INFLUENCE OF THE STARTER CULTURE ON THE AMINOPEPTIDASE ACTIVITIES OF FERMENTED SAUSAGES

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Background

Much of the research carried on muscle proteinases has been concentrated on endoproteinases. In this sense, there is evidence of the Calpain system key role in meat tenderization (for review see: Roncalés et al., 1995). The central contribution of lysosomal proteinases to proteolysis taking place throughout the process of dry cured ham, one of the meat products of greatest commercial value in Spain, is well documented (Sárraga, 1992; Toldrà, 1992; Parreño et al., 1994).

There are few data about the role of exopeptidases in protein degradation of meat and meat products. Hortós and García Regueiro (1991) reported a substantial increase in amino acids during the curing of ham. Aminopeptidases degraded peptides by removing single amino acid residues sequentially from the N-terminus and are responsible for amino acid generation during the processing of pork meat and contribute to flavor development (Toldrà et al., 1992). Therefore, the activity of these enzymes could be strongly involved in the quality of the final product

The aim of this study was to evaluate the effect of the addition of different starter cultures on the activity of the most characteristics muscle aminopeptidases of fermented sausages

Material and Methods

Four groups of sausages were manufactured. Three of them contained the following starter cultures and the fourth was manufactured as a control group: *Staphylococcus carnosus* LTH 2102 was used as a comercial starter culture. *S. xylosus* CTC 3037 and *S. xylosus* CTC 3050 were selected because of their proteolytic and lipolytic characteristics (Roca, 1997).

Three samples of each group were analysed at different times of processing: 0, 1, 3, 7, 14 and 21 days from the beginning of the process. Sample extracts were prepared according to the method of Lauffard and Mantle (1988).

The activities of Leucyl, Arginyl, Tyrosyl, Alanyl and Pyroglutamyl aminopeptidase were assayed fluorimetrically according to Toldrà et al. (1993) with some modifications. 2.5 µM of L-leucyl NHMec (Bachem), L-arginyl NHMec (Bachem), L-tyrosyl NHMec (Sigma), L-alanyl NHMec (Bachem) and L-pyroglutamyl NHMec (Bachem) were used as substrates. All enzymes were incubated at 37 °C for 30 min. One unit of activity was defined as the amount of enzyme hydrolysing 1 nmol of substrate per min at 37 °C, and specific activities were expressed as units per mg of protein (U/mg prot).

Results and Discussion

The acceleration ripening of fermented sausages, without any loss in sensory quality, can be achieved by adding starter cultures. *S. xylosus* CTC 3037 and *S. xylosus* CTC 3050 have demostrated to be usefull as starter cultures with lipolytic and proteolytic properties *in vitro* (Hugas and Roca, 1997).

Fig. 1 and 2 showed the evolution of aminopeptidase activities determined during the ripening of fermented sausages. No differences between the individual starter cultures and the control samples (without starter culture) were observed. Pyroglutamyl aminopeptidase activity was not detected in any of the different groups.

In general, aminopeptidase activities increased during the first steps of the ripening. Arginyl aminopeptidae and leucyl aminopeptidse showed an important peak of activity at 24 hours. Tyrosyl aminopeptidase activity determined from fermented sausages added CTC 3037 and CTC 3050 presented this increase of activity at the third day from the beginning of the ripening. Arginyl aminopeptidase showed a continous increase of activity during the first week of the processing. A gentle slope of activities was detected from seventh day to the end of the ripening in all the samples studied.

It is worth mentioning that the evolution pattern of aminopeptidase activities corresponded to the increase of Micrococcaceae and Acid Lactic Bacteria growth displayed by these samples (Roca, 1997). Besides, the increase of pH occurred during the fermentation step of the process could contribute to enhance the activities of these exopeptidase.

