3 September 2009

PLASTICS INDUSTRY'S VIEW ON:
PLASTIC PRODUCTS MADE OF "BIOPLASTICS"

In the past few years, authorities and the general public have become increasingly sensitised to environmental issues and to climate protection matters. Along with this trend, an increasing interest in "bioplastics" has been observed.
In the present paper PlasticsEurope and EuPC provides some of the essential information which should be kept in mind when assessing "bioplastics".
This document serves to contribute to the discussion on these plastics and is intended as being:

- **The basis for a response to political and public concerns in order to eliminate confusion in the marketplace and to avoid misinterpretation.**
- **A reference document for discussion within the industry, urging appropriate evaluation of the risks and business opportunities in this relatively new market segment.**

<u>Document content</u>

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1. “Bioplastics”

Many stakeholders use the collective term “bioplastics” to describe two different concepts, often leading to confusion:

- biodegradable/compostable plastics: their functionality at end of life
- renewable, resource-based, or biomass-based, plastics: an alternative raw material sourcing

It is of the utmost importance to realise that bio-based plastics are not always biodegradable and biodegradable plastics are not always bio-based: fossil raw materials can give origin to biodegradable polymers. It is difficult to talk about “bioplastics” in general without acknowledging this differentiation. Both concepts may coexist but address different societal concerns and applications in the market and must therefore be considered separately.

2. Biodegradable and compostable plastics

Biodegradable Plastics are degradable due to cell-mediated phenomena (fungi, bacteria). A material is biodegradable when degradation is caused by the action of micro-organisms, and the material is ultimately converted into water, carbon dioxide and/or methane, and new cell biomass, independently of time.

Compostable Plastics are degradable by biological processes during composting to yield carbon dioxide, methane, water, inorganic compounds and biomass at a rate consistent with other known compostable materials (green waste) and leaving no visually distinguishable or toxic residue: a material is compostable when its biodegradation is compatible with the conditions (temperature, humidity level, time) found in composting facilities.

It should be highlighted that not all biodegradable materials meet composting criteria. Materials which do not fulfil the compostability criteria may still be biodegradable under other environmental conditions.

Further to biodegradation/compostability there are other degradation mechanisms (oxo-degradation, UV-degradation), acting on especially modified plastics materials. Plastics packaging with such degradation mechanisms are no bioplastics, they do not meet the standards on biodegradability/compostability. At present there are no standards or certifications for oxo- or UV-degradable plastics or plastics products in Europe.

In Europe, the compostability of products is defined by the harmonized standard EN13432, according to which the degradation process takes between 6 and 12 weeks meeting the current requirements of composting plants. On the basis of the standard, participating stakeholders have developed a program, including a conformity test, for the certification and marking of compostable products made of biodegradable material.

Biodegradability and compostability as a material property are regulated by international standards. PlasticsEurope **and EuPC** supports the application of the recognized compostability standards (EN 13432, EN 14995) to ensure compostability in specific and well defined industrial composting environments.

In addition, there are ongoing standardization activities for biodegradation in soil and on anaerobic digestion.

Certified packaging according to acknowledged test standards such as EN13432 enjoys favourable taxation or levy concessions in some EU member states (e.g. Germany, Belgium, Malta, the Netherlands).

Only products that meet the above standards should be labelled compostable or as biodegradable in the specific environmental conditions defined by the standards (i.e. “biodegradable in industrial composting”, “biodegradable in soil” etc).

3. Benefits of compostable plastics products

Compostability should be regarded as a functional property which is offered in applications where it brings a well-defined benefit to the consumer or user.

Examples include the rationalized handling of the packed product at its end of life, e.g. joint composting of food packaging and contents.

