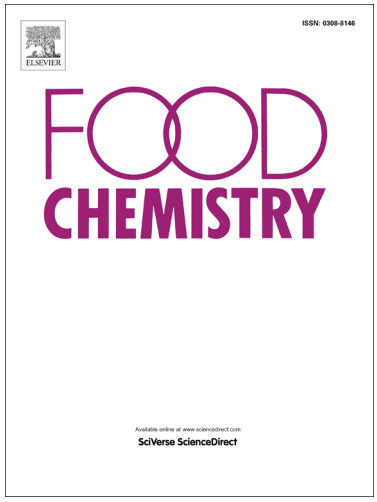

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Use of Fourier transform infrared spectroscopy to monitor sugars in the beer mashing process

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Abstract

Mashing is an enzymatic procedure for the extraction of sugars from malt. It has strong temperature dependence, so monitoring the sugar production is very important for optimization of the brewing process. In this work, Fourier transform infrared spectroscopy (FTIR) was used to monitor three different mashing programs. These all presented high concentrations of maltose and dextrin, enabling their differentiation according to the FTIR absorption bands at 991 and 1022 cm^{-1}, characteristic of maltose and dextrin, respectively. The absorption intensities of these bands were used to monitor the concentrations of the compounds during mashing, and the values were compared to HPLC data. Multivariate analysis of variance was applied to the FTIR absorption intensities in order to separate groups corresponding to the temperature steps of each mashing program. The results demonstrated that infrared absorption offers an alternative to the HPLC method for monitoring the mashing process.

Keywords: Beer mashing; maltose; dextrin; infrared absorption; HPLC.