

Emission of VOCs and quality evolution in response to repeated oxygen pull downs on ‘Conference’ pears during long-term cold storage

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Abstract

The effect of long-term storage of ‘Conference’ pears under ultra-low oxygen levels with or without multiple oxygen pull downs of different duration on fruit quality, ethylene emission, fermentative metabolites and volatile organic compounds (VOCs) was investigated. Pears were cold stored for seven months under three different atmospheres: initial low oxygen stress (ILOS), dynamic low oxygen pull downs monitored with a chlorophyll fluorescence sensor (DLOS₁) and extended dynamic or repeated low oxygen pull downs (DLOS₂). Overall, the application of repeated oxygen pull downs in the atmosphere composition (DLOS₁ and DLOS₂) did not affect the fruit firmness upon removal from cold storage.

Our results showed that fruit submitted to multiple oxygen pull downs (DLOS₁ and DLOS₂) ripened slower when further placed at 20 °C, as indicated by changes in the index of absorbance difference (I_{AD}), the fruit ethylene production capacity and the accumulation of ethanol within the fruit pulp. Moreover, the detected concentrations of specific VOCs (butyl acetate, hexyl propanoate and α -farnesene) inside the storage atmosphere correlated well with some ripening parameters (I_{AD}), thereby suggesting that specific VOCs could be used as fruit ripening state markers for real-time monitoring throughout the storage of ‘Conference’ pears.