Plastics pollution: Are biodegradable plastics a solution?

Wednesday 16 June 2021, 13:00 – 15:00 CEST

Online event

Hosted by MEP Mohammed Chahim

Co-chair of the Circular Economy Working Group of the European Parliament Intergroup on 'Climate Change, Biodiversity and Sustainable Development'

Speakers:

- **MEP Mohammed Chahim**
- **Professor Ole Petersen,** Vice-President, Academia Europaea
- **Patrick Child**, Deputy Director General, DG RTD, European Commission
- **Kestutis Sadauskas**, Director of Circular Economy & Green Growth, DG ENV, European Commission
- **Professor Nicole Grobert**, Chair of the Group of Chief Scientific Advisors to the European Commission
- **Dr. Miriam Weber**, Managing Director of HYDRA Marine Sciences and Member of the SAPEA expert working group on the biodegradability of plastics in the open environment
- **Dr. Michael Sander**, Senior Scientist, Research Group Leader and Lecturer in Environmental Chemistry at ETH Zurich & Member of the SAPEA expert working group on the biodegradability of plastics in the open environment
- **Jean-Marc Nony**, Director of Sustainable Development, SPHERE group
- **Ioana Popescu**, Senior Programme Manager, Environmental Coalition on Standards (ECOS)
- **MEP Delara Burkhardt**
- **MEP Stéphane Bijoux**

Welcome remarks

MEP Mohammed Chahim

> ***"The rate at which biodegradable plastics can be biodegraded depends on the material used and on the environment where it ends up. Moreover, it is essential to understand how the use of biodegradable plastics fits in our transition towards a CO2 neutral society."***

MEP Mohammed Chahim inaugurated the event by stressing that plastics pollution needs to be addressed and that we need to fully understand what role biodegradable plastics can have in the solution. Given the considerable problem linked to plastics production due to their long degradation period, a first evident step in that regard is to **reduce the quantity** used, and to promote reuse and recycling. Although biodegradable plastics could play a role, their use can be misleading since the **rate of biodegradation depends on the conditions in the environment**. Therefore, MEP Chahim concluded his welcome remarks by recalling the objective of the discussion: **to clarify how society, science and politics can work together on this issue**.

Introductory remarks

Professor Ole Petersen, Vice-President, Academia Europaea

> ***"While plastics production is flat in Europe, the vast majority of the plastic already produced is not biodegradable and therefore it accumulates and remains in the environment."***

Prof. Petersen presented the work and organization of **SAPEA** (Science Advice for Policy by European Academies), part of the **European Commission's Scientific Advice Mechanism**. It works **jointly with the Group of Chief Scientific Advisors** and provides **independent scientific advice** to European Commissioners to support their decision-making by producing evidence

review reports. SAPEA consists of five European networks, including Academia Europea, ALLEA, FEAM, EASAC and Euro-CASE.

Prof. Petersen then provided some insight into the results of a graph presented by SAPEA in a report entitled "Biodegradability of plastics in the open environment" published in December 2020, comparing the production of plastics worldwide and in Europe from 1950 to 2018 (see graphic below). While European plastics production stayed rather flat since 2002, it remains **problematic given that most of it is not biodegradable**; hence, it is cumulative and the plastics remain in the environment. The worldwide curve is even more alarming given the continuous steep increase in plastics production.

