

# Food safety and quality profile of *Alheira de Vitela*, *Chouriço de Carne* and *Salpicão Serra D'Arga*: traditional Portuguese sausages produced in the North of Portugal

Lúcia Noronha<sup>1</sup>, Ana Luísa Almeida<sup>1</sup>, Ricardo Freixo<sup>1</sup>, Samuel Jácome<sup>2</sup>, Susana Fonseca<sup>2</sup>, Manuela Vaz Velho<sup>2</sup>, Gonçalo Almeida<sup>1</sup>, Cristina L. M. Silva<sup>1</sup>, Alcina M. M. B. Morais<sup>1</sup>, Joana Silva<sup>1</sup>, Paula Teixeira<sup>1</sup>

<sup>1</sup>CBOF/ Escola Superior de Biotecnologia – Centro Regional do Porto da Universidade Católica Portuguesa – R. Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal

<sup>2</sup>Escola Superior de Tecnologia e Gestão – Instituto Politécnico de Viana do Castelo, Portugal – Avenida do Atlântico, 4900-348 Viana do Castelo, Portugal

## Introduction

Traditional Portuguese fermented meat sausages are part of a daily diet in the Northern regions of Portugal. The study of the quality profile of these products is important to support the improvement and optimization of the production process, in order to respond more effectively to new demands for food safety and quality. Some of the fermented meat sausages are eaten raw, requiring a careful control over the microbiological quality. On the other hand, it is necessary to pay attention to chemical preservatives added to products to protect them from microbial contamination and, therefore increase their shelf life. The aim of this work was to investigate the microbiological, chemical and sensory characterization of traditional Portuguese sausages produced in the North of Portugal: *Alheira de Vitela*, *Chouriço de Carne* and *Salpicão Serra D'Arga*.



## Methods

*Alheira de Vitela*, *Chouriço de Carne* and *Salpicão Serra D'Arga* were collected from the same company. They were obtained from several lots ready to go to the distribution chains and analysed directly without any treatment, even the one that needs cooking before consumption (*Alheira de Vitela*). Enumeration of total aerobic microorganisms, *Enterobacteriaceae*, yeasts-moulds, lactic acid bacteria (LAB), coagulase-positive staphylococci, *Clostridium perfringens*, clostridia spores, *Escherichia coli* and *Bacillus cereus*, as well as detection of foodborne pathogens commonly presented in this kind of products, like *Listeria monocytogenes* and *Salmonella* spp. (Ferreira *et al.* 2006, 2007) were performed for all samples. Chemical characterization was based on water activity, pH value, moisture, protein and fat content, peroxide value and nitrite, nitrate and sodium chloride concentrations. For the sensorial characterization, these products were analysed directly without any treatment, with the exception of *Alheira de Vitela* that was cooked in an oven at 185 °C for 15 min. Sensory characterization was performed by a sensory trained panel of 8 assessors in 3 different sessions with different batches. A quantitative descriptive sensory method was tested, involving previous sessions for main descriptors definition, their scale limits as well as verbal anchors by panel consensus and analysing 3 different brands of the same product.

## Results and Discussion

Most of the samples showed a good microbiological quality. *Alheira de Vitela*, a product that needs to be cooked before consumption, was an exception. Pathogenic microorganisms such as *L. monocytogenes*, *E. coli* (>10<sup>4</sup> CFU/g), coagulase-positive staphylococci (>10<sup>2</sup> CFU/g) were detected in some of this samples. However, samples of *Alheira de Vitela* showed low values of nitrates when compared with *Chouriço de Carne* and *Salpicão Serra D'Arga*, which presented values close to the maximum allowed limit by Portuguese legislation (250 mg/kg). Samples with high salt content were also those which had higher levels of nitrates. Sensory profiles with 14 descriptors for *Chouriço de Carne* and *Salpicão Serra D'Arga*, and with 18 descriptors for *Alheira de Vitela* were developed. *Meet colour*, *typical odour* and *smoked smell* in *Alheira* (fig. 1a), *consistency on touch*, *fat visible quantity* and *succulence* in *Salpicão* (fig. 1b), *meet colour*, *consistency on touch* and *salty taste* in *Chouriço de Carne* (fig. 1c) were the attributes with higher panel consensus and consequently lower variability.

In conclusion, although these three products were considered of acceptable sensorial quality, some microbiological or chemical issues were identified.

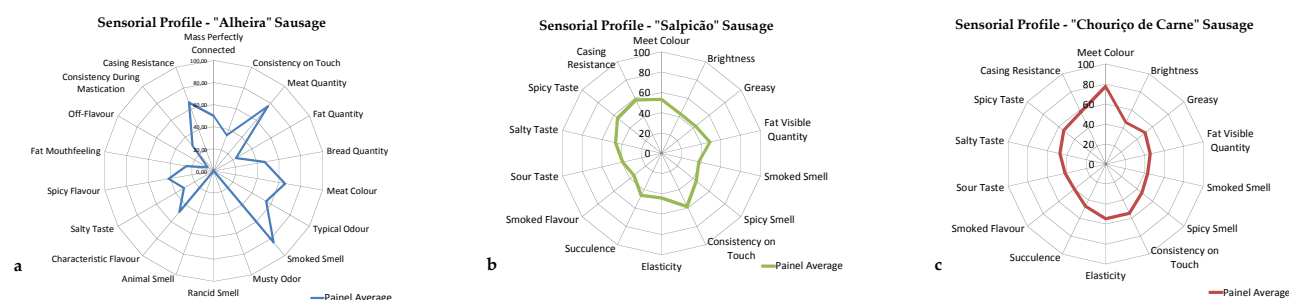


Fig. 1. Sensory profiles of *Alheira de Vitela* (a); *Salpicão Serra D'Arga* (b); *Chouriço de Carne* (c).

## References

- Ferreira, V., Barbosa, J., Vendeiro, S., Mota, A., Silva, F., Monteiro, M. J., Hogg, T., Gibbs, P., Teixeira, P. (2006). "Chemical and microbiological characterization of *alheira*: A typical Portuguese fermented sausage with particular reference to factors relating to food safety". *Meat Science* 73: 570 – 575;
- Ferreira, V., Barbosa, J., Silva, J., Felício, M. T., Mena, C., Hogg, T., Gibbs, P., Teixeira, P. (2007). "Characterisation of *alheiras*, traditional sausages produced in the North of Portugal, with respect to their microbiological safety". *Food Control* 18: 436-440.

## Acknowledgements

This work was supported by National Funds from FCT – Fundação para a Ciência e a Tecnologia through project PEst-OE/EQB/LA0016/2011;

The accomplishment of this work was also supported by QREN project - ADI 13338 "Biofumados: Validação do biocontrolo de enchidos tradicionais Portugueses".

