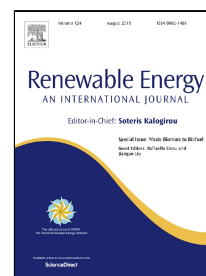


Accepted Manuscript

Experimental study and numerical modeling for drying grapes under solar greenhouse

Ilhem Hamdi, Sami Kooli, Aymen Elkhadraoui, Zaineb Azaizia, Fadhel Abdelhamid, Amenallah Guizani



PII: S0960-1481(18)30548-2
DOI: 10.1016/j.renene.2018.05.027
Reference: RENE 10079
To appear in: *Renewable Energy*
Received Date: 26 December 2017
Revised Date: 04 May 2018
Accepted Date: 05 May 2018

Please cite this article as: Ilhem Hamdi, Sami Kooli, Aymen Elkhadraoui, Zaineb Azaizia, Fadhel Abdelhamid, Amenallah Guizani, Experimental study and numerical modeling for drying grapes under solar greenhouse, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.05.027

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.

Experimental study and numerical modeling for drying grapes under solar greenhouse

Ilhem HAMDI, Sami KOOLI, Aymen ELKHADRAOUI*, Zaineb AZAIZIA, Fadhel Abdelhamid, Amenallah GUIZANI

Research and Technology Center of Energy, Thermal Processes Laboratory, Hammam Lif, B.P. 95, 2050 Tunis, Tunisia

*Corresponding author: Tel: + 216 23 962 854 , Fax: + 216 71 325 825

E-mail: elkhadraoui1987@gmail.com

Abstract

Renewable energy, in particular solar energy, is becoming world widely spread. Solar energy is a non-polluting viable and economical source used in several fields such as drying. This work presents a combined numerical and experimental study of grape drying in a mixed mode using a solar greenhouse dryer. The experimental set up consists mainly of a solar air collector and a chapel-shaped greenhouse. The experiments were carried out in two steps. First, the solar collector was tested to study its performance before being coupled to the greenhouse. Second, the system was used to perform drying experiments. The variation of the product moisture content and the principal drying parameters were analyzed. The collector efficiency with a flow rate equal to 0.05 kg/s changed between 29.63 % and 88.52 % for the drying days. The moisture content of grape was reduced to 0.22 (g water/g dry matter) from its initial moisture content of 5.5 (g water/g dry matter) in 128 hours.

A mathematical model was developed in order to simulate the system in the appropriate conditions on TRNSYS software.

The simulation results were compared to the experimental data. Also, the new model was compared with the classical one for validation purposes.

Keywords: grape, solar greenhouse mixed dryer, TRNSYS simulation.

Download English Version:

<https://daneshyari.com/en/article/6764180>

Download Persian Version:

<https://daneshyari.com/article/6764180>

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