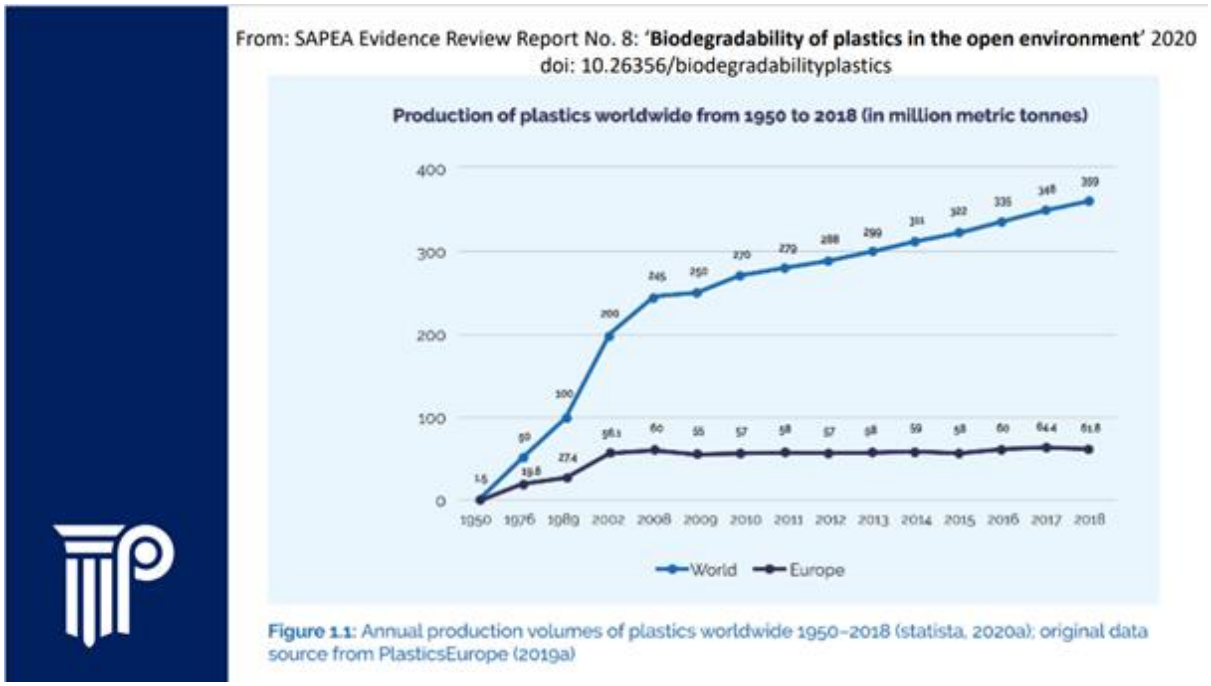

Figure 1.1: Annual production volumes of plastics worldwide 1950–2018 (statista, 2020a); original data source from PlasticsEurope (2019a)

Keynote intervention by European Commission

Patrick Child, Deputy Director General, DG RTD

"By ensuring that colleagues in DG Research & Innovation and DG Environment work together, we are able to focus the output of the Scientific Advice Mechanism on what is most topical, timely and relevant for the ongoing policy discussions."

Research and innovation constitute an essential base of the European Green Deal. DG Research & Innovation can play an **important role in funding and supporting scientific and technological activities** to address societal and policy challenges. This is one of the rationales behind the establishment of the Commission's Scientific Advice Mechanism, which has already made significant contributions relevant to the European Green Deal. These include for example the Group of Chief Scientific Advisors' 2019 report on "Environmental and health risks of microplastic pollution" and the underpinning SAPEA evidence review "A Scientific Perspective on Microplastics in Nature and Society". The Mechanism is currently working on specific requests in various policy areas such as energy, cancer and crisis management, and feeds into policies in a variety of different Directorates of the European Commission.

Kestutis Sadauskas, Director of Circular Economy & Green Growth, DG ENV

"According to researchers, when reducing, reusing and recycling are not feasible options, biodegradable plastics can be of benefit for specific applications."

While biodegradable plastics can form part of a concrete solution in the transition to a sustainable and circular plastics economy, they **also present challenges,** which need to be exposed. Indeed, they are **only biodegradable in specific environments, in certain climate conditions and within a unique timescale**. This then suggests the need for a nuanced approach as to their usage. Researchers tell us that when reduce, reuse and recycling are not feasible options, and specific conditions are met, biodegradable plastics may be of benefit. Possible benefits include; less cross-contamination of waste streams and where collection from the environment is not feasible, less persistent micro- and macro-plastic pollution. Because biodegradable plastics are not a solution to inappropriate waste management or littering, we have to think carefully about where collection is not or hardly possible in practice.

