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Amino Acids Profile of Kazakh National Soft Cheese Made of Goat's, Cow's Milk and Their Mixture.

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ABSTRACT

Due to modified technology of Kazakh national soft cheese from mixture cow's and goat's milk managed to get a cheese with more essential and non-essential amino acids than in control cheese from cow's milk or goat's milk.

Keywords: soft cheese, goat's milk, cow's milk, amino acid, capillary electrophoresis.

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INTRODUCTION

Solution of the food problem and to provide the population valuable nutritious protein, expanding the range of food products, increasing their biological and nutritional value, as well as the creation of products meeting the requirements of healthy nutrition are the problems of contemporary society. One of the available way to implement these problems was to develop technology for product of various combination products specific physiological and biological orientation.

Great promise in the development of the production of combination products are available to the dairy industry. Even today, milk-based, using a wide variety of different food components of plant and animal origin are produced by a variety of fermented milk drinks, processed and soft cheeses, cottage cheese products and many other products.

The purpose of the developed technology to allocate unused cheese nutritional potential of goat's milk and the need for improvement, especially in the area of food safety. Goat's milk, such a cow's milk, provides a lot of nutrients but relatively low energy content. At present, many scientists investigated and presented evidence that goat milk has many benefits compared to cow's milk, for use as a source of nutrition for infants and children, and as a preventive food value. Production of goat milk is a dynamic and growing industry, and is fundamental to the well-being of hundreds of millions of people around the world and is an important part of the economy in many countries.

In Kazakhstan, the average annual consumption of cheese per person is 2.5 kilograms. Recommended intake of cheese according to the World Health Organization (WHO) - 8 kg per year. According to the Agency for Statistics, last year produced 21.8 thousand tons of cheese and cottage cheese.

In Kazakhstan dairy products from goat's milk are not produced on an industrial. According to statistics, in 2014 the number of goats reached 3015 thousand and milk produced from goat is about 2360.8 tons. [1].

Issue soft cheeses is more economical, since their production consumes 1.5 times less milk, not subject to high specific requirements for the quality, do not need a significant production area for a long maturation, storage and installation of expensive cheeses specialized cheesemaking equipments [2]. Organization of their production provides a more rapid turnover of invested funds and helps to balance the seasonality of cheese fabrication [3, 4]. Cheeses in this group have good commodity properties and increased bioavailability. Production of soft and fresh cheeses can be organizedin any dairy industry [5].

In summary, we can conclude that the provision of the population with new types of soft cheese made from goat's milk or a mixture thereof is necessary and appropriate.

The offered Kazakh national soft cheese is an acid-rennet curd cheese ripened for over a short period of time. Currently Kazakh national soft cheese is made from cow's milk [6].

MATERIALS AND METHODS

Three different cheese type were made in three different moments: CCM (Control cheese made from cow's milk), CGM (cheese made from goat's milk) and CCGM (cheese made from cow's and goat's milk, a 1: 1 ratio, L: L). The cheeses were made following the modified technologyof Kazakh national soft cheese described in Kazakhstan patent.

The samples of cheeses were investigated on the total amino acids by capillary electrophoresis (Kapel 105M, Lumex, Russia).

The method is based on the decomposition by acid hydrolysis of samples translated amino acids in free form obtained phenyl-isothiocyanate (FTC) derivatives, their further separation and quantitative determination by capillary electrophoresis detection is performed in the UV region of the spectrum at a wavelength of 254 nm. The analysis was performed on a system of capillary electrophoresis "Kapel 105M" positive polarity high voltage source (internal capillary diameter of 50 microns, the total capillary length 75 cm,

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effective length 65 cm). The calculation of mass amino acids was performed using the absolute calibration method [7].

Weigh the sample mass (200,0 ± 0,2) mg is placed in a vial for the hydrolysis is added 10 ml of hydrochloric acid diluted with distilled water 1: 1 and stirred and hydrolysis is carried out at a temperature of 110 ^{0}C for 14-16 hours. Then filtered, rejecting the first portion. The 50 µlhydrolyze was evaporated to dryness under a stream of warm air and added 150 µl of a 0.1 M sodium carbonate and 300 µl solution of phenyl isothiocyanate in isopropyl alcohol. Mix thoroughly to dissolve the precipitate was capped and allowed to stand for 35 minutes at room temperature. The solution was evaporated to dryness under a stream of warm air. The dry residues were dissolved in 0,5 ml of distilled water and used for analysis during 12 hours. Prepared for the analysis of the solution was transferred to the tube type "Eppendorf". Centrifuged for 5 min at a speed of 5000 rot/ min.

