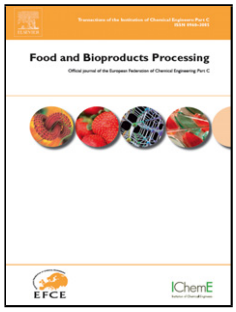

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Mathematical model, validation and analysis of the drying treatment on quality attributes of chicory root cubes considering variable properties and shrinkage

M. F. Balzarini[1,2], M.A. Reinheimer[1,3], M.C. Ciappini[2], N. J. Scenna[1,3]

[1]Centro de Aplicaciones Informáticas y Modelado en Ingeniería (CAIMI), Universidad Tecnológica Nacional, Facultad Regional Rosario (UTN, FRRo), Zeballos 1346, S2000BQA Rosario, Argentina

[2]Centro de Investigación de Tecnología de los Alimentos (CIDTA), Universidad Tecnológica Nacional, Facultad Regional Rosario (UTN, FRRo), Zeballos 1346, S2000BQA Rosario, Argentina

[3]CONICET – Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina

* Corresponding author: María Agustina Reinheimer. Mailing address: *CAIMI - UTN, FRRo – Universidad Tecnológica Nacional, Facultad Regional Rosario, Zeballos 1346, S2000BQA Rosario – Argentina*. E-mail address: mareinheimer@santafe-conicet.gov.ar, Phone (+54) 341 4484909.

Highlights

- Three dimensional mathematical model to describe the drying process of chicory root (*Cichorium intibyus L.*) cubes
- Consideration of temporal variations as function of the sample humidity content for shrinkage and transfer properties
- Process representation by mathematical modeling
- Application of first principles equations and semi-empirical correlations
- Sensitive analysis for the main mass and heat transfer parameters.

Abstract

This work presents an exhaustive three dimensional mathematical model to describe chicory root cubes drying process (*Cichorium intibyus L.*) using a Fick's diffusion model considering a variable diffusion path length in three dimensions. Experimental data obtained at laboratory scale is used to validate the proposed model. Experiments are conducted using a forced convection laboratory dryer at temperatures of 60°C and 80°C and air velocities of 0.2 and 0.7 m/s to dry chicory