POSITION PAPER ON

DEGRADABLE ADDITIVES

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The SPI Bioplastics Division would like to thank the following individuals for reviewing this document:

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On the topic of “degradable additives,” the SPI Bioplastics Division formally updates its 2013 position paper. In this position paper, the SPI Bioplastics Division outlines the issues and questions of concern in order to support consumers, retailers and the plastics industry in identifying unsubstantiated and misleading product claims around degradability and biodegradability of plastics.

Definitions

For clarity, a few terms are defined here to prevent confusion.

Bioplastic:
plastic that is a) biodegradable, b) has biobased content, or c) is both biodegradable or has biobased content.

Biodegradable Plastic:
a plastic that undergoes biodegradation under specified environmental conditions (a process in which the degradation results from the action of naturally-occurring micro-organisms such as bacteria, fungi, and algae) and within a specified degradation time as per accepted industry standards. As of 2015, accepted industry standard specifications include, but are not limited to: ASTM D6400, ASTM D6868, ASTM D7081, ISO 17088 and EN 13432 (note: full titles are listed in Table 1).

Degradable Plastic:
a plastic designed to undergo a significant change in its chemical structure under specific environmental conditions, resulting in a loss of some properties that may be measured by standard test methods appropriate to the plastic and the application in a period of time that determines its classification.

Oxo-Degradation of Plastics:
degradation identified as resulting from oxidative cleavage of macromolecules. (CEN TC249/WG9)

Oxo-Biodegradation of Plastics:
degradation identified as resulting from oxidative and cell-mediated phenomena, either simultaneously or successively. (CEN TC249/WG9)

Introduction

Terms such as "degradable," "oxo-degradable," "oxo-biodegradable," "oxo-green" and "landfill degradable" are often used to promote products made with traditional plastics supplemented with specific degradable additives. Products made with these technologies and available in the market include film applications such as trash can liners, shopping bags, agricultural mulch films, landfill daily covers and plastic bottles. There are serious concerns amongst many plastics, composting and waste management experts that these products do not meet their claimed environmental promises.

The "degradable additives" are typically incorporated in conventional plastics such as polyethylene (PE), polypropylene (PP), polystyrene (PS), polyethylene terephthalate (PET) and polyvinyl chloride (PVC) during the converting process from polymer pellets to final products. Addition rates vary by type of degradable additive and planned use but are typically below 5%.

These additives are based on chemical catalysts containing transition metals such as cobalt, manganese, iron, etc., or organic materials, which may cause fragmentation as a result of a chemical oxidation of the plastics' polymer chains triggered by ultraviolet irradiation or heat exposure, or outright biodegradation of the organic additive. In a second phase, the resulting fragments are claimed to eventually undergo biodegradation. While there is chemical theory to support a very slow biodegradation process, the absence of light and oxygen as well as the presence of moisture or very low temperatures act as dimmer switches for the process, resulting in a very slow or absent chemical process. Similar to putting water on a fire, the chemical process is halted and the fire stops.

In addition to additives that trigger the fragmentation process, the "degradable additives" include stabilizers, which are added to limit the unwanted fragmentation of the polymer chains while the plastic is progressing along the value chain from production to warehousing to end use. However, the stabilizing effect of the additives is limited. A peer reviewed research study has concluded that "even with some content of stabilizing additives, PE film [with "degradable additives"] loses its mechanical properties rather fast, especially when exposed to sunlight."[1] For this reason, different storage conditions are required in order to prevent premature aging and loss of mechanical properties for plastics containing "degradable additives."

The terms (i.e., "degradable," "oxo-degradable," "oxo-biodegradable," "oxo-green" and "landfill degradable") suggest that the products can undergo rapid degradation and biodegradation under many different end-of-life conditions. However, the main effect of oxidation is fragmentation, not biodegradation, into small particles, which remain in the environment for an indeterminate amount of time, becoming uncontrollable in terms of their final disposition.

The SPI Bioplastics Division considers the use of terms without reference to existing acceptable standard specifications misleading, and as such are not reproducible and verifiable. Also since no peer reviewed data has been released publicly relating to mineralization rates that support the claims of complete biodegradation for these additive technologies, the term "oxo-biodegradable," and more specifically biodegradation in general, lacks meaning and is not supported by any recognized industry certifications or third-party peer reviewed scientific data.

