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Meat and Muscle Biology™

Use of Beaker Sausages Models to Evaluate Starter Culture for Use in Salami with Reduced Sodium Contents

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Objectives

Evaluate the growth and proteolytic activity of strains *Pediococcus pentosaceus* and *Staphylococcus xylosus* to be applied as starter culture in fermented sausage production with reduced sodium contents, using an in vitro Beaker Sausage model.

Materials and Methods

Beaker sausages (BS) models comprised pork *Longissimus dorsi* (70%) and beef *Semimembranosus* (30%) muscles. In this models, we added some additives: sodium nitrite (0.015%), sodium nitrate (0.015%) and sodium erythorbate (0.05%), which were sterilized by filtration (0.22 µm), and NaCl (1.0%), KCl (0.25%) and $CaCl_2$ (0.25%), glucose (0.75%), and sucrose (0.75%) were sterilized by autoclave. Two treaments were prepared ($N = 3$): a batch with commercial starter culture constituted by *P. pentosaceus* and *S. xylosus* (lyophilized powder, 1:5 w/v; BS- Csp) and un-inoculated control with antibiotics (BS- Control). Portions of 30 g were added on sterile polyethylene tubes and incubated at 22°C. Three replicates were assayed and samples were collected on 0, 3, 6, and 10 d of incubation and analysis of bacterial counts, pH measurement, and free amino acids by RP-HPLC were performed performed.

Results

After inoculation and fermentation, the beaker sausages showed an optimal growth of *P. pentosaceus* producing a desired pH decrease (Fig. 1). The acidic environments produced as consequence of LAB fermentation could promote protein degradation by activating muscle proteases. However, high concentration of lactic acid and lower pH inhibits *S. xylosus* (CNS) growth, but in this study showed optimal counts of this strains and high free amino acids concentration after 10 d of incubation. High concentration of *S. xylosus* are highly important for fermented meat products because this type of microorganism contributes to formation of flavor and taste. We observed that low sodium chloride concentration did not influence the performance of this strains combination. After 10 d of incubation, BS- Csp had the greatest increase of total free amino acids, approximately 79% of these amino acids between 0 and 10 d of incubation (Fig. 2). When the BS inoculated was compared to BS-Control, there was great influence of the starter cultures in the model studied, because they produce significant 3 to 4 times more amino acids than the control did. In the case of the producing matured salamis with reduced Na content, there is greater interest in the production of amino acids related to the flavor that can mask or hide the metallic taste produced by the addition of substitute chlorides, particularly with K chloride. In addition, the BS- Csp had a greater production of amino acids, which is more related to flavor, such as Glu, Ala, Val, Leu, and Lys, showing that this combination of strains had a higher performance in producing flavor-related amino acids in the conditions proposed in this study.

Conclusion

The study using the proposed technique for BS, simulating fermentation and maturation of meat matrices with low content of Na chloride. This model is a preliminary tool to evaluate and select strains to the use in fermented products. The low concentration of chloride

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and the use of this strains combinations had an additional positive effect regarding the production of amino acids. Further studies should be conducted to evaluate benefits of these protein degradation products on the aroma of developing products with low Na content.

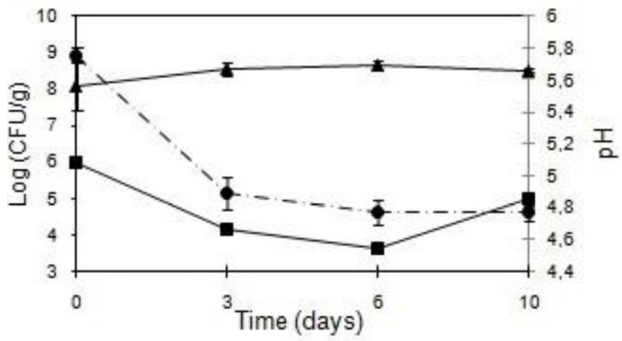

Figure 1. Microbial counts and pH of breaker sausage model (BS– Csp) during 10 d of incubation at 22°C. LAB (■■■), CNS (■■■), and pH (dash dot).

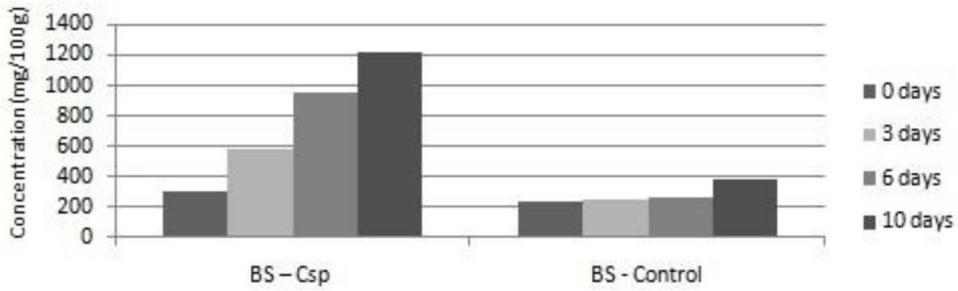

Figure 2. Free amino acid profile in BS in study on 0, 3, 6, and 10 d of incubation. **[AU: Figure was not supplied in original document.]**

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