P35 - Development and characterization of edible films from polysaccharides of different sources

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Edible packaging experienced a notable growth in recent years and an important impact in the food industry. This growth is due to an increase in the interest, research and development of new packaging materials using natural polymers to replace the non-biodegradable, synthetic materials used in synthetic packaging. Factors like the impact on sustainability, the increased interest in renewable resources and biodegradable materials with no ecological impact on the environment are influencing the growth perspectives on the use of these materials [1], [2]. Moreover, the use of edible materials opens the possibility of new and innovative applications of these packaging systems.

In this work polysaccharides from different sources were tested in order to develop edible films to apply in food products in new innovative packaging systems. Methylcellulose (MC) of different grade (15 cP and 1600 cP of viscosity), carboxymethylcellulose (CMC) and potato starch films were used for the preparation of film forming solutions that were used for films' preparation (produced by casting). Mechanical properties, moisture, solubility, water vapor permeability (WVP), thickness, colour and opacity were evaluated for each film. Results showed that films present good optical properties with low opacity values. Potato starch-based films present values of 5.03 % ± 0.33 %, while for CMC the value obtained was 3.14 % ± 0.35 %. For MC of 15 cP and 1600 cP the obtained values were respectively, 4.07 % ± 1.50 % and 3.57 % ± 2.04 %. Regarding solubility the MC films were totally soluble in water while CMC films present a solubility of 58.46 % ± 1.29 %. Potato starch-based films presented the lowest solubility with values of 19.18 % ± 1.40 %.

Mechanical properties results showed that the films of MC of 1600 cP are flexible (elongation at break of 61.35 % ± 8.80 %) and have the higher values of tensile strength (12.22 MPa ± 2.14 MPa). The films presenting higher vapor permeability were the ones produced using MC 15 cP (7.31x10⁻⁷ g(mhPa)⁻¹± 3.73x10⁻⁸ g(mhPa)⁻¹), while the potato starch-based films present a water vapour permeability of 3.78x10⁻⁷ g(mhPa)⁻¹ ± 3.79x10⁻⁸ g(mhPa)⁻¹.

Obtained results showed that polysaccharide-based films based on cellulose derivate and starch present good properties to be used as edible packing in different food products, since that they are resistant and flexibles and present good optical properties.

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