

Monitoring of the Macronutrient Composition of Dairy Products

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ABSTRACT: The composition of dairy products - yogurt and cheese, for protein and total fat content was studied. The content of total carbohydrates and the energy value are determined by calculations. The results show a relatively high fat content in white brined cheese from 19% in goat to 30% in sheep cheese, a high protein content to 17,19% in sheep cheese. Milk and dairy products are ready-to-eat foods rich in complete proteins. The data can be used to form a daily menu, limiting the risk of overweight and obesity.

KEYWORDS -protein, fat, dairy product

Date of Submission: 09-07-2020

Date of Acceptance: 25-07-2020

I. INTRODUCTION

Nutrition is vital for building the human body, to ensure the constancy of metabolic processes and physical activity. It is a basic life process related to the reception, processing and assimilation of food from the environment, necessary for the construction and renewal of cells and tissues, the implementation and regulation of vital functions. Prolonged nutrient deficiency or excess often leads to disease states [1]. The nutritional and energy value of dairy products are indicators of the quality of the products. Through the information about the energy value, nutritionists and the population get acquainted with the main energy sources in food, fats, carbohydrates and proteins. Fats show the greatest possible effect if the ration contains almost equal amounts of vegetable, milk and other animal fats.

For the normal functioning of the human body, the need for energy is different for each individual. Age, health and physical activity are important, which is related to the regulation of energy intake. Energy value is one of the basic indicators for determining scientifically based physiological norms for proper nutrition of the population. Controlling them is an important requirement for a healthy diet. The subject of the study are various dairy products. It is important to note that in order to obtain a quality dairy product, a quality raw material is needed. The sources of contamination of milk are very different. Based on a study of [8,9] on the quality of finished dairy products, the raw material has an impact. The quality of raw milk depends on the content of the total number of microorganisms in it. The total number of microorganisms in raw cow's milk is highest during the summer.

II. EXPERIMENT

The study was conducted in 2020. 2 cheeses and yogurt were analyzed for protein, total fat and carbohydrates.

Proteins were analyzed according to BDS 6231 Milk and dairy products. Methods for determining the protein content. [3]

Total fats were determined according to ISO 2446 Milk. Routine method (Gerber method) [4] and ISO 3433 Cheese / yellow cheese. Determination of oil content. Van Gulik method [5].

Energy value Regulation (EC) №1169 / 2011Ex. XIV to Article 31, Chapter IV, Section III (EU) of the European Parliament and of the Council for the provision of food information to consumers [6].

The carbohydrate content as well as the energy content of each of the tested dairy products was calculated.

III. RESULTS AND DISCUSSION

The aim of the present study is to investigate the main energy sources in yogurt of different fat content, cheese made from cow, sheep, buffalo milk, goat's milk, and to calculate their energy value per 100g and to present them in kilocalories (kcal / kJ). The data can serve to form a daily menu, limiting the risk of overweight and obesity.

According to a study [7], comparing my result with the results of a study conducted in 2017, Of all the products studied, it can be seen that sheep cheese has the highest fat content of 30 g. Sheep and buffalo yogurt have a high energy value, respectively 91.78 kcal (384kJ) and 95.96 kcal (401.50 kJ). [7]. Comparison with my study, where in one of the samples sheep yogurt has the highest energy content of 113.0 kcal (470.42k).

