

Prospects of Import Substitution by Extending the Volume of Russian Dairy and Milk-Containing Production

Perspectivas de la sustitución de las importaciones mediante la ampliación del volumen de producción láctea rusa

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ABSTRACT:

The goal of the research is to study the prospects of import substitution of milk-containing products in the Russian Federation by domestic production technologies. In order to achieve this goal, the following tasks were set and solved: the volumes of the Russian import milk-containing products' market were analyzed; possibilities of substituting import products by analogous domestic ones were defined; and promising areas of developing import substitution of milk-containing products by domestic products were determined. The volume of import milk-containing products' market was analyzed by using the data base of the customs statistics of the Russian external trading. For the period since 2013 to 2016 the volumes of importing dairy products in physical and monetary term were analyzed, and tendencies of changing and describing them were revealed. When estimating the possibilities of import substituting of milk-containing products by domestic products, the results of the production in the Russian Federation were analyzed. Technologies of cheese and processed cheese products

RESUMEN:

El objetivo de la investigación es estudiar las perspectivas de la sustitución de la importación de productos que contienen leche en la Federación de Rusia por las tecnologías de producción nacionales. Para alcanzar esta meta, las tareas siguientes fueron fijadas y solucionadas: los volúmenes del mercado de productos leche-que contienen de la importación rusa fueron analizados; se definieron las posibilidades de sustituir los productos de importación por análogos domésticos; y se determinaron áreas prometedoras para el desarrollo de la sustitución de importaciones de productos que contienen leche por productos domésticos. El volumen de importación de productos lácteos que contienen el mercado se analizó utilizando la base de datos de las estadísticas aduaneras del comercio exterior ruso. Para el período desde 2013 a 2016 los volúmenes de importar productos lácteos en término físico y monetario fueron analizados, y las tendencias de cambiar y de describirlos fueron reveladas. Al estimar las posibilidades de sustitución de las importaciones de productos lácteos por productos

developed by the Omsk State Agrarian University together with West Siberian milk processing enterprises that are competitive in relation to import analogues were used as the research object. When defining promising areas of developing import substitution of milk-containing products by domestic products, volumes and cost of import were taken into account. The research material is the food and biological value of the selected object of research, functionality, storage stability, production, and milk content.

Key words: import substitution, Russian milk-containing products, cheese and processed cheese products, efficiency, production technology, dairy products import, milk content.

domésticos, se analizaron los resultados de la producción en la Federación de Rusia. Tecnologías del queso y productos elaborados con queso elaborados por la Universidad Agraria del estado de Omsk junto con las empresas de procesamiento de leche de Siberia occidental que son competitivas en relación con los análogos de importación se utilizaron como objeto de investigación. A la hora de definir áreas prometedoras para el desarrollo de la sustitución de importaciones de productos que contienen leche por productos domésticos, se tuvieron en cuenta los volúmenes y el costo de la importación. El material de investigación es el valor alimenticio y biológico del objeto seleccionado de investigación, funcionalidad, estabilidad del almacenamiento, producción y contenido de leche.

Palabras clave: sustitución de importaciones, productos lácteos rusos, quesos y quesos elaborados, eficiencia, tecnología de producción, importación de productos lácteos, contenido de leche.

1. Introduction

The policy of developing import substitution can be focused on solving tactical tasks of providing the population with food that can be produced in the country. Import substitution of agricultural products refers to the top priority areas of ensuring the food safety of any country. In this case this policy is adaptive and is stipulated by sudden changes in external political relations between countries when traditional channels to supply import food cease functioning due to any reasons. Specific peculiarities of such import substitution policy include its focus on solving the current problems and meeting needs of the population in imported food. All measures taken by the country government within this policy are short-term and do not aim at solving the system problems of agriculture development and increase in its competitiveness because they are focused on quick solving of the problem related to substituting import goods by domestic ones. Long duration of such policy may finally cause degradation of agricultural areas and catastrophic fall of competitiveness, because the creation of the maximum favorable conditions of functioning for national agricultural producers due to artificial limitations for foreign competitors does not create stimuli for the sector development.

