

Abstract

In order to simulate the respiration rate of fresh produce during transport, retailing and storage, a respiration model for time and temperature dependence was developed. First, a model for time, based on the enzyme kinetics, was derived at a constant temperature. Next, temperature dependence of the model parameters was evaluated using an Arrhenius plot, and the model incorporating both temperature and time dependence was developed. To verify the model, the respiration rates of eggplant, asparagus, and broccoli were measured at changing temperatures (25 to 10 to 20 to 10 to 25 °C) with time. The results indicated that the model simulation was valid and the model was able to represent the respiration process. In other words, the predicted values by using this model agreed well with the experimental data. The model is expected to be available for rough estimation of sugar consumption during distribution.