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Mineral Composition of Kazakh National Milk Product: Kurt.

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Abstract

In this paper the mineral composition of Kazakh national milk product – kurt is studied. For observing the microstructure and the line of X-ray spectrum of mineral elements the scanning electron microscope with the system of X-ray microanalysis is used. The mineral composition is presented by the following elements: sodium, phosphorus, sulfur, chlorine, potassium and calcium.

Keywords: kurt, milk product, mineral, X-ray microanalysis, Kazakhstan

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INTRODUCTION

Kurt is a milk product popular in Turkic people. According to flavoring characteristics kurt is similar to dry cheese, and rich in calories. In Bashkiria it is added to aliphatic meat soups. Milk product efficiently helps to cope with thirst in the desert and the steppe [1].

Kurt is a national food in Central Asia, including Kazakhstan, Kyrgyzstan and Uzbekistan. This product is also very popular in Georgia, Azerbaijan and Armenia, Tatarstan, Bashkiria and Mongolia. Kazakh people prepare kurt from the suzbe. Suzbe is a curd received by dewatering of ayran (sour milk, a kefir analog). Milk for preparation to the suzbe can be fat-free if it is a pro-separated milk, i.e. milk from which through an express separator separated cream. If in technology is used the whole milk, then the suzbe is obtained with particular fat content and from it already most often cook cottage cheese [2].

For making kurt the skim milk is boiled, then cooled up to the temperature of 20-30 C and is added 1-2 tablespoons of the ferment. Then the mixture is covered and put to the warm place for souring. When milk is soured, the received kefir is poured to the dense webbing bag and suspended for liquid running off. This process lasts from several hours to one day, depending on the amount of kefir. As a result the heavy-bodied curd is formed which then is boiled with salt addition, cooled and rolled in balls of small diameter or in the form of oblong small sausages. On this stage the kurt is fresh, but not dry yet. It tastes like cottage cheese and since the kurt is salted finally we obtain heavy-bodied cottage cheese with saltish taste [3].

Fresh kurt's balls put on the wide flat plate, covered with a clear gauze and dried in the warm aired place. During the summer time this process takes from several days to one week. After the complete drying kurt does not spoil, and can become harder, but it does not lose flavoring properties, on the contrary, develops a juicy taste [4].

The aim of this publication is to determine the mineral composition of Kazakh national milk product – kurt sampled from the different places of the Republic of Kazakhstan.

MATERIALS AND METHODS

Kurt was sampled from three cities of Kazakhstan: Astana, Oskemen and Semey. From each city at least three food trade markets and ten point places of trade market was chosen for sampling.

Fig. 1. Map of Kazakhstan with sampling point locations

Determination of the mineral elements is performed by the scanning electron microscope «JSM-6390LV JEOL» with the system of X-ray microanalysis «INCA ENERGY 250». The samples fixed on the holder of

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the microscope and with the appropriate software the microstructure and the quantity content of mineral elements are determined according to [5, 6]

RESULTS

The results of the analysis of mineral composition of kurt are presented in tables 1-3. The mineral composition is presented by the following elements: sodium, phosphorus, sulfur, chlorine, potassium and calcium. Strong concentration of sodium and chlorine coming from the fact that during the kurt making the sodium chloride is added.

