
FOR IMMEDIATE RELEASE

Outright Lies by Bioplast in Turkey

Vancouver, Canada (July 22, 2011) – This is the reply to the Ministry of Industry and Commerce (Republic of Turkey) requesting two kinds of information:

1. published evidence in support of the statement printed on the specified shopping bags, and
2. responses to the issues raised in a number of comments submitted to the Ministry by Mr. Hasim Cayli, Bioplastics Turkey, Karizma A.S.

In responding to point # 1, we attach a paper ([link here](#)) which has been published recently in the premier refereed journal in the field of polymer degradation, The Journal of Polymer Degradation and Stabilisation. There is no connection between the scientists who performed the research, or their laboratories, and EPI. The results of the research as described in the paper support fully the statement printed on the shopping bags at issue here. The plastic used in the research described in the paper is just like the plastic used in those shopping bags and it oxidises in exactly the same way by the same mechanism to give the same biodegradable oxidation products as are observed in the case of the shopping bags. Only the identity of the pro-degradant catalyst is different. But the catalysts are chemically very similar and the mechanism by which each functions is identical. This 3rd party verification is very important, and several points need to be emphasized:

- (a) The oxo-biodegradable plastic which was studied in the Swedish paper does not meet the requirements of either of the usual compostability standards [EN 13432 ; D 6400] that Mr. Cayli and the Biodegradable Plastics Institute (BPI) are so concerned with.
- (b) The oxo-biodegradable plastic in the Swedish publication was shown to undergo 91% biodegradation in 2 years, without reaching a plateau phase. In other words, the biodegradation was continuing. This is undeniably “environmentally friendly.” The plastic used in the shopping bags at issue here will produce the same result in the tests used in the Swedish research. Thus, the wording on the shopping bags is entirely valid.
- (c) Oxo-biodegradation of the oxo-biodegradable plastic in the Swedish work was much slower in a compost environment than in the soil contact experiments because (as is explained in the paper) there is a much less active microbial population in the composting work. It has become even more obvious that standard composting testing is NOT a good measure of biodegradability in soil contact environments, in landfills, etc
- (d) The mythology of persistent plastic particles as residue in the environment from partially degraded oxo-biodegradable plastics is nonsense.

Now let us turn to point number 2, the issues raised by Mr. Cayli. It is apparent that he is not a scientist and has no knowledge of the technology of oxo-biodegradable plastics [OBPs] or of the science behind this technology.

The statements made by Mr. Cayli are false, entirely without scientific evidence to support them. The comments and corrections provided below relate specifically to those OBPs prepared using EPI technology.

Mr. Cayli has written that “the pro-oxidant additives, due to their unstable structure, are apt to rapid degradation depending on the ambient conditions and can migrate into foods in consumers houses. These additives bear toxic risks because of heavy metal (like manganese, cobalt, zinc, iron, etc. but not limited with those) content.”

There are three unwarranted criticisms here, none of which is correct and none of which is supported by any data.

1. The basis of EPI’s technology is the catalysts for the oxidative degradation of polyolefin products at rates up to 1000 times (or even faster) than would otherwise be the case. These catalysts are organic salts of transition metals. They speed up a normal process without being consumed. They are added in very small quantities to conventional polyolefin resins.
2. It must be emphasized that there is no such thing as a heavy metal; this term has no scientific meaning, but is commonly used to refer to known toxic metals. Metal salts (not the metals themselves) are the pro-oxidant additives in EPI – based OBPs and they do not have an unstable structure. They remain perfectly stable, for example, even at the high temperatures (> 100C) used to fabricate extruded films and moulded articles. So yes, metals are used in OBPs in very small quantities, but these metals are not in any way considered as toxic metals, by any known definition (i.e. US CONEG legislation or EU directives regarding toxic metals). The statements regarding heavy metals in OBPs are absolutely baseless with regards to any health and safety concerns.
3. EPI’s pro-degradant formulations have been evaluated and certified safe according to American and European Standards. For example, the UK Food Standard Agency’s Expert Group on Vitamins and Minerals has carried out a risk assessment on trace elements and has shown that the transition metals salts used in EPI – based plastics are in fact trace elements necessary for healthy plant and human growth. It is the opinion of independent experts that the EPI formulations reviewed by them comply with the food packaging safety requirements as regulated by the US Food and Drug Administration.

