

STUDY OF SOME CHANGES THAT OCCUR DURING MEAT FERMENTATION

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Abstract

Dry-fermented sausages and dry-cured ham, constitute one of the most representative traditional foods represents meat products, which have a high variety of flavors and textures, represent an important part of local economies, particular cultures and gastronomic heritages.

Purpose of this paper is to present present comparative physical, chemical and biochemical changes that occur during maturation of three products maintained under the same conditions: Plescoi sausages, Chorizo salami and Prosciutto. The drying removes 38,8 to 58,8%, while amino acids content increased between 1.87 and 2.52 times. pH variation was small because fermentation without starter was chosen.

Keywords: meat products, ripening and drying, pH, amino acids.

INTRODUCTION

As shown by Brown (2003) and Bogdan (2010) demand for meat has increased and this innate hunger for animal protein, which occurs in any society, raised global demand for meat every year for the past 40 consecutive years.

The production of fermented foods is one of the oldest food processing technologies known to man (Nollet, 2006). Raw-dried meat products are frequently obtained from pork, beef or sheep meat and they are presented as minced meat or entire piece. Three products can be given as examples to cover this range of products: Plescoi sausages, Chorizo salami and Prosciutto.

Numerous articles shows physicochemical and biochemical changes that occur during maturation of meat. In dry-cured products, one of the main factors affecting final product quality is proteolytic activity, which depends on many factors, such as pH, water content, NaCl content and drying conditions (Arnau et.al. 1998; Zhao et al., 2008). Free amino acids are generated by proteolysis during the processing of dry-cured meat products and can thus serve as an indicator of maturation. They are also known to be related to the development of a particular taste, flavour or aroma like saltiness, acid taste, aged/dry-cured taste, bittertaste, etc (Sforza et.al., 2001) In this material, follow these changes for Plescoi sausages, Chorizo salami and Prosciutto, the three above mentioned meat products, which were stored in similar condition.

MATERIALS AND METHODS

All materials were stored in a refrigerator at a temperature of 4⁰C until processing. Plescoi sausages recipes was: sheep meat 55%, beef 40%, spices 2.4%, mixture of curing 2.6%. Chorizo is found in many varieties, some with special association. Recipes in this case was: lean pork 74%, fat 14%, water 4%, salt and nitrite 2,6% and spices 4,4%.. For these two products filling was done in natural pork casings. For the third product, Prosciutto, the green hams without rind and external fat was salted using dry salt and was placed in a tray. After 6 days exudates water was removed and the ham was suspended. All products were ripened and dried by storing in the refrigerator at a temperature of 4⁰C in order to maturation Water content was determined as SR ISO 1442:2010 and pH as SR ISO 2917:2007. For amino acids content methods of analysis were those described by Banu et al (1984).

RESULTS AND DISCUSSIONS

Sausages are usually made from lean pork, mixtures of pork and beef, or solely beef. Some other animal species may be used depending on the type of product and geographic location like Plescoi sausages which are a Romanian sausage made from mutton spiced with chili peppers and garlic.

During the technological process of fermented meat products, physicochemical and bioche-

mical processes occurring. These processes are influenced by product type (chopped or whole piece), the product recipe, operations and parameters of technological process.

Among the physicochemical processes, variation of water content and pH were studied (Figure 1 and Figure 2).

As expected in all cases humidity decreased over time. In case of, minced meat products, drying was more intense because the two products were permanently suspended. Drying speed, expressed as moisture variation in time, is higher in the early days, and it was 3.2 for Plescoi sausage, and 3.45 for Chorizo after the first 6 days. After 30 days, the drying rate drops, reaching 1.3 respectively 0.95.

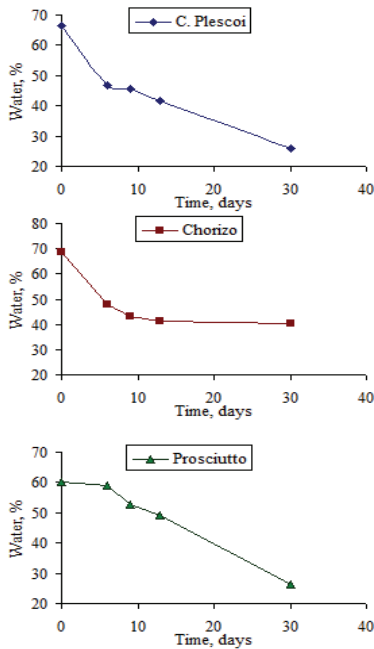


Figure 1. Time variation of moisture content for three products: Plescoi sausage, Chorizo salami and Prosciutto

Previously (Toldrá, 2004) has been pointed that the reduction of water activity is slower in those sausages containing beef because this type of meat is more resistant than pork in the process of desiccation. This was observed for Plescoi sausages just for the first six days, but a second explanation is that, for Chorizo composition meat and fat was used. This may explain why the percentage of water after 30 days is higher in Chorizo than in Plescoi sausages.

