

The pilot comparison of meat product's composition bearing/not-bearing nutrition claims marketed in the Czech Republic

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Abstract— The aim of this pilot study was to overlook situation related to nutrition/health claims stated on meat products (MPs) marketed in the Czech Republic. We observed only very limited number of MPs bearing claims. We collected and compared chemical composition of 5 MPs bearing nutrition claims to 5 products from the same producer, with the same name, but without any claim in order to test the compliance with legal requirements and understand nutritional/health advantages for consumers. Samples were purchased from July to September 2010 in 6 major retail chains. Most of mentioned nutrition claims were related to reduce fat content declared as “Light”, “Fit” and “Fitness”. One claim was formulated as "Healthier MP Fit" but it was more related to the nutrition than health claim – increased content of omega 3 fatty acids (FA) group. Surprisingly, no claim dealt with reduced amount of sodium/salt. The analyses of total fat, FA composition and sodium content were made in accredited laboratories. These substances are in MP seen, in terms of consumer's healthy diet, as less appropriate. Nutrition claims on all five MPs referring to the amount of reduced fat and added omega 3 FA complied with legal requirements. We recognized that number of MPs bearing nutrition/health claims on the Czech market is limited. Chemical composition of some claimed MPs such as sodium level can be even higher or unchanged comparing with products without claim. In this reason, these claimed MPs could be seen as a bit misleading for consumers looking for healthier diet.

Keywords—Meat products, fatty acids, sodium

I. INTRODUCTION

Meat has an important place in a healthy diet, providing protein with a good balance of amino-acids, beneficial forms of vitamins and essential minerals [1]. However, processed meats are often associated with a high intake of fat, saturated fatty acids, cholesterol and sodium intake [2].

A. Fat, fatty acids and health

The importance of fat quantity, but also its fatty acid (FA) composition in the human diet is shown by a number of national and international nutritional recommendations [3, 4]. Not only the FA group, but also individual FA affects a wide range of metabolic functions in the human body [4]. Some saturated FA (SFA with less than 18-carbon atoms chain length) raise blood levels of LDL (“low density lipoprotein”) cholesterol, which increases the risk of atherosclerosis leading to cardiovascular diseases in man [4, 5]. Overall understanding of relationships between intake and health risk is still limited. E.g. saturated stearic acid, due to its quick conversion to oleic acid, does not have the same negative impact on human health such as palmitic or myristic acid [4]. On the other hand, monosaturated (MUFA) and polysaturated (PUFA) FA lower blood levels of LDL cholesterol [4, 5].

B. Salt, sodium and health

A high sodium (Na) intake (in food generally represented by sodium chloride, where 1 g represents about 2.54 g of Na) is among the major risks factors of hypertension resulting in coronary heart disease, stroke and renal disease [3, 6, and 7]. According to EFSA, the European population sodium daily intake range between 3-5 g (which corresponds to 8-11 g of salt), which exceeds recommended daily dose set by EFSA (1.5 g Na/person/day) or WHO (2.0 g Na/person/day). Most of NaCl in the diet comes from processed foods (70-75 %) [6, 7]. Meat and meat products (MPs) are the second major source of salt/Na in the diet after cereal and cereal products [7, 9]. According to the Czech national food consumption study (SISP04) organized in 2003/4 [8] estimated daily intake of Na is above 2g/day for more than 95%

of adult males and females. More than 50 % of this Na comes from added salt. Between 10-20% of Na are from meat and MPs.

C. Nutrition/health claims

In recent years, consumers demand for healthier MPs with reduced level of fat, cholesterol, decreased content of NaCl, with improved FA profile or incorporated health enhancing ingredients [1]. Food promoted with claims may be perceived by consumers as having a nutritional, physiological or other health advantage over similar or other products to which such nutrients and other substances are not added [9]. As the regulation (EC) no 1924/2006 state, "claim" means any message or representation (pictorial, graphic or symbolic representation), which is not mandatory under Community or national legislation and states and suggests or implies that a food has particular characteristics. Nutrition claim means any claim which states, suggests or implies that a food has particular beneficial nutritional properties due to the energy or nutrient or other substances it provides/contains, provides/contains in reduced or increased proportions/rates, or does not provide/contain. Health claim means any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health of consumer [9]. The aim of this study was to monitor the occurrence of MPs with nutrition/health claim available in the Czech Republic market, analyze its fat content, FA composition and sodium content. These products were compared with products sold under the same name and produced by the same producers, but without declared claim. This study was carried out to determine, if the nutrition or health claims do not mask the other nutritional status of a food product [9].