Mr. Cayli has written “The degradation process does not necessarily take place in the environment as it is proposed. Presence of UV and heat can easily lead to a chemical reaction and fragmentation of the material under storage conditions as well.”

This is totally incorrect. The pro-degradant is inert until the plastic starts to oxidize and this can’t happen until all the stabilizer (antioxidant) in the plastic is consumed. Damaging UV radiation is filtered out by window glass so this is not a factor inside a building. All commercial resins contain antioxidants so they can ‘survive’ processing and so they will have a shelf life and a service life. All plastics that are formulated according to EPI technology contain the amount of antioxidant that is necessary to provide the required shelf life/service life.

Mr. Cayli goes on to say that “The material is not environmentally friendly. Degradability by chemical reaction doesn’t make the material environmentally friendly; it must consist of biological (renewable

elements), or contain such elements. These additives, however, are produced from conventional plastics and do not contain any biological material.”

These statements make it abundantly clear that he really has no idea what oxo-biodegradable plastics are or how they work.

In the first place, the oxo-biodegradation of OBPs, after being used (perhaps for numerous times) and discarded perform by undergoing a two-stage conversion. The first stage is the abiotic degradation (thermochemical and/or photochemical – not microbiological) during which the plastic is oxidized, becomes brittle and is converted into fragments which contain a mixture of oxidation products that are biodegradable. The plastic bag breaks into fragments and the plastic molecules are changed into much smaller molecules which are biodegradable. To give a specific example, polyethylene is not biodegradable but its oxidation products are readily biodegraded, in the second stage. The carbon in what had been polyethylene becomes the carbon in a host of oxidation products which are metabolized by fungi and bacteria to produce biomass and carbon dioxide – which re-enters the biocycle. That is Environmentally Friendly. There is no requirement that this term may only be used to describe materials of biological or renewable elements.

Mr. Cayli goes on to say that “These additives are produced from conventional plastics and do not contain any biological material.”

Well, the additives which are used on tiny amounts are not polymeric and are not produced from conventional plastics.

In a most unusual bit of writing, Mr. Cayli claims that the slogan “water friendly” is based on the decrease in the number of molecules of plastic material. However, decreasing the number of molecules in a mass means decreasing its volume as well. If the volume is kept constant, then other material shall fill up the spaces. This material is the heavy metal and does not have hydrophilic properties. Instead it bears the risk of being toxic to the environment in case of accumulation.”

It is not clear what is meant by this strange set of words. It needs to be emphasized again that there is no scientific meaning to the term “heavy metal.” If Mr. Cayli is referring to metals such as lead, mercury, cadmium, arsenic, selenium, barium, chromium and the like, it needs to be emphasized that none of these metals is used in any form in any of EPI’s formulations. The metal salts (not the metals themselves) that are used are acknowledged to be not toxic to the environment. Much independent ecotoxicity testing has been done on the partial and complete degradation products from EPI- based polyethylene that had been treated in a commercial composting facility in Austria. The results demonstrated that that the material met all the requirements of the Austrian Compost Quality Seal. The results of standard plant tolerance tests, seed germination tests, daphnia and earthworm tests on the degraded material all showed no negative results. Analogous favourable results were obtained in similar tests by other agencies of the products of commercial composting of polypropylene containing EPI additive.

Mr. Cayli has made another statement that shows his complete misunderstanding of oxo-biodegradable technology. He has written that “the plastics degraded by a chemical reaction is [sic] claimed to be

attacked by microbes in a second phase. But, if plastics were readily degradable by the attack of microbes, then there would be no need for additives containing heavy metals. The material should be readily consumed by bacteria upon disposal in the environment. Unfortunately, this assertion is not true either. All scientific studies on the subject indicate that it is not possible to claim that the material is biologically degradable.”

