**Chemical interaction between sunflower proteins and locust bean gum polysaccharides for the production of biopolymers**

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The development of blended systems consisting of polysaccharides and proteins allows the development of biodegradable films with improved performance. The synergistic interaction of locust bean gum polysaccharides (LBGP) with sunflower seed proteins (SSP) is poorly described. This study aimed to investigate the influence of the addition of different concentrations of LBGP (0.10%, 0.30%, 0.50% and 0.75% w/v) in SSP-based films regarding the chemical interaction between these biopolymers during their use in the development of cast films, in which glycerol was used as a plasticizer. Fourier transform infrared spectroscopy (FTIR) was used to highlight the chemical interactions between the two biopolymers. The normalized FTIR spectra of the films showed specific absorption bands corresponding to the chemical components of SSP and LBGP. Protein-polysaccharide interactions were evident in the amide A and amide B regions of the spectra, with the wavenumber for amide A changing from 3277 cm−1 (pure protein) to 3284 cm−1 (blend). The wavenumber at 2924 cm−1 in the SSP spectra changed to 2916 cm−1 in the spectra of the blends. These changes can be explained by the hydrogen bonding established between SSP and LBGP. Decreases in the peak heights associated with amide I and amide II (1631 and 1537 cm−1) were observed in the spectra for the blends compared to the spectrum for the pure SSP film. They indicate the degree of hydrogen bonding between proteins and galactomannans necessary to ensure the stability of the blends [1]. The increase of polysaccharides in the blend led to a reduction of intra- and intermolecular β-sheets. The proportion of β-sheets increased from 69% (pure protein) to 76% (0.1% galactomannan mixture), then gradually decreased to 22% (0.75% mixture). The contribution of α-helix/random coil decreased from 31% (pure protein) to 24% (0.1% mixture) and increased to 78% (0.75% mixture). These results demonstrate that the polysaccharide/protein mass ratio plays a significant role in the nature and intensity of interactions between these two types of biomolecules.

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References

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