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NEWS

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of the Institute of Plant Biology and Biotechnology

**БИОЛОГИЯ ЖӘНЕ МЕДИЦИНА
СЕРИЯСЫ**



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БИОЛОГИЧЕСКАЯ И МЕДИЦИНСКАЯ



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NOURISHING VALUE OF NATIONAL FOOD “MAISOK”

Abstract. A study of the article reveals that the national food “maisok” has protein, oil, carbohydrates, caloric content, all main vitamins such as: A, B, C, E, PP, unchangeable aminoacids and unsaturated oil acids. In particular, the nourishing results of vitamins E and A such as protein, oil and carbohydrates are greatly seen in this food. With regard to the quality of food Maisok, it was found that Maisok is rich in first rate amino acids such as leucine and lysine. At the same time, richness of glutamine in Maisok among changeable vitamins can also guarantee the quality of this food. Human health can also benefit from the large amount of olein in Maisok which is a starting point to meet the needs of oils in the body of a person.

Unsaturated oil acids are seen in essential substances, this means that they are not digested in the body but can be accepted only through food. Therefore, its biological value is high. It helps to improve person's health, increase immune system which enables to overcome any disease prevents from an early aging and strengthens person's ability to work. Establishing biological and physiological functions of organism, Kazakh national food maisok takes a leading role in contributing valuable nourishing things into organism and consequently makes body healthier.

Relying on the results of the research practically maisok has a good potential to increase nourishment of the food menu. According to the study in social places, in health resorts and in families where people have food prepared data in the table is used. There is a solid ground to consider that this traditional Kazakh food will take a leading role in our cuisine in future as well.

Key words: protein, oils, carbohydrates, vitamins, caloric content, value, kilocalorie, unsaturated oil acids, colorimetry, statistics.

Introduction. Maisok is a national dish, which is made of millet. Millet belongs to the grain family of annual herbaceous plants. In the world, there are about 500 species, one species - common or cultivated is grown in Kazakhstan. In the Kazakh fields they have been grown since the 6th century. In the 19th century, millet was sown in 75-80% of the arable land. Millet is one of the earliest crops. The first center of formation and origin of millet is the mountainous areas of East Asia [1]. Millet is a very important cereal crop. Refined millet is characterized by being easily cooked and nutritious. Glydine, gluten, globulin and albumin dominate in the millet protein complex. Starch consists of amylase and amylopectin. There are a lot of essential amino acids - lysine, methionine and tryptophan. The activity of its enzymes (maltose, amylase, lipase, etc.) is very high, there is s K, Na, Mg, P, as well as a sufficient number of microelements C, B, I in the ashes [2].

Millet grains consist of starch (81%), protein (12%), butter (3.5%), sugar (0.15%), protein content is much higher than in rice and buckwheat. The importance of millet as feed is very high, it is used as feeding poultry farming.

Millet is very nutritious and high calorie food. It is particularly important for children and ill people feeding. Millet is the source of carbohydrates and vegetable proteins [3, 4].

“Food gives strength to a man,” is said in the Kazakh proverb. This means that regular meals can have a beneficial effect on the growth, development and health of the body: it helps maintain increased work capacity, intensified life, and inhibits the aging process. For this reason, organisms in addition to

food need the ingredients to have the cells and tissues grown well, and also for perfect functioning of heart, brain, muscles, skeletons and other organs. It should be noted that the food ration should include a full range of amino acids, vitamins, minerals and other components of meals [5-7].

One of the most important tasks of the steady development is the increase in the average life expectancy of the population. It is planned to achieve this by introducing the mechanisms ensuring health of the population. Strategic significance of healthy nutrition for the population of the Republic of Kazakhstan is also highlighted in the fourth, long-term priority of the President's Address to the people of Kazakhstan "Kazakhstan – 2030" Health, Education and Welfare of Kazakhstan People. The health policy of the Republic is aimed at the development of sanatorium treatment [8]. In the national sanatorium resorts, the menu includes national food, and meals should include various types of dietary menu. Meanwhile, the formula of a healthy diet consists of three parts: the level of knowledge of economic opportunities, food assortment and proper nutrition.

The main task of the food industry is to produce food from different high quality assortments. A man is people's wealth. People's health is an integral part of Kazakhstan's success in achieving its strategic goals. Nutrition in the food ration should consist of dietary supplements that require everyday nutrition, including nutritional supplements (nutritional fibers, vitamins, trace elements), and nutrients containing the components that protect from various harmful substances in the environment [9-10]. Our task is to determine the chemical composition, theoretical and practical significance of the most widely used national meal of our people – Maisok (meal with fried millet), characterized by its unique properties.

Research Materials. When we examined the chemical composition of millet, we took a ready meal.

Maisok – after washing 1 kg of fried millet with warm water and stewing it in hot water (10-15 min.), drying in a cotton material, mixing with 200 g of sugar and oil, it was sent to the laboratory [11].

Research methods. In the basic laboratory of the Kazakh Academy of Nutrition, the amount and nutritional value of proteins, fats, carbohydrates, contained in Maisok were determined.