II. MATERIALS AND METHODS

Analyzed samples

Totally 10 appropriate samples were purchased in six major retail chains in the Czech Republic in terms from July to September 2010. Five samples of MPs were selected on the base of their nutrition/health claim declared on the product packaging. The same five products, produced by the same manufacturer,

under the same product name but without any claim were purchased to compare the composition of total fat, FA profile and sodium content of these two products mutually.

Sampling

Samples were transported to the National Institute of Public Health (NIPH) - Center for Health, Nutrition and Food in Brno, into the laboratory which is accredited by the ČSN EN ISO/IEC 17025 method for all needed analytical methods. These products were stored in temperature conditions of 0-4°C, for maximum period 48 hours. Afterwards, each sample was homogenized by Grindamix device (3000 rotations per minute during 120 seconds). Homogenized samples were reported and stored in plastic boxes with no air access, in temperature conditions below -18°C until the total fat, FA and Na content analysis.

The fatty acid analysis

After the total fat extraction and quantification by the petroleum/acetone isolation, the triacylglycerol saponification and its subsequence methanol reesterification to the FA methylesters, the individuals of 37 FA (for the specification see standard Supelco 37 Component FAME Mix) were analyzed by the method of gas chromatography (separation on the capillary colony 100m x 0,25mm x 0,2um – Supelco SPTM2560) with flame-ionizing detection (GC-FID; Trace, TemoQuest Italy).

Sodium analysis

For the Na content determination, the sample was undergone to microwave digestion system on MLS-1200, ETHOS device. The accredited method of AAS-FT was used subsequently. After the sample digestion and blending with 0.2% solution of KCl, it was fogged into the acetylene-air flame. The emission was measured on the AAS 3300 Perkin-Elmer device at a wavelength of 589.6 nm.

Data processing

Totally, 10 x 38 analytical results in 3 parallel measurements per sample of the FA composition and total fat content were gained and processed. The mean value of these parallel measurements in grams in one kg of the sample was calculated. The values for each

FA were summarized by the characteristic of its saturation to the groups of SFA (17 individuals), MUFA (9), PUFA (11). Omega 3 FA group comprises the sum of 4 FA (18:3N3, 20:3N3, 20:5N3, 22:6N3). At total, three parallel measurements of sodium content per sample were done. The measured values were expressed as the mean value in grams to 1 kg of analyzed sample.

III. RESULTS

All measured values for total fat, FA profile and sodium content are mentioned in Table 1. The total fat content values (in %) were compared to total amount of FA (in g/kg of sample) and it corresponded to each other. For the salt content evaluation, expected natural content of sodium in meat was taken into account. Natural content of sodium in meat expressed as “salt” is not higher than 0.3% from total content of salt (based on pork with 23% of fat).

IV. DISCUSSION

Most of mentioned nutrition claims on purchased MP were declared as “Fit”, “Fitness” and “Light”. Only one claim was dealing with FA group fortification - “the addition of omega 3 FA”. More of claims monitored on MP in the Czech market were found, such as “Wellness”, “Light Wellness” and “Light Line”. But there were no products without these claims from the same manufacturer for the sample comparison, so these samples were not included in this study. No nutrition claim dealing directly with reduced amount of sodium or salt content was observed. It is not really clear, which benefits claims as “Fit” and “Fitness” should bring to the consumer. Our results show, that only the amount of measured fat content in products with these claims was lower and corresponded to the amount of fat declared on the packaging. But there were no significant difference in sodium content or the FA profile observed between these products. Even one product without a claim had a better nutritional FA profile (less SFA and more MUFA) than the same one declared as “Fitness”. Two products declared as “Fit” had a higher sodium content than without a claim. Typical Czech MP Poličan declared as “Fit and

Healthier” with omega 3 FA fortifications had just higher omega 3 FA content. The amount of total fat was almost the same and even the sodium content was higher in MP without a claim. In MP Vysočina, declared as “Fit and Healthier” with 50 % of fat reduction, a lightly higher sodium content and not all 50 % (but only 48 %) of fat reduction was observed (but this fat reduction complied with fat claimed on comparable product).

