

## Accepted Manuscript

Analysis by non-linear irreversible thermodynamics of compositional and structural changes occurred during air drying of vacuum impregnated apple (*cv. Granny smith*): Calcium and trehalose effects

E. Betoret, N. Betoret, J.M. Castagnini, P. Rocculi, M. Dalla Rosa, P. Fito

PII: S0260-8774(14)00396-3

DOI: <http://dx.doi.org/10.1016/j.jfoodeng.2014.09.028>

Reference: JFOE 7933

To appear in: *Journal of Food Engineering*

Received Date: 20 June 2014

Revised Date: 26 August 2014

Accepted Date: 8 September 2014

Please cite this article as: Betoret, E., Betoret, N., Castagnini, J.M., Rocculi, P., Dalla Rosa, M., Fito, P., Analysis by non-linear irreversible thermodynamics of compositional and structural changes occurred during air drying of vacuum impregnated apple (*cv. Granny smith*): Calcium and trehalose effects, *Journal of Food Engineering* (2014), doi: <http://dx.doi.org/10.1016/j.jfoodeng.2014.09.028>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Analysis by non-linear irreversible thermodynamics of compositional and structural changes occurred during air drying of vacuum impregnated apple (cv. *Granny smith*): calcium and trehalose effects.**

E. Betoret<sup>a\*</sup>, N. Betoret<sup>b</sup>, J.M. Castagnini<sup>b</sup>, P. Rocculi<sup>a</sup>, M. Dalla Rosa<sup>a</sup>, P. Fito<sup>b</sup>.

<sup>a</sup>Dipartimento di Scienze e Tecnologie Agro-Alimentari, Alma Mater Studiorum Università di Bologna, Piazza Goidanich 60, 47023 Cesena, Italy.

<sup>b</sup>Institute of Food Engineering for Development, Department of Food Technology, Universitat Politècnica de València, Camino de Vera s/n, 46022 Valencia, Spain.

\* Corresponding author: Dipartimento di Scienze e Tecnologie Agro-Alimentari, Alma Mater Studiorum Università di Bologna, Piazza Goidanich 60, 47023 Cesena, Italy. Tel: +39 0547 338120 Fax: +39 0547 382348. e-mail address: maria.betoretvalls@unibo.it (E. Betoret)

**Abstract**

Apple discs were impregnated with isotonic solutions of sucrose and trehalose with and without calcium addition and after air dried. In the vacuum impregnation experiments, the calcium and the replacement of sucrose by trehalose did not have significant effect on the final volumetric deformation of the samples. During air drying two stages of changes were considered. The first one lasted until the saturation of the intracellular liquid phase, and the second one from the saturation of the intracellular liquid phase until the end of the drying process. Mass transfer has been analysed applying nonlinear irreversible thermodynamics. Water flux, water chemical potential and tissue shrinkage have been taken into account in order to accurately describe the mass

Download English Version:

<https://daneshyari.com/en/article/6665662>

Download Persian Version:

<https://daneshyari.com/article/6665662>

[Daneshyari.com](https://daneshyari.com)