

Oxo-Biodegradable Plastics Association

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OXO-BIO TECHNOLOGY REDUCES PLASTIC WASTE IN THE ENVIRONMENT



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OPA Chairman

- The world and particularly the oceans are being choked by plastic.
- In an ideal world all plastic waste would be collected and recycled, but we do not live in an ideal world.
- Microplastics are a serious environmental problem. They are caused by the embrittlement and erosion of ordinary plastic, and these fragments of plastic can lie or float around for decades.
- Oxo-biodegradable plastic (OBP) is an upgrade to ordinary plastic, which ensures that if plastic litter escapes into the open environment, it will convert rapidly into biodegradable materials and will not remain there for decades as conventional plastic does now.
- Given that our oceans are fast approaching a crisis caused by plastic waste, governments, companies and consumers' worldwide need to be pragmatic and they need to act. Some governments in the Middle East, Africa, and Asia have already made OBP mandatory.
- There is no easy solution to the problem of plastic in the environment – but OBP can make a huge contribution and it can be implemented right now at little or no extra cost.
- The merits of OBP have been debated for more than ten years
- Time is not on our side and action cannot wait any longer.



THE EUROPEAN UNION – THE FACTS

Eunomia Consultants were appointed by the European Commission to report on oxo-biodegradable plastics. Their 2017 report found that “...***it is possible for [OBP] plastic to fully mineralise in an open environment, with the prodegradant additives encouraging this action, and thus the polymers and entrained substances can be assimilated into the natural environment.***”

*Michael Stephen was a member of the Environment Select Committee of the UK Parliament, and is a Director of Symphony Environmental Technologies Plc.

Eunomia continued “*The debate around the biodegradability of [OBP] plastic is not finalised, but should **move forward from the assertion that it merely fragments**, towards confirming whether the timeframes observed for total biodegradation are acceptable from an environmental point of view and whether this is likely to take place in natural environments.*” We agree, and have assisted the Commission to answer these questions.

There is no longer any justification for anyone to confuse the public by referring to OBP as “oxo-fragmentable” or “oxo-degradable” (as the MacArthur Foundation report does). Moreover, the European Standards organisation CEN has clearly defined Oxo-biodegradation (in TR 15351) as “degradation resulting from oxidative and cell-mediated phenomena, either simultaneously or successively.” The MacArthur report confuses the reader by mentioning enzyme-mediated degradable plastics, but they are not OBP and they are not recognised by this Association as having any value.

For oxo-biodegradable plastic generally see www.biodeg.org

Timescale

OBP items can be programmed to degrade according to whatever timescale is required. They are (like all other plastic items) designed to have a service-life before they will start degrading in normal use or storage, and during that time they can be re-used in the same way as conventional plastic items. It can easily be demonstrated that under *any* given conditions in the open environment OBP will degrade at a **much faster rate than conventional plastic** and will therefore be available for biodegradation in a much shorter time-frame. OBP are therefore much less persistent and **cannot accumulate in the environment as conventional plastics do**. The key point is that OBP items are *in substitution for*, not *in addition to*, conventional plastic items, and are therefore much more acceptable from an environmental point of view.

The Natural Environment

The very many laboratory **tests on OBP over the past three decades** have not been done for the amusement of scientists – they have been done to replicate the performance of OBP in the natural environment. Ageing techniques in the laboratory, and the temperatures used, have been developed and are well understood so as to produce the same mechanisms and products of degradation as are observed in natural ageing. In addition, OBP has been tested many times for **degradation in real time in seawater**, most recently at Bandol in France. The residue of the material was sent to Queen Mary University London who observed it being **used as a food-source by bacteria** commonly found on land and in the oceans, with no harmful effects.

Some of the scientific work has been commissioned by stakeholders in the oxo-biodegradable plastic industry, but it is performed by universities and tests houses who will not of course work free of charge but are rightly protective of their scientific independence. The oxo-biodegradable plastics industry nevertheless welcomes proper and appropriate testing commissioned by anyone.

