# *LISTERIA MONOCYTOGENES* ISOLATES IN READY-TO-EAT MEAT-BASED FOODS FROM PORTUGUESE RETAIL ESTABLISHMENTS

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**Abstract – The purpose of this work was to assess *Listeria monocytogenes* presence in ready-to-eat (RTE) meat-based foods collected in retail units – major supermarket chains. A total of one hundred RTE meat-based food products were analysed, of which sixty-one were collected prepacked and thirty-nine were sliced and packed at the moment of order. After detection, phenotypic presumptive isolates were assessed by multiplex PCR assay, in order to confirm *L. monocytogenes* or *Listeria* spp. Only two samples were positive for *Listeria* spp. Overall, *L. monocytogenes* was isolated from thirteen samples, of which four exceeded the European Commission's food safety criteria limit of 100 CFU/g of *L. monocytogenes* within shelf-life. *L. monocytogenes* presence was more frequent in prepacked RTE food items than in those that were packed in the moment of order. Further work needs to be done regarding this pathogen for molecular characterization, as well as in developing strategies for contamination prevention.**

**Key Words –*Listeria monocytogenes, Listeria* spp., Retail establishments, Ready-to-eat meat-based food products**

## I. INTRODUCTION

In the last decade, European member states have reported thousands of human listeriosis confirmed cases per year, with high fatality rates among these cases [1]. This trend has also been reported by the Centers for Disease Control and Prevention in United States of America [2].

RTE meat-based food products are one of the most consumed food products around the world [3]. Their long shelf-lives in refrigerated storage, as well as the fact that they do not need to undergo any heat-treatment prior to consumption, makes them an important source of food-borne disease, especially by *L. monocytogenes* [1].

RTE meat-based food products are recognized to be contaminated during handling at retail points [3]. Particularly, cutting utensils and slicing machines are identified as important contamination vehicles of RTE meat-based food products both in production industry and sale points. As a result of cross-contamination, sliced RTE meats that allow growth of *L. monocytogenes* during prolonged refrigerated storage, likely pose an increased public health risk for certain consumers. [4].

The aim of this study was to determine the frequency of *L. monocytogenes* in RTE meat-based foods collected in retail establishments in Lisbon metropolitan region.

## II. MATERIALS AND METHODS

*Retail establishments characterization*: Twenty-five supermarkets located in Lisbon metropolitan region were assessed during 2011/2012.

*Sample collection:* One hundred RTE meat-based food samples (i.e. meat sandwich, sliced ham, bacon and chourição, cooked turkey breast, pork galantine, chicken salad) were collected from refrigerated storage expositor in delicatessen department. In each retail establishment, four RTE products of meat origin in their final package or packed at the moment of order were collected. Overall, sixty-one of the samples were for sale in the pre-packed form, this meaning that there was no handling of the food contained in the package in the retail store. The rest of the samples (thirty-nine) were sliced and packed by the delicatessen department attendants in the retail store. The samples were transported in an isothermal box (below 5ºC) to the laboratory in less than 1 hour.

*Microbiological methods:* Samples were prepared according to ISO 6887-2:2003. Detection and counting of *Listeria monocytogenes* was performed

according to ISO11290-1:1996 and ISO11290-2:1998. *L. monocytogenes* identification was confirmed by PCR, according to Simon *et al*. (1996). Afterwards, a multiplex PCR assay method adapted from that described by Kérouanton *et al*. (2010) was used. In this assay, genus and species-specific recognition was made, using *prs* and *prfA* genes, respectively.

## III. RESULTS AND DISCUSSION

Table 1 shows the frequency of positive samples to *L. monocytogenes* presence regarding the mode of packaging.

From the 100 food products analyzed, 13 samples were positive for *L. monocytogenes* presence and two for *Listeria* spp.. The majority of the samples seem to be already contaminated from industry since they were prepacked and suffered no handling at retail point.

Four of the samples exceeded the European Commission's food safety criteria limit of 100 CFU/g of *L. monocytogenes*. These samples were sliced and packed by order and the counting ranged from 2.7 to 3.6 log cfu/g. This high counting level can be explained by the handling performed on retail with increased probability of cross contamination from environment and equipment/utensils [3, 4].

Table 1 *L.monocytogenes* positive samples frequency considering handling and packaging method

| Food handling and packaging | n | Positive samples for *L.monocytogenes* | Frequency (%) |
|---|---|---|---|
| Pre-packed | 61 | 8 | 13,1% |
| Sliced and packed by order | 39 | 5 | 12,8% |
| Total | 100 | 13 | 13% |

Independently of the applied packaging method, both pre-packed and packed by order samples had a frequency of 13% positive samples to *L. monocytogenes* presence. These results are similar to the ones presented in previous studies [11, 12].

## IV. CONCLUSION

The frequency of *L monocytogenes* found in RTE meat-based food samples was 13% and similar to the observed in other studies.

## ACKNOWLEDGEMENTS

The authors thank Project PRODER-PA 13017 and Fundação para a Ciência e Tecnologia for the research grant SFRH/BD/70711/2010.

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