Effects of adjustable parallel high voltage electrostatic field on the freshness of tilapia (Orechromis niloticus) during refrigeration

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ABSTRACT

Our preliminary findings indicated that at 4 C, a High Voltage Electrostatic Field (HVEF) of 100 kV/m can effectively extend the shelf life of fish for up to 2 days. This study further investigated changes in the freshness of tilapia meat after using various HVEF treatments: 300, 600, or 900 kV/m. Both the VBN and K-values of the untreated tilapia meat increased during the storage period, eventually exceeding the hygienic standard on the 6th day, with values of 60% and 25 mg/100 g, respectively. However, in fish treated with 600 kV/m HVEF, the K-value approached 60% around the 8th day; fish treated with 300 kV/m HVEF had a VBN of only 20.47 mg/100 g. This demonstrated the effectiveness of HVEF in preserving freshness. In untreated fish, the total plate counts (TPC) reached 4.02 10^5 CFU/g meat by the 8th day, while fish treated with an HVEF of 900 kV/m still had not exceeded the sanitary standard in that same time period (3.45 10^5 CFU/g meat). In summary, an HVEF with 600 kV/m electric field strength or more can enhance food preservation, as it effectively delays ATP degradation, protein denaturation, lipid oxidation, and microbiological growth.

Keywords: Adjustable parallel high voltage electrostatic field (AP-HVEF) Tilapia meat Preserving freshness

REFERENCES