In addition, the term "biodegradable" by itself is no more informative than when the adjective "tasty" is used to advertise food products. The term "oxo-biodegradable" is an appealing marketing term that is very misleading because the "biodegradation" part of the adjective cannot be verified in the absence of standard specifications (i.e., an explicit set of requirements with well-defined pass/fail criteria to be satisfied by a product).

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[1] Koutny, Marek, Jaques Lemaire and Anne-Marie Delort. "Biodegradation of Prooxidant films with Prooxidant Additives." Chemosphere 64 (2006): 1243-1252.

Standards and Certifications

The specification of time needed for the ultimate biodegradation is an essential requirement for any third-party tested and certified biodegradability claim. There are several internationally established and acknowledged standards and certifications that effectively substantiate claims of biodegradation under certain, specific end-of-life conditions. For compostability there are standard specifications AS 4736, ASTM D6400, ASTM D6868, EN 13432, and ISO 17088 (note: full titles are listed in Table 1). Complete biodegradation levels under industrial composting conditions in less than six months must be proven, according to these specifications.

The published standards are used to certify materials and products by several other organizations including DIN CERTCO in Germany, the Japanese BioPlastics Association in Japan, Vinçotte in Belgium, the Bureau de normalisation du Québec (BNQ) in Canada, the Australasian Bioplastics Association in Australia/New Zealand or the Biodegradable Products Institute (BPI) in the U.S. These certification agencies use well-researched and vetted test specifications to establish third-party, peer reviewed programs to confirm the end-of-life performance of bioplastic materials following the requirements of the standard specifications.

With the ongoing development of new materials, standards and certifications for other end-of-life scenarios have or are in the process of being developed. At this time the testing done on “degradable additives” often refers to ASTM D5338 and D5511, but these standard test methods are not standard specifications, do not take the material to complete biodegradation, and contain no pass or fail criteria established by the industry for rate, time or amount of biodegradation. Tables 1-3 provide examples of test specifications, guides and methodologies as well as an explanation to the proper use of each term.

Table 1: List of Standard (Pass/Fail) Specifications Discussed in the Position Paper*

Test Specifications	Title	Duration
ASTM D6400	Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities	84 days disintegration; 180 days mineralization
ASTM D6868	Standard Specification for Biodegradable Plastics Used as Coatings on Paper and Other Compostable Substrates	84 days disintegration; 180 days mineralization
ASTM D7081	Standard Specification for Non-Floating Biodegradable Plastics in the Marine Environment	Up to 365 days
EN 13432	Requirements for Packaging Recoverable Through Composting and Biodegradation – Test Scheme and Evaluation Criteria for the Final Acceptance of Packaging	84 days disintegration; 180 days mineralization
AS 4736	Requirement for claims in Australia and New Zealand for Biodegradable or Compostable Plastics	84 days disintegration; 180 days mineralization
ISO 17088	Specifications for Compostable Plastics	84 days disintegration; 180 days mineralization

**Note: Standard specifications carry pass/fail criteria and reporting.*

Table 2: Example of Test Guides**

Test Guides	Title
ASTM D6954	Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities

***Note: Test guides provide a framework or roadmap of steps, criteria, procedures or a general approach but provide no pass/fail guidance on how to qualify results of the tests.*

Table 3: Examples of Test Methodologies***

Test Methodologies	Purpose	Data Obtained
ASTM D5338	Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions	Degree and Rate of Aerobic Biodegradation
ASTM D5511	Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions	Test Duration, % Landfill Biodegradation
ASTM D5988	Soil Biodegradability	Test Duration, % Soil Biodegradation
ASTM D6691	Marine Biodegradation	Test Duration, % Marine Biodegradation
ASTM D6866	Biobased Carbon Content	% Biobased Carbon Content

****Note: Test methodologies provide standardized guidelines on how to conduct testing but provide no pass/fail guidance on how to qualify results of the tests.*

Guidance on Marketing Claims for Biodegradation

The U.S. Environmental Protection Agency (EPA) notes that "municipal solid waste (MSW) landfills are the third-largest source of human-related methane emissions in the United States, accounting for approximately 18.2 percent of these emissions in 2012", or 115.27 million metric tons of carbon dioxide equivalents.[2] [3] o In addition, the EPA estimates that only about 24.5% of municipal solid waste goes to landfills that capture methane for energy use, with 19.9% of those landfills flaring excess gas. 54.3 % of landfills do not have an active collection and control system or have some sort of passive system in place.[4]

