

Title The effect of gaseous ozone and chlorine on quality and shelf life of minimally processed red pepper

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Abstract

Postharvest diseases result in substantial losses of the harvested crop reducing shelf life of the affected products. In this sense, microbial contamination is one of the main causes of bell pepper decay during storage. In this research, fresh-cut red peppers were washed with chlorinated water (200 ppm) or treated with 0.7 ppm ozone for 1 (T1), 3 (T2) and 5 (T3) minutes. Untreated fruits were used as a control. Pepper strips were packaged in polypropylene trays in air and stored at 10 °C for 14 days. Weight loss, gas composition, pH, colour, firmness and microbial quality were evaluated. Weight loss was negligible during storage in all the treatments. O₂ concentration decreased and CO₂ levels increased continuously, mainly on day 14. However, when O₃ was used, no differences were found between treatments on any of the evaluation dates. In the case of chlorine, the changes in the gas composition were more accentuated in the treated samples. By day 14th, pH values increased and a significant softening was observed in all the fruits. While no differences were observed between the control and the ozonated samples for these parameters, in the chlorinated peppers a higher firmness loss was registered when washing lasted 5 minutes. Regardless of exposure time, no differences in colour were found in the samples before and after the treatment with O₃. Moreover, O₃ did not cause surface discoloration or damage to the peppers. In both, chlorinated and O₃-treated fruits, lower values of L and an increase in °hue and chroma values were observed after 14 days of storage. Total colour difference was similar for all the treatments when O₃ was used. However, in the chlorine washed samples, this difference was higher with increasing treatment duration. A reduction in the counts of the yeasts and moulds and aerobic mesophilic and psychrotrophic bacteria was observed in all the samples subjected to O₃ treatment. On the other hand, chlorine was not effective to reduce aerobic mesophilic bacteria counts. In the case of yeasts and moulds and psychrotrophic bacteria, the best results were obtained with T1, as increasing the time of washing did not improve the efficacy of this disinfectant. Our results indicate that O₃ was more effective than chlorine to reduce microbial counts and did not cause any physiological damage to the fruits. Combined with modified atmosphere, this treatment could be used to extend the shelf-life of minimally processed red bell peppers.