

July 23, 2010

### **EPI Response to BPI Comments on Biodegradable Additives**

EPI would like to respond to the comments made by BPI (Biodegradable Products Institute) in a February 12, 2010 article regarding additives used to promote degradation and biodegradation of conventional plastics. EPI's oxobiodegradable plastics (OBP) technology is included in the BPI commentary and BPI makes statements that imply that OBP do not perform as claimed. EPI certainly takes issue with such comments as it is the pioneer of OBP technology and strives to ensure that its claims are fully substantiated.

#### **Background**

It must be noted that BPI's focus is on the promotion of compostable, hydrobiodegradable (water-hydrolyzed) plastics. As such, BPI's opinions must be considered particularly biased since alternate technologies for achieving degradation and biodegradation are viewed as direct competition to the plastics technology that BPI is supporting. The fact is that OBP technology is a much more economical approach and BPI recognizes OBP as a significant threat.

#### **Article Comments**

The article brings up several points that need to be addressed in order clear up any misconceptions and misinformation that BPI continues to perpetuate.

##### **1) Fragmentation not a sign of biodegradation**

BPI asserts that oxobiodegradable plastics do indeed degrade and fragment, but that the fragments will not likely biodegrade in the environment. In particular, BPI highlights desert and cold forest conditions as if these typical are environments for plastics.

The biodegradation process for degraded plastics (in particular polyolefins) is well understood and substantiated in the scientific literature. Of course, moisture is necessary for all life forms to exist and this includes the micro-organisms that consume degraded plastic. For BPI to point to extreme conditions such as deserts, clearly indicates a calculated effort to discredit OBP technology.

Plastics made with EPI additives will biodegrade in the presence of moisture and micro-organisms, once the plastic has gone through the degradation process. EPI additives have been used for years in the preparation of OBP agricultural mulch film and have been widely used throughout Europe. These films degrade in the field and are left in the ground to biodegrade. If

there was no biodegradation occurring, as BPI suggests, then one would expect fragmented plastics to be accumulating and interfering with subsequent planting seasons. However, there is no plastics accumulation or reduction of soil fertility reported after several years of use.

## **2) Composting standard is the only acceptable standard for biodegradation**

Biodegradation is part of the composting process, but certainly this does not mean that all biodegradable materials must pass composting standards to be considered biodegradable. For plastics, compostability means that the plastic product meets an international standard such as ASTM D6400 or EN13432. OBP do not biodegrade as quickly in a compost environment as required by these standards that were developed primarily for hydro-biodegradable polymers.

The biodegradability of OBP is recognized in ASTM D6954-04 which provides a testing protocol using ASTM standard methods (including metrics used in the composting standards) to evaluate degradability, biodegradability and ecotoxicity. EPI cannot and does not claim compostability as per ASTM D6400 for plastics made with EPI additives. However, this does not mean EPI's OBP products will not biodegrade; they just convert the carbon in the plastic to carbon dioxide in a longer time frame than required by ASTM D6400. Many naturally occurring materials, all biodegradable, do not convert in the time frames established by ASTM D6400 and EN 13432.

But when it comes to plastics, composting as an end-of-life option is highly questionable in itself. The only plastic materials that meet current industrial compostability standards are the hydrobiodegradables. However, there is much to consider on whether composting of hydrobiodegradable plastics is an environmentally sound alternative.

The primary concerns are as follows:

- Currently, there are relatively few industrial composting facilities
- Of the current facilities, few are accepting plastics of any kind
- Consumers may confuse industrially compostable materials with home compostable (which the hydrobiodegradables are not)

In many cases, compostable plastic bags are segregated from organic material received at composting facilities and sent to landfills because the composting rates of these products do not meet the facilities' requirements. So the reality is that the so-called compostable plastics are not being composted to any significant degree. BPI should consider these issues when commenting on FTC guidelines regarding making supportable environmental claims. In this light, hydrobiodegradable plastics compostability claims are certainly dubious.

### **3) Lack of scientific data to support biodegradation claims**

The biodegradability of OBP is not only demonstrated through ASTM D6954-04, but there is a substantial body of supporting scientific literature. A sampling of such literature is found in the appendix at the end of this document.

With regards to biodegradation substantiation, BPI suggests that 90% material biodegradation should be demonstrated to indicate biodegradability. However, the ASTM D6400 composting standard clearly states that 60% conversion of carbon is an acceptable measure of biodegradability. Therefore 60% would seem to be accepted for so-called compostable plastics, but apparently not when it applies to OBP.

### **4) Landfill biodegradation claims are unsubstantiated**

EPI does not claim that plastics made with EPI oxobiodegradable additives will completely biodegrade in a landfill environment, but that complete degradation will occur while oxygen is available. EPI has conducted several landfill studies that conclude that oxygen is available for sufficient time for complete degradation to occur and that some aerobic biodegradation would also be expected. However, there are currently no acceptable standards for evaluating aerobic landfill biodegradation and EPI makes no claims on biodegradability in landfills.

While biodegradation of OBP in landfill is not claimed, there are clear benefits that result in degradation of OBP in the landfill environment. Increased material compaction and enhanced aerobic biodegradation of the organic content in the landfill are understood to be the primary benefits.

Current evidence does not indicate that oxobiodegradable plastics will anaerobically biodegrade and produce methane in the landfill.

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## **Appendix – Supporting Scientific Literature References on OBP Degradation and Biodegradation**

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