The effect of high pressure on microbiological quality of *Alheiras*

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Abstract

The effect of high pressure (HP) and bacteriocionogenic lactic acid bacteria on the survival of *Listeria innocua* inoculated in *Alheira*, a naturally fermented meat sausage, typical from the North of Portugal, was evaluated in the present study. From the obtained results, HP demonstrated to be a promising technique to guarantee the safety of this product since it reduces the inoculated *L. innocua* up to admissible values. Besides, these values are maintained during refrigerated storage up to 60 days. Nevertheless, further studies are necessary to highlight the effect of both pressure and bacteriocinogenic bacteria in *L. Innocua*.

Introduction

Alheira is made of several meats, boiled in water with salt and spices, and bread, olive oil and/or fat drippings are also added to the mixture. Those are brought into a paste and stuffed into cattle intestinal casings and submitted to a dry smoke process, usually for no longer than eight days. A wide variety of microorganisms have already been isolated from *Alheira*, including lactic acid bacteria (LAB), and pathogens, such as *L. monocytogenes* [1]. Research on bacteriocins produced by LAB, has led to consideration of their use as natural preservatives in meat products [2]. The use of HP to reduce microbial loads has already shown great potential in several products, including meat [3].

Experimental Procedure

Alheira paste was inoculated with *L. innocua* and *Pediococcus acidilactici* with bacteriocinogenic activity against *L. Innocua* (both strains 10^7 CFU/g). This mixture was stuffed into artificial casings (ca. 5 g, 28 mm diameter) and further vacuum packed. Small *Alheiras* were then submitted to HP treatment (500 MPa, 5 min, 10 °C), in duplicate, followed by refrigerated storage (4 °C, the recommended storage temperature for final product). From each duplicate, three replicate samples of 1g were taken during several storage days (0, 2 , 7, 14, 28, 60). Non-processed and processed small *Alheiras* were analyzed concerning the enumeration of i) *L. innocua* in ALOA medium, ii) *P. acidilactici* in MRSA and iii) Total Viable Counts in TSA.

Results & Discussion

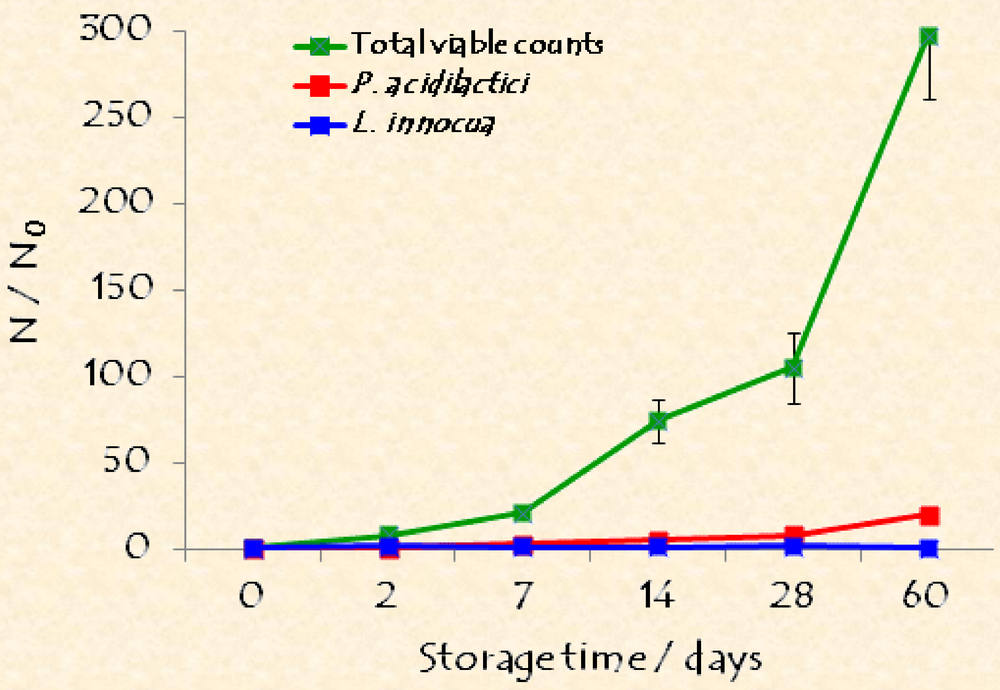

Figure: 1 The effect of storage time under refrigeration in non-processed *Alheiras*. (The error bars indicate the standard deviation.)

- Concerning non-processed small *Alheiras* and with the exception of total viable counts, no differences during the storage period were observed in the enumeration of *L. innocua* and *P. acidilactici* (Figure 1).

- The applied HP treatments seemed to destroy *L. innocua* up to values admissible by European Regulamentation (10^2 CFU / 25g of product).

- Just after HP, total viable counts had a decrease of 3.5 log CFU / g when compared to non-processed samples.

- According to Table 1, in processed samples and up to 60 days of refrigerated storage, *L. Innocua* counts were kept at admissible values.

Table: 1. The effect of storage time under refrigeration in HP treated small *Alheiras*.

Storage time (days)	Total Viable counts (Log CFU/g)	*P. acidilactici* (Log CFU/g)	*L. innocua* (Log CFU/g)
0	3.0±0.1	<2.2*	<2.2*
2	3.2±0.2	<2.2*	<2.2*
7	3.2±0.1	<2.2*	<2.2*
14	3.7±0.1	<2.2*	<2.2*
28	4.0±0.2	3.1±0.0	<2.2*
60	4.1±0.1	3.5±0.3	<2.2*

* Values lower than the limit of the enumeration technique.

Conclusions

- From the obtained results, HP seemed to be the main factor that contributes to maintain *L. Innocua* under the admissible values.

- Further studies at lower pressure values are required in order to evaluate the simultaneous effect of pressure and bacteriocinogenic LAB on the survival of *L. innocua* in *Alheiras* under refrigerated storage.

References

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