Tipo de Comunicación:
Póster: P_BB_20

Simposio:
BIOENERGÍA Y BIOPRODUCTOS

Título:
Development of galactomannan-based films from Cassia grandis for the immobilization of biomolecules: physicochemical characterization

Autores:
Barbosa Sales de Albuquerque Priscilla, Parente Ribeiro Cerqueira Miguel Ângelo, Correa de Souza Coelho Caroline, Martins de Oliveira Soares Vicente António Augusto, Couto Teixeira José António, Carneiro da Cunha Maria das Graças
Centro de Trabajo:
Centre of Biological Engineering
Email:
priscillaibm@hotmail.com

Palabras Clave:
Barrier properties; bioactive compounds; mechanical properties; membranes

Comunicación:

Galactomannans are polysaccharides formed by a β(1□4)-D-mannan backbone attached to α(1□6)-D-galactose units. They are commonly extracted from leguminous seeds and used as alternative sources for the production of films. Lactoferrin (Lf), bioactive peptides (BAPs), and phytosterols are biomolecules with functional properties and potential immobilization into films. The use of galactomannan films as immobilization systems is unexplored and emerges as an alternative for the incorporation of biomolecules for several biotechnological applications. This work aims evaluating the effect of different concentrations of LF, BAPs and phytosterols on the properties of galactomannan films obtained from Cassia grandis seeds. Colour parameters (L*, a* and b*) and opacity were determined using a digital colorimeter. Solubility in water was expressed as percentage of the film dry matter solubilized after 24 h immersion in distilled water and water vapour permeability (WVP) was determined gravimetrically based on ASTM E96-92 method. Contact angle (CA) was measured by the sessile drop method and mechanical properties were measured using a texture analyzer following the guidelines of ASTM D882-02. All the studied films had a strong whiteness tendency. The presence of Lf increased ($p<0.05$) the redness appearance of the films, even considering their evident yellowness tendency. All the studied films presented low opacity values (ranged between 11.53±0.15 and 12.37±0.16), however the films with immobilized phytosterols were more opaque than the other films. Solubility values decreased with the addition of Lf, while the incorporation of BAPs and phytosterols did not lead to statistical differences ($p>0.05$) between the films. The presence of Lf and phytosterols significantly increased the WVP values, leading to values 3.9 and 1.7-fold higher than the control film, respectively. Lf and BAPs increased ($p<0.05$) the CA values when compared to the results of the control film. Young's modulus and tensile strength increased with the addition of biomolecules, improving the stiffness of the films, while the control films were more flexible due to the highest values of elongation at break. Galactomannan-based films from C. grandis showed to be a promising structure for the immobilization of biomolecules foreseeing a great number of possible applications in food and pharmaceutical industries.