Also, benefits will not be reached without proportionate **action being undertaken vi-à-vis the consumer**; nonetheless, for products that look similar or identical, clear labelling is necessary but not sufficient to move to a circular plastics economy successfully.

Panel discussion on biodegradable plastics

Professor Nicole Grobert, Chair of the Group of Chief Scientific Advisors to the European Commission

> ***"The most important [recommendation] is to adopt a definition of biodegradability as a system property that takes into account material properties in specific environmental conditions."***

As chair of the European Commission's Group of Chief Scientific Advisors, Prof. Grobert proposed to adopt a definition of biodegradability as a **system property which takes into account both material properties and specific environmental conditions**, as recommended in the Advisor's December 2020 report on "Biodegradability of Plastics in the Open Environment." The report recommends to limit the use of biodegradable plastics in the open environment to **specific applications** for which no alternatives exist and reduction, reuse and recycling are not feasible. Prof. Grobert further recommended more support should be allocated to the **development of testing and certification standards** for biodegradation of plastic in the open environment and **clear communication of what biodegradable plastics are and how they need to be handled**. Finally, it is necessary to promote the supply of accurate information on the properties, appropriate use, disposal and limitations of biodegradable plastics to relevant user groups.

Dr. Miriam Weber, Managing Director of HYDRA Marine Sciences & Dr. Michael Sander, Senior Scientist, Research Group Leader and Lecturer in Environmental Chemistry at ETH Zurich. Members of the SAPEA expert working group on the biodegradability of plastics in the open environment

"Biodegradable plastics are indeed a solution but they are not the solution, and should not be in violation of the waste hierarchy concept." - Dr. Miriam Weber

Dr. Sander explained that biodegradable plastics are not a solution to littering and **should not be deemed an answer to the plastics crisis**. However, their **usage can be a solution** for **selected and specific applications**, such as when there is **intentional use of plastics** in the open environment and recovery of plastic is not foreseen or is impossible. It could also be useful where there is a **high potential of plastic loss** to the environment and recovery is impossible or not feasible, or where there is an **unavoidable release** of plastics into the environment and recovery is impossible.

During her intervention, Dr. Weber drew attention to several steps forward mentioned in the SAPEA report, including the need to consider **different timeframes** according to different applications of biodegradable plastics. For example, it is reasonable that geotextiles have a slower biodegradation (e.g. timeframe of years) than mulch films with a faster biodegradation (e.g. timeframe of months). Potential biodegradation rate categories could be identified, such as **fast** (weeks), **medium** (months to years) and **slow** (years to decades) biodegradable plastics. Dr. Weber also proposed to account for variations within and between receiving environments as well as for prevalent conditions. For instance, this would mean **considering how different climatic conditions** affect biodegradation. The proposals also included a **standardization of labelling** along with clear communication efforts, such as which plastics biodegrade in which environment and how fast.

Jean-Marc Nony, Director of Sustainable Development, SPHERE group

"The World Economic Forum ranked bioplastics number 1 out of 10 emerging technologies in 2019 and highlighted their contribution to a circular economy"

Mr. Nony's presentation focused on **biobased and compostable fruit and vegetable bags**, a key application which can greatly contribute to the worldwide challenge of plastics pollution

by increasing both the quantity and the quality of compost. In fact, kitchen organic waste represents one-third of total kitchen waste. To get a good quality compost, it is essential to **ensure the qualitative and quantitative sorting of organic waste by inhabitants**. Compostable fruit and vegetable bags are an easy and pragmatic tool to achieve this level of sorting and collection of biowaste, while ensuring that pollution by regular plastics in compost is reduced. There are **several successful examples of EU countries and cities** that allowed the use of compostable fruit and vegetable bags to serve two purposes: firstly, to carry fruits and vegetables home from the shop and secondly to collect organic waste for its treatment. The city of Milan has nearly quadrupled the quantity of biowaste collection in a few years only.

