954-04(2013)%7cnull

not therefore necessary to restrict this type of plastic bag, and **an exemption from the levy, or a reduction in the levy, should be granted, as already envisaged by the government.**

8. Even if a levy is imposed there will still be very large numbers of plastic bags in circulation. The government has no policy for those which cannot realistically be collected, unless the levy is higher on conventional plastic than on oxo-biodegradable plastic so as to encourage a switch to the more environmentally beneficial option.

9. It needs to be clearly understood that there are two very different types of biodegradable plastic products:

    a. "Compostable" - (also loosely known as "bio-based plastics" or "bioplastics") and designed according to EN13432 to biodegrade in industrial composting, and
    b. Oxo-biodegradable - made from petroleum-derived polymers such as PE and PP, containing special ingredients which reduce the molecular weight in the presence of oxygen to the point where it is no longer a plastic and has become biodegradable.

10. One common misunderstanding that the OPA has encountered is that biodegradability and compostability are the same thing. This is far from true. The environment of an industrial composting facility is quite different from that to which oxo-biodegradable plastics are expected to be exposed in the open environment on land or sea.

11. Oxo-degradation is defined by CEN[3] in TR15351 as "*degradation resulting from oxidative cleavage of macromolecules*." And oxo-biodegradation as "*degradation resulting from oxidative and cell-mediated phenomena, either simultaneously or successively*."

12. Oxo-biodegradable plastic does not just fragment, but will be consumed by bacteria and fungi after oxidative cleavage has reduced the molecular structure to a level which permits living micro-organisms access to the carbon and hydrogen. It is therefore "biodegradable." This process continues until the material has biodegraded to nothing more than CO_2, water, and humus, and it does not leave fragments of petro-polymers in the environment.

13. The abiotic phase can be as short as a few months depending on the heat, UV light, and stress in the disposal location. As the residues are invisible and non-toxic at the end of that phase it is not important how long they take for total bioassimilation in the open environment. Materials such as twigs and straw, which are obviously biodegradable, will usually take much longer than oxo-biodegradable plastic to completely bio-degrade.

14. Oxo-biodegradation of polymers has been studied in depth in many scientific publications[4] - most recently at the Technical Research Institute of Sweden and the Swedish University of Agricultural Sciences. A peer-reviewed report of the work was published in Vol. 96 of the journal of Polymer Degradation & Stability (2011) at pages 919-928. It shows 91% biodegradation in a soil environment within 24 months, in tests conducted in accordance with ISO 17556.

15. A Life Cycle Analysis conducted by Intertek for the Environment Agency in 2011[5] showed that plastic shopping bags have better environmental credentials than paper, cotton or bio-based plastic. A further LCA by Intertek

[3] the European Standards Organisation
[4] See Bibliography
[5] http://www.biodeg.org/files/uploaded/biodeg/EA_Carrier_Bag_Repor_%20Jul_2011(1).pdf

in 2012[6] showed that oxo-biodegradable plastic has the best environmental credentials.

16. The process of making paper bags causes 70% more atmospheric pollution than plastic bags. Paper bags use 300% more energy to produce, and the process uses huge amounts of water and creates very unpleasant organic waste. When they degrade they emit methane and carbon dioxide. Paper bag production use and disposal results in 3.3 times the greenhouse gas emissions associated with HDPE plastic bags. The global-warming impact of paper bag use is almost twice that of conventional plastic bags.[7]

17. "*There have been unforeseen consequences in the Irish Experience … increase in the use of paper bags which are actually worse for the environment …*"[8]

18. Oxo-biodegradable plastic is tested according to ASTM D6954 to prove that it does degrade and biodegrade, that it is not eco-toxic and that it does not contain significant amounts of gel which might inhibit biodegradability.

19. Oxo-biodegradable plastic products can be made at little or no additional cost by British factories with their normal equipment, workforce, and polymer resins. This is not the case with bio-based compostable plastic.

20. DEFRA has found no evidence that degradable plastics of any kind encourage littering, and oxo-biodegradable plastic bags look and feel exactly the same as ordinary plastic bags. Whilst people should still be fined for disposing irresponsibly of their waste, degradability recognises the fact that it is not practicable to collect 100% of the waste.

21. Oxo-biodegradable plastic is designed to be inert deep in landfill so that it does not generate methane – a powerful greenhouse gas.

22. Oxo-biodegradable plastic does not contain heavy metals, and the metal salts contained within it are at such low concentrations that they are unlikely to be toxic to the environment. This is confirmed by research commissioned by DEFRA[9].

23. Oxo-biodegradable plastic has not been designed for composting, because plastic (even if EN 13432-compliant)[10] cannot be made into compost. It is useful only for transporting organic waste to a composting facility, and oxo-biodegradable plastic has been tested and found satisfactory for that purpose.

