Potravinarstvo, vol. 7, Special Issue, March 2013

Available online: 20 March 2013 at www.potravinarstvo.com
ISSN 1337-0960 (online)

COMPARISON OF QUALITY OF TRADITIONAL AND REDUCED FAT CONTENT CHEESE

Joanna Sobolewska-Zielińska, Małgorzata Bączkowicz, Joanna Socha, Teresa Fortuna, Paulina Pająk

Abstract: Manufacturers of 'light' food products cover up attractive advertisements that encourage us to buy them. The products labeled as 'light' not always meet the legal criteria. The European Parliament controls over labeling. In this paper, we compare the quality of different cheese in the traditional version and their counterparts with lower fat content. It was found that Polish producers comply with the legal requirements, and declarations on food products does not mislead consumers.
Keywords: quality, traditional and reduced fat, cheese

INTRODUCTION

In the world there is an increasing number of people suffering from lifestyle diseases, such as atherosclerosis, diabetes, and cardiovascular disease. In 2020, the FAO/WHO experts predict that diseases caused by poor nutrition will result in three-quarters of deaths in the world (**Kunachowicz 2004**). One of the major problems is actually excessive, high caloric food consumption, and especially fats, particularly those of animal origin, leading to obesity. In economically developed countries the excess weight is a social problem, therefore, low-calories food is becoming more popular in the food market.

Due to the growing interest in health and wellbeing, the word market has reacted by adopting terms such as ''healthy food'' that, in general, imply enrichment by adding beneficial ingredients to food (lycopene, calcium, omega-3, fibre, etc.) or the reduction or elimination of specific components (such as fat or sugar) with the purpose of reducing the calories intake (**Carillo et all. 2012**) .

However consumers are not always willing to give up their favorite products, therefore almost every product has its counterpart in 'light', or non-fat or sugar-free version. In 2006 the first European regulation regarding nutrition and health was introduced to avoid misunderstanding and to protect consumers against false information (Regulation EC No. 1924/2006).

THE AIM OF WORK

The aim of the study has been examination the chemical composition of selected cheese and their traditional counterparts with lower fat content. The authors verified if their labeling and nutrition claims are used in accordance with the legislation.

MATERIAL AND METHODS

Research material consisted of 4 types of cheese: hard cheese type Swiss-Dutch; blue cheese Brie; salad and sandwich cheese (type feta); fresh natural cottage cheese. Each of these products is available on the Polish market, both as a traditional and 'light' version.

Samples of cheese were subjected to the following analysis: content of ash (A) by using dry mineralization; content of water (W) by using thermal drying method; content of protein (P) by using Kjeldahl method; content of fat (F) by using Van Gulik method [AOAC]. Total carbohydrate (C) content was calculated mathematically as follows C=100-(A+W+P+F).

Based on these determinations calculated energy value (EV) of the product Atwater method [PN PN-79011-6:1998] as follows EV=17*(C+P)+38*F.

STATISTICAL ANALYSIS

The data were presented as mean values of three measurements. Results were subjected to univariate analysis of variance using the computer program Excel 2000. The significance of differences was verified using Tukey's test ($p \leq 0,05$).

RESULTS AND DISCUSSION

According to the Central Statistical Office in years 2000-2011 production of rennet cheese and cottage cheese in Poland increased by nearly 59 % and reached a record level of 754.2 thousand tons. Currently, our country's participation in the total world production of more than 3 % (in 2009 - 3,6 %) (**Bugała 2012, GUS 2012**).

Rennet cheese is relatively high contents of fat, cholesterol and calories. Therefore, taking into account the prevailing fashion dietary products, low-fat cheese rennet and the cottage cheese are more popular in recent years (**Pluta 2009**). The majority of consumers surveyed in the study **Jaworska (2007)** drew attention to the fat content in dairy products (75 %), and 48 % declared that eating light products. Similarly, in the study **Szczepaniak et al. (2003)** found a high frequency of consumption of cottage cheese with reduced fat content.

