

Mathematical Modeling of Moisture Transport of Date Palm (*V. Barhee*) during Drying

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Abstract

Introduction: Drying influences physicochemical and quality characteristics of products. In this research, date palm, as an important, Iranian agricultural crop, has been studied during drying process.

Materials and Methods: Date palms (*V. Barhee*) in khalal stage, with and without skin, were dried in single layer at the different air temperatures of 60, 70 and 80 °C and air velocity of 1.5 m/s in a cabinet dryer. A numerical model was developed to simulate two-dimensional moisture transfer during single layer drying of dates in the base of Fick's second law of diffusion by finite difference method on MATLAB software.

Results: The predicted water loss content was validated by comparison with the experimental values ($r > 0.99$). The results indicated that this model, firstly, describes well the mechanisms of moisture diffusion in a two-dimensional transfer during drying of date palms and, secondly, it is appropriate to be applied for prediction of moisture profiles and water loss during drying.

Conclusion: The numerical, developed may be used to predict the moisture transport phenomena of date palm during drying, in order to control the process and produce high quality products.

Keywords: Barhi Variety, Date Palm, Drying, Modeling, Moisture Transport.

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