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THE EFFECTS OF BIODEGRADABLE PLASTICS

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Abstract

This review talks about the importance of biodegradable plastics that have a positive impact, for now positive, on the environment. Here you will find, the good parts of recycling, reusing, and how you can do better, step by step, doing small changes in your life.
Humans don't know exactly how to do good things for the planet, and so, here you will find information about bioplastic and biodegradable plastic that can be found around us and help us to improve our lives. It's not certain if bioplastic does too much good, or too much bad, but for now, the balance is on the good part. As long as we have microorganisms and we learn how to correctly recycle and appreciate what we have, we'll be fine.

Keywords: *biobase, biodegradable, bioplastic, compost, environment, plastics ,recycle.*

INTRODUCTION

The purpose of this review is to present the effects of Biodegradable Plastics and how they affect people and the environment. In fact Biodegradable Plastic is plastic that decomposes naturally in the environment. This decomposition is achieved when the microorganisms in the environment metabolize and break down the structure of biodegradable plastic. This means that this new type of plastic is less harmful to the environment than the traditional plastics.
Biodegradable plastic is composed of bio-plastics, which is made from renewable raw materials. These are two forms of biodegradable plastics: solid and injection moled.
Bioplastics are not made from one single material. They also comprise a whole family of materialsthat have different properties and applications.
The European Bioplasticssais that a plastic material is defined as a bioplastic only if it is either biodegradable, biobased, or features both properties.
Biodegradable is in fact biodegradation and it is a chemical processthat involves microorganism that are available in the environment converting materials into natural substances such as water, carbon dioxide, and compost (where artificial additives are not needed). The process is determined by environmental conditions, like temperature or location, that have an impact on the material and on the application.
The term "biobased" means that the material or the product is partly derived from biomass.
Biomass used for bioplactics stems from corn, cellulose, or sugarcane.

Figure 1.Represention of biobasedplastics
https://goo.gl/images/qsgEud

There is advantages and disadvantages of bioplastics. They are driving the evolution of plastics. In comparison to the conventional versions two major advantages are that on one hand they save fossil resources by using biomass witch regenerates annually andon the other hand they provide the unique potential of carbon neutrality.

Everything used in the production of biodegradable plastics is natural. Unlike traditional plastic, biodegradable plastic does not contain harmful chemicals and materials.
The disadvantages of this bioplastics are that they do not decompose unless they are disposed of properly, which means that if they are not treated like compost, they might not decompose. If they are simply tossed in a landfill with other trash, the plastic will not breakdown naturally. Even though they biodegrade in open environment, compostable plastics need to adhere to a set of requirements such as fragmentation, absence of ecotoxicity and threshold concentration of potential pollutants such as heavy metals.
I think that the biggest disadvantage when it comes to bioplastics is that consumers have a hard time telling the difference between biodegradable or compostable. Also it is difficult for them to distinguish which conventional plastics they're using are biodegradable, compostable, or otherwise recyclable. This explains why a big part of bioplastics don't get discarded correctly and because some municipalities don't even dispose sorting, composting, or recycling facilities. As a result everything that is not sorted, composted, or recycled ends up in a landfill. For example, you have a cup made from polylactic acid (PLA) looks and feels like recular plastic, so you could be tempted to throw it into the recyle bin, when in fact this cup could be composted. According to EarthI sland, here's what may happen: "At the recycling facility, a PLA cup can be mechanically separated from PET products using an infrared sensor. But recyclers don't usually take the trouble to do such sorting. It's an expensive process and no one is going to pay them enough for that PLA to justify the cost. Within the PET stream, PLA tends to muck things up. If enough PLA (or other non-PET material) ends up in a bale of PET, a plastics reclaimer is going to turn it away and the bale will likely end up in a landfill. So suddenly those earth-friendly packaging materials have cut short the possibility that the PET inside that bale will find another useful life before ending up in a landfill."

