The objectives of this research were to study the theoretical drying kinetic equation of longan flesh drying and to develop diffusion models. Effective diffusion coefficient was determined by regression analysis of the experimental data to the drying kinetic equation. Numerical method based on finite difference was applied for solving drying kinetic equation. Modifying the Arrhenius factor and/or energy of activation as a function of product moisture content developed three alternative diffusion models. The volume shrinkage of Logan flesh during drying was also considered. Models 1 and 2 were established by modifying the Arrhenius factor as a second-degree polynomial and an exponential function of product moisture content, respectively. In Model 3, not only the Arrhenius factor but also the energy of activation was modified as a function of product moisture content. The effective diffusion coefficients obtained from each model were compared. It was found that Model 2 gave the maximum value of $R^2$ and the lowest value of mean residual square. Also, by comparing the moisture ratios calculated from each model with experimental results, it could be concluded that the drying kinetic curve calculated using Model 2 was recommended.