Contribution of several fruit quality factors and mineral elements to water-soaked brown flesh disorder in peaches

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Abstract

Water-soaked brown flesh disorder in peach [*Prunus persica* (L.) Batsch] fruit is a known physiological disorder which can affect the economic value of peach crops. The disorder is more severe in high-quality fruit when maturity and/or ripening advanced. Principal component analysis (PCA) of fruit with different qualities and mineral concentrations showed that factors contributing to the first component (PC1) were total soluble solids (TSS), fruit weight, pH, B and Ca concentrations, the ratios of Ca:K, Ca:Mg and Ca:(Mg + K), and the severity of the disorder. Firmness was not grouped in PC1. When firmness was low, the disorder appeared in fruit with high TSS (> 15 %) and low Ca concentration (< 24 mg kg^{-1} FW). $CaCl_2$ application significantly increased Ca concentration in the fruit and reduced the symptoms of the disorder. A bagging treatment to minimize fruit transpiration significantly decreased the Ca concentration during the growing period and in the apoplast of the flesh at harvest, resulting in increased symptoms of the disorder. These results indicated that as well as fruit quality factors, such as TSS, pH and fruit weight, Ca concentration is involved in this disorder. Because the contribution of Ca was not strong compared to the other factors, the effect of Ca on the disorder should be considered in terms of its relationships with other contributing factors, such as the condition of the tree and its environment.