

Microbiological and physicochemical characterization of “innovative” *alheiras*



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PORTO



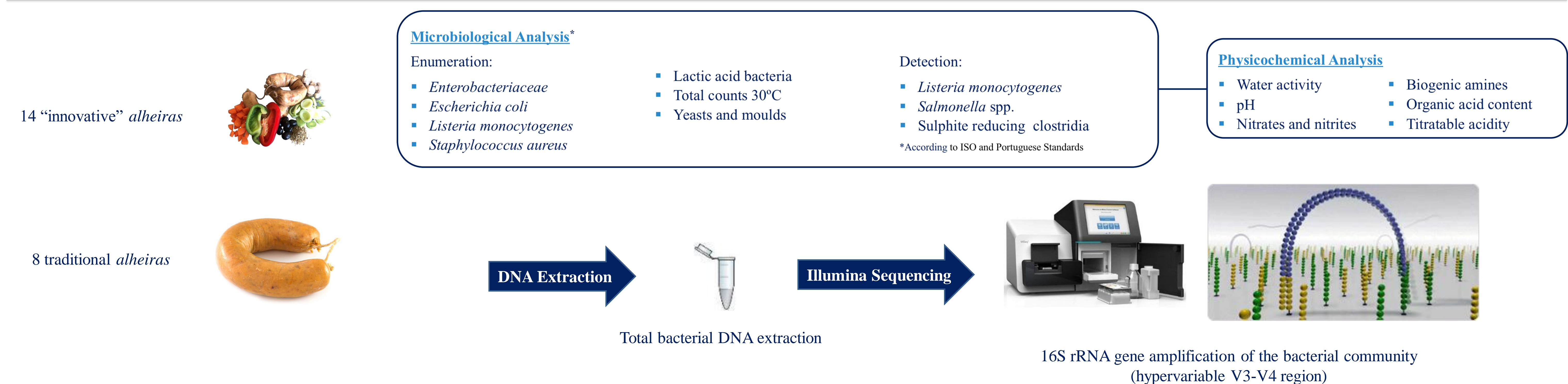
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Introduction

Alheira is a well-known Portuguese fermented sausage traditionally made with pork and/or poultry meats [1]. In response to nutritional and health concerns, the food industry has begun to offer a wider variety of products that reflect changing consumer preferences. In addition to traditional *alheiras*, made with pork and/or poultry meats, other varieties (“innovative”) made from codfish, mushrooms, tofu, soy and vegetables have been appeared in the market to meet different preferences of consumers. Even though there is already extensive scientific knowledge on fermentation and behavior of pathogens in traditional *alheiras* [2-4], to our knowledge, detailed characterization of these “innovative” products is not available in the scientific literature.

Therefore, the main objective of this study involved the characterization of 22 *alheiras*, including fourteen “innovative” products and eight corresponding traditional *alheira* (produced by the same company), regarding their microbiological and physicochemical characteristics. Metagenomic approaches were also used to evaluate the microbial diversity on different *alheira* matrix in order to help us to characterize pathogenic organisms and lactic acid bacteria often present in fermented meat sausages.

