

Intermittent warming as an efficient postharvest treatment affects the enzymatic and non-enzymatic responses of pomegranate during cold storage

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Abstract

Limited shelf life of pomegranate makes its cold storage necessary. On the other hand, it encounters chilling injury (CI) incidence at temperatures below 5 °C. Intermittent warming (IW), known as one or more warming periods during cold storage, is a beneficial postharvest treatment for keeping fruit quality. Pomegranate ‘Rabab-e-Neyriz’ fruit were stored at 2 ± 0.5 °C (chilling temperature) and $90 \pm 5\%$ relative humidity (RH) for 70 days. IW was performed as one warming period by transferring the fruit to a warm room (1 day at 20 °C with 70% RH). The experimental design was factorial based on a complete randomized design. Experimental factors included 4 temporal points of interruption in storage, i.e., 15th, 25th, 35th or 45th days of storage; 2 levels of warming regime for each interruption date, i.e., warming and control; and 2 levels of sampling time, i.e., immediately after treatment or postponed until the end of the storage period. Treated fruit were compared to controls twice, immediately after treatment and at the end of the storage period. Warming on the 15th day of storage led to higher enzymatic antioxidant activity and phenolic content coincided with lower polyphenol oxidase (PPO) activity in the peel and, as a result, lower chilling injury (CI) damage to the treated fruit compared to control. It was concluded that a successful and commercially applicable method for postharvest cold storage of pomegranate could be the only one warming period prior to the incidence of irreversible damage.