

Comparison of meat products' composition bearing/not-bearing claims marketed in the Czech Republic

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Abstract

The aim of this study was to analyse the occurrence and specific composition of meat products (MPs) bearing nutrition/health claims marketed in the Czech Republic. MPs were analysed for fat content, fatty acids (FA) composition and sodium (Na) content. The compliance with legal requirements (Regulation EC No 1924/2006) and information stated on the product was checked. This study is the first one in the Czech Republic dealing with this issue. Among hundreds of marketed MPs, we observed only a limited number of MPs bearing claims. We analysed and compared chemical composition of 12 MPs bearing nutrition claims to 5 identical brand products without any claim. None of the claims dealt with reduced amount of Na/salt content and none was evaluated as an explicit health claim. Most of the mentioned nutrition claims were declared as “Fit, Fitness, Light, Wellness, With low/reduced fat”. Only one claim mentioned “ ω 3 FA addition”. All analytical results, except one product with claim “Low/reduced fat” or “Light” (if connected with fat reduction), corresponded to the legal requirements and information stated on the product. Three statements on the products associated with Na/salt content did not correspond to the amount measured in the sample. When comparing MPs “with” and “without” nutrition claim, lightly reduced fat or added amount of ω 3 FA was recognized only in one product with claim. Other indicators, such as Na/salt content, better FA profile or more evident fat reduction were not found. The results of our study show that claims such as “Healthier, Fit, Fitness or Wellness” may be considered as somewhat misleading for consumers.

Food, fat, fatty acids, sodium, health

Meat has an important role in a healthy diet, providing protein with a good balance of amino-acids, beneficial forms of vitamins and essential minerals (McAfee et al. 2010). However, processed meats are often associated with a high intake of fat, saturated fatty acids, cholesterol and sodium (Na) (Valsta et al. 2005; Decker et al. 2010). The importance of fat quantity and also of the fatty acids (FA) composition in human diet is expressed in a number of national and international nutritional recommendations (WHO 2003; EFSA 2010). Not only the FA group but also individual FA affect a wide range of metabolic functions in human body. An overall understanding of relationships between the intake and health risk is still limited. Some saturated FA raise blood concentrations of low density lipoprotein (LDL) cholesterol, which increases the risk of atherosclerosis leading to cardiovascular diseases while unsaturated FA lower it (Smit et al. 2009). A high Na intake, in food generally represented by sodium chloride (NaCl), is one of major risk factors of hypertension resulting in coronary heart disease, stroke and renal disease (He et al. 2007). According to the European Food Safety Authority (EFSA), the European population's Na daily intake is 3–5 g which exceeds the daily dose recommended by WHO (2.0 g Na/person/day) or EFSA (1.5 g Na/person/day) (WHO 2003; EFSA 2006). The main source of Na in the diet is processed foods (70–75%), where meat and MPs are the second major source of Na/salt following cereals and cereal products (SACN 2003). The estimated daily Na intake is above 2g/day for more

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than 95% of Czech adults; between 10–20% is from meat and MPs (Ruprich et al. 2006). Many national and international organizations have set up targets for reduction of Na consumed in common diet (SACN 2003; WHO 2003). Consumers also demand healthier MPs with reduced contents of fat, cholesterol, salt, improved FA profile or incorporated health enhancing ingredients. Products bearing claims that are nowadays presented and studied beside traditional MPs may be perceived as having a nutritional or health advantage over similar MPs without these claims (Colmenero 2007; Zhang et al. 2010). A nutrition claim states that the food has particular beneficial nutritional properties due to energy, nutrients or other substances provided in reduced or increased proportions. A health claim states a relationship between the food, category or food constituents and consumer's health (Regulation EC No 1924/2006).

The aim of this study was to analyse the FA profile, fat and Na content in MPs bearing claims and identical MPs without these claims, in order to test the compliance with legal requirements and claims stated on the product. This study was carried out to determine whether the nutrition/health claims mask other nutritional properties of a product, which could mislead consumers trying to make healthy choices of a balanced diet.

Materials and Methods

A total of 17 samples were purchased from 6 major retail chains in the Czech Republic (July–September 2010). Five samples of MPs with nutrition/health claims on the product and the same 5 products without any claim, produced by the same manufacturer, were purchased to compare the FA profile, total fat and Na content. Additional 7 MPs bearing nutrition claims (without comparable counterpart = product from the same manufacturer but without claim) were analyzed. Samples were transported to the National Institute of Public Health - Centre for Health, Nutrition and Food in Brno to a laboratory accredited by the European Standard EN ISO/IEC 17025 for all necessary analytical methods. Samples were stored at 0–4 °C for 48 h, homogenized by Grindomix (120 s, 3000 rpm) at room temperature and kept in plastic boxes at -18 °C until the fat, FA and Na analysis.