RESULTS

The electrophoregram of contents of amino acids of 3 samples are represented on the Figure 1, 2 and 3.

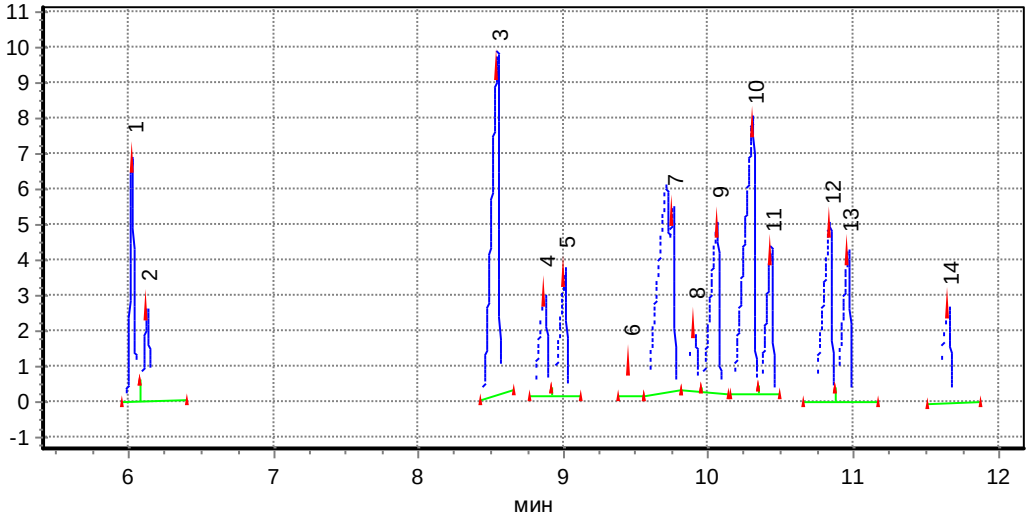

Figure 1: A electrophoregram of control CCM: 1 – electro osmotic stream (start time of sample),2 – arginine, 3– lysine, 4– tyrosine, 5– phenylalanine, 6– histidine, 7– leucine+isoleucine, 8– methionine, 9– valine, 10– proline, 11– threonine, 12– serine, 13– alanine, 14– glycine.

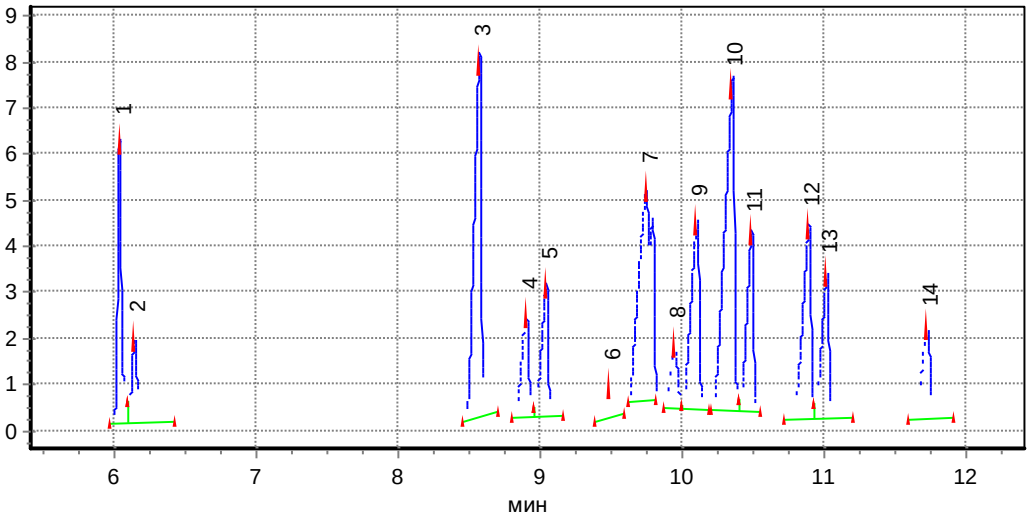

Figure 2: A electrophoregram of control CGM: 1 – electro osmotic stream (start time of sample),2 – arginine, 3– lysine, 4– tyrosine, 5– phenylalanine, 6– histidine, 7– leucine+isoleucine, 8– methionine, 9– valine, 10– proline, 11– threonine, 12– serine, 13– alanine, 14– glycine.

