

## **Abstract**

An attempt is made to explain why the apparent activation energy of respiration of fresh produce is negative at the higher temperatures of 40–50 °C. We assumed that maintenance of respiratory enzyme function was reduced at high temperatures, but the activity of the individual enzymes was not changed. In this study, experiments for testing the assumption were carried out to examine the influence of high temperature (50 °C) on the Arrhenius parameters of respiration rate. As a result, for asparagus and broccoli, the apparent activation energy of the respiratory reaction barely changed. However, the pre-exponential factor decreased with increasing exposure time at 50 °C. The apparent activation energy is defined as the minimum kinetic energy that reactants must have to form products and the pre-exponential factor reflects the frequency of interaction between reactants. Considering that the respiratory reaction is composed of many different enzyme reactions, the apparent activation energy and pre-exponential factor of the respiratory reaction reflect the activation energy of the enzyme reaction and the concentration of enzyme, respectively, under conditions of enriched oxygen and respiratory substrate. Therefore, the results for asparagus and broccoli in this study support our assumption. Also, a temperature of 50 °C is proposed to reduce the quantity of respiratory enzyme, with no affect on the apparent activation energy of enzyme reaction when the produce is heated to 50 °C.