

Title Shelf-life of a chilled precooked chicken product stored in air and under modified atmospheres: microbiological, chemical, sensory attributes

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Abstract

This study evaluated the effect of modified atmosphere packaging on shelf-life extension of a precooked chicken meat product stored at 4°C using microbiological, physico-chemical and sensory analyses. The following gas mixtures were used: M1: 30%/70% (CO₂/N₂), M2: 60%/40% (CO₂/N₂) and M3: 90%/10% (CO₂/N₂). Identical chicken samples were aerobically packaged and used as control samples. Sampling was carried out at predetermined time intervals namely: 0, 4, 8, 12, 16 and 20 days. Total viable counts (TVC), Lactic acid bacteria (LAB), *Brochothrix thermosphacta*, pseudomonads, yeasts and molds, and *Enterobacteriaceae* were monitored. TVC of precooked chicken product reached 7 log cfu/g, after days 12 and 16 of storage (air and M1 samples), respectively. The M2 and M3 gas mixture packaged samples did not reach this value throughout the 20 days storage period under refrigeration. LAB and to a lesser degree *B. thermosphacta*, constituted part of the natural microflora of precooked chicken samples stored in air and under MAP reaching 7.0–8.1 log cfu/g at the end of storage period. Of the remaining bacterial species monitored, both pseudomonads and yeasts/molds were significantly higher ($P < 0.05$) for chicken samples stored in air than under MAP (M1, M2, M3) throughout the entire storage period under refrigeration. Finally, counts of *Enterobacteriaceae* were low (<2 log cfu/g) in all chicken samples irrespective of the packaging conditions throughout the entire storage period. Of the chemical indices determined, thiobarbituric (TBA) values in all cases remained low, equal or lower than 3.0 mg malonaldehyde (MA)/kg during the entire storage period. Results of the present work show that the limit of sensory acceptability was only reached for the aerobically stored and M1 gas mixture chicken samples somewhat before days 16 and 20 of storage, respectively. This limit coincided with high TVC and LAB populations (>6.8 log cfu/g), increased lipid oxidation (aerobic storage only) and apparent growth of yeasts/moulds on the surface of chicken samples. The use of MAP as shown in the present study, resulted in an extension of shelf-life of precooked chicken by ca. 4 days (M1 gas mixture), and by more than 6 days (M2 and M3 gas mixtures), respectively. Precooked chicken meat was better preserved under M2 and M3 mixtures maintaining desirable odor/taste attributes even on final day of storage tested.