

Effect of pulsed electric field treatments on melanosis and quality changes of Pacific white shrimp during refrigerated storage

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Abstract

Polyphenoloxidase (PPO) from Pacific white shrimp was subjected to Pulsed electric field (PEF) at varying specific energy (54-483 kJ/kg) and pulse number (200-600). PPO activity was decreased as both parameters increased ($P < 0.05$). Among shrimp treated with PEF, those subjected to PEF-T3 (483 kJ/kg, 600 pulses) had the lower melanosis score than other PEF treatments and the control, packaged in polystyrene trays and wrapped with shrink film, during 10 days of storage at 4 °C ($P < 0.05$). Highest shear force values were noticed with PEF-T3 treated sample at the end of storage period (day 10) ($P < 0.05$). Microstructural gaping between shrimp muscle fibers was notably higher in PEF-T3. No protein degradation was observed for all samples, regardless of PEF treatments. Lower mesophilic and psychrophilic microbial counts in shrimp were obtained when PEF-T3 was implemented. After 10 days of storage, higher sensory scores of PEF-T3 treated samples were also attained, as compared to others ($P < 0.05$). Quality deterioration of shrimp was retarded with the aid of PEF.

Keywords: Pulsed electric field, polyphenoloxidase, Melanosis, microstructure, microbiology, Pacific white shrimp, Quality