

INFLUENCE OF SYNTHESIS ON COMPOSITE/LAMINATED STARCH-GELATINE BASED BIOPOLYMER FILM PROPERTIES

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ABSTRACT

Biopolymer films have an increasing share and influence in the packaging materials sector, certainly due to a number of advantages: availability, cheapness, easy processing, degradability, etc. On the other hand, numerous methods have been developed to optimize their unfavorable properties (weaker mechanical characteristics, hydrophilicity, etc.). This paper examines the influence of the method of synthesis of biopolymer films on their properties. The selected substrate are starch-gelatin films. A starch-gelatin film was synthesized in a ratio 1:1 as an example of a composite film (label C). The second sample was obtained by lamination of gelatin film on starch film (label L). Plain starch film was used as a control sample (label 0). On the all three groups of samples, mechanical (thickness, tensile strength and elongation at break), structural (Fourier transform infrared spectroscopy) and physico-chemical (moisture content, swelling, solubility) properties of importance for the application of packaging materials were tested. All the obtained biopolymer films were transparent and easy to handle. Fourier transform infrared (FTIR) spectroscopy identified all characteristic groups and bonds formed in composite and laminated films. The results showed a significant contribution of gelatin in the developed biopolymer films compared to the control sample. Gelatin incorporation in both forms, as a component in composite film or as a separate layer, improved mechanical properties (tensile strength and elongation at break increased) and water solubility. Slight differences were observed between composite and laminated films because the effect of the method of added gelatin is minimal compared to the sample without the addition of gelatin.

Keywords: biopolymer films, starch, gelatin, synthesis, properties