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POSTER ABSTRACT

Title of the poster: Quantitative detection of pork's meat adulteration in processed poultry's meat products by Real Time PCR

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Abstract:

The need for reliable and sensitive methods for meat species identification in ground and comminuted meat products encompasses many issues including the fraudulent substitution of higher value species by cheaper meats species, the presence of undeclared species, the use of lower amounts of meat than the quantities declared on the product's label and the substitution of meat by lower price vegetable proteins. This can represent an important economic fraud, but can also bring ethical, religious and even health repercussions. Several techniques are currently used for meat species identification in complex mixtures, including different protein-based methods such as HPLC, ELISA and electrophoretic techniques. Nevertheless, in processed meat products, these methods can be significantly less sensitive for the detection of specific species due to heat denaturation of proteins during industrial thermal processing. Due to the higher stability of DNA molecules compared to proteins, and to its ubiquity in every type of cell, the analysis of DNA coupled with polymerase chain reaction (PCR) presents a fast, sensitive and highly specific alternative to protein-based methods.

In the present work, we used a real-time PCR technique for pork's meat detection in processed meat products available in commercial retail. Several binary mixtures of pork and poultry's meat were prepared at the laboratory and DNA was extracted. The real-time PCR approach was based on the specific amplification targeting the 18S rRNA mitochondrial gene for pork species detection (149 bp fragment) and targeting a eukaryotic DNA fragment (140 bp) as a reference gene for quantification. The amplification products were monitored by using SYBR Green I associated with melting curve analysis to verify the specificity of obtained fragments (melting temperatures of 83.5ºC and 87.5º for pork and eukaryotic detection systems, respectively). Calibration curves were obtained with the cycle threshold (Ct) values by using the $\Delta\Delta$Ct method. The detection and quantification of pork's meat was achieved in the range of 0.1% to 25%, with a high correlation coefficient and PCR efficiency. The methodology was successfully validated using blind samples and applied to the quantitative evaluation of pork's meat in different poultry processed meat products.

Keywords: Real-Time PCR, meat species identification; pork's meat; poultry's meat