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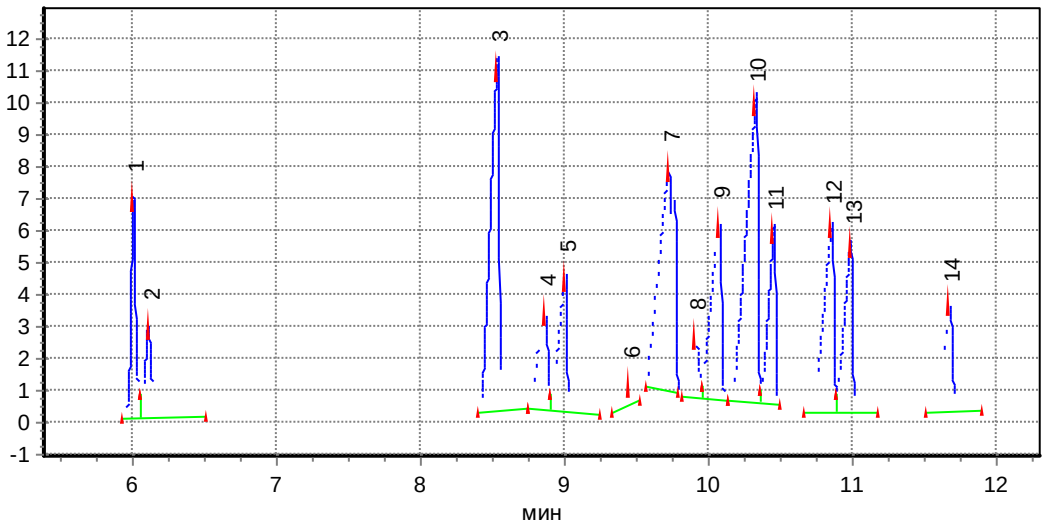

Figure 3: A electrophoregram of test CCGM: 1 – electro osmotic stream (start time of sample),2 – arginine, 3– lysine, 4– tyrosine, 5– phenylalanine, 6– histidine, 7– leucine+isoleucine, 8– methionine, 9– valine, 10– proline, 11– threonine, 12– serine, 13– alanine, 14– glycine.

