

Title Low UV-C illumination for keeping overall quality of fresh-cut watermelon

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Abstract

The effects of four pre-packaging UV-C illumination doses (1.6, 2.8, 4.8 and 7.2 kJ m⁻²) on quality changes of watermelon cubes stored up to 11 days at 5 °C were studied. Non-treated cubes were used as a control. Higher UV-C doses induced slightly higher CO₂ production throughout the storage period, while no changes in C₂H₄ production were monitored. However, UV-C did not significantly affect the final gas partial pressures within modified atmosphere packages where levels of 3–6 kPa O₂ and 13–17 kPa CO₂ were reached for all treatments. UV-C decreased microbial counts just after illumination. After 11 days at 5 °C, mesophilic, psychrophilic and enterobacteria populations were significantly lower in UV-C treated watermelon. Slight changes in CIE colour parameters were observed. According to sensory quality attributes, control and low UV-C treated cubes (1.6 and 2.8 kJ m⁻²) can be stored for up to 11 days at 5 °C while the maximum shelf-life of moderate to high UV-C treated fruit was 8 days at 5 °C. Control cubes showed a 16% decrease in lycopene content after 11 days at 5 °C similar to that found for the high UV-C treatment. However low UV-C treated watermelon cubes preserved their initial lycopene content (2.8 kJ m⁻²) or it was slightly decreased (1.6 kJ m⁻²). UV-C radiation did not significantly affect the vitamin C content while catalase activity and total polyphenols content considerably declined throughout the storage period. However, total antioxidant capacity markedly increased, independently of UV-C doses. As a main conclusion, UV-C radiation can be considered a promising tool for keeping overall quality of fresh-cut watermelon.