ELLEN MACARTHUR FOUNDATION REPORT

A report has been published under the auspices of the Ellen McArthur Foundation, which bears the logos of a number of companies and organisations. **Many of these are aggressively promoting a rival technology, and others are themselves producers of most of the plastic articles which are found in the environment.** The MacArthur Foundation have not declared the amounts of **money which they received from those companies and organisations.**

A draft of the MacArthur report was submitted by its authors to Prof. Ignacy Jakubowicz, one of the world's leading polymer scientists, who said that it did not accord with his understanding nor the science in this field.

<http://www.biodeg.org/Reply%20to%20Ellen%20MacArthur%20Foundation%20from%20Prof%20Ignacy%20Jakubowicz%20-%202021-8-17.pdf>.

He also explained to them that “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.” They are then recycled back into nature by the naturally-occurring micro-organisms. **This point is absolutely crucial to an understanding of OBP.**

Rival Technology

The rival technology is called “**bio-plastic,**” but this is deceptive because **50% or more of its composition is from petro-chemicals.** This type of plastic can be up to **400% more expensive,** it **cannot be recycled** together with ordinary plastic, and **it is tested to biodegrade in the special conditions found only in industrial composting or anaerobic digestion.** It therefore has to be collected and taken to an industrial facility, **which does not resolve the key issue of plastic which has found its way into the open environment.** Although sold as “compostable” it **does not convert into compost** but converts instead **into CO₂** within 180 days, which is emitted to atmosphere as a greenhouse gas. It is deceptive to call this “organic-recycling” or “plastics-recovery.” The promoters of this type of plastic see OBP as a threat to their market share, as it is much more useful, with better performance, a better LCA, and much less expensive.

OBP and other **oil-based plastics do not cause fossil resource-depletion.** They are made from an inevitable by-product of oil which used to be wasted. The oil is extracted from the ground to make fuels and lubricants, and the same amount would be extracted even if oil-based plastics did not exist. Therefore, until other fuels and lubricants are found for vehicles, ships, aircraft, buildings, and factories, it makes sense to use this by-product instead of consuming large amounts of fossil fuel in the agricultural production, transport, and polymerisation of “bio-plastics.” See <http://www.biodeg.org/biobased.html>

In 2014 The French Federation of Commerce & Distribution described the law introduced by Ségolène Royal, forcing shops to change to paper or bioplastic bags, as “Une mesure dangereuse, inefficace et coûteuse pour les Français” and said that it represents **an additional cost of 300 million euros and would lead to higher food prices** - All this for no benefit.

This MacArthur report is ultimately **counter-productive and confusing.** It seeks to deprive our environment of the benefits of a technology which has for more than ten years and in nearly 100 countries been making a real contribution to reducing the accumulation of plastic litter, with no reports of any adverse effects.

We wrote to Dame Ellen MacArthur herself on 13th March 2017 but have never received a reply. She is not a polymer scientist and it seems that she is being misled. We have now given her an **open invitation to meet with us** at a time and place of her choice, but have received no reply.

This MacArthur report is the latest in a series of commercially-motivated attacks on OBP over more than ten years. The authors of the report have done no research themselves, and are relying on a selective review of the literature. They rely heavily on **reports from lobby groups** who promote “bio-based” plastic such as “SPI Bioplastics Council,” “European Bioplastics,” and “Biodegradable Products Institute.”

Packaging

With regard to companies whose packaging is responsible for much of the plastic waste in the environment, they all say that they support redesign, re-use, and recycling, and so do we, but it is really surprising that they are not willing to engage with the OBP industry to run trials and find out whether OBP will work for them. It is disappointing that they align themselves instead with people who attack the technology **while thousands of tons of their plastic products get into the open environment every year**, where they will lie or float around for decades. It is sad that they care more about their profits than about the environment, and do not see the benefits of OBP for their own industry, which is under attack every day because its products can lie or float around in the environment for decades.

