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Development of starch-based edible film of jackfruit seeds through the valorization of agroindustry waste

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Polysaccharides obtained from fruit processing residues considered sustainable alternatives of materials for the development of biodegradable food packaging because they reduce environmental problems associated with improperly discarded packaging waste as well as non-biodegradable packaging. Starch extracted from jackfruit (*Artocarpus integrifolia* L.) seeds can be used successfully in the development of research in the areas of food packaging. Jackfruit is a fruit with about 70 cm and up to 40 kg. The pulp consumed in nature form or sweets/jelly and has about 25 to 40 % of the total weight of the fruit. Each fruit has up to 500 seeds and these, about 86.0 % starch content. In this context, the aim of this work was to extract the starch from seeds of the hard jackfruit varieties, to characterize and to evaluate as potential input for the development of food packaging. The yield of starch extracted with sodium bisulfite was 11.06 % and showed 4.40 ± 0.06 % of moisture; 0.07 ± 0.03 % of ash with dry basis; 1.30 ± 0.04 % of proteins; 0.40 ± 0.10 % of lipids and 93.0 ± 0.10 % of starch content. The films developed by the casting technique and analyzed for thermogravimetry with mass loss of up to 63.27% for temperatures between 58.42 and 318.99 °C. The mean values presented for elastic modulus, tensile strength and elongation percentage at rupture were 0.45 MPa, 5.09 MPa and 2.46%, respectively. The film presented 0.047 ± 0.00 µm of thickness; 36.43 ± 5.26 % of solubility; 1.948 ± 0.19 gm/day.m² of water vapor permeability and 32.87 ± 6.43 of contact angle. The characteristics of the film samples indicate a promising future for this starch as a source of biopolysaccharides for food packaging. The incorporation of natural antioxidants and antimicrobials can extend shelf life becoming a potential active packaging.

Keywords: biodegradable, packaging, fruit residues, food processing