QUALITY PARAMETERES OF COOKED MEAT PRODUCTS FROM CZECH MARKET

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Abstract – The aim of this study was to determine the chemical composition in selected cooked meat products form Czech market. For analysis were used 160 samples of five types of cooked meat products in the period 2011 and 2015. The amount of dry matter, fat, salt, collagen, pure protein and pure muscle protein was evaluated. Food chemical compositions have significant impacts on the quality attributes. The average amount of dry matter ranged from 22.3 to 50.4 %. The fat content varied between 2.6 and 34.7 %. The mean salt content varied between 2.1 and 2.5 %. The composition of cooked meat products has changed little over 5 years.

Key Words – fat, dry matter, protein

I. INTRODUCTION

Cook meat products are the most common and the most consumed meat products category in Central Europe [1]. In the past fifty years, the meat processing industry in the Czech Republic has been a development which affected the category of cooked meat products and whole muscle products and comminuted products. The individual factors can be mentioned in particular:
• the use of additives such as phosphates, hydrocolloids or foreign proteins;
• the use of barrier packaging technology;
• the use of cheaper raw materials such as mechanically separated meat or pork skin.
These effects complement one another and undermined. The result is a wide range of products varying sensory properties (especially texture) and the price in the market.
Using the technology of packaging impermeable to water vapour together with the application of phosphate is possible to increase the water content in the final product. Using hydrocolloids also influenced by the water content, but also the fat, if necessary protein. The aim of this study was to determine the basic chemical composition of selected cooked meat products on the Czech market in the period 2011 and 2015 and to compare the obtained values.

II. MATERIALS AND METHODS

Altogether, 160 samples of cooked meat products were purchased on the Czech retail network in 2011 and 2015. The given samples included five types of popular and widespread Czech meat products (coded A–E). The products speckwurst (product A) and Gothaj sausage (product B) represented products with a fine homogeneous mass as the base and visible particles of fat. Ham sausage (product C) is a product with a large proportion lean meat (pork), filled in artificial barrier casings. One of the five analysed types of meat product belonged to the category cooked ham (product D). Frankfurters (product E) represented a product with a fine homogeneous mass filled in edible casings. Speckwurst was filled in beef rounds or pork intestines of a corresponding diameter, while Gothaj sausage is a product filled in plastic barrier casings. Each product came from four different producers, with each producer being represented by five, respective three different batches of the same product. Each product was purchased in whole consumer packages at an amount of approximately 2 kg.
The content of chlorides was detected according to the Mohr titration method. A drying method [2] at 103 ± 2 °C for a period of 24 hours was used for the determination of the content of dry matter. The fat content was determined using a SOXTEC instrument (TECATOR, Sweden). Diethyl ether was used as the extraction agent. Pure proteins were determined following the precipitation of non-protein N-substances by hot tannin and subsequent conversion of organic nitrogen into inorganic nitrogen in a KJELTEC instrument (TECATOR, Sweden) by the Kjeldahl method. A factor of 6.25 was used for the conversion of the nitrogen content into the protein content. The collagen content was determined spectrophotometrically at a wavelength of 550 nm in a GENESYS™ 6 spectrophotometer (Thermo Electron Corporation, USA) as the quantity of 4-hydroxyproline. The content of hydroxyproline was obtained from

the calibration curve and converted into the collagen content (f = 8). Pure muscle protein was calculated as pure protein minus collagen. Statistical analyses were performed with the Statistica (StatSoft, Czech Republic).

III.   RESULTS AND DISCUSSION

Meat products, and especially comminuted meat products, show great variability in chemical composition. Table 1 shows selected chemical characteristics of cooked meat products. The average amount of dry matter ranged from 22.3 to 50.4 %. The fat content varied between 2.6 and 34.7 % and this parameter was in line with the dry matter content. The meat products with the lowest fat content (product C: ham sausage or product D: cooked hams) contained the smallest share of dry matter. The mean salt content varied between 2.1 and 2.5 %. The chemical composition of meat products has to be determined during processing and distribution to guarantee that raw materials, the production process and the end product meet stringent quality requirements [3]. The pure protein content varied between 8.36 % and 14.67 %.

Table 1 Chemical composition of meat products 2011 and 2015 (means ± S.D.)

2011	A n = 20	B n = 20	C n = 20	D n = 20	E n = 20
Salt [%]	2.29 ±0.40*	2.16±0.19*	2.32±0.26	2.40±0.17	2.47±0.18
Dry matter [%]	48.27±3.24*	42.59±3.74	26.04±3.36	22.32±0.76	38.26±3.30
Fat [%]	31.61±3.15*	24.67±5.07	6.97±3.10	2.64±1.10*	18.64±3.38
Collagen [%]	2.00±0.34	1.76±0.42*	1.04±0.35	0.69±0.40	2.48±0.33
Pure protein [%]	9.13±0.89*	9.00±1.07*	11.12±1.88*	13.78±1.57	11.58±0.87*
Pure muscle protein [%]	7.18±0.93*	7.21±1.19*	10.07±2.17*	13.05±1.56	9.04±0.87*
2015	A n = 12	B n = 12	C n = 12	D n = 12	E n = 12
Salt [%]	2.05±0.33*	2.28±0.21*	2.35±0.21	2.49±0.17	2.42±0.21
Dry matter [%]	50.41±2.43*	43.01±3.70	24.88±1.28	22.64±0.94	40.42±5.51
Fat [%]	34.69±2.75*	25.99±4.58	6.59±1.82	3.07±0.86*	19.59±5.46
Collagen [%]	2.17±0.32	2.20±0.42*	1.20±0.28	0.58±0.12	2.49±0.20
Pure protein [%]	9.96±1.02*	8.38±0.83*	10.10±0.84*	14.67±1.49	10.67±1.06*
Pure muscle protein [%]	7.80±1.01*	6.18±0.68*	8.90±0.91*	14.10±1.55	8.17±1.02*

*statistical significant differences in parameters in one products between year 2011 and 2015

The composition of meat products has changed little over 5 years. Statistical significant differences were detected only in a few parameters (Table 1).

IV.   CONCLUSION

The study confirmed the variability in the meat products composition on the Czech market. Between years 2011-2015 only several parameters were changed with statistical significant differences. The salt content in Czech meat products represents a potential to a reduction.

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