

Impact factor: **0.477**ISSN Print: **1064-2285**
ISSN Online: **2162-6561****Buy Now****Volumes:**

Volume 47, 2016

Volume 46, 2015[Issue 1](#)[Issue 2](#)[Issue 3](#)[Issue 4](#)[Issue 5](#)[Issue 6](#)[Issue 7](#)[Issue 8](#)[Issue 9](#)**[Issue 10](#)**[Issue 11](#)[Issue 12](#)[Volume 45, 2014](#)[Volume 0, 2014](#)[Volume 44, 2013](#)[Volume 43, 2012](#)[Volume 42, 2011](#)[Volume 41, 2010](#)[Volume 40, 2009](#)[Volume 39, 2008](#)[Volume 38, 2007](#)[Volume 37, 2006](#)[Volume 36, 2005](#)[Volume 35, 2004](#)[Volume 34, 2003](#)[Volume 33, 2002](#)[Volume 32, 2001](#)[Volume 31, 2000](#)[Volume 30, 1999](#)[Volume 29, 1998](#)[Volume 28, 1997](#)**Heat Transfer Research**DOI: 10.1615/HeatTransRes.2015007463
pages 923-935**PREDICTION OF THE RATE OF MOISTURE EVAPORATION FROM JAGGERY IN GREENHOUSE DRYING USING THE FUZZY LOGIC****Om Prakash***Department of Mechanical Engineering, Birla Institute of Technology, Mesra, Ranchi, Jharkhand, India***Anil Kumar***Department of Energy, Maulana Azad National Institute of Technology, Bhopal, M.P., India***Ajay Kumar Kaviti***Department of Mechanical Engineering, Sagar Institute of Science and Technology, Gandhinagar, Bhopal, M.P., India***P. Vishwanath Kumar***Institute of Fronter Materials, Deakin University, Waurn Campus, 3216 Australia***ABSTRACT**

In this study an attempt has been made to predict the rate of moisture evaporation by natural and forced convection from jaggery in a controlled environment. For this purpose, we have adopted simulating software called Fuzzy logic in MATLAB software (Version 7.0.1). Initially the input values from the literature, namely the jaggery temperature (T_j), surface temperature (T_s), and the relative humidity (RH), were taken corresponding to different jaggery dimensions ($0.03 \times 0.03 \times 0.01 \text{ m}^3$, $0.03 \times 0.03 \times 0.02 \text{ m}^3$, and $0.03 \times 0.03 \times 0.03 \text{ m}^3$) with a total quantity of jaggery of a (0.75 kg and 2.0 kg) that are fed in the software tool box and the output values of moisture evaporation (me) were predicted. These values were compared with the experimental values and it was seen that there is close accuracy between the values. The results from this investigation indicate that the Fuzzy tool predicts the moisture evaporation rate with an absolute error varying from no error in the case of a jaggery piece of dimensions $0.03 \times 0.03 \times 0.01 \text{ m}^3$ to a maximum error of 0.27 for a jaggery piece of 2 kg and of dimensions $0.03 \times 0.03 \times 0.02 \text{ m}^3$ in the forced convection mode. The values of root mean square error and coefficient of determination are calculated and they are found to be 0.112 and 0.986, respectively. Thus it is concluded that the Fuzzy logic can be used to accurately predict the results with a minimum error and the present model can be extended to different places corresponding to different weather conditions, namely ambient temperature, solar radiation, and relative humidity.

KEY WORDS: jaggery, Fuzzy logic, greenhouse drying, evaporation, convection[Purchase \\$45.00](#)[Check subscription](#)[Download MARC record](#)[Add to Citation Manager](#)