Methods

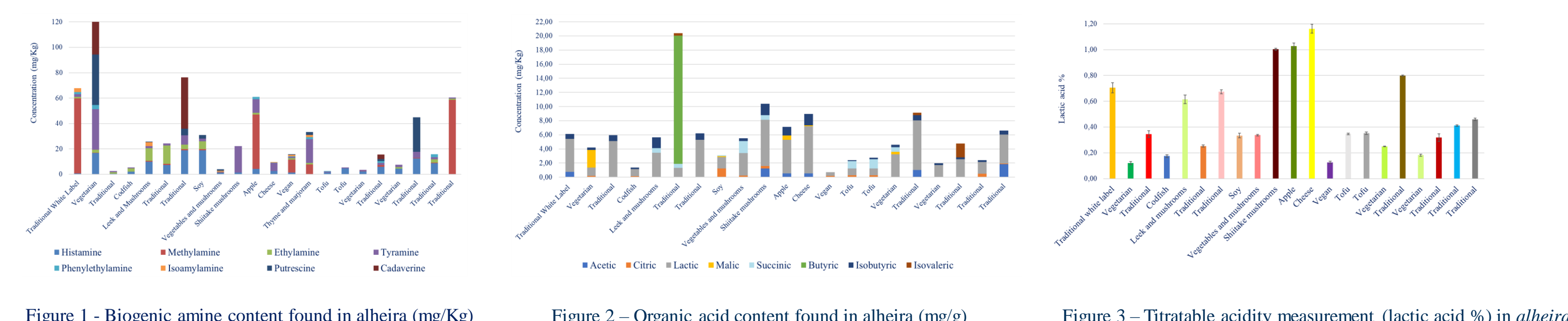


Results

Microbiological Analysis

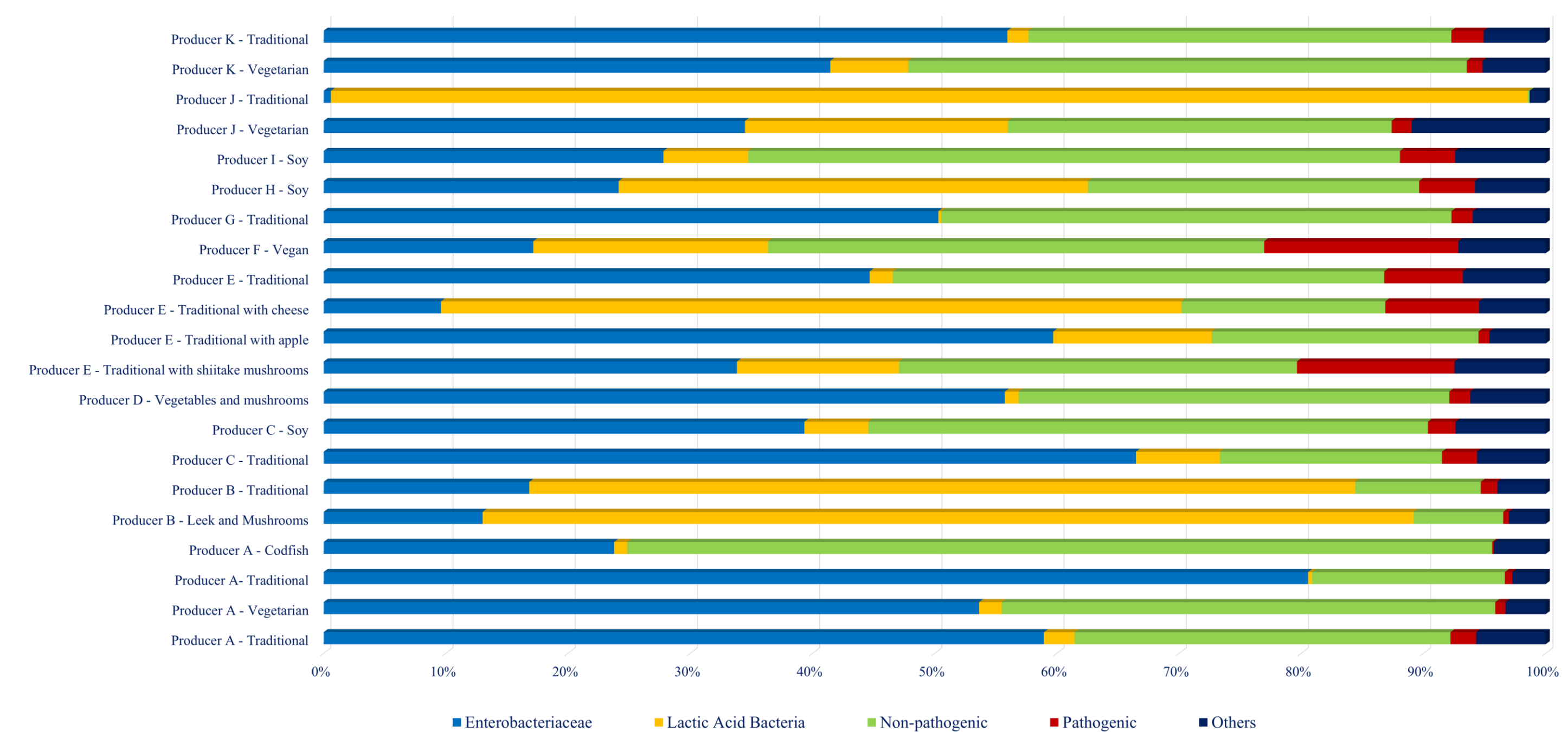
- *E. coli* and *S. aureus* were below the detection limit of the enumeration technique and *L. monocytogenes*, *Salmonella* spp. and sulphite reducing clostridia were not detected in “innovative” *alheiras*
- In traditional *alheiras*, *E. coli* was found in 6 samples (between 0.8 and 3.4 log cfu/g) and *L. monocytogenes* in 3 samples (between 2.3 and 3.8 log cfu/g)
- Total counts at 30 °C, lactic acid bacteria and enterococci counts were very similar in both *alheira* types, ranging from 5.7 – 9.9, 5.4 – 9.9 and 1.5 – 8.2 log cfu/g, respectively
- No microbiological growth was detected in vegan and tofu *alheiras*
- Variability was observed between producers and even between lots

Physicochemical Analysis



- Water activity, pH and nitrites/nitrates showed were not significantly different for all the analyzed samples
- A great variability was observed in the biogenic amines content in *alheiras* from different producers
- Lactic acid was the dominant organic acid in most of the samples

Metagenomic Approach



Conclusions

- Foodborne pathogens were not found on any “innovative” *alheiras*
- Water activity and pH levels were insufficient to assure microbiological safety of the analysed *alheiras*; nitrites, nitrates, biogenic amines and organic acids levels were found to be within accepted limits for this kind of product
- *Lactococcus*, *Lactobacillus*, *Alcaligenes*, *Bacillus* and *Escherichia* were the main genera found with no significant differences between traditional and “innovative” *alheiras*
- Even though *Enterobacteriaceae* were found in all samples, lactic acid bacteria were still present in higher amounts as they have shown to play an important role in production of numerous fermented sausages
- Non-pathogenic bacteria were found in superior numbers than pathogenic bacteria
- Most traditional *alheiras* presented higher contamination by *Enterobacteriaceae* when compared to “innovative” *alheiras*

References

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