

Title Relationship between respiration activity and ascorbic acid content in spinach leaves at various temperature conditions

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Citation ISHS Acta Horticulturae 712: 817-822. 2006.

Keywords Fresh-cut; respiratory activity; quality; modeling

Abstract

Recently, the internal qualities of fresh produce are increasingly important and a reliable predictive quality model has become more necessary. In order to construct a mathematical model for predicting quality of postharvest fresh spinach, we measured the respiration rate (as carbon dioxide production rate) and ascorbic acid content under storage condition at 5, 10, 20 and 30°C. Relative ascorbic acid content (AsA_{rel}) obtained in all temperature conditions were plotted versus corresponding accumulated amount of respiratory activity (A_{RCO_2}) which was calculated by integrating the respiration curve at each measuring point. This graph pattern illustrated that AsA_{rel} in all storage temperature decreased exponentially as a function of A_{RCO_2} . The more A_{RCO_2} (as the higher CO_2 production rate) was, the higher the rate of loss of AsA_{rel} . We could successfully express such quantitative relationship by exponential equation with the same degradation constant rate of $3.464 \times 10^{-5} \pm 0.156 \times 10^{-5}$ ($R^2 = 0.89$). This finding suggests that A_{RCO_2} could be a useful guide parameter to predict the remaining ascorbic acid in spinach leaves during storage at various temperature conditions ($R^2 = 0.90$).