Fat and FA analysis

Total lipids from 50 g of homogenized sample were extracted with 200 ml of petroleum ether/acetone (2:1) by homogenization on Polytron PT-MR 3100 (180 s, 10000 rpm) at room temperature. Triacylglycerols were after saponification and ester interchange with methanol detected as methyl esters of FA. A total of 37 of FA methyl esters (Standard Supelco 37 Component FAME Mix) were analysed using the method of gas chromatography on the TRACE GC chromatograph (ThermoQuest, Italy). The FA methyl esters were separated on the capillary column Supelco SPTM2560 (100 m × 0.25 mm × 0.2 μm) and detected by flame-ionizing detection. For the data collection and processing, chromatographic software HP ChromQuest 3.0 was used.

Na analysis

Approximately 1 g of homogenised sample was mixed with 6 ml of HNO₃ and 1 ml of hydrogen peroxide and underwent pressure decomposition in closed microwave system ETHOS (Milestone, Italy). Subsequently, accredited method of atomic emission spectrophotometry was used. After the sample digestion and blending with 0.2% KCl (FIAS 400, Perkin-Elmer), it was fogged into the acetylene-air flame. The emission was measured on AAS 3300 Perkin-Elmer spectrometer at the wavelength of 589.6 nm.

Results of analysed MPs were expressed as each of 37 FA and Na content per 1 kg of edible part (= arithmetic mean value of 3 parallel measurements with the standard deviation calculated). Meat itself contains Na which naturally ranges from 50–70 mg/100 g (Desmond 2006). The amount of 2.54 g NaCl is equivalent to 1 g of Na (SACN 2003). For the comparison of results, the NaCl content (g/kg of sample) was calculated as: amount of Na (g/kg) measured in the sample minus 0.7 (g/kg of Na naturally in meat) multiplied by 2.54.

Results

All measured values of total fat, FA and Na/recalculated salt content are presented in Tables 1 and 2. Values for each FA were summarized by its saturation to the groups of SFA (n = 17), MUFA (n = 9), PUFA (n = 11) and their representation in the sample was calculated (%). The ω3 FA group comprises the sum of 4 FA (18:3N3, 20:3N3, 20:5N3, 22:6N3). The total fat content measured in the sample (%) was compared to the amount of total FA calculated from the FA analysis (g/kg of sample) and it corresponded to each other.

Table 1. Comparison of analytical results of 5 meat products bearing claims to 5 meat products without any claim based on Regulation EC No 1924/2006 and information provided on the product.

Product name /Product group	Claim stated on the product	Analyzed indicators				Compliance/noncompliance with European legislation Regulation EC No 1924/2006 and the information on the product
		Fat (%)	SFA/MUFA /PUFA (%)	ω 3 FA (g/kg)	NaCl (g/kg)	
Tyrolian ham Karé Light	Light Max. 3% fat	4.6	41 / 53 / 7	0.12	41.9	^{2,3} The fat reduction is 76% = corresponds to the regulation. The amount of fat measured does not correspond to max. fat on the label. Product contains 4.2% of salt = does not correspond to the amount on the label.
Light /Dried meat	Max. 4% salt					
Tyrolian ham Karé /Dried meat	Max. 24% fat Na/NaCl not declared	17.6	42 / 45 / 13	1.15	50.8	The amount of fat measured in the product corresponds to max. fat on the label.
Poličan Fit /Dry	Healthier and Fit ω 3 FA added	33.4	40 / 47 / 13	2.21	36.6	⁴ The ω 3 FA representation is 16 × higher (more than 30%) = corresponds to the regulation (total amount is relatively low). The amount of fat in the product corresponds to the amount on the label. The amount of fat measured in the product corresponds to max. fat on the label.
fermented sausage	Max. 4.5% salt					
Poličan /Dry fermented sausage	Max. 50% fat Max. 4.5% salt	34.4	41 / 48 / 12	0.14	31.9	The amount of salt in the product corresponds to the amount on the label.
Vysočina Fit /Salami	Healthier and Fit Reduced fat to 25% Max. 4.5% salt	20.1	42 / 46 / 12	0.15	31.1	² The fat reduction is 46% = corresponds to the regulation. Fat content corresponds to the amount on the label. The amount of salt in the product corresponds to the amount on the label.
Vysočina /Salami	Max. 50% fat Max. 4.5% salt	37.4	41 / 47 / 12	1.84	28.8	The amount of fat measured in the sample corresponds to max. fat on the label. The amount of salt in the product corresponds to the amount on the label.
Chicken breast ham Fitness /Cooked product	Fitness Low fat content Max. 5% fat Max. 2.8% salt	1.3	39 / 48 / 13	0.00	18.7	⁵ The fat content is not more than 3% = corresponds to the regulation. The amount of fat corresponds to max. fat on the label. The amount of salt in the product corresponds to the amount on the label.
Chicken breast ham /Cooked product	Max. 8% fat Max. 2.8% salt	1.5	35 / 53 / 12	0.12	20.7	
Sausages Fitness Extra /Cooked product	Fitness Extra Max. 15.8% fat Max. 2.4% salt	12.3	42 / 49 / 10	0.07	20.6	² The fat reduction is 44% = corresponds to the regulation. The amount of fat corresponds to max. fat on the label. The amount of salt in the product corresponds to the amount on the label.
Sausages /Cooked product	Max. 35% fat Max. 2.8% salt	21.9	42 / 48 / 11	0.12	21.1	The amount of fat measured in the product corresponds to max. fat on the label. The amount of salt in the product corresponds to the amount on the label.

