



RESISTANT STARCH CONTENT AND STRUCTURAL CHANGES IN MAIZE (ZEA MAYS) TORTILLAS DURING STORAGE.

ABSTRACT

Storage of maize products such as tortillas may cause starch retrogradation and lead to resistant starch (RS) formation. This study was carried out to determine if storage of maize tortillas under refrigerated conditions enhanced RS content and/or modified RS structure. Improved Costeño variety maize grain was nixtamalized and processed into tortillas which were stored for five and ten days at 5°C. Total resistant starch (TRS) and retrograded resistant starch (RRS or RS3) contents were determined on raw and nixtamalized maize grain and tortillas stored for zero, five and ten days. Differential scanning calorimetry (DSC), X-ray diffraction (XRD) and near-infrared (NIR) spectroscopy were used to evaluate structural changes in retrograded resistant starch isolated from each sample type. Total starch content was $67 \pm 1.5\%$ for all samples, TRS ranged from 3.3% in the raw grain to 7.2% in tortillas stored for ten days, while RRS starch content ranged from 0% in the raw grain to 3.2% in tortillas stored for ten days. DSC showed endothermic transitions corresponding to amylopectin and amylose retrogradation, at 31.9 and 139.7°C in RRS from tortillas stored for five days, and at 47.9 and 146°C in RRS from tortillas stored for ten days. These values agreed with the higher total RS content recorded after prolonged storage. XRD revealed a starch crystallinity of 13.7% in tortillas stored for five days and 15.3% in those stored for ten days. NIR spectroscopy analysis showed evidence of structural changes in polymeric order that were more pronounced in RRS of tortillas stored for ten days, due to increase in crystalline region.

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