

Title Respiration, hydrogen peroxide levels and antioxidant enzyme activities during cold storage of zucchini squash fruit

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Abstract

Steady-state levels of hydrogen peroxide and activities of catalase and peroxidase were measured in the peel and pulp of zucchini squash (*Cucurbita pepo* L., cv., Giambo) during storage at 10 °C or 0 °C for two weeks. No visible damage occurred during this storage time; epidermal brown pits become visible later, at day 20 in fruit stored at 10 °C and at day 15 in those stored at 0 °C. In order to analyze the early effects of the chilling-induced oxidative stress during zucchini storage, rates of succinate oxidation, alternative oxidase activity, membrane fluidity and phospholipid composition were also measured in mitochondria isolated from the zucchini pulp. A decrease in hydrogen peroxide levels, an increase in the activity of detoxifying enzymes, a recovery of chilling-induced mitochondrial membrane fluidity and an increase in alternative oxidase (AOX) activity were detected in the early stages of zucchini storage at 10 °C. The peroxidase and the AOX activities of the pulp of zucchini stored at 0 °C were also found to increase but to a lesser extent and later during storage, suggesting that these fruit can also activate these ROS regulatory systems, possibly preventing the occurrence of early visible damage in the peel but not the occurrence of cold stress.