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SOME PARAMETERS OF DRIED PORK PRODUCED WITH LOWER SALT CONTENT

Slobodan Lilić* (1), Nikola Stanišić (2), Dragica Karan (1), Mladen Rašeta (1), Ivana Branković (1), Jelena Jovanović (1), Mirjana Lukić (1)

(1) Institute of meat hygiene and technology, Belgrade, Kacanskog 13, Serbia
(2) Institute for animal husbandry, Belgrade-Zemun, Autoput 16, Serbia

*Corresponding author
Phone: +381 11 2650-722
Fax: +381 11 2651-825
E-mail address: slobo@inmesbgd.com

ABSTRACT; Production of meat products with lower salt/sodium content is the goal of today's meat industry because of bad influence of exceed sodium intake by food. In this paper are presented some physico-chemical parameters during processing of dried pork produced with lower salt content. Pork (*m. longissimus dorsi*) was cured with nitrite curing salt in amount of 3 kg/100 kg of meat. In meat were measured the weight loss during curing and drying; moisture content by standard method SRPS ISO 1442:1998, water activity using aw-meter (Wert-Messer, Durotherm) at temperature of 25℃; and pH value by pH-meter (MA-5730; PAT N° 35398, Iskra) according to SRPS ISO 29 17:2004. Average moisture content in dried meat at the end of production was 40.10%. Average weight loss was 2.39% after 7 days of production (after curing) and it is increased up to the end of production, average 34.57%. Acidity of meat during curing, smoking and drying was similar; pH value was around 6.00. Water activity was gradually decreased from average 0.985 after curing (7^{th} day) up to 0.899 at the end of production. During the storage of dried meat under vacuum conditions, pH value decreased from 5.43 in the final product up to 5.11 at the end of storage (120^{th} day). These values are characteristic for curing, drying and fermentation of meat. Dried meat was shelf stable for 120 day under vacuum conditions, without signs of rancidity and without changes in other sensory attributes.
Key words: *dried pork, low salt content, weight loss, water activity, pH value*

INTRODUCTION

Sodium chloride (common salt) is essential ingredient in meat processing which contributes the saltiness (taste), water holding capacity of meat and consequently to textural characteristics (Ruusunen i Poullane, 2005). In modern meat processing, sodium chloride is added mostly through nitrite curing salt. Curing salts with sodium and potassium nitrate are mostly disappeared from industrial meat production, but sometimes they are used in the house-hold manufacturing of dried meat. Salt diffusion in meat and meat dehydration (drying) are common processes but sometimes it is difficult to control them (Arnau et al., 1995).

The first stage in the dry meat processing is dry curing at low temperature, mostly up to 5℃. Curing lasts different time, depending on s hape and size of meat. Curing lasts shortly if meat size is small and at higher temperature; it is also depended on relative humidity (Fantazzinia i dr., 2005). Salt diffusion is key process in dry meat production and solubility of salt on the meat surface is the first factor which regulates salt penetration in meat (Sörheim i Gumpen, 1986; Gil i dr., 1999).

Meat is cured traditionally with 6% of common salt or nitrite curing salt. Present trend in the nutrition is reducing the salt content in meat products, as reported by Ruusunen and Puolanne (2005). According to mentioned the goal of this paper was to investigate some physico-chemical characteristics of dried pork produced with lower salt content, during the curing, drying and storage under vacuum conditions.

MATERIAL AND METHODS

The material in this paper was pork (*m. longissimus dorsi pars thoracis*) originated from white pigs, six months old, with live average weight of 100 kg. After chilling the meat was treated with following mixture: 950 g of nitrite curing salt and 50 g of sucrose, in the amount of 300 g per 10 kg of meat. Curing lasted for 7 days and after that meat was smoked for next 7 days. Process of drying and ripening lasted for 14 days. Final products were packed in PA/PE bags under vacuum conditions and stored at room temperature for 120 days.
Samples for examination were taken on the first day of production (fresh meat), after curing and after 14^{th}, 21^{st} and 28^{th} day of production (final product). In these samples were determined weight loss calculated from differences in the mass of meat during curing, smoking and drying on the scale with sensitivity of 10^{-3}. Moisture content was determined by standard method SRPS ISO 1442:1998; water activity using a_w-meter (Wert-Messer, Durotherm) at temperature of 25℃; and pH value by pH-meter (MA-5730; PAT N°35398, Iskra) according to
SRPS ISO 2917:2004.

