

The quality of Gold Queen Hami melons stored under different temperatures

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Abstract

Low temperature storage prolongs the postharvest life of various fresh fruits and vegetables. However, the actual storage temperature may also significantly influence fruit and vegetable quality. In the present study, we stored Gold Queen Hami melons at three different temperatures [21 °C (control), 3 °C, and 0.5 °C (0 ± 0.5 °C)] for 36 days. The humidity for all three temperatures conditions was between 75% and 85%. The results indicated a correlation between chilling injury in Gold Queen Hami melons and storage temperature and time. Different degrees of chilling injury in Gold Queen Hami melons were observed after storage at 3 °C and 0.5 °C, whereas these were detected later when stored at 21 °C. In addition, the rotting rate, weight loss rate, and chilling injury index at 3 °C were significantly lower compared to that at 0.5 °C storage temperature. Compared to other temperatures, storage at 3 °C was associated with a delay in fruit rotting, sustained high fatty acid desaturase and adenosine triphosphatase (ATPase) activity, a decrease in lipoxygenase activity, enhanced cold resistance, and extended total storage period. At 21 °C, no chilling injury was observed, although extensive weight loss and high rotting rates were detected. Moreover, two highly expressed genes, namely, *JhMYB24* and *JhMYB48*, were screened and selected from the Gold Queen Hami melon transcriptome database. Real-time PCR analysis showed that the expression of *JhMYB24* and *JhMYB48* continuously increased under cold stress and peaked at the 18th day of cold storage. The expression of *JhMYB24* and *JhMYB48* at 3 °C was significantly higher than that at 0.5 °C or 21 °C. Together, our results demonstrate that regulating enzyme activity and upregulating the expression of *JhMYB24* and *JhMYB48* alleviate cold stress in fruits stored at 3 °C, thereby maintaining high fruit quality.