

Title Impact of combined postharvest treatments (UV-C light, gaseous O₃, superatmospheric O₂ and high CO₂) on health promoting compounds and shelf-life of strawberries

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Abstract

Modified atmosphere packaging (MAP), ozone (O₃) and ultraviolet-C (UV-C) light, have been suggested as postharvest treatments to control decay of strawberries. However, the influence of these treatments on strawberry phytochemicals has not been thoroughly evaluated. Thus, the impact of individual and combined UV-C light (1 kJ m⁻²), gaseous O₃ (5000 mg L⁻¹) and two active MAP conditions (superatmospheric O₂ and CO₂-enriched atmospheres) on the polyphenols, vitamin C content and shelf-life of strawberries was studied. Samples were taken initially, and after 5, 9 and 12 days of storage and microbial, nutritional and organoleptical qualities were evaluated. None of the evaluated samples showed visual signs of fungal growth after 12 days of storage, including non-treated samples stored in air. However, phenolic contents of UV-C and O₃ treated strawberries were significantly reduced after treatments, mainly due to a significant decrease in procyanidins. Ozonated samples showed the lowest vitamin C contents at the end of storage. On the other hand, when compared with storage in air, strawberries stored under superatmospheric O₂ and CO₂-enriched concentrations showed lower total phenolic contents after 5 days and a vitamin C reduction after 12 days of storage, accompanied by a more pronounced conversion from reduced to oxidized forms under superatmospheric O₂. In general, overall quality was good in all samples throughout the shelf-life except for flavour scores of MAP strawberries, which were clearly lower than air-stored samples after 9 and 12 days of storage. No additional effect was observed when combining the postharvest treatments compared with the effect of individual treatments.