

Title Cold storage temperature following pulsed electric fields treatment to inactivate sublethally injured microorganisms and extend the shelf life of green tea infusions

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Abstract

In this work microbiological shelf life of green tea infusions processed by pulsed electric fields (PEF) treatment (38.4 kV/cm for 200 μ s) were assessed at the three storage temperatures of 4, 25 and 37 °C, respectively. Immediately after PEF treatment, no viable bacterial cells were detected. However, significant recovery was observed during storage at 25 and 37 °C. The total aerobic microbial population increased rapidly in PEF-treated green tea infusions when stored at 25 and 37 °C for 14 and 7 days respectively. However, the microbial population remained under 1 log₁₀ CFU/ml when stored at 4 °C up to 180 days. These results demonstrated that a certain proportion of microbial cells in green tea infusions were sublethally injured by PEF treatment, and the recovery of apparently dead or ‘intermediately damaged’ cells could increase the detected number of surviving microorganisms. In the present study PEF-treated green tea infusions were placed at 4 °C for various time, and then stored at 37 °C. Cold storage (4 °C for 7 days) following PEF treatment was found to be effective to delay or inhibit the repair process of sublethally injured cells and extend the microbiological shelf life of PEF-treated green tea infusions to more than 90 days at 37 °C.