

Abstract

The characterization of the internal atmosphere composition offers the potential to explain in response of horticultural products to modified atmosphere treatments and quantify permeance of skin to respiratory gases. Stem skin permeance to O₂ (β_{O_2}) and CO₂ (β_{CO_2}) were determined as a function of temperature and relative humidity. Surface chamber close to equilibrium with the stem's internal atmosphere was used to monitor internal atmosphere composition of prickly per cactus stems. Physical equilibration of chamber contents over fruit surface was completed in approximately 4 hours. However, physiological changes in the composition of internal atmosphere meant that substantial changes continued to develop for a prolonged period of time. β_{O_2} decreased in greater proportion than β_{CO_2} at high relative humidity, and as a result an inversely proportional between permeance to gases and the relative humidity was determined. β_{H_2O} also decreased as relative humidity increased. The Arrhenius model described humidity on skin permeance $\beta_x = (A \cdot HR^B + C) \cdot 1/T$. Surface chamber adhered to stem surface was adequate to quantify the composition of the atmosphere in direct contact with the stem cells.