Title Development and control of scald on wonderful pomegranates during long-term storage

Author Bruno G. Defilippi, Bruce D. Whitaker, Betty M. Hess-Pierce and Adel A. Kader

Citation Postharvest Biology and Technology, Volume 41, Issue 3 , September 2006, Pages 234-243

Keywords *Punica granatum*; Physiological disorder; Controlled atmosphere; 1-MCP; DPA

Abstract

Scald of the husk surface is an important factor limiting long-term storage of pomegranates and little information is available about its cause and methods of control. We evaluated the efficacy of prestorage treatment with diphenylamine and/or 1-methylcyclopropene and of atmospheric modification during storage on scald incidence and severity on Wonderful pomegranates.

Scald incidence and severity were greater on pomegranates harvested during late season than on those harvested during mid season, indicating that this disorder may be associated with senescence. All pomegranates from both harvests that were kept in air exhibited some scald after 4–6 months at 7 °C. Neither diphenylamine, at 1100 or 2200 μL L^{-1}, nor 1-methylcyclopropene at 1 μL L^{-1}, alone or together reduced scald incidence and severity. In contrast, the three controlled atmosphere (CA) storage conditions tested (1 kPa O_2, 1 kPa O_2 + 15 kPa CO_2 and 5 kPa O_2 + 15 kPa CO_2) significantly reduced scald incidence and severity on pomegranates from both harvest dates for up to 6 months at 7 °C. However, the two CA treatments with 1 kPa O_2 resulted in greater accumulation of fermentative volatiles (acetaldehyde, ethanol, and ethyl acetate) than the CA treatment with 5 kPa O_2, especially in the mid-season-harvested pomegranates. In addition to its fungistatic effects, 15 kPa CO_2 appears to be critical for inhibition of scald development on pomegranates. These results confirm recommendation by Hess-Pierce and Kader (2003) of 5 kPa O_2 + 15 kPa CO_2 (balance N_2) as the optimal CA for pomegranates at 7 °C and 90–95% relative humidity. Since very little if any α-farnesene or its conjugated trienol oxidation products were found in the peel of pomegranates, it appears that the biochemical basis of scald in pomegranates is different from that in apples. CA storage (5 kPa O_2 + 15 kPa CO_2) decreased or prevented changes in carotenoid, acyl lipid, and phenylpropanoid metabolism that were associated with scald development in stem-end peel tissue of air-stored fruit and are indicative of stress and/or senescence.