Table 1: Mineral composition of kurt, sampled from Astana city, %

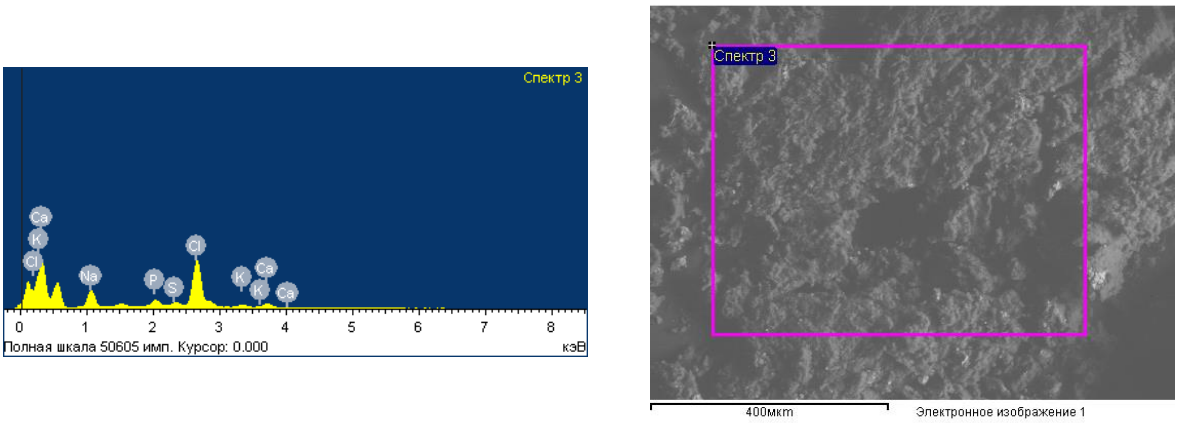
Sampling place	Na	P	S	Cl	K	Ca
Market 1	20.84±0.21	7.24±0.09	5.25±0.09	51.78±0.60	6.00±0.07	8.88±0.12
Market 2	20.89±0.26	7.20±0.09	5.19±0.07	51.55±0.80	6.61±0.10	8.55±0.09
Market 3	20.62±0.33	7.41±0.12	5.38±0.03	51.60±0.47	6.26±0.12	8.72±0.08
Mean	**20.78±0.26**	**7.28±0.10**	**5.27±0.06**	**51.64±0.62**	**6.29±0.09**	**8.72±0.09**

Table 2: Mineral composition of kurt, sampled from Oskemen city, %

Sampling place	Na	P	S	Cl	K	Ca
Market 1	23.99±0.27	6.01±0.05	4.51±0.06	54.60±0.79	4.86±0.07	6.03±0.05
Market 2	23.71±0.39	6.20±0.04	4.45±0.05	54.87±0.76	4.86±0.05	5.90±0.09
Market 3	23.83±0.31	6.13±0.08	4.43±0.06	54.44±0.88	4.84±0.06	6.32±0.07
Mean	**23.84±0.36**	**6.11±0.08**	**4.46±0.03**	**54.64±0.55**	**4.86±0.04**	**6.08±0.08**

Table 3: Mineral composition of kurt, sampled from Semey city, %

Sampling place	Na	P	S	Cl	K	Ca
Market 1	26.84±0.32	5.77±0.07	2.97±0.03	54.80±0.84	3.24±0.04	6.39±0.05
Market 2	26.14±0.30	6.29±0.08	3.17±0.04	54.51±0.76	3.09±0.04	6.81±0.04
Market 3	26.08±0.37	6.09±0.06	3.29±0.03	54.69±0.58	2.89±0.03	6.96±0.06
Mean	**26.35±0.29**	**6.05±0.08**	**3.14±0.04**	**54.66±0.53**	**3.07±0.03**	**6.72±0.09**



a) the line of X-ray spectrum of mineral elements **b) kurt microstrucure**

Fig. 2: Kurt microstructure and X-ray spectrum of mineral elements

The comparative analysis of mineral composition of kurt, selected from the different cities of Kazakhstan, showed that the largest concentration of calcium and potassium is observed in the samples from Astana. Thus, the high content of calcium of kurt sampled from Astana is average 8.72%, whereas in Semey and Oskemen the calcium concentration are 6.72% and 6.08%, respectively.

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It is known that calcium, as well as many minerals, plays an important role in the human activity. Especially it is necessary for tooth and bone formation, metabolism improvement osteoporosis prevention and other diseases. Accumulation and strengthening of human bone mass happens mainly to a 30-year age. In this regard it is very important to provide good nutrition of the person for achieving the maximal bone mass. In 40 and up years of human age the bone mass and bone strength is began to decrease [7].

