

## Calcium content and speciation in alkaline-cooked corn studied by synchrotron Ca K-edge X-ray absorption spectroscopy (Article)

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### Abstract

Using Ca K-edge X-ray absorption spectroscopy the calcium uptake and species in alkaline corn have been studied and compared with corn starch and crystalline cellulose as main compounds in corn endosperm and pericarp. XANES data showed that calcium binds preferably to hemicelluloses in the pericarp. The main calcium species found by EXAFS in cellulose and starch is calcium carbonate although some protein-calcium species could be formed within the starch granules. From X-ray diffraction and microscopy techniques, pericarp dissolution, mainly at the amorphous hemicellulose fraction was inferred. The hemicellulose dissolution during steeping increases the apparent pericarp crystallinity, while the relative calcium content determined by XANES absorption edges reduces. XANES and EXAFS spectroscopies showed to be a valuable tool in order to determine the calcium species and to make a semiquantitative determination of calcium in the different nixtamalized corn fractions. © 2014 Elsevier Ltd.

### Author keywords

Alkaline cooked corn; Calcium speciation; Calcium uptake; XAS

### Indexed keywords

**Species Index:** Zea mays