To reduce the energy value of the cheese, the fat content in product should be diminished. It is also the most important ingredients and factors which are essential in the creation of texture, taste and smell of cheese, rennet one especially (**Pluta 2006**).

Table 1. The content of the basic components of traditional cheese (T) and cheese with less fat content (L).

The content of	Kind of cheese							
	Cheese T	Cheese L	Brie T	Brie L	Feta T	Feta L	Cottage cheese T	Cottage cheese L
ash [%]	4,11	4,84	3,06	3,67	4,56	4,60	1,11	1,01
NIR	0,05		0,04		0,03		0,02	
wather [%]	40,60	44,26	48,33	54,28	59,55	61,77	74,69	81,10
NIR	0,25		0,41		0,24		0,09	
protein [%]	26,86	31,38	18,90	24,94	10,58	13,39	7,07	6,80
NIR	0,27		0,25		0,26		0,14	
fat [%]	29,33	19,17	30,33	14,17	19,83	14,00	13,50	6,00
NIR	0,65		0,65		0,46		0,00	

With the reduction in a fat content, increases the water content of the sample. The increase in water content of the cheese with reduced fat content improved texture and organoleptic properties, making them more similar to full fat cheese (**Pluta 2007**). However, reduced fat content can not be completely replaced by water. This can be achieved by the addition of protein concentrates or fat substitutes (**Górecka, Krygier, 2004**). In all examined 'light' cheese (except cottage cheese), with the reduction fat content in the product, increased the protein content.

Table 2. Comparison of nutritional information declared by the manufacturer and indicated in the research for traditional and lower a fat content.

Products		Energy value [kJ/kcal]		The content of protein [%]		The content of fat [%]		The content of carbohydrates [%]	
		D	S	D	S	D	S	D	S
Cheese	T	1503/ 359	1570/ 375	27,00	26,86	27,00	29,33	1,97	0*
	L	1211/ 290	1268/ 303	29,60	31,38	18,28	19,17	1,80	0,36*
	R D [%]	-20	-20	+9	+14	-32	-32	-9	-
Brie	T	1495/ 357	1473/ 352	17,00	18,90	32,00	30,33	0,20	0*
	L	825/ 197	1012/ 481	22,00	24,94	12,00	14,17	0,20	2,93*
	R D [%]	-45	-31	+23	+24	-62,5	-47	0	-
Feta	T	904/ 218	1027/ 245	10,00	10,58	18,00	19,83	4,00	5,48*
	L	733/ 176	866/ 207	14,00	13,39	12,00	14,00	3,00	6,24*
	R D [%]	-19	-16	+29	+21	-33	-29	-25	+12
Cottage cheese	T	670/ 161	695/ 166	7,60	7,07	12,50	13,50	4,40	3,63*
	L	369/ 88	430/ 103	7,30	6,80	5,00	6,00	3,50	5,09*
	R D [%]	-45	-38	-4	-4	-40	-44	-20	+29

manufacturer's declaration (D); own study (S); change of the contents RD= (L-T)/T [%];
*mathematically calculated values

According to the Regulation EC No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods, it can be specified that the product ″REDUCED [NAME OF THE NUTRIENT] -a claim stating that the content in one or more nutrients has been reduced, and any claim likely to have the same meaning for the consumer, may only be made where the reduction in content is at least 30 % compared to a similar product" and the product "LIGHT/LITE - a claim stating that a product is 'light' or 'lite', and any claim likely to have the same meaning for the consumer, shall follow the same conditions as those set for the term 'reduced'; the claim shall also be accompanied by an indication of the characteristic(s) which make(s) the food 'light' or 'lite'".

Table 2 shows a comparison of traditional products with those of reduced nutritional value, or the amount of energy, protein, fat and carbohydrates. This comparison was carried out to see how manufacturers respond to legal requirements.

In the case of yellow cheese, manufacturer on the packaging provides information, that the cheese is reduced fat product and calls it 'light'. In the case of 'light' cheese the energy value of the product is reduced by 20 %, while the reduction of fat in the product was 32 %. Brie cheese manufacturer on the packaging clearly wrote, that his product is a lightweight.