V. CONCLUSIONS

In comparison of MPs “with” and “without” nutrition claim, in reality, only lightly reduced fat or added amount of omega 3 FA was recognized. Other parameters, such as a sodium level, better FA profile or more evident fat reduction were not found. In this reason, used claims (“Healthier MP”, “Fitness” or “Fit”) could be seen as a bit misleading for consumers.

In our opinion, MPs with a very broad meaning claim declared such as “Fit”, “Fitness” or “Healthier” should bring to the consumers more considerable nutritional benefits than a minor fat reduction in comparison with a product without this claim. This would help people to make more healthy choices in the context of a balanced diet and a healthy lifestyle.

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9. Regulation (EC) no 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on food.

Table 1: The comparison of product's claims and analytical results in light of the Regulation (EC) no 1924/2006

| Sample identification | | Analyzed parameters in samples (3 parallel measurement) | | | | Compliance/noncompliance with the European legislation Regulation (EC) no 1924/2006 and the statement on the package ¹ |
|---------------------------------|----------------------------------|--|--|----------------------------|----------------|--|
| Product name | Claim declared on the product | Fat [%] | SFA/MUFA/PUFA representation [%] | ω 3 FA [g/kg] | NaCl [g/kg] | |
| Tyrolian ham Karé "Light" | "Light" Max. 3 % of fat | 4,6 | 41 / 53 / 7 | 0,12 | 43 | The fat reduction is 76 % (more than 30 %), which complies with the regulation, but the amount of fat measured in the sample does not comply with max. fat content declared on the product |
| | Max. 4 % of salt | | | | | The product contains around 4,3 % of salt, which is the border amount after the correction on natural content of Na in pork meat |
| Tyrolian ham Karé | Max. 24 % of fat | 17,6 | 42 / 45 / 13 | 1,15 | 53 | The amount of fat measured in the sample complies with max. fat content declared |
| Poličan "Fit" | "Healthier" | 33,4 | 40 / 47 / 13 | 2,21 | 38 | The ω 3 FA content is 16 times higher (more than 30 %), which complies with the regulation but total amount is relatively low |
| | "Fit" - ω 3 FA added | | | | | |
| Poličan | Max. 50 % of fat | 34,4 | 41 / 48 / 12 | 0,14 | 33 | The amount of fat measured in the sample complies with max. fat content declared |
| Vysočina "Fit" | "Healthier" | 20,1 | 42 / 46 / 12 | 0,15 | 33 | The fat reduction is 46 % (more than 30 %), which complies with the regulation, and reduction comply with the fat claimed on the comparable product |
| | "Fit" Reduced fat to 50 % | | | | | |
| Vysočina | Max. 50 % of fat | 37,4 | 41 / 47 / 12 | 1,84 | 31 | The amount of fat measured in the sample complies with max. fat content declared |
| Chicken breast ham "Fitness" | "Fitness" "Low fat content" | 1,3 | 39 / 48 / 13 | 0 | 20 | The fat content is not more than 3g of fat per 100g of sample (3 %), which complies with the regulation, and it complies with max. fat content declared on the product |
| | Max. 5 % of fat | | | | | The product contains around 2 % of salt, which correspond the amount stated on the product |
| Chicken breast ham | Max. 8 % of fat | 1,5 | 35 / 53 / 12 | 0,12 | 23 | The amount of fat measured in the sample complies with the declared max. content of fat |
| | Max. 2,8 % of salt | | | | | The product contains around 2,3 % of salt, which correspond the amount stated on the product |
| Sausages "Fitness Extra" | "Fitness Extra" | 12,3 | 42 / 49 / 10 | 0,07 | 23 | The fat reduction is 44 % (more than 30 %), which complies with the regulation, and it complies with max. fat declared |
| | Max. 15,8 % of fat | | | | | The product contains around 2,3 % of salt, which correspond the amount stated on the product |
| Sausages | Max. 35 % of fat | 21,9 | 42 / 48 / 11 | 0,12 | 23 | The amount of fat measured in the sample complies with max. fat content declared |
| | Max. 2,8 % of salt | | | | | The product contains around 2,3 % of salt, which correspond the amount stated on the product |

¹ Applicable rules according to the Regulation (EN) no 1924/2006.