DEVELOPMENT OF BREAKFAST FOOD CONCENTRATES FOR THERAPEUTIC NUTRITION

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INTRODUCTION

Scientific and technical progress and implementation of next-generation technologies around the world has enabled the creation of a number of utilities that facilitate human's existence, but unfortunately have increasingly affected everyone's health. Perhaps the most plausible explanation consists in human's eating habits that have changed simultaneously with the constant evolution in all areas of life. Scientific researches have established that with decreasing consumption of cereals has been recorded an increase in the frequency of XXI century diseases such as: cancer, obesity, diabetes, hypertension, cardiovascular disease, etc. Very important are the studies which proved that cereals contain protease inhibitors and antioxidants, this fact aiming to inactivate carcinogens [1-3]. So a very efficient solution would be to return to the old and simple foods that have fed our ancestors - cereal products rich in dietary fiber.

1. MATERIALS AND METHODS

The main raw materials and auxiliary materials used for the research were: No.1 and No.2 oatmeal cereals, wheat bran and oats, coconut flakes, margarine, agave syrup "*AGAVENSIRUP*", fructose, cinnamon, walnuts, egg yolk, sugar-free dark chocolate. All this materials were grouped from the start according to their principles of action and characteristics that are transposed on the characteristics of the final product. So, we can distinguish: texture enhancer (oatmeal, wheat bran and oat, walnuts grits), flavor enhancers (taste and odor: coconut flakes, cinnamon, dark chocolate) and ligands (agave syrup, margarine, fructose, egg yolk).

The main methods of physicochemical analysis that were used for the research are: determination of the content of dry substances in food concentrates, determination of total content of carbohydrates, determination of titrable acidity, ash content in food concentrates and the sensorial methods of analysis - assessing quality through 0... 5 points scale and profile diagram. It was also established the energy value for the obtained product, baking and drying losses.

2. RESULTS AND DISCUSSIONS

Following the scientific and practical research, it was established a basic recipe that allowed the development of three kinds of food concentrates for breakfast: muesli, cereal bars "*Granola Bar*" and glazed with chocolate cereal clusters. The distinctive feature of these products is the target market, represented by people with diabetes or metabolic disorders. The products were subjected to physical and chemical analyzes and the results are shown in table 1. Due to a more sophisticated recipe composition of "*Granola Crunch*" product (coated with chocolate cereal clusters), suitable methods for determining physicochemical indexes for food concentrates used before are not compatible with this product.

It was therefore performed a simple determination of the semi product, which was later cooked and presented as glazed cereal clusters, the obtained results are shown in table 2.

Because the researched and realized products are innovative, there are currently no technical documents, nor standards which might stipulate the physical and chemical indicators. However, according to studies achieved by Americans [4, 5], we can estimate the moisture content in the finished product within 2-6%. Therefore, this physicochemical index for "*Muesli*" and "*Granola Bar*" products can be included in that range.

Unlike the physicochemical analyzes that were performed for this three types of food concentrates; the sensory analysis was accomplished separately because the appearance, texture and flavor itself make the difference.

Products were rated called: Diabetic muesli, cereal bars "*Granola Bar*" and glazed cereal clusters "*Granola Crunch*".

Sensory characteristics were examined in the following order: appearance, texture, color, smell and taste and the results are presented in table 3 below.

Tabel 1. Physicochemical characteristics of food concentrates for diabetes.

Nr.	Characteristics / Product	Muesli	Granola Bar
1	Humidity content W, %	5,2	4,8
2	Ash, %	1,61	
3	Carbohydrates, g/100 g product	56	
4	Titrable acidity, degree of acidity	5,3	
5.	Energy value, kcal/100 g product	422	424
6.	Baking losses, %	0,7	1,1
7.	Drying losses, %	1,4	1,1

Tabel 2. Physicochemical characteristics of ”*Granola Crunch*” semiproduct.

Nr.	Characteristics / Product	Granola Crunch (unglazed semiproduct)
1.	Humidity content W, %	5,1
2.	Ash, %	1,63
3.	Glucide totale, g/100 g product	48
4.	Energy value, kcal/100 g product	422
5.	Baking losses, %	3,9

Tabel 3. Sensory characteristics of food concentrates for diabetes.

Nr.	Product / Characteristics	Muesli	Cereal bar ”*Granola Bar*”	Glazed cereal clusters ”*Granola Crunch*”
1.	Appearence and color	Well defined appearence, visible outline, dark brown color	Upright appearence, slightly caramelized color	Upright appearence, dark brown color, specific for chocolate
2.	Texture	Brittle, slightly crispy during mastication	Crispy, sonorous during mastication	Crispy and slightly gummy
3.	Smell and taste	The smell of caramel syrup, coconut flakes and cinnamon, harmonious and fine taste	The smell of caramel syrup and muesli, pleasant, slightly astringent	Pleasant smell of chocolate and cinnamon, sweet taste but slightly astringent

To assess the characteristics based on the 0...5 points scale, was organized a product tasting which was attended by students and teachers who had previously been examined on sensory skills.

