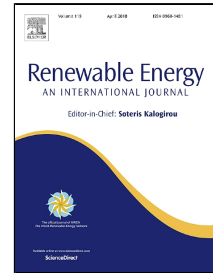


Accepted Manuscript

Experimental investigation on a solar dryer integrated with condenser unit of split air conditioner (A/C) for enhancing drying rate



M. Chandrasekar, T. Senthilkumar, B. Kumaragurubaran, J. Peter Fernandes

PII: S0960-1481(18)30119-8
DOI: 10.1016/j.renene.2018.01.109
Reference: RENE 9714
To appear in: *Renewable Energy*
Received Date: 14 November 2016
Revised Date: 19 January 2018
Accepted Date: 26 January 2018

Please cite this article as: M. Chandrasekar, T. Senthilkumar, B. Kumaragurubaran, J. Peter Fernandes, Experimental investigation on a solar dryer integrated with condenser unit of split air conditioner (A/C) for enhancing drying rate, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.01.109

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 **Experimental investigation on a solar dryer integrated with condenser unit of split**
2 **air conditioner (A/C) for enhancing drying rate**

3 M. Chandrasekar*, T. Senthilkumar, B. Kumaragurubaran, J. Peter Fernandes
4 Department of Mechanical Engineering, Anna University, BIT campus, Tiruchirappalli 620024, India
5 *corresponding author Email: shekarpunchu@yahoo.com

6 **Abstract**

7 In an indirect forced circulation solar dryer, solar thermal energy is primarily used
8 for drying the commodities while electrical energy is used for operating the blower/fan to
9 force air through the collector and drying chamber. In few applications, electrical energy
10 is also being used in auxiliary heater to speed the drying process and assist drying during
11 non sun shine hours. The aim of this research work is to eliminate the use of electricity in
12 the indirect solar dryers by utilizing split A/C condenser unit that is placed outdoors. This
13 idea will eliminate the electrical energy requirement for blower/fan to force air in the
14 drying chamber and enable to use thermal energy dissipated from split A/C system as
15 auxiliary heating source. For this purpose, an integrated solar dryer that uses hot air from
16 split A/C condenser was fabricated in house and the drying behavior of sultana grapes
17 was investigated in the present work. Drying experiments were carried out in the locality
18 of Tiruchirappalli (78.6°E & 10.8°N), Tamil Nadu, India during summer months of April
19 and May 2016. The use of split A/C condenser outlet cooling air reduced the drying time
20 of grapes by 16.7% compared with open sun drying method. A possibility of 13%
21 increase in solar dryer efficiency was demonstrated due to the integration of solar dryer
22 with A/C condenser unit compared to the conventional indirect solar dryer. From the
23 experimental results, it was found that the exponential model is capable of describing the
24 drying characteristics of seedless grapes. Predicted values of moisture ratio were in good

Download English Version:

<https://daneshyari.com/en/article/6764640>

Download Persian Version:

<https://daneshyari.com/article/6764640>

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