Dr. Morton Barlaz and James Levis of North Carolina State University modeled global warming potential (GWP) of food waste disposed of and decomposed through different end-of-life means. Industrial composting was found to have a lower GWP than landfills without gas collecting and landfills with gas collecting but not energy recovery. But, anaerobic degradation (assuming energy recovery) and landfills with gas collection and energy recovery were modeled to have lower GWP than industrial composting. That is, end-of life options with energy recovery have the lowest GWP. However as noted above, only 35% of landfills utilized energy recovery in 2012. It is anticipated that landfills that encourage anaerobic digestion and energy recovery will be increasingly common.

Overall, landfill biodegradation claims as a positive factor are misleading as noted in several reports. In another peer reviewed journal article by Dr. Barlaz and Mr. Levis entitled, "Is Biodegradability a Desirable Attribute for Discarded Solid Waste? Perspectives from a National Landfill Greenhouse Gas Inventory Model,"[4] highlighted research using a life-cycle accounting of the greenhouse gas (GHG) emissions associated with discarding waste in both national-average and state-of-the-art landfills. The results of this research show that disposing of mixed municipal solid waste in a state-of-the-art landfill is carbon negative, but disposing of similar waste in a national-average landfill leads to positive GHG emissions. The results of this analysis also show that the more degradable a material is, the greater the GHG emissions it generates when disposed in a landfill. As Mr. Levis, one of the study authors, notes in a follow-up opinion letter written to industry trade publications, "the best material to have in a landfill, from a GHG emissions standpoint, is one that does not degrade at all."[5] In addition, using her own "landfill math," Dr. Sally Brown of the University of Washington stated that when it comes to organics, it is clear that "keeping these [residual] organics out of the landfill is the environmentally best answer, hands down."[6] [7]

> **"The best material to have in a landfill, from a GHG emissions standpoint, is one that does not degrade at all."**
> — James Levis, North Carolina State University.

Some companies note that while their products are intended for non-landfill end-of-life options (e.g., industrial composting), products may end up in a landfill. A peer-reviewed article appearing in the journal Polymer Degradation and Stability concluded that Ingeo™ biopolymer (i.e. polylactic acid (PLA) biopolymer from NatureWorks LLC) is essentially stable in landfills with no statistically significant quantity of methane released. This "conclusion was reached after a series of tests to ASTM D5526 ["Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions"] and ASTM D5511 ["Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions"] standards that simulated a century's worth of landfill conditions."[8] While Ingeo™ PLA resin is not intended for disposal in a landfill, its behavior in a landfill demonstrates that one cannot broad-brush all bioplastics into one category or with the same set of performance characteristics.

In October 2012, the U.S. Federal Trade Commission (FTC) issued its revised Guides for the Use of Environmental Marketing Claims, also known as the "Green Guides." The Guides' section on "degradable claims" which the FTC notes is applicable to oxo-degradables, oxo-biodegradables and similar claims states that: (a) marketers may make an unqualified degradable claim only if they can provide that the "entire product or package will completely break down and return to nature within a reasonably short period of time (defined as within one year) after customary disposal and (b) "unqualified degradable claims for items that are customarily disposed in landfills, incinerators and

[2] *Landfill Methane Outreach Program.*, U.S. Environmental Protection Agency. February 2015. www3.epa.gov/lmop/basic-info/index.html
[3] U.S EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. February 2015. www.epa.ogv/climatechange/ghgemissions/usinventoryreport.html
[4] EPA Landfill Methane Outreach Program. February 2016. www3.epa.gov/lmop/projects-candidates
[5] Levis, James. "Collecting Landfill Gas a Good Step." Plastics News. July 2011. 8 August 2012, plasticsnews.com/headlines2.html?id=22501&q=collecting+landfill+gas
[6] Brown, Sally. "Climate Change Connections: Landfill Gas Math." BioCycle. Dec. 2009. 10 Aug. 2012. www.biocycle.net/2009/12/climate-change-connections-landfill-gas-math/
[7] Brown, Sally. "Climate Change Connections." BioCycle. May 2011: 50.
[8] Omnexus. "Research Finds NatureWorks™ Ingeo™ Biopolymer Releases No Major Amount of Methane in Landfill."

recycling facilities are deceptive because these locations do not present conditions in which complete decomposition will occur within one year." In October 2013 an article was released stating, "FTC Cracks Down on Misleading and Unsubstantiated Environmental Marketing Claims."

