



DEVELOPMENT OF BIODEGRADABLE FILMS BASED ON SORGHUM STARCH AND JABUTICABA EXTRACTS: SUSTAINABLE ALTERNATIVES FOR THE PACKAGING INDUSTRY

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ABSTRACT: Starch-based packaging has emerged as a viable alternative to traditional petroleum-based materials. Starches from unconventional botanical sources, such as sorghum grains, have been utilized as raw materials for the development of biodegradable films. In addition, incorporating extracts from jabuticaba peels, which are rich in phenolic compounds such as anthocyanins, provides an opportunity to utilize a residue typically discarded by the industry. Therefore, the aim of this study was to develop and characterize films produced from sorghum starch added of extracts of freeze-dried jabuticaba peels. For this purpose, the casting method was used. The film-forming suspension was prepared by dispersing sorghum starch in distilled water (4% w/w) and heating it in a water bath at 90 °C with constant stirring. Subsequently, glycerol was added (40% w/w of sorghum starch), and the mixture was heated for 30 minutes. Once cooled to 40°C, the jabuticaba peel extracts were added to the film-forming solution at three different concentrations: 0% (control), 5% (JT5%), and 10% (JT10%) w/w. Aliquots of 60 g of this solution were dispensed into polystyrene petri dishes (15 cm in diameter) and subjected to drying in an oven with forced air circulation at 30°C for 24 hours. The films were analyzed for biodegradability, thickness, water activity (WA), water solubility, and water vapor permeability (WVP). All samples completely degraded within seven days. The thickness of the materials ranged from 0.14 to 0.17 mm; WA from 0.63 to 0.66; solubility from 16.21 to 22.36%, and WVP from 1.72 to 2.09 g.mm/h.m².kPa. It was observed that increasing the concentration of the extract led to higher values for all evaluated parameters ($p < 0.05$). The results are promising, especially when compared to films made with conventional corn and cassava starches. Therefore, the biodegradable films developed from sorghum starch and jabuticaba peel extracts show potential for future applications, thanks to their favorable physical and mechanical properties.

Keywords: biodegradability; sustainability; industrial waste.

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