

Evaluation of Chemical Composition of Selected Meat Products Coming from Traditional and Mass Productions Sold in Retail Outlets in Poland in Podkarpacie Province

Dr Renata Stanisławczyk eng.*, Dr Paulina Duma eng.

Abstract— Currently the Polish market as well as the European market note a significant growth of interest in food products with specific quality characteristics traditionally produced for many decades, or even for many centuries. It should be noted that Podkarpacie Province in Poland is the region of the country which is in the third place in terms of number of products placed on the List of Traditional Products. The aim of this study was to compare the chemical composition of selected meat products coming from traditional production and mass production. The material for the study were selected meat products purchased in retail outlets in Poland in Podkarpacie Province. There was evaluated chemical composition of selected meat products: homogenized sausages, medium ground sausages, offal cured meats and smoked bacons. In said products there was determined the content of water, fat and protein. The evaluation of selected parameters of the chemical composition was made using Food Check apparatus. The research showed that finely ground sausages, medium ground sausages and smoked bacons produced by the traditional method were characterized by higher content of water and protein and lower amounts of fat. Only in the case of traditional offal cured meats was noted fat content higher by 2.1%. All analyzed meat products produced in the traditional manner were characterized by higher content of protein compared to similar products from mass production.

Index Terms— traditional products, meat products, chemical composition

1 INTRODUCTION

Currently in the European markets, including the Polish market, there become appreciated food products with specific characteristics of quality, traditionally produced for many decades, or even for many centuries. These products are usually associated with a particular geographical area – the region. Special local recipes and raw materials are used for their production. For obvious reasons, the volume of such a production is limited to a particular region. It is such products that make the region they come from widely recognizable. Hence they are characteristic „marks” of regions performing the role of brand name products [1].

In hitherto used definitions referring to traditional food there is emphasized the aspect related to the period of the existence of this type of products and their raw material composition [2]. The term „traditional” means proven as being in usage on the Community market at least for a period indicating a transmission from generation to generation; this period should correspond to the period usually ascribed to one generation and should last for at least 25 years [3-5]. Other existing definitions characterize traditional food as introduced to the practice or having a recipe developed before World War II. Food of this kind is characterized by a specific feature or features that distinguish it from other similar products in the same category within the "traditional ingredients" of which it was produced, the "traditional composition" and the "traditional method of production and/or method of processing" [6], [4].

The origin of goods from a particular geographic area plays an important role as a commercial marketing tool and as a factor motivating the customer to purchase given goods.

Dr Renata Stanisławczyk eng., Corresponding authors:
The Department of Food Processing and Science of Commodities,
University of Rzeszow, e-mail:rstanis@univ.rzeszow.pl
Dr Paulina Duma eng. The Department of Food Processing and
Science of Commodities, University of Rzeszow*

Geographical designations associated with a food product has long been a subject of legal protection, both in individual countries and in international relations. The earliest protection of geographical designations appeared in the industrial property law in the documents of the Paris Convention of 1883 on the Protection of Industrial Property. Thus the current community system concerning traditional and regional products is not something that suddenly appeared [1], [7]. Manufacturers of products recognized as traditional or regional, i.e. produced in the traditional way and coming from certain regions of the EU, have the right to apply for special terms and marks, to which correspond the graphical symbols, among others: Traditional Speciality Guaranteed, Protected Designation of Origin, Protected Geographical Designation [8-10].

Production of traditional food in relation to generally available food products is a niche production. Very often it is limited only to a particular region. Often the products of the same name in other regions are produced according to different recipes. This is the cause, among other things, of poor knowledge of the nutritional value of traditional food [3].

After the accession to the European Union a large group of traditional products was recorded in Poland. Podkarpace Province distinguishes itself among the regions which provided the most extensive lists of traditional products. This region, due to the specific geopolitical position, is an area particularly diverse in terms of culinary traditions. Within Podkarpace can be distinguished the southern part with the influences of the Hungarian culture and highland traditions, the eastern part with influences of culinary culture of the eastern borderlands, and also the central and north parts. The culinary heritage of Podkarpace was also influenced by traditions Armenians, Moldavians, Jews, Lemko and other nationalities living here [11]. Podkarpace Province is the region in the country that is in the third place in terms of number of products placed on the List of Traditional Products,

issued since 2005 by the Ministry of Agriculture and Rural Development, and in the fourth place in terms of ecological agricultural land area. Thus there are clear symptoms on the supply side conducive to the development of regional products market in this part of Poland [12].

The richness of traditional food placed on the National List of Traditional Products, on the one hand, and, on the other hand, the lack of tabular data on their nutritional values, require research in this field. In individual countries the studies are undertaken to determine the nutritional values of traditional food products in comparison with the products from mass production. The European and national tables of composition and nutritional value of food do not contain data on traditional products, or provide data only for individual products [3].

