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Sensory and nutritive quality of fermented dry sausages produced in industrial conditions

A. Kuzelov[1]*, O. Savinok[2], T. Angelkova[3], M. Mladenov[4], D. Naseva[1]

[1]Department of Food Technology and Processing of Animal Products, Faculty of Agriculture, University Goce Delcev, 89 Goce Delcev, 2200 Stip, Republic of Macedonia
[2]Department of Technology of Meat and Meat product, National Akademy of Food Technology, 112 Kanatnaja, 65039 Odesa, Ukraine
[3]Department of Tourism, Faculty of Tourism and Business Logistics, University Goce Delchev, 7 November, 1480 Gevgelija, Republic of Macedonia
[4]Meat Industry, Industrial Zone bb, 2220 Sveti Nikole, Republic of Macedonia

Abstract. *The paper investigates the sensory and nutritional quality of two groups of dry sausage produced in industrial conditions. The first group was produced with the addition of the nitrite salt and glucono delta lactone (GDL) and fibbers and another group with the addition of nitrite salt starter culture. Analysis of the results obtained in this study it was found that better quality sensory had tea sausage produced with the addition of a GDL. As for the quality nutritive no statistically significant differences with both groups of sausages.*

Keywords: tea sausage, industrial production quality, chemical composition, starter culture

Introduction

Before about a quarter of the century in the Balkans with different success people began to use different products such as glucono delta lactone (GDL), Tari S 77 which is mixture of GDL salt vitamin C and starter cultures. It is known that these agents are used in the production of quickly fermented raw sausages whose structure and organoleptic properties depend on the character and degree of fermentation, which today are produced in controlled industrial conditions with accelerated processes to high temperatures to 22ºC. So today's fast raw fermented sausages in some way for the application of new additives have undergone changes in the qualitative properties of the finished product so today they are different from the former raw sausages which were produced in a classical way. In Republic of Macedonia the production of raw dried permanent fastly fermented sausages in industrial conditions began about 20 years ago.

The sensory and nutritional quality and the other properties of fast fermented sausages depends on the choice and quality of basic ingredients, the metabolic activity of existing microorganism, chemical and physical changes during drying and smoking, enzymes breakdown of protein and fat, external factors (temperature, relative humidity, air circulation), duration of ripening etc. (Wirth, 1986; Radetić, 1997; Toldra, 1998; Virgili et al., 1999; Vuković, 2006). The most famous sousage in our country of this group of sausages is tea sausage (Tojagic, 1996; Radetić, 1997; Kuzelov, 2008). Also many authors have studied the microbiological and nutritional quality of the permanent fast fermented sausages (Ambrosiadias et al., 2004; Morrettia et al., 2005; Turubatović et al., 2004; Cocolin et al., 2005; Gaspark-Reichardt et al., 2005; Karolyi et al., 2005; Turubatovic and Tadić, 2005; Vesković-Moračanin, 2007).

The aim of our examination is to determine the sensory and nutritional quality of the permanent sausages produced in industrial conditions.

* e-mail: aco.kuzelov@ugd.edu.mk

Material and methods

As material for our examination we have served two groups of fast fermented sausages in the type of tea sausages. The first group of tea sausage (group A) is produced of beef - second category of meat, pork meat - second category of hard fat with addition of nitrite salt GDL and fiber and spices. The second group of tea sausage is produced from beef - second category, pork-second category hard fat with addition of nitrite salt, spices and starter cultures (group B).

First we put the chopped peaces of firmly fat tissue (TMT) in cuter, than the cooled beef and pork - second category is added to previously chopped in minor granulation of 20mm, nitrite salt for curing and other supplements and additives in sausage GDL group A and fiber and the sausage from the group B starter cultures. After achieving of the necessary granulation of the basic ingredients Ø - 8 mm and their homogenization mixture was stuffed into artificial wrappers Ø 34-36mm. The temperature of the mixture was 1.2ºC. Sausages are hand steamed and attached to metal bars and carts. Then the sausages are smoky in classical smokers. The process of drying maturing and smoking lasted 19 days. After maturation chemical and sensory examination of both groups of sausages was made. The proteins were examined by the method of Kjeldahl, fat - by the method of Soxhlet, mineral substances after the mineralization of the samples in muffle oven in the temperature of 550-650 ºC and water by the method of drying.

