

Can BIOPLASTIC contribute to a Sustainable Future?

Shubhangini Sharma
Amity Institute of Organic Agriculture,
Amity University, Noida
ARTICLE ID: 029

Plastic is a very versatile material used everywhere from homes to hospitals, from shops to laboratories. We definitely can't imagine our lives without plastic. But wait, have we ever thought of the detrimental effects that a plastic cause to our mother Earth?

Do we remember the plastic bag in which we brought grocery today; or the plastic packaging in which the milk man delivered the milk. We off course put it in the dustbin and forgot. What happens to the plastic after we dump it into the dustbin?



Figure 1: Endangered Earth

The plastic releases certain harmful chemicals into the soil and water like Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs), which can hinder

important physiological processes in animals causing diseases and abnormalities. These chemicals also deteriorate soil and water quality which makes it unsuitable for plants.

What is Bioplastic?

Bioplastic is a material made up of certain biochemicals like polysaccharides, lipids, proteins etc. instead of petroleum. It can either be made from polylactic acids (PLAs) which is extracted from sugarcane or corn, or can be made from polyhydroxyalkanoates (PHAs) which is extracted from microorganisms.

PLAs plastic is cheaper than PHAs one and it is very commonly used in plastic bottles and various food packaging.

Types of Bioplastic and raw materials used

1. **Cellulose based Bioplastic:** It is created by using derivatives made from cellulose.
2. **Starch based Bioplastic:** It is made by using potato starch, corn starch etc. It is the most widely used raw material used for making plastic.
3. **Protein based Bioplastic:** It is made from various protein sources like milk, soy protein, wheat gluten etc.
4. **Bio derived Polyethylene:** It is produced by fermenting raw material from farm produce like corn, sugarcane etc. It is also known as organic polyethylene (PE).

Advantages of Bioplastic:

- It does not require nonrenewable resources to make Bioplastic.
- Some bioplastics are biodegradable/ degrades faster.
- It reduces the overall carbon footprint.
- It does not contain harmful chemicals like phthalates or bisphenol A which are harmful to health.



Figure 2: Substitute for conventional plastic

Important viewpoints regarding Bioplastic

There is already a scarcity of food in the world and making plastic from plants like corn starch or sugarcane will lead to shortage of food. Another viewpoint is that bioplastic is made from biomass which is renewable and it is grown all over the world. On the other hand, petroleum is produced only in certain regions.

Bioplastic has benefits but only if managed properly. Some need to be recycled and some need to be burnt at high temperatures in order to be biodegradable. If bioplastic is not managed properly, it can act as the conventional plastic and can harm the oceans and marine lives. Various chemical fertilizers are used to produce crops to make PLAs plastic. In addition to this, chemical processing is also required to convert plant biomass into plastic.

Conclusion

Use of petroleum-based plastic increases the pollution level, so we have to find an alternative and 'Bioplastic' is the answer. Bioplastic has both advantages and disadvantages. High cost, recycling, reducing raw material are some of the disadvantages. In order to eliminate these disadvantages, better recycling system, proper awareness, and standardization and management should be applied.