

Title Physical and visual properties of grape rachis as affected by water vapor pressure deficit
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Abstract

Rachis browning of table grapes after harvest is a significant problem, and water loss is considered the primary factor in browning. The major rachis desiccation and browning occurs during marketing at ambient temperatures and relative humidity (RH) which create high water vapor pressure deficits (WVPD). In this study the effect of WVPD and its components on rachis browning were examined on the two white seedless cultivars 'Superior' and 'Thompson'. The grape clusters were stored at 20 °C or at 10 °C with low (70%) or high (>95%) RH, thus creating 4 WVPD levels. At each WVPD the clusters were held in open punnets, punnets sealed with low density polyethylene film or microperforated polyethylene, and examined every 2 or 3 d for weight loss, berry firmness, rachis dry weight and subjective rachis index. In addition, the rachis were photographed and image analysis employed to identify the level of browning. The results show that image analysis gave very similar patterns to subjective evaluation of rachis browning with correlation coefficients up to 0.90. However, image analysis detected an increase in browning before subjective evaluation. There was poor overall correlation between cluster weight loss and rachis dry weight to browning for 'Superior' grapes but a good correlation for 'Thompson'. Rachis of 'Superior' suffered extensive browning at 20 °C even at high RH while rachis of 'Thompson' remained relatively green under similar conditions. 'Thompson' grape rachis remained green during the entire examination period (11 d) when held at high RH in either 10 °C or 20 °C. At high WVPD, microperforated packaging offered better control of browning in 'Superior' grapes than closed packaging, while clusters of 'Thompson' retained green rachis after 4 d in open punnets, and after 7 d in covered punnets. In summary, detailed analysis of rachis browning shows that water loss is an important but not the only factor in browning. Quantitative and objective measurement of rachis browning is likely to facilitate better communication of experimental data and higher resolution of processes which lead to browning.