

The objective of this study was to simulate longan fruit drying with and without potassium chlorate treatment, using diffusion models and a mathematical model. The apparent diffusion coefficient in the diffusion model is an important parameter that affects the drying rate of the fruit and the energy consumption. Drying experiments using E-dor longan grown at the same locality of diameters of 25-30 mm, with initial moisture content of 270-290% dry basis and final moisture content of 18% dry basis were performed to determine the effects of the variables. The drying air temperature varies between 50-90°C and the air speed was 0.7 m/s. It was found that the apparent diffusion coefficient increased with the increase of drying air temperature. The apparent diffusion coefficient of longan drying with potassium chlorate treatment was found to be higher by 5-15% than that without the treatment. The diffusion models were developed with Arrhenius-type equation and the apparent diffusion coefficient was used in the equation as a function of the drying air temperature.

The mathematical model consists of a set of drying kinetic equations, heat and mass balance equations, and properties of moist air equations. It was developed at near equilibrium

conditions. The model simulates the operating condition for longan drying with the drying air temperature of 70-80°C, initial moisture content of 280% dry basis, final moisture content of 40% dry basis, diameter of 25 mm and the specific air flow rate of 25-30 kg dry air/h-kg dry longan. The simulation shows that the specific energy consumption of longan drying with potassium chlorate treatment was less than that without the treatment by 1-3%.