Furthermore, the French Agency for the Environment (ADEME) stated in 2019 that biodegradable bags have a better global environmental performance than alternatives on the market in terms of both lifecycle assessment and consumer behavior. Mr. Nony stressed the importance of interpreting correctly studies on biodegradable materials: a well-known study published in 2019 by the University of Plymouth was used as a proof that biodegradable bags do not biodegrade in real life situations. However, researchers used **oxo-degradable bags** in the study marked as "biodegradable", a material which has since been forbidden at EU level in Directive EU 2019/904[1]. It is essential in this debate to clearly define beforehand which material is being scrutinized: for instance, EU standard EN13432 specifies strict criteria for the compostability of bioplastics in a given environment. A study carried by the ADEME in 2020 concluded that evidence today shows that pollution from plastics comes exclusively from non-biodegradable plastics.

Ioana Popescu, Senior Programme Manager, Environmental Coalition on Standards (ECOS)

"Biodegradability of plastics should not be used as a product claim on consumer products. If we want to make the best use of this functionality, this is a business-to-business discussion."

[1] The authors of the study point out that a range of materials were used and these are clearly described in the paper: including the definitions and descriptions assigned by the various producers.

Speaking on behalf of the NGO ECOS, Ms. Popescu started her intervention by highlighting the **misunderstanding of the term biodegradability**. Most of the confusion of the term '**biodegradability' is caused by mixing two different concepts**. The first one is **biodegradability as a characteristic or functionality of a material or a product**. In this regards, it is important to differentiate between a controlled end-of-life option and an uncontrolled end-of-life option for the product. The second concept is **biodegradability as a claim on a product**. This concept creates **confusion for consumers** as they might think the product will biodegrade if thrown in an open environment. Therefore, **biodegradability as a claim on a product does not guide consumers towards making the right choice**. For this reason, **ECOS is skeptical about having the word 'biodegradable' or 'compostable' on consumer products**.

Then, Ms. Popescu continued her intervention on the shortcomings of labels and standards for biodegradability. The first flaw of standards for biodegradable plastics is that manufacturers can use the standards of their choice since **standards are voluntary in application.** Another weakness would be that it is **difficult to represent real-life conditions in standards because they rely on imperfect testing methods**. Ms. Popescu finished her intervention by making several recommendations. She pointed out the **need for a clear and mandatory regulatory framework, with solid stringent EU recognized terminology, test methods, and standard certifications**, to prevent misuse of biodegradable plastics. The **number of standards allowed should also be restricted** to not create confusion for manufacturers. As biodegradability is not a solution to littering and does not contribute to value retention as much as other plastic waste management, it **should not be relied on to solve the waste management issues**. Thus, biodegradable plastics should **only be considered for niche applications**. Moreover, to make the best use of the biodegradable functionality of plastic, **biodegradability should not be used as a product claim on consumer products and should remain a business-to-business discussion**.

Reactions from MEPs

MEP Delara Burkhardt

"The answer to the ban of single-use plastics should not be the implementation of single use biodegradable plastics. Our main goal is to reduce, reuse and recycle plastics."

Ms. Burkhardt recalled that 220kg of packaging waste is consumed each year per capita in Germany. **The situation has even worsened**, especially concerning single-use plastics, **because of the Covid-19 pandemic**. As the Single-Use Plastics Directive is becoming mandatory in July, the use of biodegradable plastics is a timely question. Product packaging called compostable or biodegradable is confusing for consumers. Therefore, agreeing with Ms. Popescu, Ms. Burkhardt highlighted the **importance of clear definitions and expressed some doubt on the use of biodegradability as a product claim towards consumers**. Ms. Burkhardt underlined that the **EU's main goal is and should be to reduce, reuse and recycle plastics**. Moreover, **recycling plastics offers significantly more ecological benefits** than biodegradation of biodegradable plastics. Indeed, biodegradation can be considered as a loss of valuable resources; and single-use plastics, even if biodegradable, remain short life, degrading slowly and creating unnecessary waste. Ms. Burkhardt concluded her speech by emphasizing the **need for a clear regulatory framework, and for testing, certifications, and classifications of biodegradable plastics**.