The Maisok protein was determined by the Micro - Kjeldahl method [12-14]. The total amount of fats was determined by D. I. Kuznetsov and N.G Grishina [15]. The total amount of carbohydrates was calculated from the difference between the dry residue and protein, fats and mineral substances. The determination of humidity, dry residue, ash content of the food product was carried out using the well-known physical and chemical methods [16]. The energy value of food was calculated using a heat factor equal to one gram of protein and carbohydrates, which was 4.1 kilocalories, and the fat content was 9.3 kcal.

The amount of vitamins: B1 (thiamine), B2 (riboflavin) - fluorometric, PP (niacin) -symmetric, C, A, E were determined using the colorimetric methods [17].

These studies were processed using conventional statistical methods and software [18].

The results of the research. The chemical composition of the meal Maisok was studied. The amount of protein, fat, carbohydrate and nutritional value, which were targeted in the basic laboratory of the Kazakh Academy of Nutrition, were determined (table 1).

Table 1 –Nutritional value of the meal Maisok

N	Name of food ingredients	Amount (in 100g of food)
1	Protein, g	7,32±0,004
2	Fat, g	9,7±0,02
3	Carbohydrate, g	15,55±0,06
4	Caloric value, kcal	179±0,2

Analyzing the table, there are 7.32 g of protein, 9.7 g of fat, and 15.55 g of carbohydrates in Maisok.

The value of vitamins in Maisok was determined: A - 037 mg, E - 2,4 mg, B1 - 0,21 mg, B2 - 0,09 mg, RR - 0,08 mg, C - 0,2 mg. The value of vitamin E prevails.

As can be seen from the table, the value of leucine and lysine amino acids is high in the meal Maisok. This situation was not very noticeable, but we explained that this positive result was achieved due to the use of whole grain millet.

When analyzing the non-essential amino acids, the value of glutamic acid was high in the meal Maisok.

Table 2 – The value of vitamins in the meal Maisok

N	Name of the vitamins	Amount (mg / 100 g of product)
1	A	0,37±0,005
2	B-carotene	0
3	E	2,4±0,02
4	B ₁	0,21±0,002
5	B ₂	0,09±0,0003
6	PP	0,08±0,0003
7	C	0,2±0,002

Table 3 – The value of essential amino acids in the meal Maisok

N	Essential amino acids, mg	Amount, (mg/100 g of the product)
1	Valine	345±0,3
2	Isoleucine	364±0,4
3	Leucine	673±0,5
4	Lysine	415±0,2
5	Methionine	178±0,2
6	Threonine	312±0,1
7	Tryptophan	101±0,1
8	Phenylalanine	343±0,3

Table 4 – The value of unsaturated fatty acids in the meal Maisok

N	Unsaturated fatty acids, mg	Amount, (mg / 100 g)
Monounsaturated fatty acids		
1	Trimyristin	155±0,2
2	Palmitolein	29±0,01
3	Olein	337±0,2
Unsaturated fatty acids, mg		
1	Lynol	33±0,03
2	Linolen	11±0,02

By analyzing the table, it was determined that from monounsaturated fatty acids Olein and from unsaturated fatty acids –Lynol prevail.

Analysis of results. Analyzing the composition of the national meal Maisok, it can be determined that Maisok is protein, fat, carbohydrate rich food, in terms of vitamins the values of E and A are high, the vitamin E is an antioxidant it helps feed the cells in the body, increases the regenerative capacity of the tissues and normalizes the immune system in the body against viruses and bacterial infections. Among the essential amino acids, leucine and lysine are one of the three amino acids that enter the human body only with food. Because of deficiency of leucine in the body, metabolism breaks down, growth and development stagnate, and you lose weight. Due to the high levels of leucine in this food, it participates in the formation of the body's skeletal muscle, protein synthesis and splitting. And lysine is needed to get taller, for tissue regeneration, production of hormones, antibody and enzyme formation. Lysine is a component of the connective tissue that forms proteins of the muscle collagen. Lysine participates in elastic bonding of the blood vessels, as well as the absorption of calcium. It participates in the prevention of osteoporosis, atherosclerosis, stroke and heart failure in the human body. It regenerates mammary glands [19, 20]. Among the unsaturated fatty acids, it is distinguished by the value of Olein. For example, the value of Olein in Maisok is high (3,37 mg). It takes part in the body's metabolism. Among these fatty acids, lynol

fatty acids are particularly valuable. When eating normally, an average of 0.4 g of linoleic acid enter the human body every day. Linoleic enhances the metabolism of the body and participates in regulating the level of cholesterol, and also has the ability to prevent diabetes and resist allergic diseases from various foods [21]. Due to it arachidic oil having the biological significance is formed in the body. This acid oils are not contained in vegetable oils, and the content of linoleic acid vice-versa is high in vegetable oils. Therefore animal and vegetable oils supplement each other [22]. The difference between this meal from Zhent (sweet national dish made of crushed millet) is in that it is made of whole grain millet, not of crushed millet. People began to make sweet Maisok after sugar production. Traditionally, these meals are made only with butter (in the Kazakh nomadic era).

