Abstract No: BO-04

Duplex polymerase chain reaction (Duplex-PCR) to identify adulterations in chicken and turkey meat products

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Adulteration is a process, which decreases the quality of food by the addition of low quality materials and removal of valuable ingredients. Nowadays, meat adulteration is a major concern worldwide, because of the falsely labeled food products. Consumers demand accurate labeling of these meat products to avoid economic, religious and health issues. Therefore, the aim of this study was to validate a molecular based assay i.e Duplex polymerase chain reaction (Duplex-PCR), to identify adulterations in chicken and turkey meat products to provide the correct details to consumers. Samples were collected from local supermarkets. DNA was extracted from raw, cooked and processed chicken and turkey food samples using the Qiagen Mericon® food kit and this was followed by a spot gel test to confirm the presence of DNA. The cooked samples were pre-treated before the DNA extraction. Duplex-PCR based molecular identification method using species-specific primers based on mitochondrial cytochrome *b* gene was performed. The PCR resulted 190 bp and 150 bp fragments for chicken and turkey DNA respectively. Repeatability, recovery and reproducibility were checked to validate the method. The repeatability of the overall samples was more than 80% where one of the validation parameter was successfully achieved and the recovery (sensitivity) was detected as 3 mg (1.5%). The results of reproducibility indicated same results for three analysts, which confirmed the procedure was not depend on personal errors. Since the necessary parameters for validation are effectively achieved, the duplex-PCR based method for molecular identification of chicken and turkey can be validated. This method was used to detect adulterations of ten processed/pre-cooked chicken and turkey products. Results showed that, roasted turkey and turkey sausage, which had been declared as turkey was adulterated with chicken. Chicken ham and two brands of chicken sausages that had been declared as chicken, was adulterated with an unknown species. Since the adulteration was detected in meat products effectively, the duplex-PCR method for detection of meat adulteration of turkey and chicken is successful.

Keywords: Duplex-PCR, Meat adulteration, Cytochrome *b*