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Determination of Natural Logarithm of Diffusion Coefficient and Activation Energy of Thin Layer Drying Process of Ginger Rhizome Slices

Authors : Austin Ikechukwu Gbasouzor, Sam Nna Omenyi, Sabuj Malli

Abstract : This study is an extension of the previous work done with ARS-680 Environmental Chamber. Drying is a complex operation that demands much energy and time. Drying is essentially important for preservation of ginger rhizome. Drying of ginger was modeled, and then the effective diffusion coefficient and activation energy where determined. For this purpose, the experiments were done at six levels of varied temperature ranging from (10, 20, 30, 40, 50, 60°C). The average effective diffusion coefficient for their studies samples for temperature range of 40°C to 70°C was 4.48 x10-10m²/s, 4.96 x10-10m²/s, and 5.31 x10-10m²/s for 0.8, 1.5 and 3m/s drying air velocity respectively. These values closely agreed with the values of effective diffusion coefficients obtained in these studies for the variously treated ginger rhizomes and test conducted.

Keywords : activation energy, diffusion coefficients, drying model, drying time, ginger rhizomes, moisture ratio, thin layer
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