MEP Stéphane Bijoux

"The issue of plastics is not only a challenge for the European Green Deal, but also for the Blue Deal. To this extent, biodegradable plastics can be part of the solution, provided they are improved and financed."

Mr. Bijoux started his intervention by calling for action against plastic pollution. Indeed, **plastic pollution is an ecological disaster**, and action is needed to collect old waste and stop the pollution. **Plastics are a challenge for the EU Green Deal, as well as the Blue Deal**. It is urgent to act as plastics do not only pollute the soil, but also the oceans and the whole food chain including humans. At the same time, Mr. Bijoux pointed out **biodegradable plastics could be a solution to the issue if they can be improved and financed**. Therefore, it is time

to be innovative and encourage ecological solutions. Mr. Bijoux ended his intervention on the importance of being realistic and optimistic in this fight for the planet and life.

Q&As session with audience

During the Q&As session Mr. Sadauskas was asked to share his thoughts on market-based measures. He replied that **market-based measures will be elaborated in the framework for biobased and biodegradable plastics that is due next year.** At the same time, the Commission is revising some legislation such as the Packaging Directive. Moreover, the Commission is examining the possibilities enabled by the **extended producer responsibility** (EPR). The revision should **assign fee rates to certain properties**, and this might concern biodegradability. However, no impact assessment has been made yet. Mr. Sadauskas underscored the **importance of knowing which properties the EU wants to promote and which ones it wants to demote**. Concerning labels, Mr. Sadauskas refuted the idea of a marine degradability label as **labels should be clear, simple, straightforward, and based on good behavior analysis**.

Regarding the factors influencing the biodegradation rate, Dr. Sander pointed out that biodegradation is a **multifactorial process**. Thus, given differences in the conditions prevailing between environments, there are **strong variations on how and at which rate the biodegradable plastics biodegrade**. Prof. Grobert pursued the discussion by underlining the **importance of raising awareness to ensure biodegradable plastics are used properly**.

Asked on the **risk of rebound effect** pointed out in the SAPEA report, Mr. Nony indicated that **the industry strongly recommends continuing with the do not litter warning**, even for biodegradable plastics. Moreover, there is a need to guide people on which waste stream they must use to get rid of the product or packaging. Prof. Petersen recalled that **biodegradable plastics are not a solution to littering**.

Concerning the ways to ensure the best environmental impact all along the life cycle of the product, Dr. Weber and Mr. Sadauskas highlighted the **need to take a whole life cycle approach**, from the design to the end of life of the product.

Finally, Dr. Sander shared his thoughts on consumers' role and motivation in waste management. The challenge with consumers is to ensure that the plastic product after use will be placed in the proper waste stream (and not littered). However, there are also technical applications in which plastics are deliberately released or used in the open environment. Therefore, it is **a question of the proper use and specific applications of plastics in the open environment**. Dr Weber concluded with the need to **also quickly focus on applications (release into the open environment: intentional, unavoidable or with high loss potential; recovery: not foreseen, not possible or not feasible) other than packaging and SUP**, because as we speak input into the environment is happening continuously and will continue to happen in the future.

Closing remarks by MEP Mohammed Chahim

Although biodegradable plastics can be part of the solution, **the 3R** (reduce, reuse and recycle) **should still be prioritized**. Biodegradable plastics can play a role to reduce plastic pollution, but should be **only used for specific applications**. Concerning labelling, a behavioral analysis on the effects on consumers is needed.