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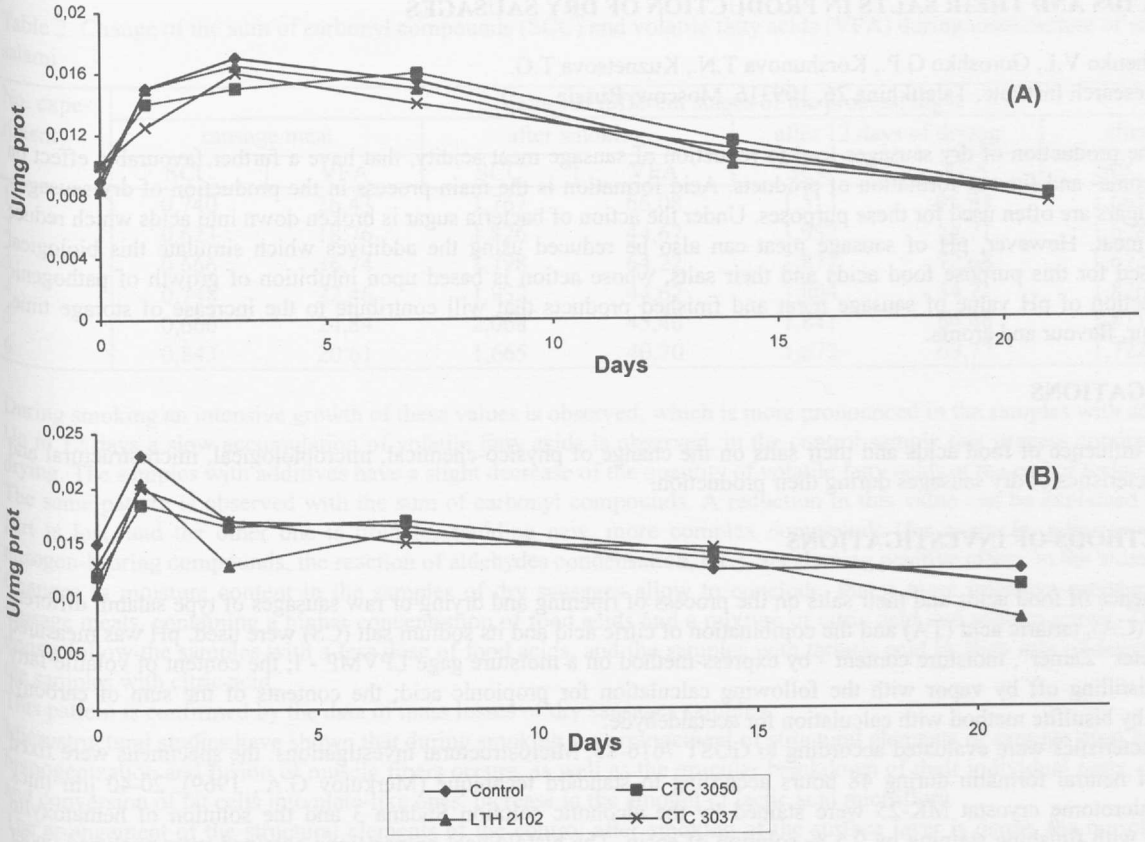

Fig. 1. Alanyl aminopeptidase (A) and Leucyl aminopeptidase (B) activities throughout the ripening of fermented sausages elaborated with different starter cultures

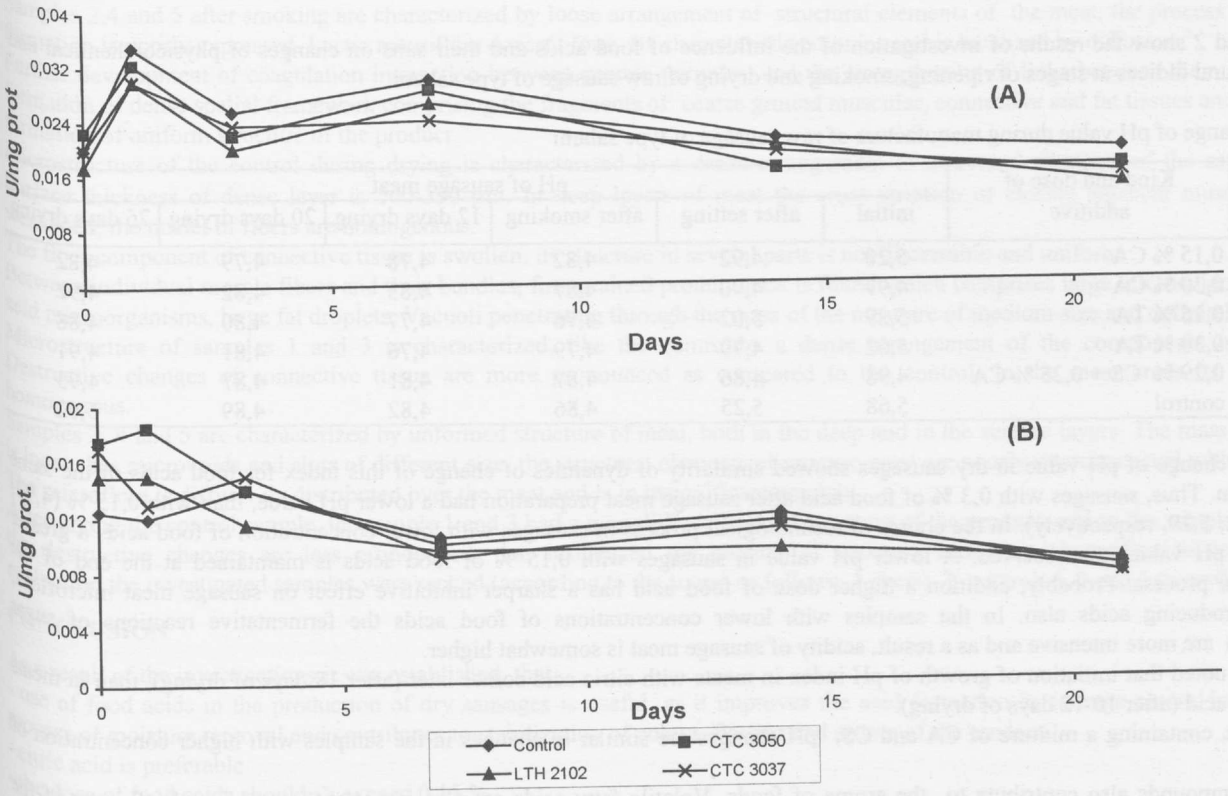

Fig. 2. Arginyl aminopeptidase (A) and Tyrosyl aminopeptidase (B) activities throughout the ripening of fermented sausages elaborated with different starter cultures