Editorial Corner

Challenges of Biodegradable Polymers: An Environmental Perspective

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Owing to their numerous advantageous properties, the petroleum derived synthetic non-biodegradable polymers are commonly used in wide range of applications. Though, they have excellent properties, they persist in the environment and takes hundreds of years to degrade causing an ecological imbalance, release toxic gases when they degrade and also causes severe health problems to human beings and other living organisms. Furthermore, the efforts to recycle the plastic materials needs more encouragement and many countries have recognized the recycling as a disposal technique which can also curb the environmental issues. This appears to be positive at the beginning, but without proper infrastructure, the open recycling systems will allow the emission of toxic gases at critical intensities. Hence, due to the growing concern towards the ecological, waste management and health issues, the bio-based and decomposable polymers have gained mounting interest. These biopolymers are generally derived from renewable resources and can be hydrolytically or enzymatically degraded. Even though, biopolymers are used for many hundreds of years, their extensive use in wide range of applications is limited due to some of their inferior functional properties compared with their synthetic counterparts. The recent breakthroughs have substantially improved their properties thereby enabling their use in wide range of applications such as food packaging, biomedical, textile, filtration, agriculture, construction and house hold products. The most vital advantage of biopolymers derived from renewable feed stocks when compared with petroleum, is the reduction in the CO_2 emission. Biopolymers can only be favorable when they actually biodegrade and hence water-soluble biopolymers can be of more beneficial. On the other hand, non-water soluble biopolymer needs infrastructure of bio active systems for their disposal. However, some other challenges that need more positive consideration in the near future will be controlling the lifetime during in-service life regardless to the end-of-life biodegradation, enhancing the mass production and reducing processing costs, and minimize the utilization of agricultural land and forests to avoid the reduction in food production, adverse effects on biodiversity and other environmental impacts.

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