DEVELOPMENT AND CHARACTERIZATION OF BIODEGRADABLE FILMS BASED ON FLOUR AND STARCH OF PLANTAIN BANANAS (MUSA PARADISIACA)

Franciele Maria Pelissari¹, Margarita María Andrade-Mahecha¹, Paulo José do Amaral Sobral², Florencia Cecilia Menegalli¹

¹ Department of Food Engineering, School of Food Engineering, University of Campinas, CEP 13083-862, Campinas, SP, Brazil.
² Department of Food Engineering, School of Animal Science and Food Engineering, University of São Paulo, CEP 13635-900, Pirassununga, SP, Brazil.

The increase in non-biodegradable waste material and the difficulty in recycling most of the available synthetic packaging have been pushing researches toward the development of new biodegradable materials, which are suitable for packaging. In this paper, biodegradable films were prepared by casting method using the flour and starch isolated from plantain bananas of the variety “Terra” (Musa paradisiaca). Since the non-starchy fraction present in the banana flour represents 29.4% (in dry basis) within its composition, it was considered interesting to compare the properties of the film elaborated from this natural blend with that produced from banana starch only. Both films were characterized based on their mechanical, barrier, structure and thermal properties. Plantain banana films produced presented a homogeneous surface with no bubbles or cracks and good handling characteristics. Banana flour film was less resistant and insoluble but more flexible than banana starch film. Regarding the surface microstructure, the flour film presented a discontinuous structure, while starch film showed a more compact surface. The FTIR spectra showed that the presence of the amide I group relating to proteins was only observed in flour film. Both plantain banana films had one glass transition temperature (Tg), with the starch film presenting a higher temperature (46.4 ºC) than the flour film (30.2 ºC). Furthermore, the presence of other components (protein, lipids and fiber) in flour film had important effects on its properties. In general, banana flour and starch seem to be very promising materials for the formulation of coatings and films.