

Microstructure Analysis of Biopolymer Mixture (Chia-Gelatin) by Laser Confocal Microscopy

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Abstract : The usual procedure to investigate the properties of biodegradable films has been to prepare the film, measure the mechanical or transport properties and then decide whether the mixture has better properties than the individual components, instead of investigating whether the mixture has biopolymer-biopolymer interaction, then prepare the film and finally measure the properties of the film. The work investigates the presence of interaction biopolymer-biopolymer in a mixture of chia biopolymer and gelatin using Laser Confocal Microscopy (LCM). Previously, the chia biopolymer was obtained from chia seed. CML analysis of mixtures of chia biopolymer-gelatin without Na⁺ ions exhibited aggregates of different size, in the range of 100-400 μm, of defined color, for the two colors, but no mixing of color was observed. The increased of gelatin in the mixture decreases the size and number of aggregates. The tridimensional microstructure revealed that there are two layers of biopolymers, chia and gelatin well defined. The mixture chia biopolymer-gelatin with 10 mM Na⁺ and with a ratio 75:25 (chia-gelatin) showed lower aggregated size than others mixture with and without ions. This result could be explained because the chia biopolymer is a polyelectrolyte and the added sodium ions reduce the molecular rigidity by neutralizing the negative charges that the chia biopolymer possesses and therefore a better biopolymer-biopolymer interaction is allowed between the biopolymer of chia and gelatin.

Keywords : biopolymer-biopolymer interaction, confocal laser microscopy, CLM, microstructure, mixture chia-gelatin

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