

BIOCOMPATIBLE PLA AND CHITOSAN BILAYER FILMS AS INTELLIGENT FOOD PACKAGING MATERIALS

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ABSTRACT

Over the past few decades, a huge rise in the use of petroleum-based products has been noted, especially with single use and non-degradable packaging materials ^[1]. In order to mitigate the pollution that the exorbitant use of such products is causing, it was deemed necessary to formulate a much friendlier material to the environment, i.e. a film that can also compete with traditional food packaging in terms of durability and safety. The aim of this study was to produce a biodegradable bilayer film from biopolymers, with the purpose of its being used as active food packaging. The aforementioned film was composed of PLA, a biodegradable polymer, and chitosan, the second most abundant natural polymer, with different additives, such as Tween 80^[2] and glycerol,^[3] to enhance the mechanical and barrier properties of the emerging membranes. The derived and most optimal bilayer film was obtained by casting the chitosan layer containing the plasticizer and the surfactant on top of the PLA layer. The resulting films were then subjected to various tests in order to ascertain their physicochemical properties. The tests included an endurance test, oxygen and moisture permeability tests, colorimetry, a water contact angle test, SEM microscopy, and finally FT-IR. Further work targets the enrichment of bilayer films with antibacterial and preservatives on the different sides of the prepared film. The collective data on the so produced hybrid films lend credence to the notion that they may be incorporated in food industry production food packaging materials.

KEYWORDS: PLA, Chitosan, Bilayer Film, Active Food Packaging, Biodegradable

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