Immediate- and long-term proteomic responses of epicarp from two heat conditioned tangor cultivars stored at low temperature differing in their susceptibility to infection

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Abstract

Citrus is one of the most relevant horticultural crops worldwide. Among them, tangors are highly appreciated by their distinctively taste and aroma. However, both mandarins and tangors are especially susceptible to cold storage. Low temperature storage is generally used to delay fruit decay and reduce pathogen attack during the postharvest period and is necessary for long overseas transport to distant markets. Fruit quality can be protected by different physical methods aimed at improving the response to cold stress, such as heat treatment (HT). These strategies are also fostered as an environmentally sound option to the use of fungicides. The present work derives from previous studies in which metabolic profiling of two tangor varieties was related with their divergent performance after heat treatment and during postharvest cold storage. That work has been expanded and complemented by the study of the proteome of both type of fruit after heat treatment (HT), followed by 7 d of cold storage, in comparison with non-treated fruit. In contrast to Murcott, Ellendale accomplished an important adjustment of its protein contents when exposed to HT. Immediately after HT and at the beginning of postharvest storage at low temperature, proteome changes suggest that a metabolic shift of carbon toward the enhancement of protective mechanisms (such as the antioxidant system, membranes and protein structure protection and cell wall reinforcement), takes place in the less pathogen susceptible variety. Other defensive mechanisms involving nuclear and mitochondrial DNA preservation or auxin inactivation throughout the postharvest period are further discussed.