> The Federal Trade Commission today announced **six enforcement actions**, including one that imposes a **$450,000 civil penalty** and five that for the first **time address biodegradable plastic claims**, as part of the agency's ongoing crackdown on false and misleading environmental claims.

The FTC maintains there is no evidence to support the degradable and biodegradable claims made by these companies concerning degradable additives.[9] [10]

Additionally, the U.S. National Advertising Division (NAD) of the Council of Better Business Bureaus has recommended that advertisers discontinue claims such as "100% oxo-biodegradable or degradable" because such statements incorrectly suggest that a plastic will quickly or completely biodegrade with the help of these additives. In fact, the NAD and FTC have taken action against companies using the additive technology for "oxo-biodegradables" and using the word "biodegradable" for marketing purposes for making false and unsubstantiated claims.[11]

The FTC maintains there is no evidence to support the degradable and biodegradable claims made by these companies concerning degradable additives.

Peer Testing of Degradable Additives

Other organizations such as the BPI have tested bottles[12] [13] [14] [15] and bags,[16] [17] containing degradable additives, to confirm claims made about the biodegradability of the product. In the case of the bottles that were tested using ASTM D5511, BPI noted that "after 60 days, the bottle achieved an overall biodegradation total of 4.47% or 10% of the positive control. Moreover, the biodegradation process has stopped, as the gas generation curve has plateaued. Per ASTM D5511-11, the results of this test cannot be extrapolated to claim that the bottle will fully biodegrade in the future." In the case of the bags that were tested using ASTM D5511, BPI noted that "after 60 days, the bags achieved an overall biodegradation total of 0.16% or less than 1% of the positive control. Additionally, the biodegradation process has stopped, as the gas generation curve plateaued. This marks the second 60 day test showing that the overall level of biodegradation stopped before the end of the test in products made from traditional resin that incorporate organic biodegradable additives."

Fragmentation Is Not the Same as Biodegradation

Fragmentation of "degradable additives" for plastics is not the result of a biodegradation process but rather the result of a chemical reaction. The resulting fragments will remain in the environment.[18] Fragmentation is not a solution to the waste problem, but rather the conversion of visible contaminants (such as bags, cutlery, packaging) into invisible contaminants (plastic fragments). This is generally not considered a feasible solution to plastic waste, as the behavioral problem of pollution by discarding waste in the environment could be even stimulated by these kinds of product claims. Furthermore, while plastic products can be collected once in the environment,

[9] Federal Trade Commission. "FTC Issues Revised „Green Guides." 1 Oct. 2012. 1 October 2012. ftc.gov/opa/2012/10/greenguides.shtm

[10] www.ftc.gov/news-events/media-resources/truth-advertising/green-guides

[11] National Advertising Division. "NAD Examines Advertising for GP Plastics Corp. PolyGreen Plastic Bags. Case Report." 5 March 2009. 2 May 2012. www.nadreview.org/CaseReports.aspx

[12] Biodegradable Products Institute. "BPI Tests Aquamantra 'Biodegradable' Bottle." Biodegradable Products Institute. February 2011. 9 August 2012. www.bpiworld.org/BPI-Public/News/Article.html?mode=PostView&bmi=513259

[13] NSF International. "NSF International Test Report." Biodegradable Products Institute. January 2011. 9 August 2012. www.bpiworld.org/Resources/Documents/Aquamantra%20NSF%20PET%20D5511%20Test%20Results%20J-00091962%20Final%20Report.pdf

[14] Biodegradable Products Institute. "Additional Testing Data on Aquamantra Bottles." Biodegradable Products Institute. May 2011 2011. 9 August 2012. www.bpiworld.org/BPI-Public/News/Article.html?mode=PostView&bmi=590719

[15] Organic Waste Systems. "Final Report – High Solids Anaerobic Digestion Under Thermophilic Conditions of Aquamantra Bottle." Biodegradable Products Institute. March 2011. 9 August 2012. www.bpiworld.org/Resources/Documents/OWS%20Aquamantra%20Final%20Report%20Mar%2011.pdf

[16] Biodegradable Products Institute. "Testing Results for Green Genius 'Biodegradable' Bags." Biodegradable Products Institute. April 2011. 9 August 2012. www.bpiworld.org/BPI-Public/News/Article.html?mode=PostView&bmi=563777