Examination of the sensory properties of sausages (appearance, color appearance of the intersection, coherence, connection of muscle and fat tissue, odor, flavor, acidity, succulence, and overall acceptability) were determined using a 9 - degree scale developed by Moscow-VNIIMP.

The results obtained are processed using mathematical statistical computer program Statistica vol. 6 Stat Soft Exel. Program 1997-2003.

Table 1. Chemical composition of the tested sausages

Chemical indicators	Sausage Group A Mean ± SD	Sausage Group B Mean ± SD
Water	34.2 ± 0.5	34.52 ± 0.6
Fat	28.0 ± 1.2	29.2 ± 1.1
Protein	21.52 ± 1.7	20.22 ± 1.8
Mineral matter	1.52 ± 1.5	1.72 ± 1.6

Table 2. Sensory evaluation of sausages tested

Sensory indicators	Sausage Group A		Sausage Group B	
	Mean ± SD	CV	Mean ± SD	CV
External appearance	6.10 ± 0.22	3.67	4.80 ± 0.45	9.32
Color cross section	6.10 ± 0.50	8.20	5.00 ± 0.00	0.00
Coherence	6.90 ± 0.22	3.24	5.90 ± 0.22	3.79
Consistency	7.90 ± 0.22	2.83	2.00 ± 0.00	0.00
Fragrance	7.90 ± 0.22	2.83	8.00 ± 0.00	0.00
Taste	6.90 ± 0.22	3.24	6.00 ± 0.00	0.00
Succulence	6.10 ± 0.50	8.20	5.1 ± 0.22	4.38
Acidity	6.20 ± 0.50	8.30	5.2 ± 0.22	4.48
Overall acceptability	6.20 ± 0.45	7.21	4.00 ± 0.00	0.00

Results and discussion

Results of nutritional analysis of the two groups examined sausages are given in Table 1. In terms of nutritional quality there was no statistically significant difference between the two groups examined sausages ($p > 0.05$). The results obtained are consistent with the results which were obtained by other authors who examined nutritional quality of permanent sausages (Radetic, 1997; Ambrosiadias et al., 2004; Morrettia et al., 2004; Turubatovic et al., 2005).

The sausage produced with the addition of starter cultures had a few bacteria in the finished product from the sausage made with the addition of GDL . Regarding the examination of the sensory properties of sausages (appearance, color appearance of the intersection, coherence, connection of muscle and fat tissue, odor, taste, succulence, and overall acceptability better sensory scores get tea sausage produced with the addition of GDL (Table 2). The averages grades in this sausage moved in a range from 6.10 to 7.90. The best average scores this sausage got in terms of consistency and odor indicators (7.90±0.22, 7.90±0.22) and lowest in terms of appearance and color of the section (6.10±0.22, 6.10±0.50). In terms of overall acceptability the sausage group A was better assessed (6.20±0.45). The difference between the two groups examined sausages in terms of overall acceptability between the two groups examined sausages (6.20±0.45; 4.00±0.0 was statistically significant ($p<0.01$). The results obtained are consistent with the results obtained by some authors (Tojagich, 1966; Sinchich et al., 2006; Veskovich – Morachanin, 2007).

Conclusion

In terms of nutritional quality there was no significant difference between the two groups examined sausages ($p>0.05$). The sausage produced with the addition of starter cultures there were a number of bacteria in the finished product from the sausage produced with the addition of GDL. Better grades in terms of sensory attributes received tea sausage manufactured with the addition of GDL. There is a statistically significant difference regarding the sensory indicator, overall acceptability between the two groups examined sausages ($p<0.01$).

