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QUALITY CONTROL OF FRANKFURT SAUSAGES BY BIOMOLECULAR TECHNIQUES

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The quality of foods is a subject of great concern not only for assuring their safety, but also regarding their authenticity. In processed meat products, it is very important to establish that declared species of high commercial value are not substituted, partial or entirely, by other lower value species. The misleading labelling might have also negative implications concerning health, especially for sensitive consumers to undeclared potential allergens, such as soybean [1].

The analytical methods used for species identification and authenticity of foods rely mainly on protein and DNA analysis. More recently, DNA molecules have been the target compounds due their high stability compared to the proteins. Moreover, the analysis of DNA coupled with polymerase chain reaction (PCR) presents fast, sensitive and highly specific alternatives to protein-based methods [2].

The aim of the present work was to develop PCR techniques able to identify and quantify several ingredients (pork, poultry, beef and soybean) in highly processed meat product, such as Frankfurt sausages. The analysed samples were acquired in the retail market and reference binary samples, as standards, were prepared in the laboratory. Samples and standards were extracted by two different methodologies: the CTAB (cetyltrimethylammonium bromide) method based on liquid-liquid extraction and the Wizard method based on silica solid phase extraction. Yield and purity of extracts were assessed by spectrophotometry. Both extraction protocols enabled high DNA yields with reasonable purity ($A_{260}/A_{280} \geq 1.5$). PCR techniques were developed for each target ingredient by optimisation of Mg^{2+} concentration and thermalcycler temperature program. The established conditions allowed the detection of levels as low as 0.1% of added pork meat or soybean protein in mixtures of meats. The results showed the undeclared presence of pork meat in commercial poultry sausages.

Besides qualitative PCR, quantitative real-time PCR assays based on the measurement of fluorescence increments by the use TaqMan probes and SYBR Green I dye were also performed.

[1] M. Lees, B. Popping, *Food authenticity and traceability*, CRC Press, Florida, 2003.

[2] I. Mafra, I.M.P.L.V.O. Ferreira, M.B.P.P. Oliveira. *Eur. Food Res. Technol.*, in press.