The second area of import substitution development is the creation of the maximum favorable conditions for developing domestic production on the basis of the sector intensification, its transfer to the innovational way of development, increase in the level of competitiveness of national food rather than on the basis of artificial limitations for importers. This import substitution policy is long-term. Positive results of pursuing it will occur in several years.

The above can be confirmed by the fact that for 11 months of 2016, out of the total volume of products made in Russia the export was as follows (%):

- Milk and dairy cream to drink – 1.1%,
- Fermented-milk products - 3%,
- Condensed canned milk – 4.8%,
- Butter and butter pastes - 2%,
- Cottage cheese – 3.1%,
- Cheese – 2.9%, and
- Cheese products – 10.2%.

Today there is the third product whose export volumes increase. These are cheese products. In 2015 5.2 thous. t. were exported, and in January-November 2016 12.7 thous. t. or about 10% of the total dairy production were exported. The reason why cheese products are popular is the population's income fall, because the main market of sales is CIS countries, the population of which suffers from crisis.

In the list of milk-containing products cheeses and cheese products happened to be the most

important. Their ratio was 33.5%, and 44.5%, including cottage cheese (Table 1).

Table 1. Volumes of Export of Main Groups of Russian Dairy Products

Product code in the external economic activity	Export volume, t	
	2015	2016 (January-November)
0401 milk and cream	53,002	53,419
0402 instant skimmed milk powder	4,363	2,563
0402 dried whole milk	2,064	1,004
0402 condensed milk	141	544
0402 sweet condensed milk	13,049	14,137
0403 fermented-milk products	75,303	68,142
0404 whey	6,645	7,085
0405 butter and fats	4,878	4,664
0406 cottage cheeses	12,327	11,755
0406 cheeses	16,040	12,407
2106 cheese products	5,217	12,740

Besides, there are also problems during import and export procedures between countries of the Eurasian Economic Union (EEU): high differences related to material expenses for preparing documents and the speed of export goods moving. The situation will not change for the better until the customs administering is fully synchronized in EEU countries.

If to consider cheese and cheese products production, in 2016 it continued growing, although slower: in 2014 the growth tempo was 115.3%, in 2015 it was 117%, and in 2016 it was 102.8%. According to the operative data of the Rosstat, in 2016 597.4 thous. t. of cheese and cheese products were produced.

As compared to 2015, the production structure (Table 2 and 3) changed inconsiderably due to increasing the ratio of natural cheeses. 355 thous. of natural cheeses, 106 thous. t. of processed cheese and 136.4 thous. t. of cheese products were produced.

Table 2 . Production of Cheeses and Analogue Cheeses in the Russian Federation

Item	Volume of production, t		2016 as to 2015, %
	2015	2016	
Hard cheese	144,166	137,941	95.7

Semi-hard cheese	113,026	122,705	108.6
Processed cheese	102,876	106,007	103
Soft-ripened cheese	28,301	33,420	118.1
Other chesses	21,440	25,135	117.2
Pickled cheese	23,747	21,258	89.5
Smoked cheese	13,424	13,097	97.6
Ripened cheese	761	765	100.5
Fromage frais	667	466	69.8
Blue cheese	-	186	-
Cheese products	132,907	136,437	102.7

Table 3. Structure of Cheese-Making Products in the Russian Federation

Group of products	Share in the total production, %	
	2015	2016
Natural cheeses	59.4	60
Processed chesses	22.9	22.5
Cheese products	17.7	17.5

It is possible to note the activation of farmer cheeses production, and production of famous foreign brands by using the capacities that belong to Russian cheese producers as basic trends.

The decrease in the production growth tempos came with the increase in import supplies of cheeses. Thus, for 10 months of 2016 the import increased by 11.3% up to 158.4 thous. t. The Republic of Belarus increased the export of cheeses to Russia by 17.4% - 133.8 thous. t., which made up 84.4% of the whole import.

