

Quality changes of fresh-cut watermelon during storage as affected by cut intensity and UV-C pre-treatment

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Abstract

The effect of a UV-C (0, 2.4, 4.8 and 7.2 kJ m⁻²) pre-treatment was studied during storage at 5 °C on quality changes of fresh-cut watermelon cylinders with different cut intensities (2.7 cm Ø; 1, 2, 4 or 8 cm length). The steady state of the modified atmosphere was reached on day 4 with 4.5–9.6 kPa CO₂ + 14 kPa O₂. UV-C treatments were more effective against enterobacteria since enterobacteria counts were better preserved during storage in 4 and 8 cm cylinders under 7.2 kJ m⁻². The longest shelf life (7 days), based on sensory quality, was established for the biggest cylinders (8 cm) treated with 4.8 kJ m⁻², while it was reduced to 5 days for the remaining UV-C doses, regardless of the cut intensity. Lycopene content (52.1–75.3 mg kg⁻¹) was not affected by radiation treatments. After UV-C illumination, initial total phenolic contents (387–508 mg kg⁻¹) were reduced, reporting less reductions for higher cut intensities. Initial total antioxidant capacity (1.32–2.44 mmol kg⁻¹), mainly due to phenolic compounds and lycopene, was decreased after UV-C treatments. Total antioxidant capacity of UV-C samples was increased (2- to 14-fold) compared with untreated samples throughout storage as an antioxidant response of UV-stressed samples. Conclusively, fresh-cut watermelon cylinders of 8 cm length (2.7 cm Ø) better preserved their quality during storage compared with smaller cylinders, with a shelf life of 7 days when a 4.8-kJ m⁻² UV-C dose was applied.