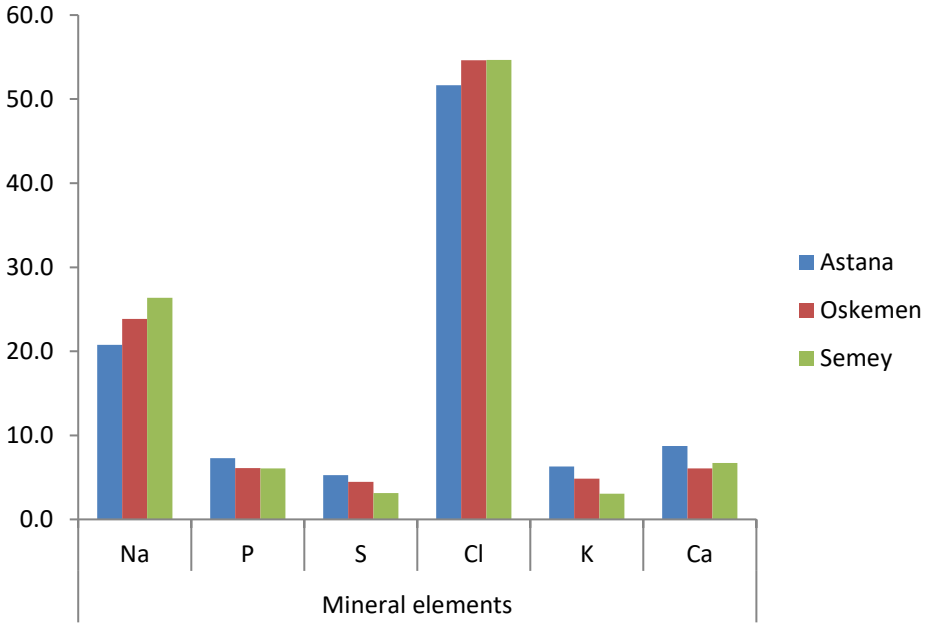

Fig. 3: Average concentration of minerals in kurt from different cities

According to the references the recommended calcium dose for children from 6 months till 1 year is 400-600 mg, from 1 to 5 years – 800 mg; for children of 6-10 years – 900-1200 mg; for teenagers – 1200-1500 mg. For women at the age of 25-50 years the optimum daily dose is 1000 mg, for pregnant women and breastfeeding mother – 1200 mg. A daily dose for men at the age of 25-65 years – 1200 mg; for all men and women over 65 years – 1500 mg [8].

The highest content of potassium is observed in the kurt from Astana - 6,29%, the lowest – in the samples from Semey – 3,07%, and in Oskemen the concentration of potassium in kurt samples is 4,86%.

The potassium role in the human body is highly important by the fact that on sodium and potassium equity balance in the human body depends the functions of muscles and nerves. Potassium participates in regulation of water-salt metabolism, supports an optimum condition of the acid-base environment. Under the influence of potassium compounds the enzymes become more active. This mineral also is necessary for ensuring normal functioning of heart. In particular, potassium improves activity of myocardium during the metabolic imbalance [9, 10].

Potassium compounds provide normal functioning of the soft tissues of which vessels, capillaries, muscles, liver, kidney, cells of the brain, an endocrine gland and other bodies consist [11, 12].

Sulfur content data is varied from 3.14% (in the samples from Semey city) to 5.27% (samples from Astana), herein, in the samples from Oskemen the sulfur concentration is 4.45%. Sulfur is concentrated in all types of tissue, with most abundance in skin, muscles, hide and juncture. Sulfur is also a part of aminoacid (cysteine, cystine, methionine and taurine) [9].

CONCLUSION

From the obtained data, it is revealed that kurt is a good source of macroelements, such as calcium, phosphorus, potassium, sodium. For many years kurt has been considered an ideal product for travelers and

pilgrims. Kurt is highly nutritious product and allows for human easier stand the heat of the day that is important in hot steppes. Another good quality of kurt is long-term storage and resistance to the thermal gradient. Kurt is not necessary keep in the refrigerator, it does not spoil on the way for a long time.

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