Examples for biodegradable and compostable plastics:

- Food packaging: the concept here is to dispose of the packaging together with the contents when the produce is past its sell-by date or spoiled
- Agriculture: in this second largest application the idea is to plough-in biodegradable mulch and seed films

- Compostable catering products (cutlery cups and plates): the used product can be disposed of with the food rests;
- Compostable bags for compostable kitchen waste (one way bags)
- Biodegradable golf tees, binding cords, planting pots and other products for outside use which are not recovered
- Compostable bags for bio waste

In order to avoid impediments to existing waste treatment facilities, it is important to ensure that only plastics waste which fulfils the requirements of the respective facility is placed into composting or digestion waste streams.

Materials for any application are best selected on their merit. Environmental characteristics of the plastics (both compostable and non-compostable) must be assessed by means of a comprehensive analysis in order to compare the performance of each product category.

Ideally, the environmental impact of individual products in their respective target applications has to be considered and risk-assessed holistically. To this end, comprehensive Life Cycle Assessments together with costs evaluations that cover all phases of the life cycle are an appropriate tool for evaluating product categories, while it is not correct to assume that biodegradable / compostable or conventional plastics by definition have lower impact on the environment.

It must be underlined that market requirements will remain a determining factor in choosing the plastic grade with the desired property profile. The choice is not directly linked to the raw material base of the plastic and products can be sourced from bio-based materials as well as fossil based.

4. Bio-based plastics

Bio-based plastics are derived from renewable resources. Biomass is understood as a material of biological origin excluding material embedded in geological formation or transformed into fossil fuels, such as peat, oil, lignite, natural gas and coal.

Two main arguments are commonly associated with the use of renewable raw materials to manufacture plastics products:

a.) Environmental aspects:

Reduced use of fossil fuel resources and effect on climate change,
The current use of fossil fuel resources is split into:

· 87% for heating and transport

· 9 % chemicals and other use

· 4% as feedstock to make plastics

Bio-based plastics today have a share of less than 0.25% of the total plastics market. Their overall effect in reducing the use of fossil resources is dependent on the application. Additionally in food packaging, biodegradable, compostable plastics support the diversion of organic waste from landfill to produce compost or energy and therefore help contribute towards reducing global greenhouse gas emissions. In other applications, such benefits may not be observed. Therefore, LCA assessment application by application is strongly recommended.

Use of renewable raw materials for the production of energy and, to a lesser extent, for industrial products such as bio-based plastics is seen as a contribution to climate protection if greenhouse gas emissions, particularly CO_2, are reduced.

The potential CO_2 neutrality of bio-based plastics is linked to the use of vegetation.

Such environmental benefits need to be proven by a life cycle management approach as for any other material or product. For bio-based plastics an environmental assessment should not only account for CO_2 emissions but also contain considerations concerning the impact and the risk related to other aspects of the life-cycle, e.g. biodiversity reduction, potential deforestation, land use change / soil modification, planting genetically selected or modified high yield crops, water consumption, fertilizers and pesticides use, harvesting and conversion of the biomaterial into a marketable product, as well as the management at the end of life.

To focus on the raw material base alone, may lead to an underestimation of the CO_2 energy and resource savings allowed by the efficient use of products made of conventional plastics, either during their use phase or their end of life. The magnitude of such savings, in some cases, can be much higher than the benefit obtained by the simple substitution of a single product made of conventional plastic by a bio-based counterpart.

b.) Structural aspects:

Political support for renewable raw materials can also be a support for EU farmers, offering new applications for agricultural products and biomass, considering in particular that the promotion of agricultural products for industrial purposes is not restricted by WTO rules.

5. Benefits of bio-based plastics products

Besides oil, natural gas and coal, biomass is an additional raw material source. The currently available biomass is consumed in five different segments: food production, power and heat generation, bio-fuel production and industrial applications. Due to the limited capacities the utilization efficiency of renewable resources and availability issues must be addressed across the entire bio-economy landscape.

The use of renewable raw materials provides benefits for the following reasons:

1) The integration between agriculture and industry is desirable from a social and economic viewpoint and can give positive effects beyond the simple replacement of a single product with a bio-based counterpart.
2) Products made from bio-based plastics may positively contribute to a reduction of CO_2 emissions.

