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Primer designing using cytochrome *b* gene for the development of a duplex polymerase chain reaction method to identify chicken and turkey adulterations in meat products

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Background: Food adulteration began decades ago where food was intentionally tampered to increase appeal and profits. Products are thus debased, reducing their quality and nutritional factor, resulting in a breach of ethics. An example of adulteration is the addition of chicken meat to turkey meat products as it is cheaper, resulting in lower costs for the manufacturer. These products are falsely labeled thus misleading consumers, resulting in global concerns involving ethics, religion and health. Polymerase Chain Reaction (PCR) may address this issue in an appropriate manner, assuring consumers that they are protected against additives. This study used cytochrome *b* gene which shows little intra species variation, making it suitable in this process.

Objective: The aim of this study was to design specific primers to be used in a duplex PCR to detect adulterations in turkey and chicken meat products.

Method: DNA was extracted from 5 chicken and 5 turkey samples using the salting out method. The presence of DNA was confirmed using a spot gel and agarose gel electrophoresis. Universal cytochrome *b* primers L14816 and H15173 were used to amplify the cytochrome *b* region and sequenced through Sanger sequencing. DNA sequences were aligned using ClustalW and specific primers were designed manually using BioEdit software and OligoAnalyzer tool. A duplex PCR then allowed the co-amplification of different DNA sequences using the designed primers.

Results: The designed primers were as follows; chicken-specific forward (ChSpF), 5' ATCCCTAGCCTTCTCCTCC 3', chicken-specific reverse (ChSpR), 5' AACATAGCCCACAAAGGCG 3', turkey-specific forward (TuSpF), 5' CCGTAACCTCCATGCGAAT 3', turkey-specific reverse (TuSpR), 5' TACAAAGGCTGTTGCTATGAGG 3'. Single bands were observed on agarose gel at 220 bp and 150 bp for chicken and turkey DNA respectively. It indicated the adulteration of chicken and turkey meat products.

Conclusion: The duplex PCR developed was proved to be a successful and rapid method to identify adulterations of chicken and turkey meat products.