THE KINETICS AND SPECIFC ENERGY CONSUMPTION OF MELON SEEDS DRYING

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**Abstract:** Drying models were developed to predict the drying characteristics of melon seeds at various air temperature, velocity, and relative humidity. To achieve this, a laboratory model dryer was developed and instrumentally equipped to determine the effect of drying conditions on the measured parameters such as drying rate constants and effective diffusion coefficient. The drying rate decreased with increases in drying time and air temperature. The moisture diffusivity was found to increase with air temperature and velocity, which follows the trend for most agricultural and food materials. The moisture diffusivity of serewa variety was observed to vary from 4.194×10–13 m2/s at the air velocity of 1.3 m/s and air temperature of 29°C to maximum of 2.108× 10–10 m2/s at the air velocity of 1.3 m/s and air temperature of 55°C. The specific energy consumption for drying the seeds were 1.209 x 1010, 5.04 x 1010, 8.085 x 1010 and 1.752 x 1010,J/kgwater, for temperatures of 40, 50, 55, and 60 oC respectively. Thermal efficiency of the drying system increased from 12% up to 51.96% in the temperature range of 29 oC to 55 oC after which it began to fall, while the pick-up efficiency was 26%.

Keywords: Dryer, models, drying kinetics, rate constants, moisture diffusivity