Abstract

Trials were conducted during three seasons (2002-2004) to determine optimal timing for a second DPA application(between 2 and 6 months after storage), for control of superficial scald on apples and to evaluate the use of thermofogging for this purpose. During the first season, Granny Smith apples from two orchards (early and late harvested), were subjected to different DPA treatments and stored in either regular air (RA, 0ºC) or controlled atmosphere storage (CA, 1.8-2%O_2 and 1.3-1.5%CO_2). Initial DPA treatment was applied immediately after harvest by drenching at a commercial packinghouse. DPA was reapplied 2, 4 or 6 months later either by dipping or fogging. DPA fog was applied to fruit that had been placed in a refrigerated trailer (0ºC) using a canister containing DPA powder formulation that was ignited. Fruit was transferred to the respective store rooms 24 hours later. The second season, thermofogging was used for initial treatment and for reapplication of DPA to Granny Smith, Fuji, and Braeburn apples. Treatments were applied using a Xeda Electrofog to fruit both in refrigerated trailers and in commercial CA storerooms. In the third season, effect of DPA reapplication at 2 or 3 months after harvest on superficial scald was further examined in Granny Smith apples under RA that had been harvested at two dates (early and late harvest). DPA was applied by dipping. In all trials, scald incidence (%) and severity was evaluated, at 6 or 8 months after harvest and plus 10 days at room temperature. Samples were drawn periodically for DPA residue analyses. At harvest and monthly thereafter, evolution of scald related compounds (a-famesene, conjugated trienes and antioxidant capacity) were analyzed and related to scald incidence. Reapplication of DPA was consistently effective at reducing scald development in susceptible fruit, especially when applied after two or three months of storage. Furthermore, reapplication decreased phytotoxicity. Scald incidence was positively correlated a-farnesene and conjugated trienes concentrations, especially those absorbing at 28l nm. Thermofogging was capable of raising DPA residues in the fruit when applied after two or three months of storage, which resulted in reducing final scald. It has the advantages of direct application in storage (feasibility of more than one treatment), a uniform distribution in the fruit, and eliminates environmental problems associated with disposal of chemical wastes.