For Prosciutto initial water losses were lower because green ham was placed in the tray, in which the water exudate has accumulated under the action of salt water from the meat surface.

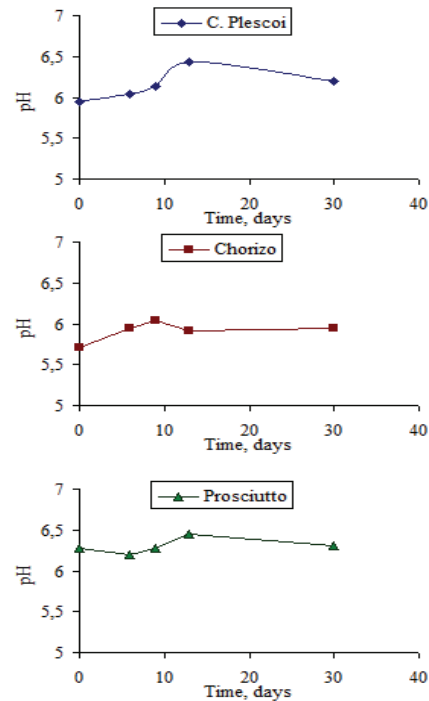


Figure 2. Time variation of pH for three products: Plescoi sausage, Chorizo salami and Prosciutto

The rate of water loss depends on pH. In case of the studied products, microbiological processes take place only under the action of spontaneous microflora.

As shown in Figure 2, the pH varies in narrow limits, and for all three products is found that in general it increases.

The pH can rise during the ripening and drying due to the buffering action of proteins as well as the enzymatic formation of nonprotein nitrogen basic compounds and ammonium ions. Among the biochemical processes, proteolysis and lipolysis are important. In the present paper only variation in free amino acids content has been assessed. They are formed mainly by the action of enzymes in meat. Dipeptidases, aminopeptidases and carboxypeptidases acts on dipeptides, peptides (amino termini), respectively peptides (carboxy termini) to form mainly free amino acids. These substrates for enzymes

mentioned above, results from the action of other enzymes involved in proteolysis such as endopeptidase and exopeptidase. Among the aminopeptidases and carboxypeptidases, it was shown that the first act to a higher pH environment, while carboxypeptidases have an optimal activity at acidic pH (Toldrá and Flores, 1998; McDonald and Barrett, 1986).

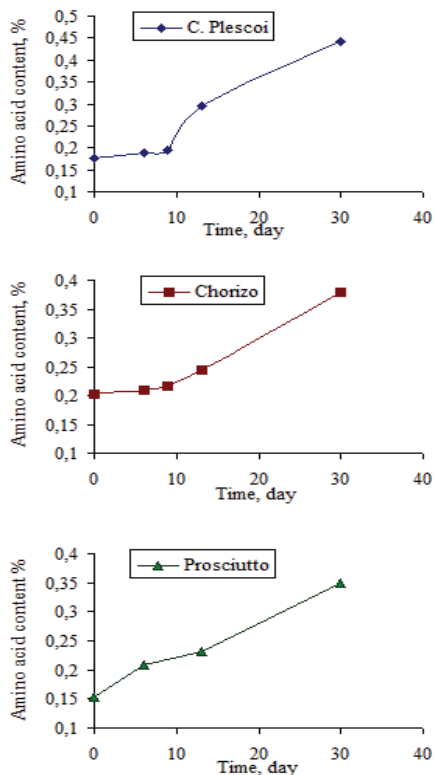


Figure 3. Time variation of amino acids content for three products: Plescoi sausage, Chorizo salami and Prosciutto

Free amino acids content increases for all three products, but in the first few days is more in Plescoi sausage and in Prosciutto than in Chorizo. This can be explained by the fact that initially Chorizo salami has a pH slightly smaller than the other two products. (Figure 3.) Rapid growth of the amino acid content is higher in sausages Plescoi because they have in composition, only minced meat (60% sheep meat and 40% beef) in comparison with Chorizo which contains 84% meat and 16% lard. The small increase in the content of amino acids for Prosciutto registers as the meat, remained whole piece.

CONCLUSIONS

Composition varies widely due to the number of fermented product types. The major factors influencing composition of the finished product are the composition and ratio of raw materials used, processing procedures utilised, and the intensity of drying. After 30 days of ripening and drying, moisture in products that are made from lean meat is lower (25.8% in sausage Plescoi and 26.3% in Prosciutto) than in Chorizo, which additionally contains lard. The lowest value of the final pH, namely 5.94 was obtained for Chorizo. The highest content of free amino acids, 0.441%, which indicates a more intense enzymatic activity, was recorded for Plescoi sausages, which are obtained only from lean minced. These results will be compared in the future with those obtained if using starter cultures.

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