



ABSTRACT

Traditional nixtamalization process produces a masa (dough) with appropriate cohesiveness and adhesiveness. Masa is considered as a network of solubilized starch polymers with dispersed, uncooked and swollen starch granules, cell fragments, proteins and lipids. In this work, the influence of proteins on the masa viscoelastic behavior was studied in corn kernels under different nixtamalization conditions. Scanning electron microscopy, SDS-PAGE, differential scanning calorimetry and rheological analysis were used to characterize the corn samples. The micrographs showed that the nixtamalization modified the shape of the starch granules and protein bodies, but no changes in appearance were observed when protein was removed. SDS-PAGE showed that corn proteins polymerized during cooking. Lime promoted both calcium–protein and protein–calcium–protein interactions mainly by calcium bridges, which were difficult to disrupt and increased the protein thermo-resistance. In the absence of lime, corn proteins polymerized mainly by disulfide bond cross-linking. Thermal analysis (DSC) indicated that the gelatinization temperature increased in lime-treated samples compared to control samples. Rheological studies showed that the corn protein exhibited greater influence on gel strength by enhancing the elastic character of the samples (G'). These results suggested that polymerized corn proteins stabilized the gel structure, which in consequence influenced the viscoelastic behavior of masa.

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