

Title Scald incidence in granny smith apples from different maturities is related to variations in H₂O₂-scavenging potential

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Citation Abstracts of 7th International Postharvest Symposium 2012 (IPS2012). 25-29 June, 2012. Putra World Trade Centre (PWTC), Kuala Lumpur, Malaysia. 238 pages.

Keywords apple; scald

Abstract

Superficial scald is a physiological disorder which limits long-term storage of many apple cultivars. The susceptibility of the fruits to develop superficial scald is known to strongly depend on the maturity of the fruits at harvest, yet the biochemical bases of such maturity-dependence remain unknown. In the present study, 'Granny Smith' apples from two different maturities (Optimum harvest date (OHD) and OHD₋₁₄ days, respectively) were harvested and stored at regular cold temperature (0.5°C) for four months. Scald incidence, fruit quality, α -farnesene and its oxidation products (CTs), H₂O₂ levels and antioxidants as well as key enzymes involved in oxidative metabolism (viz. CAT, APX, SOD and POX) were monitored at regular time intervals during cold storage and shelf-life. In summary, there was a clear relationship between the endogenous antioxidant potential of the fruits and scald susceptibility. Earlier harvested fruits showed increased POX and APX activities (2 and 3-fold, respectively) at the beginning of storage and thereby limited H₂O₂ accumulation. Accordingly, lower antioxidant capacity (1.7-fold lower) was observed in early harvested fruits that became unable to prevent the accumulation of oxidation products of α -farnesene and developed superficial scald. Overall, the results from this study support the hypothesis by which scald results from oxidative stress and more specifically to differences in H₂O₂ scavenging potential.