[17] NSF International. "NSF International Test Report – Green Genius 'Biodegradable' Bags." Biodegradable Products Institute. March 2011. 9 August 2012. www.bpiworld.org/BPI-Public/News/Article.html?mode=PostView&bmi=563777

[18] Narayan, Ramani. "Biodegradability – Sorting Facts and Claims." Bioplastics Magazine 1 (2009): 29.

plastic fragments at very small levels are impossible to collect or control. A study by Woods End Laboratories and Eco-Cycle entitled "Micro-Plastics in Compost," proposed that "only products that meet ASTM D6400, EN 13432 or BPI [Biodegradable Products Institute] standards should be allowed in food waste collection programs."[19]

An Answer to Littering or the Promotion of Littering?

"Degradable additives" for plastic products have been described as a solution to littering problems, whereby they supposedly fragment in the natural environment. In fact, such a concept risks increasing littering instead of reducing it. The United Nations Environment Program (UNEP) stresses that littering is a behavioral problem and must be resolved by raising environmental awareness and by the establishment of appropriate waste management systems.[20] "Degradable additives" for plastics are not specified as a solution by UNEP. Long standing efforts for the prevention of littering could actually be damaged by giving users of plastic items the impression that those items might vanish harmlessly if discarded into the environment. In fact, even food waste littering can be cited in many states and fined, even though the food waste is completely biodegradable.[21]

Accumulation of Plastic Fragments Bears Risks for the Environment

If "degrading" plastics are littered, they are supposed to start to disintegrate – caused by the additives triggering fragmentation. As ultimate biodegradability has not been demonstrated for these fragmented plastics, there is a substantial risk of accumulation of persistent substances in the environment. And while not within the scope of this paper, there have been expressed concerns about microplastics in the marine environment and potential toxicity issues.[22] [23] [24]

Organic Recovery Is Not Feasible

Collection and recovery schemes for organic waste are likely to suffer from the use of "degradable additive" containing products, if they are not biodegradable under current biological treatment processes such as composting or anaerobic digestion. These materials are reported to not meet the requirements of organic recovery via composting,[25] but are often selected by consumers because of misleading advertising and low cost. Reduction in quality of finished compost or digestate is likely should the degradable additive containing product not meet the requirements for biodegradation.

In the interest of the best recovery of organic waste such as food and yard debris, the involvement of "degradable" materials in such recovery programs should be avoided.

Regrettably, sometimes the "degradable" products have been publicized as "biodegradable" and "compostable," despite not meeting the standard specifications for organic recycling via composting. The terms oxo-biodegradable, oxo-degradable and the like can be taken by the consumers as synonyms of "biodegradable and compostable" and be erroneously recovered via organics recycling. This is why the Italian Antitrust Authority in 2005 sanctioned a retailer distributing "100% degradable" shopping bags made with PE supplemented with degradable additives.[26]

[19] Woods End Laboratories and Eco-Cycle. "Micro-Plastics in Compost." April 2011. Eco-Cycle. 9 July 2012. www.ecocycle.org/files/pdfs/microplastics_in_compost_summary.pdf

[20] United Nations Environment Programme. "Marine Litter – A Global Challenge" 9 June 2009. 2 May 2012. www.unep.org/regionalseas/marinelitter/publications/docs/Marine_Litter_A_Global_Challenge.pdf

[21] National Public Radio. "Lettuce-Littering Incident Comes to a Head." National Public Radio. 2006. 5 Oct. 2012. www.npr.org/templates/story/story.php?storyId=5169709

[22] Mearns, A. (2009). "Microplastics as accumulators and sources of persistent organcic pollutants in marine food webs: how significant?" IN: Arthur, C., J. Baker, and H. Bamford (eds). 2009. Proceedings of the International Research Workshop on the Occurrence, Effects, and Fate of Microplastic Marine Debris. Sept 9-11, 2008. NOAA Technical Memorandum NOS-OR&R-30.

[23] Rios, Lorena, Patrick R. Jones, Charles Moore, and Urja V. Narayan. "Quantitation of Persistent Organic Pollutants Adsorbed on Plastic Debris from the Northern Pacific Gyre's "Eastern Garbage Patch." Journal of Environmental Monitoring. 12 (12) (2010): 2226-2236.