¹An explanation of the claim's meaning according to the Regulation EC No 1924/2006:

²Reduced (name of the nutrient): the content of one or more nutrients has been reduced (or any claim likely to have the same meaning); only where the reduction content is at least 30% compared to a similar product

³Light/lite: this claim shall follow the same conditions as those set for the term "reduced" and shall be accompanied by an indication of the characteristic(s) which make(s) the food "light" or "lite"

⁴Increased (name of the nutrient): the content of one or more nutrients, other than vitamins and minerals, has been increased (or and any claim likely to have the same meaning); only where the product meets the conditions for the claim “source of” and the increased content is at least 30% compared to a similar product

⁵Low fat: only where the product contains no more than 3 g of fat/100 g for solids or 1.5 g of fat/100 ml for liquids

FA = fatty acids, SFA = saturated fatty acids, MUFA = monounsaturated fatty acids, PUFA = polyunsaturated fatty acids, ω 3 FA = omega 3 fatty acids

Only 2 of 17 analysed MPs mentioned the information about Na content on the product. The amount of salt was stated on all except 2 of the analysed MPs.

Discussion

Most of mentioned nutrition claims on purchased MPs were declared as “Fit, Fitness, Light, Wellness, With low/reduced fat”. Only one claim stated “ ω 3 FA addition”. No MPs with the nutrition claim connected directly with a reduced Na/salt content were found on the Czech market. Also, none of the MPs stated a clearly health claim. A claim mentioned as “Healthier” seems to be rather related to a nutrition claim connected with “fat reduction” and “ ω 3 FA addition” (Regulation EC No 1924/2006). Our results show that only the amount of fat measured in MPs with claims such as “Fit, Fitness or Wellness” was lower than in the product without this claim, and corresponded to the amount of fat declared on the product. However, when we took into account another important health indicator such as the FA composition, there was no benefit in consuming MPs bearing claims. Even 2 MPs without any claim had a better nutritional FA profile (less SFA and more unsaturated FA) than the same MPs declared as “Fit and Fitness”. Moreover, the Na/salt content did not correspond to the amount declared on the product in 3 of 17 analyzed MPs. Typical Czech dry fermented salami Poličan declared as “Fit and Healthier, with ω 3 FA addition” only had a higher ω 3 FA content. The amount of total fat was almost the same (1% difference), and the Na/salt content was even higher in Poličan declared as “Fit” compared to a regular one without a claim. The same results of Na/salt content were observed in the salami Vysočina and Vysočina “Fit”. Currently, there is no nutritional target proposed for Na/salt content in MPs in the Czech Republic. In the UK, the Food Standards Agency proposed targets of Na/salt content at maximum 2.5 g salt/1.4 g Na in 100 g of ham/cured meat and 1.4 g salt/0.55 g Na in 100 g of sausages to be achieved by 2010 (FSA 2006). None of the 3 analyzed salami and 8 analyzed ham/treated products would met this recommendation; only 6 MPs would. All analytical results except 1 sample with the claim “Low/reduced fat” or “Light” (when connected with fat reduction) corresponded to the legislation requirement and the claim on the product. When comparing MPs “with” and “without” a nutrition claim, in reality, only lightly reduced fat in MPs and added amount of ω 3 FA in one meat product with nutrition claims were recognized. Other indicators, such as Na/salt content, better FA profile or more evident fat reduction in these MPs were not found. From the nutritional point of view, claims such as “Healthier, Fit, Fitness or Wellness” may therefore be considered as somewhat misleading for consumers. In our opinion, such claims should secure more considerable nutritional benefits for the consumers than a minor fat reduction in comparison to the product without such claims. This would help people to make healthier choices of a balanced diet and lifestyle, and also increase the consumers’ trust in the food safety and nutrition policy in EU countries.

