

Title Effect of ultraviolet-C light on quality and microbial population of fresh-cut watermelon  
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### Abstract

The influence of ultraviolet (UV-C) light ( $1.4\text{--}13.7\text{ kJ m}^{-2}$  at 254 nm) on the quality and microbial populations of fresh-cut watermelon [*Citrus lanatus* (Thunb.) Matsum. and Nakai] was investigated and compared to that of common sanitizing solutions used for fresh-cut produce. Dipping cubes in chlorine ( $40\text{ }\mu\text{L L}^{-1}$ ) and ozone ( $0.4\text{ }\mu\text{L L}^{-1}$ ) was not effective in reducing microbial populations and quality was lower in cubes receiving these aqueous treatments compared to UV-irradiated cubes or control. In commercial trials, exposing packaged watermelons cubes to UV-C light at  $4.1\text{ kJ m}^{-2}$  produced  $>1$  log reduction in microbial populations by the end of the product's shelf life without affecting juice leakage, color and, overall visual quality. In further experimentation, lower UV-C dose ( $1.4\text{ kJ m}^{-2}$ ) reduced microbial populations to a lower degree and only when complete surface exposure was ensured. Higher UV-C doses did not show any difference in microbial populations ( $6.3\text{ kJ m}^{-2}$ ) or result in quality deterioration ( $13.7\text{ kJ m}^{-2}$ ). Spray applications of hydrogen peroxide (2%) and chlorine ( $40\text{ }\mu\text{L L}^{-1}$ ), without subsequent removal of excess water, failed to further decrease microbial load of cubes exposed to UV-C light at  $4.1\text{ kJ m}^{-2}$ . When properly utilized, UV-C light is the only method tested in this study that could potentially be used for sanitizing fresh-cut watermelon.