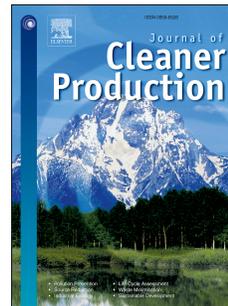


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A review of progress in the dyeing of eco-friendly aliphatic polyester-based poly(lactic acid) fabrics

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Abstract

Poly(lactic acid) (PLA) fiber has emerged as an eco-friendly alternative to conventional poly(ethylene terephthalate) (PET) polyester fiber, in many textile and clothing products. Although it is similar to PET in various aspects, yet needs slightly different pretreatment and dyeing conditions from PET to retain its strength and other desirable characteristics during and after processing. It not only needs milder temperature in pre-heat setting and scouring but also special considerations during dyeing and post-treatments. All colorants which give good dyeing results on PET do not necessarily result in good color yield and fastness properties on PLA at milder dyeing conditions. This paper reviews the recent developments in the dyeing of PLA textiles with disperse, vat, cationic and natural dyes. The optimum conditions for dyeing of PLA and its cellulosic blends with disperse/reactive dyes have been outlined as well as different eco-friendly possibilities to dye with a lower impact on the environment has been summarised. Although dyeing of 100% PLA fabrics can be accomplished fairly successfully, post-treatment and dyeing of its blends with cellulosic fibers still offer some challenges in terms of sustainability. Some future options for sustainable dyeing and post-treatment of PLA and its cellulosic blends may include dyeing with unexplored types of different natural dyes, waterless dyeing in critical carbon dioxide and seeking eco-friendly alternatives to reductive after-clearing with sodium dithionite.

Key words: Poly(lactic acid), fiber, fabrics, sustainable, dyeing, eco-friendly

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