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On the State of Calcium in Nixtamalized Corn Grains.

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Abstract

The aim of the present contribution is to shed light on the role of Ca in the *nixtamalization* process of corn and its interactions with the grain components. X-ray energy-dispersive spectroscopy (EDS) of corn grains before and after their *nixtamalization* (alkaline cooking in an aqueous solution of $\text{Ca}(\text{OH})_2$) showed that Ca is mainly retained by the corn hull (pericarp) and by the germ. In this last component Ca is found as salts of fatty acids, due to a partial saponification of fats during alkaline cooking. Experimental evidence indicates that Ca incorporated to the endosperm during the *nixtamalization* process is forming inclusion compounds of Ca salts of fatty acids within the amylose helical structure. The ionic exchange of Ca by ^{57}Fe in pericarp allows the recording of Mössbauer spectra of this part of the corn grain. All Mössbauer spectra show two different structural sites for Fe, and therefore for Ca, since EDS evidences that the ionic exchange of Ca for Fe effectively takes place. The observed isomer shift values correspond to iron coordinated to oxygen atoms as first neighbors. Calcium in *nixtamalized* pericarp could be coordinated by polyuronic acids from the hemicelluloses and/or by phenolic groups from alkaline lignin. During the alkaline cooking hemicelluloses and lignin of corn hull are strongly degraded.

I. Introduction

The cooking of corn grains in an alkaline solution of $\text{Ca}(\text{OH})_2$, known as *nixtamalization*, is a most important process for human consumption of this

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