For each researched feature of food concentrates was offered a score with values between 0 and 5 points. Based on average scores of sensory analysis it was developed a centralized sheet of the results, considering the total average score, based on weighted average scores. Variation of total average scores is presented in figure 1 below.

Assessing the data from figure 1 it is clear that preferential product is Muesli, tasters characterizing it as "an attractive colored product, flavorful, soft and sweet, with a pleasant taste". Although the opinions for different products were impartial, products gained a high total average score and tasters had been interested about the new assortment of food concentrates and their importance in human's daily diet.

The graphical presentation of average scores was shown in figure 2 named Profile Diagram. Analyzing the data presented in the profile diagram we can distinguish three features that make the difference between samples: color, texture and taste.

Default texture can influence the taste and preferences of consumers. In decreasing order of the obtained score for color we have: „*Granola Crunch*” - 4.85 points, the most prefered one, followed by „*Granola Bar*” - 4.7 points and last place „*Muesli*” - 4.5 points.
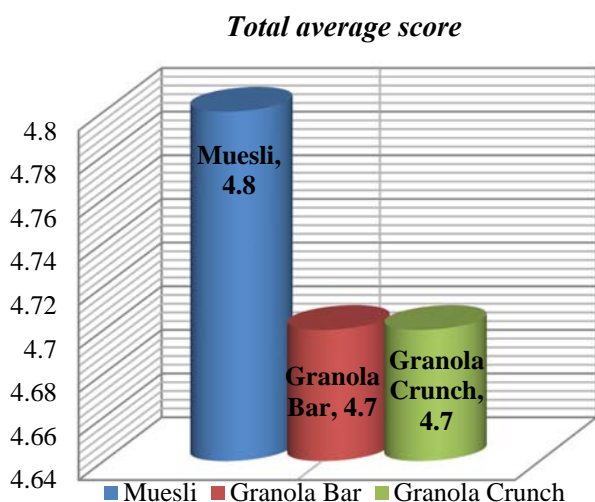
Total average score

Figure 1. Variation of total average score of food concentrate's samples.

Analysing the taster's observations it was determined that they preferred a color uniformity throughout the entire mass of muesli, noticing some particles being more caramelized than others. For texture, the score in order of decreasing values were: „*Muesli*" - 4.77 points, „*Granola Crunch*" - 4.62 points and „*Granola Bar*" - 4.42 points. Tasters noted a crisp texture and specific sound for each product during mastication. Because the product "Granola Bar" is represented by a pressed cereal mass, it's quite tenacious and difficulty while biting. This makes it difficult to consume and that has led to downgrading to. And not least, the appreciation of taste: „*Muesli*" again obtained the highest score 4.92 points, followed by „*Granola Bar*" - 4.77 points and "Granola Crunch" - 4.50 points.

Following the profile diagram we can determine that the product with the most optimal sensory characteristics, is „*Muesli*", while both „*Granola Bar*" and „*Granola Crunch*" need to be improved; for the first one mentioned - texture and appearance, and the second one - taste and appearance.

CONCLUSIONS

After studying about food concentrates for breakfast in general, and different varieties of cereal mixture (muesli and granola) in particular, there were revealed a list of their nutritional and dietary benefits on human's body, which have helped with choice of product and production technology.

So it was performed a wide new assortment (muesli, cereal bars "*Granola Bar*" and clusters of grains coated with chocolate "*Granola Crunch*"), all food concentrated for breakfast being intended for curative nutrition (people suffering from diabetes).
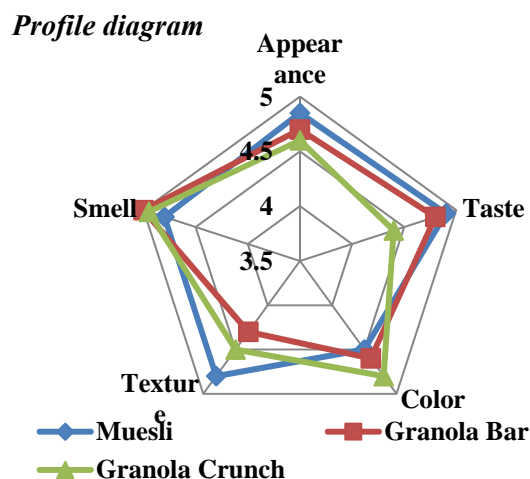
Profile diagram

Figure 2. Profile diagram of food concentrates for diabetes.

Based on the analysis and evaluation of sensory profile diagram, the highest average scoring was obtained by muesli-type product, defining its sensory characteristics: flavor (smell and taste), color and texture. The products "*Granola Bar*" and "*Granola Crunch*", although accumulated a similarly total average score should be improved, especially some characteristics (color and texture). Thus, we can say that the entire range of products that was developed has a nutritional and special curative purpose, which offer innovativeness and will certainly cause interest among buyers.

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