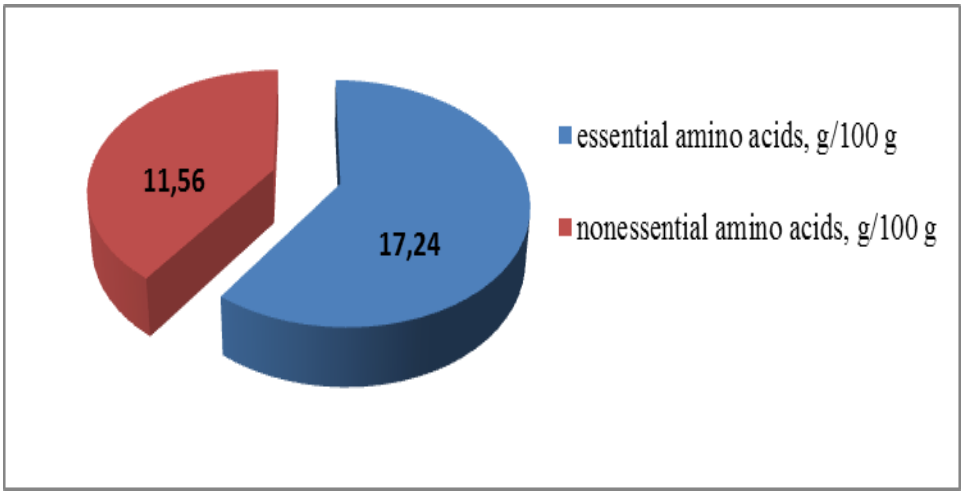

Figure 4: Distribution of amino acids in control CCM

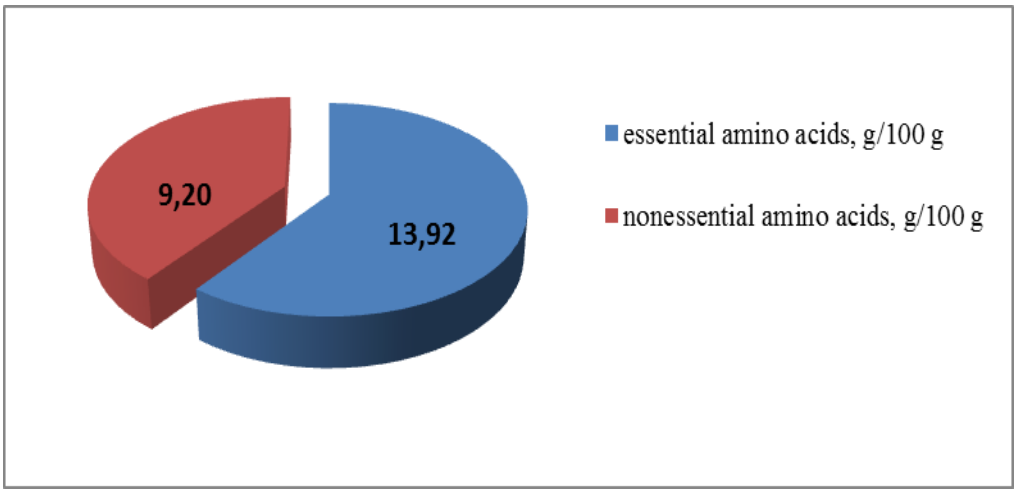

Figure 5:Distribution of amino acids in control CGM

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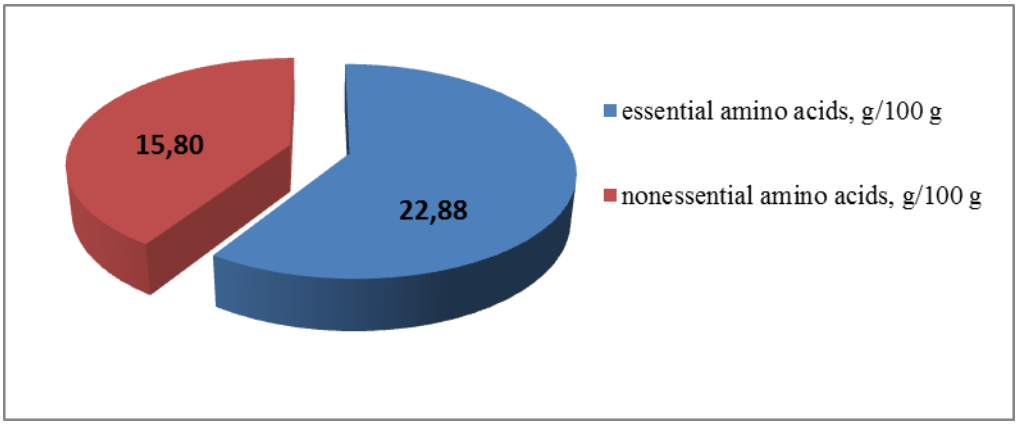

Figure 6: Distribution of amino acids in test CCGM

DISCUSSION

The correlation essential: nonessential amino acids acids was 60÷59: 40÷41 and their distribution profiles are presented on Figures 4, 5 and 6. Lysine acid predominated in thefraction of essential amino acids and proline predominanted among the nonessential amino acids.

New product due to essential amino acid has a high nutritional and biological value. Thanks to the prepared mixture and processes managed to get the product to 1.6 times more than the essential amino acids in cheese from goat's milk and 32% more than in cow's milk cheese.

CONCLUSIONS

The using the mixture of goat's and cow's milk for prepare national Kazakh cheese influence on content of essential amino acids.

Due to modified technology of national soft cheese mixture and managed to get a cheese with a lot of essential and non-essential amino acids in the composition. We managed to achieve this goal.

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