References

Ambrosiadias J, Soultosa N, Abrahima A and Bloukas JG, 2004. Physicochemical, microbiological and sensory attributes for the characterization of Greek traditional sausages. Meat Science, 66, 279–287.

Aleksandrova N, Gorinov Y and Marinova P, 1999. Post mortem properties of meat from calves of different breeds. Research Institute of Animal Science, Kostinbrod, Bulgaria.

AOAC, 1990. Official Methods of Analysis of the Association of Official Analytical Chemists, Wasington D.C., 7,pp. 1-2.

Cocolin L, Urso R, Rantsiou K and Comi G, 2005. Identification, Sequencing and Characterization of Lactic Acid Bacteria Genes Responsible for Bacteriocin Production. Tehnologija Mesa, 3–4, 162–172.

Gasparik-Reichardt J, Toth Sz, Cocolin G, Comi G, Drosinos E, Cvrtila Z, Kozačinski L, Smajlović A, Saičić S and Borović B, 2005. Technological, physicochemical and microbiological characteristics of traditionally fermented sausages in Mediterranean and central European countries. Meat Technology, 3–4, 143–153.

Karolyi D, Salapaj K, Đikić M, Kostelić A and Jurić I, 2005. Physical chemical properties of slavonski Cullen. Journal of Meat, 2, VII.

Kuzelov A and Kirovska-Cigulevska O, 2008. Adding a combination of supplements suitable for manufacturing of raw-dried sausages, , Scientific Conference with international participation, Food Science, Techniques and Technologies, 24-25 October 2008, Plovdiv, pp. 84-88 (Bg).

Kjeldahl T, 1983 En my methode til Kvaelstofbebestemmelse I Organske Stoffer , Medd Carsberg Lab 2,10-27 Compt Rend Traw , Lab Crasberg 2,1 -12 Analytical Chemistry, 22, 336-382.

Morettia VM, Madoniab G, Diaferiac C, Mentastia T, Palearia MA, Petrohilou I and Rantsios A, 2005. Task and goals of the project: Safety of traditional fermented sausages: Research on protective cultures and bacteriocins", funded by the INCO-DEV Programme. Meat Technology, 3–4, 138–142.

Pozarskaja LS, Kogan MB, Randina VP and Freidman EM, 1964. Physical chemical and microbiological control in meat industry . Journal of Food Technology, Moskva, 45-64 (Ru).

Radetić P, 1997. Raw Sausages, 1–15 (Sr).

Sinchich S, Karan D and Vesković-Moračanin S, 2006. „Sremska" sausage with the addition of protective cultures and bactriocins. 52th International Congress of Meat science and Technology, 13 -18 August, Dublin

Statistica vol. 6 Stat Soft Exel Program 1997-2003.

Tojagić S, 1996. Making sausage Srem household as the vanguard of industrial manufacturing. Journal of Meat Technology, 6, 261–265.

Toldra F, 1998. Proteolysis and lipolysis in flavour development of dry-cured meat products, Meat Science, 49,101-110.

Turubatović L and Tadić R, 2005. Standard Operation Procedures (SOP) for the Production of Traditionally Fermented Sausages. Proceedings, Workshop for dissemination of the project results. University of Sarajevo, 104–111.

Vesković-Moračanin S, 2007. The influence of lactobacillus sakei I151, bacteriocins Leuconostoc mesenteroides E131 and MAP on the sustainability of Srem sausages. Thesis for PhD, Faculty of Agriculture University of Belgrade, 40-42 (Sr) .

Virgili R, Parolai G, Soresi BC and Schivazappa C, 1999. Free amino acids and dipeptides in dry-cured hams, Journal of Muscle Foods, 10, 119–130.

Vukovic I, 2006. Fundamentals of meat technology, third edition, Veterinary Chamber of Serbia. Belgrade (Sr).

Wochs, 1961. Oil und Fette. Analyse Nahrungsfette. Verlag A. W. Hayne, Erban, 98-104.