

Title Reduction of pomegranate chilling injury during storage after heat treatment: Role of polyamines

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Abstract

Pomegranate fruit (*Punica granatum* L.) were heat-treated by hot water dip at 45 °C for 4 min, and then stored at 2 °C for 90 days. Fruit immersed in distilled water at 25 °C for 4 min served as controls. Samples were taken every 15 days followed by 3 days at 20 °C. Pomegranates developed chilling injury, manifested as increases in skin browning and electrolyte leakage, which were highly correlated. The severity of damage in control fruit was related to softening and loss of fatty acids with a concomitant reduction in the ratio of unsaturated/saturated fatty acids during storage. These chilling injury symptoms were slightly, but significantly reduced in heat-treated pomegranates. In addition, the heat treatment induced increases in free putrescine and spermidine during storage, which could have a role in the lower rate of fruit softening and in the diminution of chilling injury severity. These higher polyamine levels as well as maintenance of the unsaturated/saturated fatty acid ratio during storage could account for the maintenance of membrane integrity and fluidity. Thus, heat treatment could induce tolerance mechanism to low temperature through stimulation of polyamine biosynthesis.