

Alternative Energy

Edited by

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Chapter 6

Solar Drying of Guavas, Papayas and Apples

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Abstract

This paper includes the results of a study carried out to determine the drying characteristics of three agricultural fruit products. The products used in this analysis were apples, guavas and papayas. The drying characteristics of the three products were investigated under different operating conditions by varying flow velocities and the thickness of the specimens. An experimental solar dryer was built to conduct tests on different samples. Tests were carried under both natural and forced convection conditions. Different meteorological conditions were considered in the experiments. A analytical model, based on Fick's second law of diffusion, was used to determine the effective diffusion coefficients of the three products. The diffusion coefficients were obtained from the slope of $\ln(w/w_0)$ against t/L^2 . It was found that the diffusivities of apples, guavas and papayas range between 5.74×10^{-12} and 8.61×10^{-10} m^2/s . It was also observed that shrinkage occurred in the above three specimens during drying. This effect was taken into account and a correction factor for thickness, L , was introduced.

INTRODUCTION

The recent concern about environment and the depletion of conventional energy resources has provided in the last three decades considerable impetus for research and development in the area of alternative energy resources. This may be attributed to a great demand for energy resources, as the world population increases steadily with unprecedented technological development, and persistent effort to keep the environment clean for the future generations. As a result, considerable research and development have