Effect of oxygen absorber concentration and temperature on enzyme kinetics–based respiration rate modeling of mango (cv. *Amrapali*)

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Abstract

Various experiments were conducted at different storage temperatures and oxygen absorber concentrations to assess the effect of oxygen absorber and temperature on enzyme kinetics–based respiration rate model of mango (cv. *Amrapali*). Using the principle of enzyme kinetics and the Arrhenius equation, a model was proposed for predicting the respiration rates of mango as a function of O_2 and CO_2 concentrations with time at a given storage temperature and oxygen absorber concentration. The respiration data were generated using a closed system method. The model parameters calculated from the respiration rate at different O_2 and CO_2 concentrations were correlated with different storage temperatures using the Arrhenius equation. The activation energy and pre-exponential factors of the Arrhenius equation were used to predict the model parameters at any temperature between 10 and 37 °C and at any oxygen absorber concentration (0cc, 50cc, 100cc, and 150cc). In this model, the dependence of respiration rate on O_2 and CO_2 was found to follow the uncompetitive type inhibition. The model parameters were found to be significantly affected by oxygen absorber concentration, and storage temperature. The models were tested for their applicability by validating at 27 °C along with 75cc oxygen absorber and found to be in good agreement with the experimentally observed respiration rates.