

Title Effect of 1-Methylcyclopropene and cooling management of Apple Cv., 'Pink Lady'TM on internal browning disorder

Author Juan Pablo Zoffoli, Javier Jauregui

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

Keywords Radial and diffuse flesh browning; degree days accumulated; physiological disorders

Abstract

Australia and Chile are the main "Pink Lady"TM apple suppliers in the northern hemisphere off-season. However, the trade is concentrated in a post-harvest period of up to 150 days, with fruit stored at 0°C, because of radial and diffuse flesh browning which are symptoms of internal browning disorder (IBD). In addition to some agronomic pre-harvest practices, other factors that enhance this disorder on "Pink Lady"TM are over mature fruit and fast cooling protocols. The objective of this research was to characterize the fruit's sensitivity to IBD, throughout the Chilean apple production areas, under extreme cooling practices. 1-MCP was evaluated in order to counteract the negative effect of high temperature on fruit quality. Nine "Pink Lady"TM apple orchards were selected covering 1,089 to 1,698 degree days accumulated (DDA). The cooling treatments were: 1. Force air cooling to 0°C in 7 h; 2. Force air cooling to 5°C in 3 h and room cooling to 0°C in 44 h; 3. Cooling and storage at 5°C for 60 days. Before cooling, half the fruit was treated with 1-MCP and the other half was left untreated as control. The fruit was stored for 160 days at 0°C and 5 days at 20°C. High incidence of IBD (20.9% to 86.4%) was induced by forced-air cooling and room cooling at 0°C, but the lowest incidence (1.7% to 13.8%) was reached when the fruit was previously stored for 60 days at 5°C. Cluster analysis by Jaccard index separated the fruit into three groups of IBD occurrences: high incidence of radial symptoms (four orchards with rates of 25% to 40%); high incidence of diffuse symptoms (two orchards with rates of 38% and 49%) and low incidence of radial and diffuse flesh browning (three orchards <15%). No consistent relationship was found between IBD incidence and degree days accumulated. 1-MCP did not reduce the incidence of the disorder. However, it complemented the 60 days at 5°C "best" treatment by reducing the amount of greasy fruit and maintaining high acidity and firmness. Low incidence of decay was associated with 1-MCP treated fruit. Further work needs to be done to adjust the maturity and time fruit is stored at 5°C to balance the benefit found here.