Title:

Polymerase chain reaction for soybean detection in heat processed meat products

Authors & affiliations:

*Sónia Soares[1,2], Joana S. Amaral[1,2], Isabel Mafra,[1,3]*M. Beatriz P.P. Oliveira[1]*
[1]REQUIMTE, Serviço de Bromatologia, Faculdade de Farmácia, Universidade do Porto, Rua Aníbal Cunha 164, 4099-030 Porto, Portugal.
[2]ESTiG, Instituto Politécnico de Bragança, Quinta de Sta. Apolónia, Apartado 134, 5301-857 Bragança, Portugal.
[3]Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Rua Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal
*(igmafra@esb.ucp.pt)

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Since vegetable proteins are considerably cheaper than muscle proteins, they are frequently used as meat extenders in order to reduce the cost of the final product. Due to several interesting characteristics, soybean is reported to be the most widely used vegetable protein in the meat industry. Nevertheless, soybean is included in the group of 12 ingredients potentially allergenic, which should therefore be labelled according to the Codex Alimentarius FAO/WHO and the European Commission (Directive 2003/89/EC). In fact, it has been described that amounts of soy bellow 0.1% and 1% (w/w) can lead to allergic reactions in sensitive consumers (1).

The analytical methods used for soybean detection in foods rely mainly on protein and DNA analysis. However, it has been referred that protein-based methods can be significantly less sensitive in the evaluation of thermally processed foods because of protein denaturation. Recently, the analysis of DNA coupled with polymerase chain reaction (PCR) presents a fast, sensitive and highly specific alternative to protein-based methods.

The aim of the present work was to develop PCR techniques able to identify soybean in highly processed meat products. Specific primers designed for soybean detection based on the *lectin* gene were used. The methodology was optimized using reference binary samples with different known percentages of pork meat and soybean protein, prepared in the laboratory. To evaluate the effect of thermal treatment, identical binary mixtures were submitted to heat treatment in an autoclave at 121ºC for 5 min. The results showed that detection of soybean was successful in all raw mixtures until the level of 0.1%. Regarding the autoclaved samples, detection was only achieved for levels ≥ 0.5% of soybean, probably due to thermally induced DNA degradation. Several commercial samples of Frankfurt or Frankfurt like sausages were tested to detect the presence of soybean in compliance with the label statements.

(1) S.J. Koppelman, C.M.M. Lakemond, R. Vlooswijk, S.L. Hefle, Detection of soy proteins in processed foods: literature overview and new experimental work, J. AOAC Int. 87 (2004) 1398.