A complete protein contains all the essential amino acids in quantities necessary for the normal course of protein synthesis in the human body. Complete proteins are contained in products of animal origin, milk and their derivatives. 1 g of protein releases energy in an amount of 17 kJ (4 kcal). [2] (Neslerova V., 2014). In the study, yogurt was examined. The content of macronutrients and energy in 100 g net weight of yoghurt cow and yoghurt with different fat content was determined. The results obtained are presented in Table I. The results obtained can help in labeling foods and designing a daily menu. The values for protein, fat and carbohydrate content in 100g of yoghurt are determined. Sheep's yogurt has the highest fat content of 7.13%, the lowest fat is cow's milk 2%. The higher the fat content in the milk, the higher the percentage of protein. Yogurt with 4% fat also contains 4.13% protein. It is known from the literature that sheep's yogurt is high in fat. In one of the tested samples sheep yogurt fat was 8% and the protein content was 7.13%. The fluctuation in protein in sheep's milk is 5.30 to 7.13%. The total content of nutrients determines the energy value, which is the highest value in sheep's milk. Protein needs are met by different products depending on age. Table I shows that sheep's yogurt has an energy value of 113.0 kcal (470.42kJ) and has a higher energy value compared to cow's yogurt, where the lowest value obtained is 45.84 kcal (191.80 kJ). Due to the high percentage of fat, sheep's milk is not preferred by young children and the elderly. Yogurt and sheep's milk, with a fat content of 2.0% to 8.0%, refer to low-fat foods, according to the Nestor fat classification defined by [2]. Low fat content of 3-9 g.

Table I. Macronutrient content and energy in 100 g net weight of yoghurt

Nº	Food product	Protein (%)	Fat (%)	Carbohydrates (%)	Energy value Kcal (kJ)
1	Yogurtcow milk	3,76	2,0	3,2	45,84(192,32)
2	Yogurtcow milk	4,07	3,5	3,2	60,58(253,09)
3	Yogurtcow milk	3,32	3,6	3,0	57,68(238,6)
4	Sourcow milk	4,13	4,0	3,69	67,28(280,94)
5	Sheep yogurt	5,30	6,5	4,3	96,9(403,70)
6	Sheep yogurt	5,33	7,0	2,0	92,32(383,61)
7	Sheep yogurt	7,13	8,0	3,13	113,0(470,42)

The content of macronutrients and energy in 100 g net weight of cow, sheep, buffalo and goat cheese was determined. The results obtained are presented in Table I. The results obtained can help in labeling foods and designing a daily menu. The values for the content of proteins, fats and carbohydrates in 100 g of milk cheese have been determined by laboratory tests. In one of the tested samples, sheep cheese had the highest fat content of 30%, compared to a study where the fat content of sheep cheese was 28g [7] with the lowest fat content being goat cheese 19%. The higher the fat content of the cheese, the higher the protein content. Sheep cheese with 30% fat content also contains 17.19% protein. The protein content of buffalo milk cheese is 28-29% and the protein content is 15%. Goat cheese has the lowest fat content of 19%. The total content of nutrients determines the energy value, which has the highest value in sheep cheese 344.2 kcal. Cow's and sheep's cheese, with a fat content of 20% to 30%, refers to foodstuffs with a high fat content, according to the Nestor fat classification defined by [2]. High fat content of 20-40 g. Excessive fat consumption is one of the negative trends in nutrition, and therefore the amount of fat consumed should be controlled. A healthy person should consume a variety of fats of plant and animal origin.

Table II. Macronutrient content and energy in 100 g net weight of cheese.

Nº	Food product	Protein (%)	Fat (%)	Carbohydrates (%)	Energy value Kcal (kJ)
1	Cow cheese	15,82	27,0	2,02	314,4(1302,28)
2	Cow cheese	14,03	20,0	2,31	245,4(1017,28)
3	Cow cheese	15,12	25,0	1,85	292,9(1213,49)
4	Sheep cheese	16,29	26,5	1,64	310,2(1285,31)
5	Sheep cheese	17,19	30,0	1,35	344,2(1425,18)
6	Buffalo cheese	15,0	29,0	2,5	329(1362,85)
7	Buffalo cheese	15,9	28,0	1,92	320,0(1325,17)
8	Buffalo cheese	15,21	29,0	1,23	326,8(1352,48)
9	Goat cheese	8,67	21,0	2,05	231,9(959,24)
10	Goat cheese	19,0	19,0	2,0	255,0(1060,00)

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Nikola Todorov. "Monitoring of The Macronutrient Composition Of Dairy Products." *International Journal of Engineering Science Invention (IJESI)*, Vol. 09(07), 2020, PP 51-53. Journal DOI- 10.35629/6734