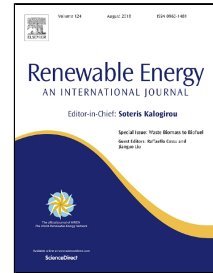


Accepted Manuscript

Development and Performance Comparison of Mixed-Mode Solar Crop Dryers with and without Thermal Storage

S. Abubakar, S. Umaru, M.U. Kaisan, U.A. Umar, B. Ashok, K. Nanthagopal



PII: S0960-1481(18)30570-6
DOI: 10.1016/j.renene.2018.05.049
Reference: RENE 10101
To appear in: *Renewable Energy*
Received Date: 22 November 2017
Accepted Date: 14 May 2018

Please cite this article as: S. Abubakar, S. Umaru, M.U. Kaisan, U.A. Umar, B. Ashok, K. Nanthagopal, Development and Performance Comparison of Mixed-Mode Solar Crop Dryers with and without Thermal Storage, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.05.049

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 **Development and Performance Comparison of Mixed-Mode Solar Crop Dryers with and**
2 **without Thermal Storage**

3 S. Abubakar^{a*}, S. Umaru^b, M.U. Kaisan^c, U.A. Umar^d, B. Ashok^e, K. Nanthagopal^f

4 ^{a,b,c,d}Department of Mechanical Engineering, Ahmadu Bello University, Zaria.

5 ^{e,f}Department of Automotive Engineering, VIT University, Vellore, India.

6 *Corresponding author's e-mail address - abubakarshitu88@gmail.com

7
8 **ABSTRACT**
9

10 The major shortcoming of multiple trays cabinet dryer is uneven drying of the products being
11 dried on different trays. Mixed-mode solar crop dryers with and without thermal storage
12 materials were developed and tested under the same meteorological conditions of Zaria, Nigeria.
13 The dimensions of the dryers were: 0.65 m, 0.30 m², 0.9 m, 0.7 m, 1.64 m and 0.43 m for
14 collector length, collector area, the height of the drying chamber, chimney height, length of the
15 drying chamber and width of the drying chamber respectively. It was observed that the average
16 drying rates, collector efficiencies, and drying efficiencies of the solar crop dryers with and
17 without thermal storage for June and August 2016 test period are 2.71×10^{-5} kg/s and $2.35 \times$
18 10^{-5} kg/s, 67.25% and 40.10 %, 28.75 % and 24.20% respectively. As per the experimental
19 results, the efficiency of the dryer with the storage materials is enhanced by about 13 % due to
20 the thermal storage used. The extent of the variation of the drying products on different trays was
21 investigated using statistical t-test analysis. The *p*-values obtained revealed that there was no
22 significant difference between the drying rates of the yam slices on different positions of the
23 trays.

24 **Keywords:** air flow distribution, mixed-mode solar dryer, performance evaluation.
25
26
27
28

Download English Version:

<https://daneshyari.com/en/article/7460630>

Download Persian Version:

<https://daneshyari.com/article/7460630>

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