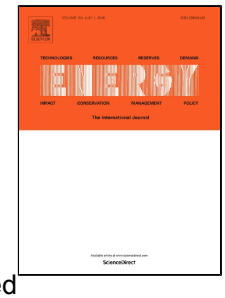
Accepted Manuscript



An investigation on solar drying: A review with economic and environmental assessment

Hisham Elhage, Amal Herez, Mohamad Ramadan, Hasan Bazzi, Mahmoud Khaled

PII:	S0360-5442(18)31043-0
DOI:	10.1016/j.energy.2018.05.197
Reference:	EGY 13032
To appear in:	*Energy*
Received Date:	25 October 2017
Accepted Date:	30 May 2018

Please cite this article as: Hisham Elhage, Amal Herez, Mohamad Ramadan, Hasan Bazzi, Mahmoud Khaled, An investigation on solar drying: A review with economic and environmental assessment, *Energy* (2018), doi: 10.1016/j.energy.2018.05.197

An investigation on solar drying: A review with economic and environmental assessment.

Hisham Elhage[1], Amal Herez[1], Mohamad Ramadan[1,2,*], Hasan Bazzi[1], , Mahmoud Khaled[1,3]

[1] International University of Beirut – PO Box 146404 Beirut – Lebanon
[2]Associate member at FCLAB, CNRS, Univ. Bourgogne Franche-Comte, Belfort cedex, France
[3]Univ Paris Diderot, Sorbonne Paris Cité, Interdisciplinary Energy Research Institute (PIERI), Paris, France

**Corresponding author:* mohamad.ramadan@liu.edu.lb

Abstract

In this paper, a review on solar drying is presented. The review comprises the main components, classifications and affecting parameters. Advantages, disadvantages and limitations of such technology are also investigated. That said, solar dryers are assessed according to three key-elements: way of air movement (passive and active), mode of transferring heat (direct and indirect, hybrid and mixed) and type of drying chamber (cabinet, greenhouse and tent). Moreover, economic and environmental studies are performed for the Lebanese case in order to assess the Payback Period (PP) and the amount of CO_2 reduction. The examined parameters are the percentage of time where solar dryer is utilized (Pr), the mass of dried food and food type. Results show that for Pr equals to 0.6, when drying 120 kg of carrots using solar dryer the amount of Saved Money (SM) is 780 $/month, PP is 10 months and the amount of CO2 emissions decreases by 6400 kg/month.