The aim of this study was to compare the chemical composition of selected meat products coming from traditional production and mass production.

2. MATERIAL AND METHODS

The material for the study were selected meat products purchased in Poland in retail outlets in the area of Podkarpacie Province. There was evaluated chemical composition of the following meat products both from traditional production and mass production: homogenized sausages (made of pork), medium ground sausages (made of pork), offal cured meats (pate made of pork) and smoked bacons.

The examined products prior to determination of their chemical composition were subjected to grinding by the blender of Zelmer company.

In said meat products there was determined the content of water, fat and protein. The evaluation of selected parameters of the chemical composition was made using Food Check apparatus (Fig.1).



Source: the author's elaboration

The results of the study were subjected to the analysis of variance, using the STATISTICA 10 Software (StatSoft Inc.) in which the significance of differences between means was determined at $P \leq 0.05$ using the Fisher's NIR test.

3. RESULTS

The results concerning the basic chemical composition of experimental meat products are presented in Table 1. The analysis of given parameters of chemical composition of finely ground sausages shows that the examined products coming from mass production were characterized by the content of water at the level of 62.18% on average, fat – 18.75% and protein – 17.08%. In comparison to the finely ground sausages coming from traditional production these products were characterized by higher content of fat by 4.0% and lower content of water and protein by 3.17% and 0.93% respectively. Similar results were obtained in the case of medium ground sausages. In the chemical composition of meat products coming from traditional production there was found protein content higher by 1.04% and content of fat and water lower by 4.53% and 2.85% respectively.

The detailed analysis of numerical data in Table 1 indicates that in the case of smoked bacons the analyzed correlations between chemical composition of traditional meat products and those coming from mass production developed in a similar way as in the case of sausages. Smoked

Fig. 1. Food Check

bacons produced by the traditional method were characterized by higher content of protein and water by 0.4% and 1.37% respectively, and content of fat lower by 1.69% fat. The author's research showed that offal cured meats produced in the traditional manner were characterized by fat content at the level of 23.80% on average, water – 56.35% and protein – 16.39%. In similar meat products coming from mass production the chemical composition was at the levels: 21.79%, 57.96 and 15.78% respectively. Such a distribution of numerical data indicates that the meat products produced in the traditional way are characterized by higher content of fat (2.01%) and protein (0.61%) and lower content of water (1.61%).

4. DISCUSSION

In the southern region of Poland the most frequently purchased finely ground products are hotdogs. These products, especially pork hotdogs, are the most frequently consumed type of finely ground cured meat mainly by children and older persons. Their negative dietetic aspect is the intake of large amounts of fat and functional additives as well as preservatives [13]. This finding is confirmed by numerous works devoted to evaluation of the chemical composition of meat products. The obtained results of the author's research, which showed in finely ground sausages coming from mass production the content of water at the level of 62.18%, fat – 18.75% and protein – 17.08%, correspond with a number of works devoted to evaluation of the chemical composition of these meat products. As a result of conducted research Tyburcy et al. [14] showed in finely ground sausages the average content of water within 58.1-60.7%, protein and fat: 11.5-13.4% and 23.0-26.0% respectively. In the case of finely ground sausages made of poultry the chemical composition was at the following level: content of water 66.0-62.1%, protein 11.8-11.9% and fat 19.1-19.4%. In turn Florowski et al. [15] showed in finely ground sausages the content of water at the level of 55.1%

on average, protein – 11.0% and fat – 29.4%. However, according to Duda [16] typical hotdogs made of a mixture of pork and beef contain about 11% of protein and 29% of fat, while the ones made of chicken or turkey 13-15% of protein and 17-18% of fat. For comparison of the results we can also quote results of the work of et al. [17] who as a result of conducted studies showed in finely ground sausages 62.45% of water, 24.14% of fat and 10.50% of protein. Similar results concerning the chemical composition of finely ground sausages were also obtained by Walczykca [13]. The content of water was at the level of 61.88%, protein 10.41% and fat 18.64%. According to the literature [18] in hotdogs offered in the Spanish market made of different raw materials the content of protein ranged from 11 to 16%, and fat from 11 to 22%, at the same time the majority of these products (9 out of 10) had the fat content below 20%, and in half of them the content of this ingredient did not exceed 15%.