Conclusion. In conclusion, we found out that the meal Maisok has high nutritional value, the vitamins A and E, from monounsaturated fatty acids Olein, from unsaturated fatty acids high values of Linoleic, from amino acids leucine, lysine, from non-essential amino acids glutamine. Theoretically, the results of the work are of utmost significance because it has been proven that the national food in the biological and physiological functions of the body is in the forefront of providing nutritional value with essential nutrients. Practically, based on the results of the study, it has the full potential to increase the menu nutritional level. Prepared table data are used in health resorts, places of public catering [23].

It is suitable for people of different professional groups and for people of all ages. Today it is widely used among other nations.

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ҰЛТТЫҚ ДӘМ МАЙСӨКТИҢ ҚОРЕКТИК ҚҰНДЫЛЫҒЫ

Аннотация. Мақалада зерттеу нәтижелерінен ұлттық қоспа тағам майсөктің ақуызы, майы, көмірсуы, қуаттылығы, барлық негізгі дәрумендері – А, В, С, Е, РР, алмаспайтын аминқышқылдары, қанықпаған май қышқылдары бар екендігі айқындалды. Дәрумендерден Е, А дәрумендерінің көрсеткіші, қоректік құндылығы жағынан ақуыз, май, көмірсуы тағамда жақсы нәтиже танытты. Майсөк тағамының сапасын сипаттауға бірінші реттегі аминқышқылы қатарына лейцин, лизин молдығымен анықталды. Ал, алмаса алатын аминқышқылдарының арасынан глутаминнің мол көрінуі де тағам сапасына кепіл бола алады. Тағамда олеиннің мол болуы астың денсаулыққа тиімділігіне кепіл береді, ағзаның майларға деген мұқтаждылығын қанағаттандыруға бастамалық қызметін атқарады. Қанықпаған май қышқылдары эссенциалды заттардың қатарынан көрінеді, яғни олар ағзада қорытылмайды, тек тағам арқылы қабылданады. Сондықтан оның биологиялық құндылығы жоғары. Ол адамның жалпы денсаулығын күшейтіп, кеселге қарсы қасиетін арттырып, ерте қартаюдың алдын алып, жұмыс істеу қабілетін көтереді. Ағзаның биологиялық және физиологиялық қызметін қалыптастыруда қазақ ұлттық тағамы майсөктің сауықтыру қасиеті бар, бағалы қоректік заттармен қамтамасыз етуде алдыңғы қатарда екендігі анықталды. Практикалық жағынан алғанда зерттеу нәтижелеріне сүйеніп дастархан мәзіріне нәрлілік деңгейін жоғарылатуға толық мүмкіндігі болады. Қоғамдық және жанұялық тамақтану орындарында, санаторлы-курортты шипажайларда зерттеу нәтижелері бойынша дайындалған кестелік мәліметтер пайдаланылады. Бұл дәстүрлі қазақтың тағамы әрі қарай дастарханнан өзіне лайықты орын алады деуге толық негіз бар.

Түйін сөздер: ақуыз, майлар, көмірсулар, дәрумендер, қуаттылық, құндылық, килокалория, қанықпаған май қышқылдары, колориметрия, статистика.

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ПИЩЕВАЯ ЦЕННОСТЬ НАЦИОНАЛЬНОГО БЛЮДА «МАЙСОК»

Аннотация. В статье представлены результаты исследования, согласно которых в национальном блюде «майсок» установлено наличие калорий, белков, углеводов, всех основных витаминов – А, В, С, Е, РР, незаменимых аминокислот и ненасыщенных жирных кислот. У блюда имеются хорошие показатели наличия витаминов Е и А, а также белков, жиров и углеводов. Качество «майсок» прежде всего характеризуется большим количеством лейцина и лизина. Гарантией качества данного блюда является высокое содержание одной из аминокислот – глутамина. Наличие олеина так же является гарантией эффективного положительного влияния блюда на здоровье, обеспечивая организм человека необходимыми жирами. Ненасыщенные жирные кислоты выделяются в ряду эссенциальных веществ, другими словами они не накапливаются в организме, а поступают в него посредством пищи, в результате чего обладают повышенной биологической ценностью. Это блюдо положительно влияет на здоровье человека, повышает его устойчивость к различным заболеваниям, предупреждает раннее старение и улучшает работоспособность. Установлено, что при формировании биологических и физиологических функций организма, казахское национальное блюдо «майсок» является одним из ведущих видов пищи, обеспечивающих человека ценными питательными веществами и обладающие оздоравливающим эффектом. С практической точки зрения, опираясь на результаты исследования можно сказать, что будет возможность значительно повысить уровень пищевой ценности рационов питания человека. В местах общественного и семейного питания, санаторно-курортных учреждениях будут использованы справочные таблицы, подготовленные на основании результатов исследования. Имеются все основания утверждать, что это традиционное казахское блюдо займет достойное место на нашем столе.

Ключевые слова: белок, жиры, углеводы, витамины, энергичность, пищевая ценность, килокалория, ненасыщенные жирные кислоты, колориметрия, статистика.

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