

Accepted Manuscript

Heat transfer during pasteurization of fruit pulps stored in containers with arbitrary geometries obtained through revolution of flat areas



Wilton Pereira da Silva, Jair Stefanini Pereira de Ataíde, Maria Elieidy Gomes de Oliveira, Cleide Maria Diniz P. S. e Silva, Jarderlany Sousa Nunes

PII: S0260-8774(17)30345-X
DOI: 10.1016/j.jfoodeng.2017.08.012
Reference: JFOE 8987
To appear in: *Journal of Food Engineering*
Received Date: 16 February 2017
Revised Date: 23 May 2017
Accepted Date: 13 August 2017

Please cite this article as: Wilton Pereira da Silva, Jair Stefanini Pereira de Ataíde, Maria Elieidy Gomes de Oliveira, Cleide Maria Diniz P. S. e Silva, Jarderlany Sousa Nunes, Heat transfer during pasteurization of fruit pulps stored in containers with arbitrary geometries obtained through revolution of flat areas, *Journal of Food Engineering* (2017), doi: 10.1016/j.jfoodeng.2017.08.012

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.

1 **Heat transfer during pasteurization of fruit pulps stored in containers with**
2 **arbitrary geometries obtained through revolution of flat areas**

3
4 Wilton Pereira da Silva*, Jair Stefanini Pereira de Ataíde, Maria Elieidy Gomes de
5 Oliveira, Cleide Maria Diniz P. S. e Silva, Jarderlany Sousa Nunes

6
7 Federal University of Campina Grande, PB, Brazil.

8 *Corresponding author: wiltonps@uol.com.br <http://orcid.org/0000-0001-5841-6023>

9
10 **Abstract**

11 Thermal diffusivity of papaya pulp, stored in metal container with arbitrary geometry
12 obtained through revolution of flat areas, was determined through optimization using
13 experimental data. To describe heat conduction during pulp pasteurization, the diffusion
14 equation in generalized coordinates was discretized and numerically solved, through the
15 finite volume method, with a fully implicit formulation. Temperature over time during
16 heating was measured by placing a thermocouple at the point of the container where the
17 equilibrium temperature occurs with greatest delay. Once the expression for thermal
18 diffusivity as a function of local temperature was known by optimization, it was
19 possible to determine, through simulation, the minimum time necessary for the pulp
20 stored in a new container, also with arbitrary geometry obtained through revolution of
21 flat areas, to come into thermal equilibrium with the pasteurization temperature.
22 Microbiological analysis performed before and after the second pasteurization showed
23 that there was a strong reduction of the total microorganisms. Since the thermal
24 equilibrium time was determined through simulation for the new container, the use of a
25 thermocouple for its experimental determination became unnecessary.

Download English Version:

<https://daneshyari.com/en/article/4908783>

Download Persian Version:

<https://daneshyari.com/article/4908783>

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