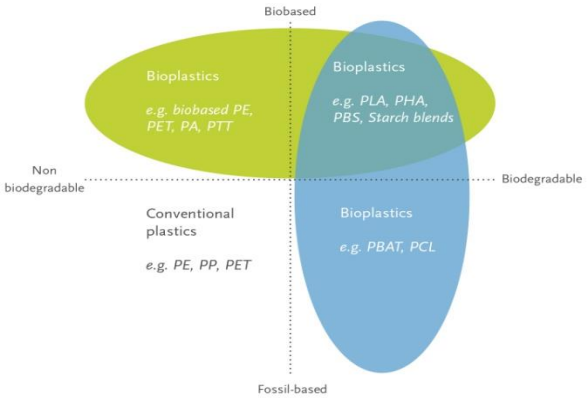

Figure 2.Bioplastics material coordinate system https://www.european-bioplastics.org/wp-content/uploads/2016/02/2.1_Material-Koordinatensystem_eng_2015_150109-1.jpg

In Figure 2 we have examples of the three main groups of a diverse family of materials with different properties that compose the bioplastics.
Biobased or partially biobased non-biodegradable plastics such as biobased PE, PP, or PET and biobased technical performance polymers such as PTT or TPC-ET;
Plastics that are both biobased and biodegradable, such as PLA and PHA or PBS;
Plastics that are based on fossil resources and are biodegradable, such as PBAT.

MATERIALS AND METHODS

My review is based on online articles and it presents the impact of biopastics on the environment and human life.
Using search engines I've found documents and data that sustain my subject and provide information about the environment, bioplastic and biodegradable plastic, that does not have neither a good or bad impact. The benefits would seem to outweight any potential drawbacks, but the question of rather or not the biodegradable plastics will someday replace traditional plastic is still a matter of debate.

RESULTS AND DISCUSSION

The following figures present the impact upon Production and Consumption over the years (or one year), Waste Management (the recycles and non recycled ones), Competitivness and innovation.

Production and consumption represent the initial steps in illustrating a circular economy. There are some economic sectors in EU that produce and consume materials.
Statistical indicators such as generation of different types of waste are used to better estimate the impact of production and consumption in the EU.

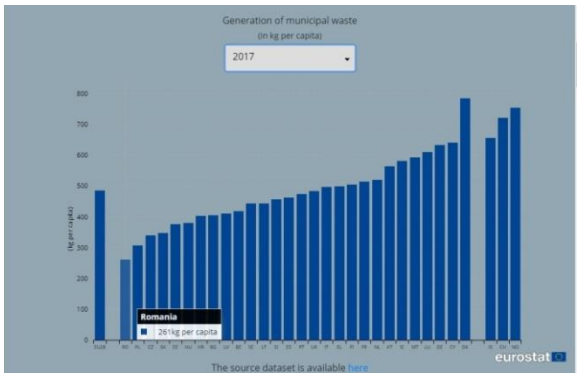

Figure 3. Production and consumption Romania's in 2017- https://ec.europa.eu/eurostat/web/products-eurostat-news

The statistics over the years show that in 2005 there was 383 kg per capital in Romania, in 2010 decreased to 313 kg per capital, in 2016 was recorded the smallest value 261 kg per capital, and in 2017 it increased to 272 capital.
Despite the fact that the numbers changed, Romania kept a position among the countries with low values.
Waste management is the next step towards a circular economy by recycling materials and products. The intention is to increase the share of waste which is recycled and returned into the economic circle. The following figure will illustrate the improved situation over the way waste is treated in the EU.

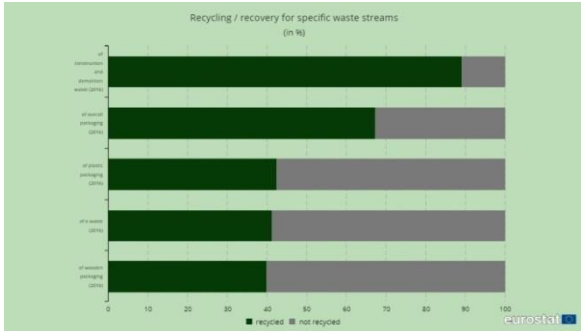

Figure 4. Waste management 2016 https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20180422-1?inheritRedirect=true

Table 1. Recycling / recovery for specific waste steam

Activity	Recycled(%)	Not recycled (%)
Construction and demolition	89	11
Overall packaging	67.2	32.8
Plastic packaging	42.2	57.6
e-waste	41.2	58.8
Wooden packaging	39.8	60.2

The table refers to the amount of waste that is more recycled than not, which is a good thing and means that we're going in the right direction.
The second row materials refer to materials and products that need to be re-introduced into the economy, to close the loop in circular economy. Also there are some advantages that are numerous: the size of the environmental footprint caused by production and consumption which is reduced, the future of supply of raw materials is secured.

