

Marination performance and quality of chicken thigh meats: comparison of radio frequency and conventional thawing processes

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Thawing process has an important effect on freeze-thawed meat quality. The studies recently conducted in lab-scale conditions showed that radio frequency (RF) thawing revealed successful results by saving energy and decreasing mass losses. In poultry industry, freeze-thawed meats are used for marinated and emulsified products. From this viewpoint, the objective of the study was to determine the marination performance and quality of chicken thigh meats thawed with RF heating and compare the results obtained from conventional thawing processes.

Commercially frozen chicken thigh meat bulk (29 kg in a retail box of 60x40x10 cm) was thawed in an RF system (a free oscillating pilot scale staggered through field electrode system, 10 kW, 27.12 MHz) at 17.5 cm electrode gap and 2000 V potential. For conventional approach, the bulk meat was thawed in a temperature-controlled incubator with circulated air at 22 °C (CA22) and 4 °C (CA4). Thawing process was completed when the internal temperature reached to -1°C . Thawed samples were marinated within a phosphate-salt solution by using a hand-held single needle injector under 2 psi brine pressure with a targeted final 10% weight gain and 2% salt concentration. Unfrozen meat samples were also marinated as a positive control. Quality analysis was conducted, and the results were compared for significant difference.

Freeze-thaw process decreased the marination yield and increased the cooking loss regardless the thawing process used. Cooking yield in CA4 (13.30%) was significantly lower than RF (16.10%) and CA22 (17.90%) ($p<0.05$). Higher a^* value on skin side and lower L^* value on bone side was measured in RF, CA4 and CA22 as compared to unfrozen-marinated meat ($p<0.05$). RF thawing did not differ from CA4 and CA22 while more redness and darker color was observed in CA4 as compared to CA22 ($p<0.05$). The highest water holding capacity (97.60%) was determined in unfrozen-marinated meat while RF (96.10%) had significantly higher capacity than CA22 (90.20%) ($p<0.05$). RF process, as an innovative and emerging technology, could provide marinated meat of similar quality to unfrozen-marinated meat by minimizing the adverse effect of freeze-thaw process.

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