

## **THE MAIN FEATURES AND ADVANTAGES OF PLASTIC (PET) AND BIOPLASTIC (PLA)**

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One of the most promising biopolymers is the poly (lactic acid) (PLA) obtained from the controlled depolymerization of the lactic acid monomer. The latter is produced from the fermentation of sugar feedstock, corn, etc., which are renewable resources readily biodegradable (Cabedo, 2006, p.191).

PLA (Polylactic acid) is a thermoplastic substance which is obtained from renewable sources such as plant starch or sugar cane. Using of organic resources makes PLA production different from PET (Polyethylene terephthalate) which is produced using fossil fuels through the esterification and polymerization of ethylene glycol and terephthalic acid.

In spite of the raw material differences, PLA can be produced using the same equipment as PET. Such an approach makes PLA manufacturing processes low-cost and highly efficient. PLA is the second most produced bioplastic (after thermoplastic starch) and has similar characteristics to PET as well as being biodegradable.

Taking into consideration the advantages and disadvantages of PLA plastic the following can be presented.

Advantages:

- PLA is made from renewable raw materials;
- It has a reduced carbon footprint compared to PET;
- Production of PLA takes less energy and releases less greenhouse gases to atmosphere;

-PLA has a lower melting point than PET. It's easy to work with PLA and it requires less energy to modify it;

-It is used in 3D printing;

-PLA is compostable;

-PLA degrades into non-toxic acid.

Despite all benefits, this material also has disadvantages:

-PLA is more expensive than PET;

-Food crops are used to produce PLA;

-The residue is not compost, it doesn't improve the quality of soil and gives no nutrient;

-It changes the PH value of the soil, making it more acidic;

-PLA has a lower melting point, so it cannot be recycled with other plastics. It is unsuitable for high temperature applying.

So, biopolymers fulfill the environmental concerns, but they show such limitations in terms of performance as thermal resistance, barrier and mechanical properties associated with the costs (Siracusa, 2008, p. 643). PLA is more ecological and easily recyclable, but this bioplastic also has some problems with its application and production: it melts easily, it is useless after recycling and has higher price. I suppose that in the near future this plastic will be improved to be more convenient in use, cheaper and ecologically friendly.

### **References:**

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