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Table 2. Analytical results of 7 meat products bearing claims in comparison with the Regulation EC No 1924/2006 and the information on the product

Product name /Product group	Claim stated on the product	Analyzed indicators				¹ Compliance/noncompliance with the European legislation Regulation EC No 1924/2006 and the information on the product
		Fat (%)	SFA/MUFA /PUFA (%)	ω 3 FA (g/kg)	NaCl (g/kg)	
Fitness cooked ham /Cooked product	Fitness Low fat (max. 5%) Sea salt (max. 2.8%)	2.9	44 / 48 / 8	0.00	26.1	⁵ The fat content is not more than 3% = corresponds to the regulation. The amount of fat corresponds to max. fat on the label. Amount of salt in the product corresponds to the amount on the label.
Cooked ham Junior /Cooked product	Low fat (max. 3%) Salt (max. 2.8%)	1.3	42 / 53 / 6	0.01	23.3	⁵ The fat content is not more than 3% = corresponds to the regulation. The amount of fat corresponds to max. fat on the label. The amount of salt in the product corresponds to the amount on the label.
Chicken sausages natural /Cooked product	Reduced fat (max. 10%) Na/NaCl not declared	7.1	35 / 49 / 16	0.06	15.6	² The fat reduction is 68% = corresponds to the regulation (compared to regular type of sausages). The amount of fat measured corresponds to max. fat on the label.
Light Line wellness Ham /Cooked product	Light wellness Low fat (max. 3%) Salt (max. 2.8%)	2.1	42 / 47 / 11	0.07	45.9	⁵ The fat content is not more than 3% = corresponds to the regulation. The amount of fat corresponds to max. fat on the label. The amount of salt in the product does not correspond to the amount on the label.
Ham selection for children /Cooked product	Low fat (max. 3%) Sea salt (max. 3%)	2.3	46 / 50 / 4	0.05	22.2	⁵ The fat content is not more than 3% = corresponds to the regulation. The amount of fat corresponds to max. fat on the label. The amount of salt in the product corresponds to the amount on the label.
Light wellness ham Top quality /Cooked product	Light wellness Fat (max. 2%) ⁶ SFA (0.8 g/100 g) Na (0.4 g/100 g)	1.1	43 / 53 / 4	0.02	23.9	^{2, 3} The fat reduction is 45% = corresponds to the regulation (compared to regular type of ham). The amount of fat measured corresponds to max. fat on the label. The ⁶ SFA content measured (0.36 g/100 g) corresponds to the amount on the label. The amount of Na (1.0 g/100 g) in the product does not correspond to the amount on the label.
Wellness extra Junior sausage /Cooked product	Wellness extra Fat (max. 3%) ⁶ SFA (1g/100g) 85% less fat than regular Junior sausage Na (1 g/100g)	2.4	43 / 51 / 6	0.07	22.1	The amount of fat measured in the product corresponds to max. fat on the label. The SFA content measured (0.96 g/100 g) corresponds to the amount on the label. The amount of Na (0.9 g/100 g) in the product corresponds to the amount on the label.

¹An explanation of the claim's meaning according to the Regulation EC No 1924/2006:

²Reduced (name of the nutrient): the content of one or more nutrients has been reduced (or any claim likely to have the same meaning); only where the reduction content is at least 30% compared to a similar product

³Light/lite: this claim shall follow the same conditions as those set for the term "reduced" and shall be accompanied by an indication of the characteristic(s) which make(s) the food "light" or "lite"

⁴Increased (name of the nutrient): the content of one or more nutrients, other than vitamins and minerals, has been increased (or and any claim likely to have the same meaning); only where the product meets the conditions for the claim "source of" and the increased content is at least 30% compared to a similar product

⁵Low fat: only where the product contains no more than 3 g of fat/100 g for solids or 1.5 g of fat/100 ml for liquids

⁶FA = fatty acids, SFA = saturated fatty acids, MUFA = monounsaturated fatty acids, PUFA = polyunsaturated fatty acids,

ω 3 FA = omega 3 fatty acids

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