



Bioplastics: A Sustainable Hope for Non-degradable Plastics

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PLASTIC has become so essential that it is now considered a necessity for modern life. The term “plastic” originally referred to materials that are malleable and easily shaped. Over the last century, the synthesis of synthetic polymers has been extensively studied. Although some natural materials like cellulose have been used in these studies, the majority of the carbon atoms used have come from petroleum and other fossil fuels. Unfortunately, plastic waste is challenging to dispose of because it does not break down easily. Additionally, a significant amount of plastic waste is released into the environment each year, contributing to pollution.

In view of this, in the coming years, the demand for biodegradable plastics is expected to rise. Raw materials such as proteins, polyesters, lipids, and polysaccharides can be used to develop biodegradable plastics, which are widely available from various agricultural sources. Variations in the composition of these agricultural resources can lead to differences in the properties of bio-thermoplastic materials. Plastics derived from petroleum have several drawbacks, such as the considerable amount of energy required for their

manufacturing process, the extended time for degradation, and the serious impacts on the environment. In an attempt to pursue more sustainable alternatives, the production of biodegradable products has increased recently. Specialists continue to be drawn to this field to provide innovative eco-friendly materials and concepts.

Plastic and the Environment

Over the years, plastics have gained popularity worldwide because of their long durability, affordability, lightweight and resilience. The plastics industry produces over 300 million tons of plastic annually, with most of it as single-use plastic, which is used just once before being discarded. Plastic waste can take hundreds or even thousands of years to decompose because it is composed of durable polymers that break down slowly. Furthermore, only 7% of the total plastic produced is recycled; around 8% is burned, while the rest is disposed of in landfills. According to estimates from the National Academy of Plastic Waste, 14 billion pounds of plastic are discarded annually, which leads to serious environmental issues.