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*Pioneering Oxo-biodegradable Plastic Technology*

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**Via Email**

Editor  
Plastics News  
dloebb@crain.com

**Re: January 28, 2010 Article – SPI Bioplastics Panel Questions Oxo-Degradability Claims**

Dear Sirs:

This letter is in response to the above article printed in [www.plasticsnews.com](http://www.plasticsnews.com), which article refers to a recent position paper prepared by the hydro-biodegradable plastics industry's special interest group, the Bioplastics Council. The Bioplastics Council and its European counterpart are inherently biased against competing technologies and they have once again sought to discredit oxo-biodegradable plastics technology through their ongoing campaign of misinformation and rumor mongering. This is part of the hydro-biodegradable industry's effort to give its product an artificial advantage by creating confusion on the term "biodegradability" and "compostability" by implying that the two words are interchangeable, and on that basis, that oxo-biodegradable plastics biodegradation is unsubstantiated.

Here are the facts:

**1. Oxo-biodegradable Plastics are biodegradable not compostable.**

Compostability has come to mean to the consumer that the plastic product, primarily bags, meet an international standard (ASTM D6400 or EN13432). Oxo-biodegradable plastics bags do not biodegrade as quickly in a compost environment as required by these standards which were developed primarily for hydro-biodegradable polymers (e.g. starch-based products). Consequently we cannot and do not claim compostability as per ASTM D6400 for EPI products. However, this does not mean EPI's oxo-biodegradable plastics products will not biodegrade; they just convert the carbon to carbon dioxide in a longer time frame. Many naturally occurring materials, all biodegradable, do not convert in the time frames established by ASTM D6400 and EN 13432, which are explained in the attached Position Statement. ASTM D6400 and EN13432 were established to support the composting industry, which will only accept plastics into its input stream if they are very rapidly biodegradable. Whilst this may be reasonable for bags intended e.g. for collection of food waste, rapid biodegradation to CO<sub>2</sub> and water is not an environmentally sensible way of managing plastic waste in general.

## **2. EPI's oxo-biodegradable plastics meet existing international standards for biodegradation.**

Standard specifications for degradable plastics currently exist only for their performance in industrial composting. As noted above, EPI products do not currently meet those standards for the reason given. These standards are compost standards, not biodegradation ones. We do not claim that our products are compostable but we maintain and have shown scientifically that they do biodegrade when tested according to ASTM D5988. The biodegradation of oxo-biodegradable plastics is also presented in ASTM D6954-04 which provides a testing protocol using ASTM standard methods to compare the performance of plastics that biodegrade in various disposal environments.

## **3. EPI's oxo-biodegradable plastics biodegrade.**

Oxo-biodegradable plastics do not simply disintegrate into smaller pieces of plastic that pollute the environment. The oxo-biodegradable plastics use a technology that is based on the well understood but slow reaction of conventional plastics with the oxygen in the air. The incorporation of EPI's TDPA additive accelerates this reaction in a very controlled way. This causes the products to physically disintegrate in an acceptable time period when they are exposed to air and sunlight or heat. The products of this degradation, which continues after physical changes to the bags are seen, are not just small pieces of the original plastic but are chemically completely different. They are significantly oxidized, denser and hydrophilic. These degradation products are highly susceptible to biodegradation by microorganisms that are naturally present in the environment and their biodegradation has been demonstrated in independent peer-reviewed studies. This allows the return of the original plastic to the eco-cycle. Biodegradation occurs over a period of 1-3 years, slightly slower than other competing products (compostable plastics) but completely satisfactory from an environmental viewpoint.

## **4. EPI's oxo-biodegradable plastics are compatible with the post consumer recycle stream.**

A 2007 study by the Québec government in Canada for post-consumer recyclability verified that polyethylene bags incorporating EPI's TDPA additives are completely compatible with the recycling stream and can be labeled as recyclable. Plastic scraps containing TDPA have been shown to be recyclable in the plastics processing facility. The products have an acceptable shelf life and retain their physical properties in their intended use. The underlying polymer structure is the same as for the other products in the recycle stream and the TDPA treated plastics will have no negative impact on the quality of the final recycled product.

## **5. Compounds of transition metals**

The catalysts usually used in oxo-biodegradable plastics are salts of the transition metals such as iron, manganese or cobalt. This means that the metals are present in the form of metal ions. None of these has been shown to be eco-toxic under any of the conditions in which oxo-biodegradable plastics products are used. In fact these metal ions are necessary in human and plant nutrition and they are acquired from food and water in the form of “essential minerals.”

It is important to note that TDPA additives and finished products incorporating TDPA have been approved by the European Food Safety Authority (EFSA), the US Food and Drug Administration (FDA) and the Canadian Food Inspection Agency (CFIA) as direct food contact compliant and can be used for direct food contact applications.

## **6. The 60% Standard**

The Bioplastics Council put forth the following suppositions:

- Complete biodegradation levels must be proven; and
- The 60% mineralization threshold in ASTM D6954 is only a point at which a test can be considered valid, and therefore is not proof of biodegradation.

The ASTM D6400 composting standard clearly states that 60% conversion of carbon (in the specified time) is an acceptable measure of biodegradability. Therefore 60% is accepted by the Bioplastics Council but apparently not when it applies to oxo-biodegradables.

## **7. Other**

The Bioplastics Council made other careless and unsubstantiated accusations in its most recent position paper. Their arbitrary accusations that degradable plastics (whether oxo or hydro) have encouraged littering, that tiny fragments of what used to be oxo-biodegradable plastic are more harmful than the countless other fragments normally found in the environment and that such fragments are more likely to attract toxins in a marine environment than fragments of seaweed or of ordinary plastic are made without any supporting evidence.

### **Concluding Comments:**

Some of the undisputable benefits of EPI’s technology to processors, consumers and the environment are as follows:

- The plastic products incorporating the TDPA additives degrade disintegrate and biodegrade as we claim and as has been demonstrated by a number of scientific studies by some very respected researchers.

- The technology, which uses additives, works with polyethylene, polypropylene and polystyrene and the resultant products have very similar processing and physical properties to the regular plastic itself.
- The technology utilizes existing plant and equipment and is easy and inexpensive to implement.
- Recycling with the main polyolefin recycle streams is possible because the product is either diluted or can be neutralized by traditional antioxidants.
- Products made using the technology have been demonstrated to have no toxic effects on sensitive plant and animal life in actual eco-toxicity testing to international standards.
- They meet FDA (USA), EFSA (European Union) and CFIA (Canada) requirements for direct food-contact packaging.
- The technology is extremely affordable.
- Some oxo-biodegradable providers are more credible than others. Purchasers of oxo-biodegradable additives should take care to ensure they are working with reputable companies that can support their environmental claims.

For more information, please contact Joseph G. Gho or Andy Koutsandreas.

Yours truly,

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Technical Manager

and

Jonathan Kutnr  
Legal Counsel