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Thermoplastic blends of chitosan: A method for the preparation of high thermally stable blends with polyesters

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Highlights

- Thermoplastic chitosan blends were prepared.
- Miscible thermoplastic poly(vinyl alcohol)/chitosan blends dispersed in poly(lactic acid).
- Poly(vinyl alcohol)/chitosan blends prepared by freeze- or spray-drying techniques.
- Thermal stable PVA/chitosan/PLA blends were prepared and characterized.

Abstract

Chitosan is high potential material for new applications due to its properties, especially its microbial activity, and because it is one of the most abundant natural polymers. However, chitosan can be processed only from solution limiting its applications. Methods for processing chitosan in molten have been a subject of recent interest. One method, involves thermoplastic its blends with poly(vinyl alcohol), however these blends undergo degradation due to acid residues from previous processing steps. Here we described a process to produce thermoplastic blends of poly(vinyl alcohol)-chitosan in a poly(lactic acid) matrix by avoiding degradation even at higher chitosan contents. The process involves the use of spray- and freeze-drying techniques to produce acid free blends of PVA/chitosan, then incorporated in PLA matrix by extrusion. These findings are expected to contribute to increasing and extending the applications of polysaccharides, such as chitosan, in new applications such as textiles, medical and food packing.

Keywords: extrusion, chitosan, natural polymers, thermoplastic blends, spray-drying, freeze-drying.

1. Introduction

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