Title Crucial roles of membrane stability and its related proteins in the tolerance of peach fruit to chilling injury

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Abstract

Proteome patterns in peach fruit (*Prunus persica* L.) stored at different low temperatures were examined in order to gain a better understanding why peach fruit is less prone to chilling injury when stored at 0°C than at 5°C. Some differently expressed proteins in peach fruit stored at 0 and 5°C were identified using electrospray ionization quadrupole time-of-flight tandem mass spectrometry. Among these proteins, four membrane stability related proteins, i.e., enolase, temperature-induced lipocalin, major allergen Pru p 1, and type II SK2 dehydrin were enhanced, but three proteins related to phenolic compounds metabolization, cinnamyl-alcohol dehydrogenase 5, cinnamyl-alcohol dehydrogenase 1, and chorismate mutase, were repressed in peach fruit at 0°C as compared to that at 5°C. The abundance of glucose-6-phosphate dehydrogenase, NADP-dependent isocitrate dehydrogenase, and NADP-denpendent malic enzyme, which catalyze the reactions during sugar metabolism and energy pathways, was found to decrease in peach fruit stored at 0°C. In addition, our data revealed that low temperature of 0°C might regulate the endogenous H_2O_2 level, resulting in activating the transcriptional level of genes encoding the proteins related to membrane stability. These results provide a comprehensive knowledge to understand the mechanisms by which peach fruit stored at 0°C showed a higher chilling tolerance than that at 5°C.