

Effect of combined disinfection with peracetic acid and power ultrasound on quality attributes of whole strawberries (cv. ata)

IRAZOQUI M. (2), BARRIOS S. (1), LEMA P. (1), COLAZZO M. (3)

1 Facultad de Ingenier, Universidad de la Repblica, Montevideo, Uruguay

2 Centro Universitario Litoral Norte, Universidad de la Repblica, Paysand, Uruguay

3 Licenciatura en Anisis Alimentarios, Paysand, Uruguay

Disinfection step is one of the most important operations in fresh-cut production where different strategies are used to minimize and reduce microbial hazards. Cavitation bubbles formed by power ultrasound (US) can be applied in decontamination step because of their ability to remove or reduce microbial loads. However, cavitation can affect product quality because of tissue rupture. The aim of this work was to apply a combined disinfection methodology involving power ultrasound and peracetic acid (US-HPA) for disinfection of strawberries (cv. Ágata) and evaluate its effect on product quality attributes. Two different acoustic power densities (APD) and frequencies were assayed. Classic disinfection with HPA alone was performed as control. Parameters associated with disinfection step (HPA concentration, pH, conductivity and microbial counts) were determined before and after disinfection treatment. Parameters associated with ultrasound performance in combined US-HPA treatment were measured: dissipated power and acoustic power density (20 and 42 W/L). Parameters associated with product quality before and after treatments were measured: microbial counts, pH, total soluble solids (TSS), instrumental color, instrumental texture, respiration rate, vitamin C content, total phenolic content (TPC) and antioxidant capacity (AOC). In addition, a phenolic profile was conducted by HPLC-DAD.

Significant differences ($p < 0.05$) were found between US-HPA and HPA disinfection treatments, but no significant effect of APD or frequency was determined. Additional average reductions of 0.8 log/g for total aerobic counts and 1.3 log/g for Enterobacteriaceae were obtained for combined US-HPA treatments. In the case of moulds and yeasts, differences between disinfection treatments were not significant, presenting reductions between 2.0 and 2.4 log cfu/g. As for quality parameters, no significant differences were found for TSS, pH, instrumental texture, instrumental color and respiration rate between treatments. TPC and vitamin C content in combined US-HPA treatments showed a slight increase with respect to HPA disinfection, but antioxidant capacity was similar in all samples. Catechin content was not affected by treatments, while a 10% reduction in ellagic acid content was obtained in all treatments. Identified anthocyanins, cyanidin and pelargonidin, were affected by disinfection treatments but with no identifiable trend.