Abstract

Respiration rate (R_{02}) of prickly pear cactus stems (*Opuntia* spp.) was measured as a function of four temperature (T) and 6 relative humidity (RH) combinations for O_2 partial pressures between 15 and 0.8 kPa, which were considered to support aerobic respiration. The rate of respiration (R_2) was determined based on O_2 depletion of the atmosphere in sealed containers containing 1 kg of stems. The O_2 partial pressure declined linearly over time and the slopes of the fitted lines were used to calculate the rate of O_2 uptake. The rate of O_2 uptake increased with increasing temperature and decreased with increasing relative humidity. The respiratory rate at 25ºC was approximately 30 to 40 times higher than at 5ºC. The respiratory rate at 65% RH was between 30 and 90% greater than at 90% RH, depending on the temperature. Data for $In(R_{02})$ for each RH level were regressed against the inverse of the temperature (K^{-1}) to determine. Arrhenius constants and calculate the apparent Ea of respiration for the six RH conditions. The Ea was similar for each RH level, varying between a low of 113 to a high of 131 kJ-mole$^{.1}$. An equation having an R^2 of 0.95 was developed describing respiration as a function of RH and temperature (ºC) using only four constants.