The author's research (Table. 1) shows that medium ground sausages coming from mass production are characterized, in comparison to traditional products, by higher content of fat at the level of 29.80% and lower content of water (53.50%) and protein (14.58%). This analysis can be partially referred to the results of other studies. Szmańko et al. [19] when evaluating medium ground sausages from mass production depending on location of meat processing plants, showed considerable differences in the content of basic parameters of chemical composition. The content of water was within 58.36-66.15%, protein 11.84-16.54% and fat 15.61-26.61%. Also Makala et al. [20] in the case of medium ground sausages found considerable differences in the content of water – 54.3-68.8%, protein – 9.7-21.0% and fat – 7.0-24.9%. In another conducted research Makala et al. [21] determined the content of protein at the level not exceeding 13%, fat 35%, and water 70%.

Taking into account the above findings of many authors devoted to evaluation of the chemical composition of finely ground sausages coming from

mass production it should be noted that all conducted research showed high content of fat. A careful analysis of the data contained in Table 1 allows us to state that traditional products are characterized by much lower fat content compared to similar products from mass production. Furthermore, the author's research also indicates significantly higher content of protein in traditional products. In turn, in the case of medium ground sausages, taking into account the results of the author's research and of other authors, such significant differences in the content of basic components of chemical composition were not shown.

Szmańko et al. [19] in studies devoted to the evaluation of chemical composition of smoked bacon coming from mass production showed, depending on location of meat processing plants, the content of water within 72.07-78.05%, protein 15.58-17.55%, and fat 3.83-7.21%. In the author's research there was found lower content of fat (3.23%), higher content of protein (20.63%), while the determined content of water at the level of 74.82% was comparable with the results obtained by other authors. When comparing the chemical composition of traditional smoked bacon and the ones coming from mass production it should be emphasized that the first mentioned group of meat products is characterized by higher content of protein (0.40%) and water (1.37%), and lower content of fat (1.69%).

In the author's research the offal cured meats from traditional production, as the only group of cured meats in comparison to products from mass production, was characterized by higher content of fat at the level of 23.80%. Moreover, the determined content of protein was higher by 0.61%, while the content of water was lower by 1.61%. The obtained results of author's research should be compared with other results of works devoted to evaluation of chemical composition of meat products. A similar chemical composition resulting from conducted research was showed by Makala

and Tyszkiewicz [22]. As these authors say, the content of water in evaluated samples of pates from mass production ranged from 56.9 to 70.4%, protein from 9.0 to 13.9%, and fat from 13.4 to 24.7%. Tyburcy et al. [23] in pork-beef pates showed 62.5% of water, 12.6% of protein and 20.5% of fat.

5. CONCLUSIONS

1. The numerical values obtained in the author's research lead to the conclusion that all analyzed meat products produced in the traditional manner are characterized by higher content of protein compared to similar products coming from mass production.
2. Moreover, in finely ground sausages, medium ground sausages and smoked bacon produced by the traditional method there was also shown higher content of water and lower content of fat compared to their equivalents coming from mass production.
3. In traditional meat products higher content of fat by 2.01% was observed only in the case of offal cured meats.

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TABLE 1.
CHEMICAL COMPOSITION OF SELECTED MEAT PRODUCTS COMING FROM TRADITIONAL PRODUCTION AND MASS PRODUCTION

Attribute	The statistical measure	Meat products coming from traditional production				Meat products coming from mass production			
		Finely ground sausage	Medium ground sausage	Finely ground sausage	Medium ground sausage	Finely ground sausage	Medium ground sausage	Finely ground sausage	Medium ground sausage
Fat content [%]	N	15	18	20	17	13	17	16	16
	\bar{x}	14,75 ^{A,B}	25,27 ^{A,B}	1,54 ^{A,B}	23,80 ^{A,B}	18,75 ^{B,A}	29,80 ^{B,A}	3,23 ^{B,A}	21,79 ^{B,A}
	S	0,53	1,15	0,72	0,94	0,39	2,02	1,95	0,72
Water content [%]	N	15	18	20	17	13	17	16	16
	\bar{x}	65,35 ^{A,B}	57,00 ^{A,B}	76,19 ^{A,B}	56,35 ^{A,B}	62,18 ^{B,A}	53,50 ^{B,A}	74,82 ^{B,A}	57,96 ^{B,A}
	S	0,44	0,92	0,63	0,69	0,32	1,57	1,64	0,66
Protein content [%]	N	15	18	20	17	13	17	16	16
	\bar{x}	18,01 ^{A,B}	15,62 ^{A,B}	21,03	16,39	17,08 ^{B,A}	14,58 ^{B,A}	20,63	15,78
	S	0,11	0,26	0,18	0,44	0,08	0,46	0,45	0,12

Source: the author's elaboration

N – size of samples, S – standard deviation, \bar{x} – mean value

^{A,B} – difference significance level $P \leq 0,01$