

# High relative humidity (HRH) storage alleviates chilling injury of zucchini fruit by promoting the accumulation of proline and ABA

Xiaoxia Zuo, Shifeng Cao, Meng Zhang, Ziwei Cheng, Tingting Cao, Peng Jin and Yonghua Zheng

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## Abstract

In order to investigate the effect of water loss on the different physiological metabolism of zucchini fruit under cold stress after harvest, two cold rooms (4 °C) with different relative humidities (RH:  $74 \pm 2\%$  and  $98 \pm 2\%$ ) were used for cold storage. The result suggested that high relative humidity (HRH) storage slowed down the increase of weight loss, chilling injury index, malondialdehyde (MDA) content and cell death rate and maintained the postharvest quality such as firmness and flesh color in zucchini fruit. HRH storage promoted the accumulation of proline and induced higher ornithine  $\delta$ -aminotransferase (OAT),  $\Delta$ -1-pyrroline-5-carboxylate synthetase (P5CS) enzyme activities and lower proline dehydrogenase (PDH) enzyme activity as compared with low relative humidity (LRH) storage. The content of putrescine (Put) accumulated with the progress of cold damage, which could be delayed by HRH storage due to higher activities of polyamine oxidase (PAO), diamine oxidase (DAO) and ornithine decarboxylase (ODC). Besides, chilling stress induced the biosynthesis of abscisic acid (ABA) during storage and the zucchini fruit stored in high RH with less water loss showed more accumulation of ABA and higher activity of abscisic acid aldehyde oxidase (AAO) compared to zucchini fruit stored in low RH with severe dehydration during long-term cold storage. Taken together, our results suggested that the high RH storage could reduce water loss and alleviate chilling injury in zucchini fruit after harvest by promoting the accumulation of ABA and proline.