The chemical composition declaired by the manufacturer on the packaging is not consistent with the results obtained in this paper, however a significant reduction in a fat content between the traditional and the light product, was observed.

Until recently, feta cheese with reduced fat content analysed in this paper, had the name 'light' on the packaging. Now, the manufacturer withdrawn their naming and the products are distinguished by their color of the packaging. The traditional product is packaged in blue box and the 'light' in yellow one. Consumers wanting to buy a product with lower energy, are obliged to read the nuritional information of cheese. On the product's labels there is information that 30 g portion contains 65 calories for traditional product and 53kcal for a product with a lower fat content. The packaging manufacturer declares that the fat content of the product is 18 % of the traditional and the 'light' of 12 %. According to our studies, these values are slightly higher (19.93 and 14.00 % respectively), but this may be due to the fact, that the we used a butyrometer Van Gulik, a producer could use different method. Taking into account the manufacturer's declaration, its product can be defined as a product with reduced fat content, however according to results obtained in our studies this term would be against the law.

In the case of cottage cheese, both the name and the packaging of products, clearly inform the consumer which one is traditional and 'light'. Lite cottage cheese producer called 'Figure'. In addition, there is visible slim figure and 5% fat content declaration on the packaging. The difference in fat content between lite cottage cheese and traditional version is 40 %.

CONCLUSIONS

Based on the analysis of selected cheese available on the Polish market, it can be concluded that manufacturers meet the requirements of the law regarding the nutrition declarations. Proper labelling do not mislead consumers. On the basis of our analysis, it can be stated that the chemical compounds of light and traditional cheese are not consistent with manufacturers results and declarations on the packaging.

REFERENCES

AOAC 1995. Official Methods of Analysis of AOAC International (16th ed.) Arlington, Virginia

Bugała, A. 2012 Rynek sera w Polsce rozwija się, konsumpcja wciąż poniżej średniej UE, http://ksow.pl/rynki-rolne/news/entry/3342-rynek-sera-w-polsce-rozwija-sie-konsumpcja-wci.html (in Polish)

Carrillo, E., Varela, P., Fiszman, S. 2012. Packaging information as a modulator of consumers' perception of enriched and reduced-calorie biscuits in tasting and non-tasting tests Food Quality and Preference 25 (2012) 105–115

Górecka, A., Krygier, K. 2004. Zamienniki tłuszczu w produkcji żywności o obniżonej wartości energetycznej. Przemysł Spożywczy 58, 5, 36-40 (in Polish)

GUS 2012 Central Statistical Office GUS Warszawa, http://www.stat.gov.pl/cps/role/xbcr/gus (in Polish)

Jaworska, D. 2007 Jakość sensoryczna serów twarogowych o zróżnicowanej zawartości tłuszczu. Żywność. Nauka. Technologia. Jakość 2, 51, 40-50 (in Polish)

Kunachowicz, E. 2004 Zalecenia żywieniowe a specyfikacja żywności wytwarzanej w Polsce. Przemysł Spożywczy, 58, 7, 2-5 (in Polish)

Pluta A., 2009. Sery podpuszczkowe o zmniejszonej zawartości tłuszczu. Przemysł Spożywczy, 61, 8,26-32 (in Polish)

PN-79011-6:1998 Koncentraty spożywcze. Metody badań. Oznaczenie wartości kalorycznej (in Polish)

Regulation EC No. 1924/2006, of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods http://eur-lex.europa.eu/LexUriServ/ LexUriServ.do?uri= CONSLEG:2006R1924: 20080304:EN:PDF

Szczepaniak, B., Flaczyk, E., Górecka, D. 2003. Assessment of the consumption frequency of products with different fat content among youth, Polish Journal of Food and Nutrition Science, Vol. 12/53, No 1, pp. 65-68

Contact address: Joanna Sobolewska-Zielińska, PhD, Department of Food Analysis and Quality Assessment, University of Agriculture, Balicka str. 122, 30-149 Krakow, Poland, e-mail:rrsobole@cyf-kr.edu.pl