RESULTS AND DISCUSSION

The results of weight loss and moisture content of meat are presented in Figure 1. Average moisture content in meat was 77.85%. After curing, moisture content in the superficial layer was 71.59% and in inner part of meat 70.17%. After smoking (14^{th} day of production), moisture content is decreased up to 58.16% in the superficial layer and up to 49.71% in the inner part of meat. During drying of meat (21^{st} day of production), moisture content is also decreased up to 57.20% in the superficial layer of meat and up to 37.72% in the inner part of meat. At the end of production, moisture content was 40.10% in whole dried meat. Consequently to decreasing of moisture content in meat, it was increased weight loss, from 2.39% ± 0.58 in meat after curing up to 34.57% ± 1.48 at the end of production. There are common processes during the dried meat production and according to Incze (1992), the weight loss at meat drying could be very various, from 40 up to 50% and moisture content can be very low (18-22%).

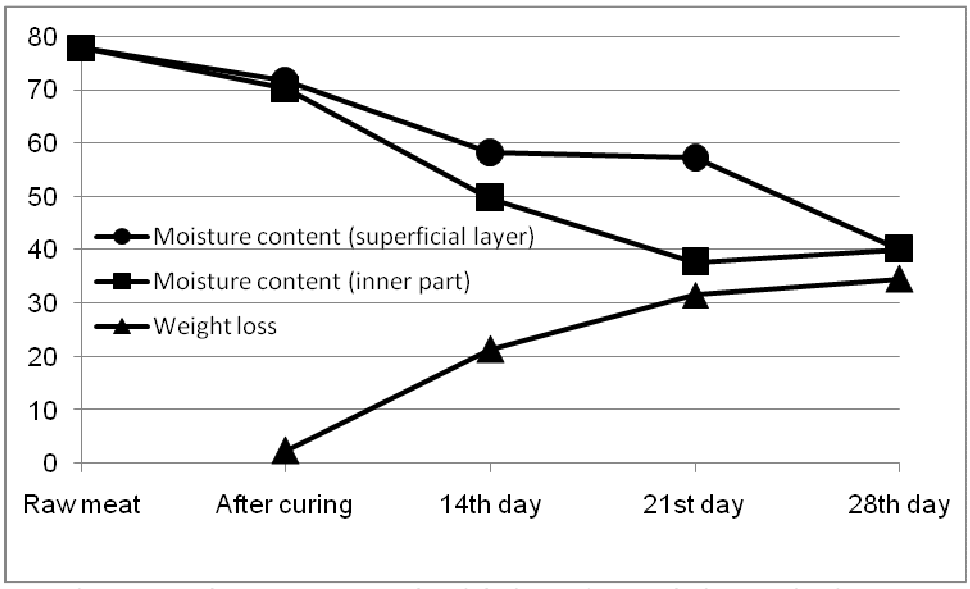

Figure 1. Moisture content and weight loss of meat during production, %

Results of pH value in meat in the different stages of the production are presented in Figure 2.
Value of pH in fresh meat was average 5.83 ± 0.06 and was similar on 7th, 14th and 21st day of production, 5.90 ± 0.09, 5.91 ± 0.07 and 5.86 ± 0.05, respectively. Obtained results for fresh meat are in the accordance with results of Dzierzynska and Pospiech (1989) which cited that pH value of fresh pork is 5.67-5.84 and with the results of Severini et al. (1989) which cited that pH value is 5.48-5.84 in fresh meat after 24 hours of slaughtering.
At the end of production, pH value was decreased up to 5.43 ± 0.01, mostly due to smoking and the influence of organic acid from the smoke. This result is in the accordance with results of Liepe and Porobic (1985) which stated that pH value is 5.30-6.25 in dry hams and with the results of Leon Crespo et al. (1982) that cited pH value of 5.30-5.95 in dry hams. Bellati et al. (1983) cited higher pH value in traditionally produced hams (6.00).
Average pH value in meat after 60 days of storage under vacuum conditions was 5.22 ± 0.05 and after 120 day of storage 5.11 ± 0.05. Lower pH values during the storage under vacuum conditions are the result of activity of lactic acid bacteria that are presented in dried meat in vacuum packaging due to their possibility to survive under microaerophylic and anaerobic conditions. Furthermore, in the curing mixture was added sucrose that was presented source for the growth of these bacteria.

