Comunicazione Orale

EFFICACY OF HOME COOKING METHODS (AIR FRYER AND PAN) IN INACTIVATING LISTERIA MONOCYTOGENES IN CHICKEN AND TURKEY WÜRSTEL: A CHALLENGE TEST

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Aim. This study aimed to evaluate, through a challenge test, the efficacy of home cooking conditions for pan cooking, as recommended on the product label, and for air frying, as recommended in commonly available online recipes, in inactivating Listeria monocytogenes inoculated into chicken and turkey würstel.

Methods. Challenge test trials were performed in triplicate on würstel. A four-strain mix of L. monocytogenes (biotype 1/2b), isolated from various meat products, was standardized by spectrophotometric reading (600 nm) and surface-inoculated onto the matrices at three contamination levels: high (~105 CFU/g), medium (~104CFU/g) and low (~103 CFU/g), with a 30-minutes contact time before cooking. Samples were cooked following the corresponding recipes, using an air fryer (200°C for 4 min), a pan on direct flame, or a pan on an electric hotplate (4 min). The core temperature was measured at the end of cooking. Enumeration and detection of Listeria monocytogenes were performed before and after cooking using different selective media (ALOA, Oxford, and PALCAM agar), with species confirmation by MALDI-TOF MS. Pathogen survival was also assessed after 24 hours of refrigerated post-cooking storage at 4°C.

Results. The mean pH and water activity of the raw matrices before the challenge tests were 6.18 and 0.9507, respectively. In raw post-inoculation samples, L. monocytogenes was confirmed by count and qualitative detection, with mean counts of 3.0417 log CFU/g on ALOA, 3.0574 log CFU/g on PALCAM and 2.3551 log CFU/g on OXFORD (OXF) for the highest concentration; ~2 log CFU/g on ALOA, ~2 log CFU/g on PALCAM and ~1 log CFU/g on OXF for the medium concentration; and <1 log CFU/g on ALOA, PALCAM and OXF for the lowest concentration, confirmed by MALDI-TOF. The OXF medium gave slightly and systematically lower counts than ALOA and PALCAM. The mean post-cooking core temperature of the würstel was 63°C (pan, direct flame), 54°C (pan, electric hotplate), and 91°C (air fryer). No Listeria was detected in air-fryer samples at any level, nor after pan cooking at the lowest levels. At the medium and high inoculation levels, mean residual loads of approximately 2.00 and 2.53 log CFU/g, respectively, were detected after pan cooking on a direct flame, while mean residual loads of approximately 2.00 and 2.43 log CFU/g, respectively, were observed after pan cooking on an electric hotplate. After 24 h of refrigerated storage, L. monocytogenes remained detectable under both pan-cooking conditions, with mean residual loads of approximately 0.80 and 2.62 log CFU/g for direct-flame pan cooking and 0.57 and 2.50 log CFU/g for electric-hotplate pan cooking at the medium and high inoculation levels, respectively.

Conclusions. Cooking effectively inactivated L. monocytogenes at low initial contamination levels, regardless of the cooking method. At medium-to-high contamination levels, however, the efficacy differed among cooking methods: air frying achieved greater pathogen inactivation than pan cooking (on either a direct flame or an electric hotplate), which allowed L. monocytogenes to survive despite adherence to the recommended cooking conditions. These findings demonstrate that the cooking method can significantly influence the inactivation of L. monocytogenes, particularly at medium-to-high contamination levels, highlighting the need for accurate consumer guidance on effective home cooking practices.