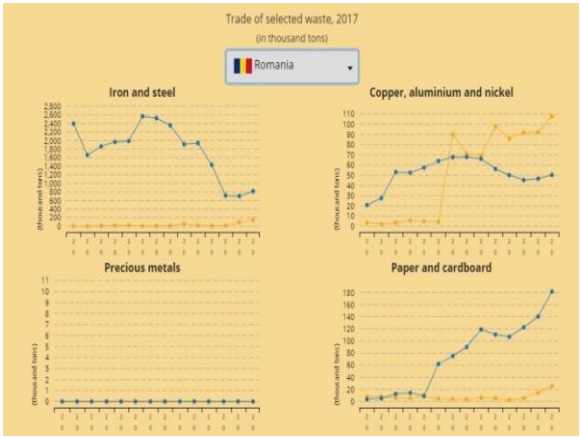

Figure 5. Trade of selected waste 2017 (thousand tons) https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20180422-1?inheritRedirect=true

The previous figure represents the situation of waste during the period of 14 years (2004-2017) in exporting (blue) and importing (yellow) iron and steel; cooper, aluminium and nickel; precious metals (they do not exist in Romania); and paper and cardboard.

Competitiveness and innovation talks about the circular economy and how it contributes to the creation of jobs and growth. When the innovative technologies improve, it also improves the product design to ease re-use and to promote innovative industrial proof.
Statistical indicators help us measure the competitiveness and innovation in the EU.

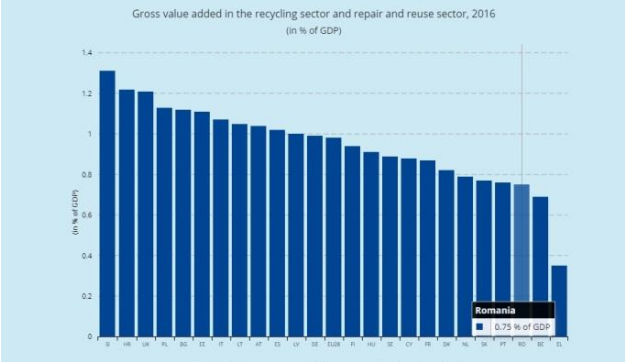

Figure 6. Gross value added in the recycling sector and repair and reuse sector 2016 (in % of GDP) https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20180422-1?inheritRedirect=true

Romania is at the bottom of the list with a percent of 0.75 % of GDP.
Giving the fact that our planet is suffocating in plastics, there are some things you can do to help. Besides these biodegradable things, you can reuse.
Refuse to buy products with lots of packaging, don't buy things you don't really need, reduce the amount of unnecessary objects.
Learn to reuse the things you already have. Try to find then other purpose that is different from the initial use.
Compost, because 80 % of waste is organic, and they rarely end up decomposing in landfills.
Recycle, even though it takes a lot of energy and resources to do so, but it's better this way than sending stuff to the landfill, where they can affect more than you think, or let it become litter.

CONCLUSIONS

After the review we have concluded that the benefits outweigh the disadvantages, and they can be introduced in the composting process, on the special landfills where the waste can be directed easily. The only one affected, and the one that affects, is humanity, which does not care about what happens next.

REFERENCES

http://www.pepctplastics.com/resources/connecticut-plastics-learning-center/biodegradable-plastics/
https://www.european-bioplastics.org/bioplastics/
https://www.letsdoitworld.org/2018/03/what-are-biodegradable-plastics-the-need-for-a-clarified-terminology/
https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20180422-1?inheritRedirect=true
https://www.google.com/imgres?imgurl=https://www.european-bioplastics.org/wp-content/uploads/2016/11/EUBP_Biobased_plastics-1024x622.jpg&imgrefurl=https://www.european-bioplastics.org/bioplastics/&docid=A9C-iXex5eEuCM&tbnid=bqqcGOQpI8s0UM:&vet=1&w=1024&h=622&hl=ro-RO&source=sh/x/im
https://news.nationalgeographic.com/2018/05/zero-waste-families-plastic-culture/?fbclid=IwAR3V4yoTIz8tXGoKZAp8gKWkoIqosPXFeiZXblhszpJldTvXuIllTl5Q8s
https://www.european-bioplastics.org/bioplastics/materials/