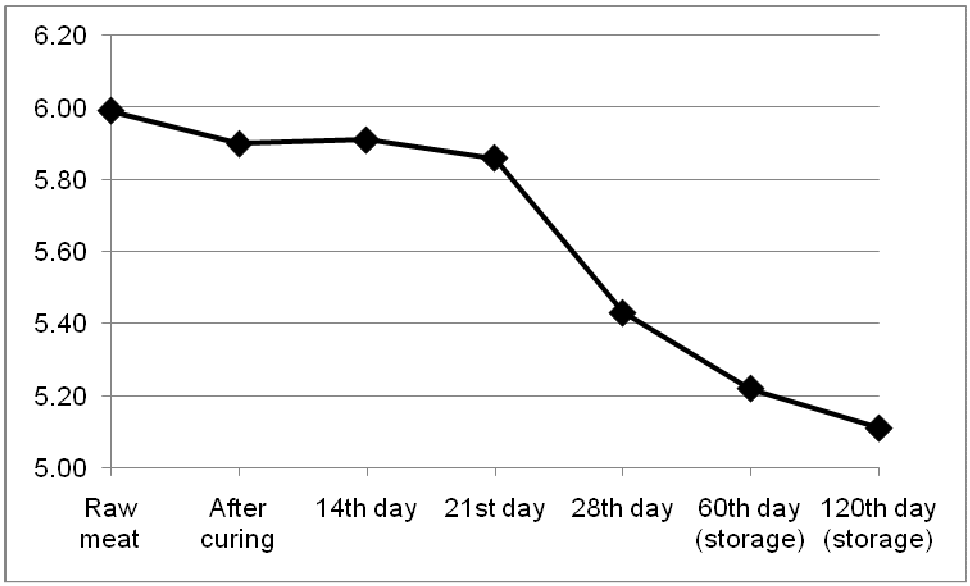

Figure 2. Changes of pH value during production and storage of dried pork

During the curing, smoking and drying, water activity in meat is decreased accordingly with physico-chemical processes (dehydration of meat). Results of the changes of water activity in meat during production are presented in the Figure 3. Average a_w value in fresh meat was 0.992 that decreased after curing (7th day of production) up to 0.985 ± 0.002. After smoking and drying (14th and 21st day of production), a_w value was decreased up to 0.950 ± 0.008 and 0.936 ± 0.009, respectively. At the end of production, a_w value was 0.899 ± 0.004. Obtained results are higher than the results of Leon Crespo et al. (1982) which cited that average a_w value in Jabugo ham of 0.83 (0.75-0.88), but in the accordance with results of Ventanas et al. (1989) which stated a_w value 0.90-0.96 and Molina et al. (1989) which cited that a_w value was 0.83-0.95 in the slow process and 0.87-0.93 in the fast process of the production of dry Iberian ham.

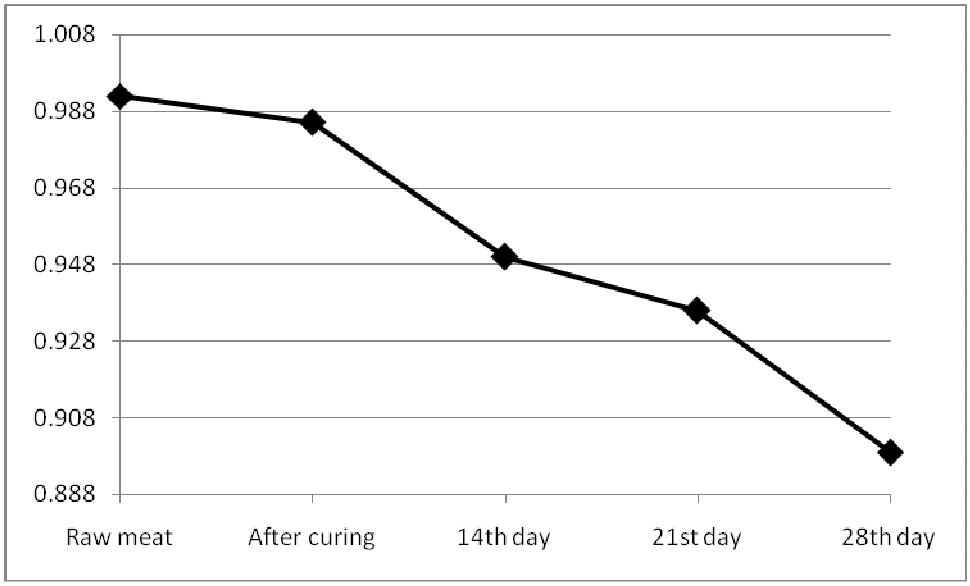

Figure 3. Water activity in dried pork during production

CONCLUSIONS

Moisture content of meat is decreased during the production, while weight loss is increased at the end drying, these values were similar (40.10% and 34.57%, respectively)
Water activity is decreased during drying up to 0.899 at the end of production.
Values of pH were similar during the production (approximately 6.00), but they are lower during the storage of products under vacuum conditions due to the activity of lactic acid bacteria that are presented in the first period of storage.
Lower salt content did not influence mentioned parameters in the comparison with the results of investigation of similar products produced with higher salt content.

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