24. Fragments found in the oceans and inside animals and birds are predominantly from conventional plastic. An oxo-biodegradable plastic converts at the end of its useful life into a material which is no longer a plastic and is biodegradable.[11]

25. There would be no point in an exemption for bio-based compostable plastics, because
    (a) they are tested to biodegrade not in the open environment but in the special conditions found in an industrial composting unit
    (b) they cannot be recycled with conventional plastic[12]
    (c) they cannot be made into compost[13]

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[6] http://www.biodeg.org/files/uploaded/Intertek_Final_Report_15.5.12(9).pdf
[7] California Master Environmental Assessment March 2010 page 31
[8] Ben Bradshaw, UK Environment Minister, 4 August 2006.
[9] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=16263&FromSearch=Y&Publisher=1&SearchText=EV0422&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description
[10] because EN13432 requires it to convert to CO_2 gas within 180 days
[11] See Vol 96 of the journal of Polymer Degradation & Stability (2011) at pages 919-928, and Bibliography
[12] See Annex on Recycling

(d) they therefore contribute to climate-change
(e) they are thicker and heavier, requiring more trucks to transport them using more road-space and emitting more pollution
(f) they generate methane in anaerobic conditions

26. in landfill (g) the European Parliament[14] has resolved not to encourage the use of land and water resources for producing bio-fuels (and the same reasoning applies to bio-plastics) and (h) they are much too expensive for everyday use.

27. The Environmental Audit Committee itself has found[15] that "the stimulation of biofuels production by the [UK] Government and EU is reckless in the absence of effective mechanisms to prevent the destruction of carbon sinks internationally" The Committee continued "A large biofuel industry based on current technology is likely to increase agricultural commodity prices and, by displacing food production, could damage food security in developing countries."

28. On 6th March 2008 the United Kingdom's Chief Scientific Adviser warned that if this continues the world will soon be unable to feed itself.[16]

As to (b) – OIL-PRODUCTION

29. Oil is extracted to make petrol, diesel and other fuels, and an inevitable by-product (naphtha) is used to make plastic. The same amount of oil would therefore be extracted even if plastics did not exist. It makes sense to use the by-product.

30. Bio-based compostable plastic can be considered "renewable" only if you ignore the oil-based content (which can be 40% or more) and if you ignore the fossil fuels burned by machines which clear the land, plough the land, make the fertilisers and

31. pesticides and carry them to the farm, harrow the land, spray the crops, harvest the crops and carry them to a factory for polymerisation, and the energy consumed by

32. the machines at that factory. Insofar as the growing crops absorb CO_2, that would be true of the vegetation which was there before.

As to (c) - SYMPTOMATIC?

33. Lightweight plastic shopping bags are symptomatic of a society which has changed radically since the days when people bought milk in jugs from the milkman and carried their food home from the corner-shop in small quantities in paper or cotton bags. Lightweight plastic shopping bags do not need to be thrown away, and re-use should be encouraged. They are compact enough to be put in a pocket or handbag. After use for the primary purpose they can be re-used many times for many purposes. Oxo-biodegradable plastics can be designed to a timescale which allows multiple re-use.

34. In its 2011 LCA[17] Intertek said "We have avoided calling lightweight bags "single use" or "disposable", because consumers are increasingly reusing

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[13] EN 13432 para. A2.2

[14] **P7_TA-PROV(2013)0357**

[15] Report 15th January 2008 (HC 76-1 of 2007-08). Para 53 http://www.publications.parliament.uk/pa/cm200708/cmselect/cmenvaud/76/76.pdf

[16] The Times 7th March 2008 http://www.timesonline.co.uk/tol/news/environment/article3500954.ece

[17] http://www.biodeg.org/files/uploaded/biodeg/EA_Carrier_Bag_Repor_%20Jul_2011(1).pdf

lightweight carriers for shopping. Additionally high proportions were used as a genuine replacement for another product and the secondary reuse of these bags plays an important part in reducing their global warming potential."

RECYCLING

35. Oxo-biodegradable plastic is an oil-based plastic and can (despite claims by some recyclers to the contrary) be safely recycled with conventional plastics without the need for separate collection.[18]

36. Extensive tests by Dr. A H A Roediger were reported on 21st May 2012 and he concluded that "*Plastic products made with oxo-biodegradable technology may be recycled without any significant detriment to the newly formed recycled product."*

37. Dr. Roediger has examined the report by Transfercenter für Kunststofftecknik GmbH ("TCKT") dated 12 November 2013 prepared for European Plastic Converters ("EuPC"). He agrees that it is clear that compostable plastics cannot be recycled with conventional oil-based plastics, but sees nothing in the report to change his opinion about oxo-biodegradable plastic.

38. The OPA has offered to conduct trials with recyclers, but there has been no response. An OPA member-company has made an offer to DEFRA to purchase for recycling all the conventional and oxo-biodegradable plastic shopping bags collected in England for recycling if oxo-biodegradable plastic is exempted from the 5p levy.

39. There is no need for separate collection of oxo-biodegradable plastics for recycling, but a tracer could easily be included to make separation a simple matter.

INTERNATIONAL

40. The governments of Pakistan[19], the United Arab Emirates[20] and seven other countries carefully considered the effectiveness and safety of oxo-biodegradable technology before passing legislation which makes it mandatory to use the technology, and rejecting the bio-based alternative. These have a combined population of 195 millions, and other countries may decide to follow their example. British factories and retailers cannot now export to those countries unless their disposable plastic products and packaging are made with oxo-biodegradable technology.

BAGS FOR LIFE AND HYGIENE ISSUES

43 See Annex on Bags for Life

[18] See Annex on Recycling
[19] Prohibition of Non-degradable Plastic Products (Manufacturing, Sale and Usage) Regulations 2013
[20] Cabinet Decree No. 420/3 for the year 26/12/2009 Session No. 13