

Organic Oils Fumigation and Ozonated Cold Storage Influence Storage Life and Fruit Quality in Granny Smith Apples

Authors : Rahil Malekipoor, Zora Singh, Alan Payne

Abstract : Ethylene management during storage life of organically grown apples is a challenging issue due to limited available options. The objective of this investigation was to examine the effects of lemon and cinnamon oils fumigation on storage life, the incidence of superficial scald and quality of Granny Smith apple which were kept in cold storage with and without ozone. The fruit was fumigated with 3 μ l L⁻¹ lemon or cinnamon oil for 24 h and untreated fruit was kept as a control. Following the treatments, the fruit was stored at (0.5 to -1°C) with and without ozone for 100 and 150 days. After each storage period, ethylene production and respiration rate, superficial scald and various fruit quality parameters were estimated. Lemon oil fumigated fruit showed significantly reduced the mean climacteric peak ethylene production rate in both 100 and 150 days stored fruit. Mean climacteric peak ethylene production rate was significantly reduced in the apples which were kept in an ozonated as compared to cold stored without ozone for 100 days only. The climacteric ethylene peak was delayed only in 100 days cold stored fruit with ozone (8.78 d) as compared to without ozone (3.89 d). Firmness was significantly higher in the fruit fumigated with lemon or cinnamon oil compared to control for both storage time. The fruit stored for 150 days in cold storage without ozone exhibited higher mean firmness than those stored in ozonated. Lemon or cinnamon oil fumigation significantly reduced superficial scald in both cold stored fruit with or without ozone. Levels of total phenols were significantly higher in cinnamon oil treated fruit and stored for 100 days as compared to all other treatments. In 150 days stored fruit fumigated with lemon oil showed the significantly higher level of total phenols compared to cinnamon oil fumigation and control. The fruit fumigated with lemon oil or cinnamon oil following 150 days cold storage resulted in significantly higher levels of ascorbic acid and antioxidant capacity as compared to the control fruit. In conclusion, lemon oil fumigation was more effective in suppressing ethylene production in 100-150 days cold stored fruit than cinnamon oil. Whilst, fumigation of both lemon or cinnamon oil were effective in reducing superficial scald and maintaining quality in 100-150 days cold stored fruit.

Keywords : apple, cold storage, organic oil, ozone

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