

Durable PLA Bioplastics

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**Abstract**

Bioplastics are special plastics manufactured from biobased polymers and can potentially contribute to the circular plastics economy. In this direction, polylactic acid or polylactide (both abbreviated as PLA) is the most important commercially available polymer whose monomeric unit, lactic acid, can be produced from renewable resources. PLA has good thermal plasticity and mechanical properties and can be readily molded. During the manufacturing of PLA-based plastic products, the carbon footprint is approximately 75% lower than that of conventional plastic products. In the context of life cycle assessment and the eco-profile (input and output from the manufacturing process) of PLA, benefits and drawbacks, strategies for overcoming the drawbacks, and the trend of applications, it is worthy to develop PLA-based durable products considering regenerative technical approach. Therefore, this chapter reports recent progress in developing durable PLA bioplastics for various applications. Various strategies have been critically summarized, such as plasticization, copolymerization, and melt blending with different tough polymers, rubbers, thermoplastic elastomers, and nanomaterials. Changing the processing technology, modification of PLA by chemical methods or cross-linking and grafting, and annealing can improve the properties of PLA, which are also discussed in this chapter.