

Title Modelling dehydration and quality degradation of maize during fluidized-bed drying
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Abstract

At harvest time, maize (*Zea mays* L.) has a moisture content too high to be stored, and has to be dried. To control the drying impact on maize characteristics, it is necessary to accurately know the spatial distribution of temperature and moisture content in the kernel, and the kinetics of quality loss in relation to these two factors. To this end, a physical model of heat and mass transfer in a maize kernel was designed. The Fick and Fourier equations were solved by the finite element method (FEM). The real 3D geometry of maize was obtained by NMR imaging and then used to build the mesh needed for the FEM computations. The model correctly describes the evolutions of maize moisture and salt-soluble protein content during fluidized-bed drying with a constant drying air temperature between 50 °C and 100 °C.