Today, biomass exploitation in the sector of plastics is increasingly becoming a mature technology.

6. End of Life Management

For waste streams containing compostable plastics, as for any other recoverable waste, all recovery options including feedstock recycling, mechanical recycling, and energy recovery should remain open. In order to avoid impediments to existing facilities the correct waste should end in the appropriate waste stream.

Specifically biodegradable plastics waste should fit with composting- (aerobic degradation) or digestion (anaerobic degradation) –facilities' requirements, when organically recycled. In case of composting it must comply with EN 13432.

EuPC and Plastics Europe don't see bioplastics as a solution for litter. Littering is a behavioural issue. Preventing litter requires a combination of awareness, education, the enforcement of suitable laws and sound waste management practices.

As concerns plastics waste the plastics industry favours the creation of waste monostreams in order to achieve the best environmental route in terms of waste management and to facilitate mechanical recycling.

7. Opportunities for the plastics value chain

The Plastics industry supports innovation that offers to society and to the plastics value chain a range of additional opportunities:

- enlargement of the raw material feedstock base at the right quality and price, will improve competition;
- use of existing processing technologies;
- new business fields, including niche products;
- additional product benefits through the function of biodegradability when this attribute can be put into eco-efficient practice;
- diversion of bio-waste from landfills and resulting reduction of emissions owing to the management of food wastes in organic recycling sites.

8. Conclusions

PlasticsEurope and EuPC welcomes and supports all innovation and developments which enable plastics products to meet the functional performance requirements of the respective applications.

Biodegradability / compostability are additional features which make “bioplastics” beneficial in specific cases.

From an environmental perspective, decisions in favour of any material or product must be based on sound scientific criteria and a life cycle approach. Neither traditional nor bio-based or biodegradable / compostable plastics should be discriminated. The economic and social perspectives should also be taken into account.

PlasticsEurope and EuPC supports the development and application of EU standards for compostable plastics and for plastics biodegradable under specific conditions, i.e. soil, to create fair conditions of competition for the development of these materials.

PlasticsEurope and EuPC recommend that environmental claims are developed in compliance with standards such as ISO 14021.

PlasticsEurope and EuPC seek a level playing field to allow bio-based and biodegradable plastics to develop their potential in the market place.

At the same time, PlasticsEurope and EuPC are prepared to counter arguments and expectations which are not realistic or may even harm the development of “bioplastics” products, such as for example, the idea that biodegradable plastics represent a solution to the problem of litter, and that bio-based plastics are a credible short-term replacement of traditional oil-based plastics allowing a significant reduction in crude oil consumption.

***EuPC** is the leading EU-level Trade Association, based in Brussels, representing European Plastics Converters. The European Plastics Network exists to support the beneficial use of plastics worldwide, especially providing plastics converting companies with a voice in European legislation. EuPC now totals about 51 European Plastics Converting national and European industry associations, it represents close to 50.000 companies, producing over 45 millions tonnes of plastic products every year. The European plastics industry makes a significant contribution to the welfare in Europe by enabling innovation, creating quality of life to citizens and facilitating resource efficiency and climate protection. More than 1.6 million people are working in about 50.000 companies (mainly small and medium sized companies in the converting sector) to create a turnover in excess of 280 billion € per year.*

***PlasticsEurope** represents the plastics manufacturers in Europe. The association has more than 100 member companies, producing over 90% of polymers across the EU's 27 member states plus Croatia, Norway, Switzerland and Turkey. The plastics chain in Europe -including converters and machinery manufacturers -employs 1.6 million people. The combined turnover of our industry is approximately 300 billion euro per annum.*

***PlasticsEurope** operates from six decentralized offices: one in Brussels and five regional centers located in France, Germany, Italy, Spain and the UK.*

3rd September 2009