There are several errors in this statement. The misconception about the meaning or use of the term “heavy metals” has already been dealt with. It is well known, of course, that polyethylene is microbially inert. However, in the two-phase oxidation of EPI-based polyethylene, it is the products of the oxidation of polyethylene that biodegrade, not the plastic itself. At the end of the abiotic oxidative degradation stage, there is no plastic left. There is a great deal of published information in the scientific literature about the biodegradability of the oxidation products of polyethylene. The research has been carried out in many laboratories in numerous countries.

Mr. Cayli is apparently confused by some of the claims made by the organization called the Biodegradable Plastics Institute (BPI). Reference to this organization is irrelevant since it is dedicated to pretending that all discarded plastics should be compostable. This wish on the part of BPI to require compostability (and compliance with compostability standards ASTM D 6400 & EN 13432) is entirely misguided and unjustifiable. Among many things wrong with this wish is that there is almost no commercial composting involving waste plastics in the world today. Composters would prefer to accept no plastics of any kind into their facilities. Most used plastics are disposed of in landfills. As usual, BPI has claimed incorrectly that polyolefins containing pro-oxidant additives are not biodegradable when what they should have been claiming is that such materials do not meet the requirements for the compostability standards listed above in this paragraph. By referring to ASTM D 6400, plastics fabricators and EPI are not claiming compostability.

It must be emphasized that biodegradability and compostability are not the same. BPI acts as though they are. This leads to much misunderstanding and appears to have confused Mr. Cayli. It is suggested that those who are confused by the differences between composting and biodegradation should read the publication from Sweden attached to this message. The differences between composting and biodegradation are obvious. BPI and European Bioplastics will certify plastics that meet the requirements of the two compostability standards listed above. There is no reason why the producers and users of pro-degradant additives would want to deal with either of these two organizations that are interested only in compostability of waste plastics.

Mr. Cayli is concerned about the accumulation in nature and in humans of heavy metals in the pro-degradant additives. Since there is no such material in OBPs (or anywhere else, for that matter) let us assume that he is also concerned about the residue from the transition metal salts in OBPs. It was pointed out earlier, in this response to his false assertions that the pro-degradant additives in OBPs are a toxicity hazard, that the tiny (catalytic) quantities of transition metal salts used in EPI-based OBPs are regarded as trace elements necessary for healthy plant and human growth. There is no risk of the accumulation of toxic levels of pro-oxidant catalyst residues in nature or in the human body. Data have been published in support of this fact.

Mr. Cayli assumes that materials which are biodegradable and environmentally friendly must be “BIO-BASED.” This is an incorrect assumption. If a material is oxo-biodegradable in the environment within a matter of a year or two (as compared with decades for conventional plastics), it surely is environmentally friendly. Claims for the term environmentally friendly should be supported by 3rd party evidence of performance. In the case of oxo-biodegradable polyolefins produced using EPI technology, the evidence has been published over a period of many years.

Mr. Cayli continues to confuse the terminology. The terms environmentally friendly, biodegradable, and biologically degradable are (and should be) based on product performance and on published, scientifically- valid evidence. This is the case with OBPs manufactured using EPI technology.

The term bio-based is a description of the origin of the material and does not necessarily reflect compliance with an arbitrary, man-made performance specification. For example, a leaf from an oak tree, or straw from a farm are certainly bio-based materials. Neither meets the performance specifications required by either EN 13432 or D 6400. And yet, both leaves from trees and straw (as but 2 of many examples) are 100% biodegradable.

Mr. Cayli makes many additional wild and incorrect statements about labelling and investments. With regard to the latter, EPI has invested many millions of dollars over 20 years developing and perfecting its technology for producing pro-degradant additives in order to permit its customers to produce safe, effective and environmentally friendly oxo-biodegradable plastics from conventional polyolefins.

About EPI Environmental Products Inc.:

Established in 1991 in Canada, EPI Environmental Products Inc. (EPI) with its UK subsidiary EPI (Europe) Ltd. has become a world leader in the fight against plastic waste. EPI licenses proprietary technology that causes plastic to degrade. Plastic bags, plastic film, plastic packaging and other single-use plastics can remain in the environment for decades. When these products are manufactured using EPI’s additives, they will degrade and subsequently biodegrade when discarded in soil, in the presence of microorganisms, moisture, and oxygen.

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