[24] Mato Yukie et.al. "Plastic Resin Pallets as a Transport Medium for Toxic Chemicals in the Marine Environment." Environmental Science and Technology 35(2) (2001): 318-324 .

[25] California State University, Chico Research Foundation. "Performance Evaluation of Environmentally Degradable Plastic Packaging and Disposable Food Service Ware – Final Report." June 2007. 2 May 2012. www.calrecycle.ca.gov/Publications/Plastics/43208001.pdf

[26] Italian Official GAZETTE No. 2, 30 Jan. 2006.

This can lead to a general mistrust by consumers and composting plant managers towards the whole sector of certified biodegradable plastics and thus lead to a lack of acceptance of certified biodegradable and compostable materials. Therefore, well-developed and broadly accepted certification programs according to ASTM D6400 in the U.S. or EN 13432 in Europe or equivalent standards should be applied.

In the interest of the best recovery of organic waste such as food and yard debris, the involvement of "degradable" materials in such recovery programs should be avoided.

Toxicity

Degradable additive vendors are not currently addressing the toxicity concerns of the additives and byproducts (e.g., heavy metals, etc.) Vendors need to adequately demonstrate there are no toxicity issues with the additives themselves, or the monomers and oligomers of the degraded plastics during use or during disposal.

Plastic Recycling Programs and Degradable Additive Impacts

The SPI Bioplastics Division has reviewed current claims in the marketplace for degradable additive technologies and the concerns being voiced by the recycling industry. In conjunction with the SPI Recycling Committee, we offer the following statements regarding recycling and degradable additives.

1. Recycling is a preferred route for bioplastic materials when collection is clean and efficient. When recycling is not available or materials are contaminated with food waste or soil, and industrial composting sites are available, certified compostable applications are a prefferred alternative for those bioplastics that meet ASTM D-6400 specifications. Degradable additives used with plastics such as PET, PP and PE are not acceptable for either recycling or compostable recovery.
2. There is no scientific data showing degradable additives produce biodegradation for multi-layers films or packaging. Energy recovery is an acceptable alternative for most plastic materials including those containing degradable additives. Multilayer plastic packaging using degradable additive technologies are not suitable for compostable recovery.
3. In general, there is no publically presented and 3rd party peer reviewed scientific studies showing degradable additives promote biodegradation of traditional plastics under landfill disposal conditions.
4. We affirm that degradable additives need to show scientific evidence that the products do not alter or affect the performance of the products in the recycling stream, as voiced by the plastic recycling industry. Additionally, the degradable additives should not pose any concerns for product safety (ie. regulated metals, toxicity, food contact, etc.) and this should be well documented with appropriate studies and regulatory approvals.

"Degradable additive" containing products often harm recycling of post-consumer plastics. In practice, the "degradable additive" containing plastics are traditional plastics, such as PE, PP and PET. The only difference is that they incorporate additives which affect their chemical stability. Thus, they are identified and classified according to their chemical structure and finish together with the other plastic waste in the recycling streams. In this way, they bring their "degradable additives" to the recyclate feedstock. As a consequence the recyclates may be destabilized causing unexpected and premature degradation of products produced from the recyclate, which will hinder acceptance and lead to reduced value.[27] [28]

[27] National Association for Plastic Container Resources. "Association of Postconsumer Plastic Recyclers (APR) and the National Association for Plastic Container Resources (NAPCOR) Express Concerns About Degradable Additives." 12 Feb. 2009. 2 May 2012. www.napcor.com/pdf/Degradables_Release.pdf

[28] European Plastics Recyclers. "OXO Degradables Incompatibility with Plastics Recycling." 11 June 2009. 2 May 2012. www.plasticsrecyclers.eu/press

Conclusion

The position of the SPI Bioplastics Division is that any claim, especially claims for consumers, needs to be supported by third-party vetted scientific evidence based on well-established standard specifications. In the case of "degradable additives" the problem is one of claiming "biodegradation" where there is no evidence to support those claims or prove biodegradability as per accepted, third-party vetted specifications. Allowing the brand owner, retailer or ultimately the consumer to decide what they consider a "biodegradable" product to be is risky, as this would lead to varying definitions that would only lead to greater consumer confusion. As the biodegradable and compostable "end-of-life" products continue to grow along with organic waste diversion from landfill programs, it is the duty of the industry to provide clear, substantiated scientific third-party certifications that will assure stakeholders that the products offered meet their requirements for end-of-life disposal and offer real value in their intended use.

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