ABSTRACT

Fresh and stored maize (white and blue) tortillas were evaluated for physicochemical, rheological and structural characteristics assessed by calorimetry, x-ray diffraction, Fourier transform infrared (FTIR) spectroscopy, dynamic viscoelastic tests, and high-performance size-exclusion chromatography. Two endotherms were found in studies of fresh and stored tortillas. The low temperature endotherm (50–56 °C) was due to reorganized (retrograded) amylopectin, while the high temperature endotherm (105–123 °C) was attributed to retrograded amylose. The enthalpy value for the lower temperature transition was minor than that of the high temperature transition. Fresh tortillas showed an amorphous starch arrangement by x-ray diffraction study. Stored samples showed the presence of peaks at 2θ = 17º and 23º, indicating re-crystallization of starch components. FTIR results confirmed the development of higher levels of starch crystals during storage. Differences in the viscoelastic parameters were also observed between fresh and stored samples. At the longest storage times, white tortillas were more rigid than blue tortillas. Molar mass values for starch increased for both white and blue tortillas as storage time progressed, though relatively higher values were obtained for white tortillas. More starch reorganization occurred in white tortillas, in accordance to calorimetric, x-ray diffraction, FTIR and rheological results. These results corroborate that changes occurring in tortillas during storage are related to reorganization of starch components, and the maize variety more than the color plays an important role.

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