عنوان مقاله:

Drying Kinetics of Muscat Grapes in a Solar Drier with Evacuated Tube Collector

محل انتشار:

ماهنامه بین المللی مهندسی, دوره 27, شماره 5 (سال: 1393)

تعداد صفحات اصل مقاله: 8

نویسندگان:

ar Umayal Sundari - *Department of Physics, A.V.V.M. Sri Pushpam College, Thanjavur, India*

p Neelamegam - *School of Electrical and Electronics Engineering, SASTRA University, Thanjavur, India*

c.v Subramanian - *Department of Architecture, Periyar Maniammai University, Thanjavur, India*

خلاصه مقاله:

A solar drier assisted with evacuated tube collector is designed and developed to study and examine the drying Kinetics of muscat grapes in Thanjavur, Tamilnadu, India. During the drying period, temperatureat various places, relative humidity, wind velocity and mass of the sample are measured on hourly basis.The outlet temperature of the collector and temperature within the chamber varies from 74-130 ºC and 50- 87 ºC respectively, while the ambient temperature ranges from 29.5-33.2 ºC. Solar insulation recorded during these days ranges from 155.6-1115 W/m2. The designed drier takes 14 hours to reduce themoisture content of muscat grapes from 78% to 9.5% (wb) to ensure safe storage. It is found that thewhole drying process exists in falling-rate period. The maximum drier efficiency for muscat grapes is found to be 29.92% during the drying period. Six thin-layer drying models have been used to fit the experimental moisture ratio obtained for muscat grapes by nonlinear regression analysis using IBM SPSS 20 statistical package. According to the results, Page model shows a good fit with highest correlation (R2 = 0.991), lowest reduced chi-square (χ2 = 0.001) and lowest root mean square error (RMSE = 0.0297).

کلمات کلیدی:

Solar Drier,Evacuated Tube Collector,Muscat Grapes,Drier Efficiency,Thin-Layer Drying Model,Moisture Ratio