OBP is mandatory in several countries because their governments know that it is not possible to collect all the plastic waste and they need to ensure that if it does escape into their open environment, it will not remain there for decades. **Less plastic accumulating on land means less plastic in the world's oceans – this is crucial because 80% of the plastic waste in the oceans is estimated to have been carried into the ocean from the land.**

One might have expected the MacArthur Foundation to have more respect for the technical experts in those countries who have carried out a detailed evaluation of the suppliers of the additives and of the science and technology, over several years.

The report also talks about microplastics, which are indeed a big concern. However, **most of the microplastics come from conventional plastic items**, which have become embrittled and fragmented but remain as pieces of plastic, accumulating toxins and harming wildlife for decades. By contrast OBP technology works by quickly dismantling the molecular structure of the plastic so that it is no longer a plastic and can be consumed and returned to nature by naturally-occurring microorganisms. This in itself is a major improvement to conventional plastic.

Recycling

According to the recycling charity RECOUP (“Recyclability by Design” 2006) *“In cases where plastic products are particularly lightweight and contaminated with other materials, the energy and resources used in a recycling process may be more than those required producing new plastics. In such cases recycling may not be the most environmentally sound option.”* These are the very products in which OBP technology is commonly used and they are not plastics in high-value use.

Members of the Oxo-biodegradable Plastics Association (OPA) and their customers have been **successfully recycling OBP for more than ten years with no adverse reports**, but so as to address external concerns extensive scientific tests were done by Roediger Laboratories of Stellenbosch, South Africa. They concluded that “Plastic products made with OBP technology **may be recycled without any significant detriment to the newly formed recycled products**, and further test by the Transfercenter fur Kunststofftechnik GmbH (TCKT) laboratory in Austria came to the **same conclusion**. See <http://www.biodeg.org/recycling.html> There is therefore no need for separation of OBP from conventional plastics.

These were “worst-case-scenario” tests, using up to 100% recycle; and 100% oxo recycle, but neither of these conditions are likely to occur in practice. These tests were designed to be representative of internal and external industrial recycling, and post-consumer recycling including kerb-side collection i.e. scenarios where there has been no significant exposure to outdoor conditions which would promote the onset of degradation. Plastic products of any kind which do escape into the environment and remain there for long enough for significant degradation to occur, are unlikely to be recycled.

There have been several stories in the trade press recently about recycle from Southern European countries causing defects and ruptures in new film. When you look a little closer it becomes clear that the **defects were caused by substances used in the manufacture of “bio-plastics”** made from starch, polylactide (PLA) and which are **not** used in the manufacture of OBP.

This is a problem that is likely to get worse, as governments in France, Italy, Spain and now Greece have been persuaded by the manufacturers of “bio-plastics” to prefer their products.

Composting and Landfill

It is easy to attack a product by demonstrating that it will not do the things that it is not designed and supplied to do, and the authors of the MacArthur report have attempted to do this in relation to composting and landfill. Although OBP has been shown to work well in industrial composting and will degrade in the upper layers of a landfill, these are not its primary purposes. **Its primary purpose is to ensure that if the plastic finds its way into the open environment it will become biodegradable and return to nature much more quickly than conventional plastic.** Perversely, OBP cannot comply with EN13432 for composting because it does not emit CO₂ gas fast enough!

STANDARDS

OBP is an upgrade to ordinary plastic, and is manufactured to comply with the American Standard ASTM D6954 (which has six pass/fail tests), the British Standard 8472, the French Accord T51-808, the Swedish Standard SPCR 141, the UAE Standard 5009:2009 and the Saudi Standard 2879/2016.

The Oxo-biodegradable Plastics Association (OPA) is as much concerned as anyone **to ensure that only OBP made by reputable manufacturers in accordance with international standards should be placed on the market, and that marketing material should make only those claims which can be supported by credible evidence.**

This Association is therefore willing to **perform this service for OBP on the same basis that Vinçotte (a private company) verifies products marketed as “compostable.”** We have therefore written a Standard which will be submitted to the European Commission.

The OPA is a not-for-profit association which exists to research and explain the benefits of oxo-biodegradable plastic technology. It has 1,602 members who are manufacturers, distributors, importers, exporters, recyclers, and commercial end-users of oxo-biodegradable products in 96 countries worldwide.

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