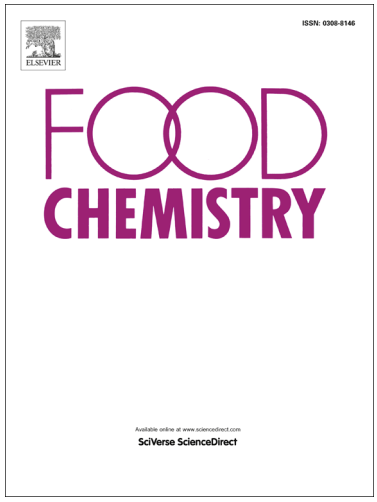

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Characterization of food additive-potato starch complexes by FTIR and X-ray diffraction

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Abstract

Fourier-transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) techniques were used to study the effect of four food additives, agar, alginate, lecithin and glycerol, at three different concentrations, 0.5, 1 and 1.5%, on the molecular structure of potato puree prepared from commercial potato powder. Vibrational spectra revealed that the amylose-amylopectin skeleton present in the raw potato starch was missing in the potato powder but could be fully recovered upon water addition when the potato puree was prepared. FTIR peaks corresponding to water were clearly present in the potato powder, indicating the important structural role of water molecules in the recovery of the initial molecular conformation.

None of the studied puree samples presented a crystalline structure or strong internal order. A comparison of the FTIR and XRD results revealed that the additives exerted some effects, mainly on the long-range order of the starch structure via interacting with and changing -OH and hydrogen bond interactions.

Keywords: X-ray diffraction, FTIR, structural properties, Starch, Food additives

1. Introduction