Works of many authors like Altukhov A. (2014), Koroliuk E.V., Mezentseva E.V. (2016), Kopein V.V., Filimonova E.A. (2016), Shagaida N., Uzun V. (2016), Plotnikov V.A., Vertakova Yu.V. (2014), Semenova N.I., Utiatskiy S.P. (2015), Nardin D.S., Shumakova O.V., Nardina S.A. (2016) are devoted to issues related to developing import substitution and ensuring food safety in the food sector. To a great degree, successful development of import substitution of agricultural products depends on conditions of the country agricultural complex functioning, level of infrastructure development and improvement of institutes and tools of the sector development. The works of Stukach V.F. et al. (2015), Stukach V.F., Astashova E.A., Shumakova O.V. (2006) also covered these issues. Balykova L.N. (2015), Golubev A.V. (2016), Shumakova, O.V., Nardin, D.S. devoted their works to developing import substitution in the food sector.

In spite of the considerable interest of researchers in the problem related to developing import substitution of milk-containing products as a whole and in producing cheese and processed cheese products in particular, there are still problems that require close attention.

Milk-containing production, in particular production of cheeses and cheese products, is one of the main milk content areas of the dairy industry, and issues related to developing import substitution are always under special control.

The goal of this research is to study the prospects of import substitution of milk-containing products, in particular cheeses and processed cheese products, in the Russian Federation made using technologies of the Omsk specialists. The work sets the following tasks:

- 1) To analyze the volumes of dairy products market, including cheeses, in the Russian Federation,
- 2) To define opportunities of import substitution by cheeses produced domestically,
- 3) To define promising areas of developing import substitution of milk-containing products of Russian producers taking into account their milk content.

2. Methods

The market of import cheese products is analyzed by using the database of the customs statistics of the external trading of the Russian Federation (Customs Statistics of External Trading]. Official website of the Federal Customs Service, 2017). For the period since 2013 till 2016 the volumes of import cheese products in physical and monetary term were analyzed, tendencies of changing them were revealed and described.

Peculiar technologies of cheese and processed cheese products made in the cooperation of specialists from the Omsk State Agrarian University with specialists of milk processing enterprises were used as the research object (Table 4) (Moliboga 2014).

Table 4. Practical Use and Scientific Novelty of Technologies

Technologies	Statutory document	Patents
Otlichnik processed cheese product	Industry Standard 56438524-003-2010	Patent No. 2450527 of the Russian Federation
Shkolnik processed cheese product	Industry Standard 56438524-004-2010	
Cheese product for school meal	Industry Standard 56438524-010-2010	Patent No. 2465775 of the Russian Federation
Studencheskiy processed cheese	Industry Standard 71063300-001-2012	Patent No. 2477611 of the Russian Federation
Studencheskiy processed cheese product	Industry Standard 56438524-004-2015	
Solnyshko cheese product for processing	Industry Standard 56438524-005-2010	Patent No. 2466545 of the
Solnyshko processed cheese product	Industry Standard 56438524-005-2014	

Vkusniashka cheese product for processing	Industry Standard 56438524-006-2010	Russian Federation
Vkusniashka processed analogue cheese	Industry Standard 56438524-004-2015	
Plasticized analogue cheese	Industry Standard 56438524-007-2010	Patent No. 2458516 of the Russian Federation
Analogue cheese for diabetes nutrition	Industry Standard 56438524-008-2010	
Analogue cheese	Industry Standard 97887659-007-2011	Patent No. 2431409 of the Russian Federation
Diabeticheskiy processed cheese	Industry Standard 71063300-002-2012	
Gerodieticheskiy processed analogue cheese	Industry Standard 71063300-003-2012	
Zagadka analogue cheese	Industry Standard 56438524-012-2010	Patent No. 2466546 of the Russian Federation
Zagadka processed analogue cheese	Industry Standard 56438524-001-2015	

The research material includes the nutrition and biological value of products made by using the above technologies, functionality, safety, and economic efficiency of production.

Indicators of the developed products safety were defined according to the Technical Regulation of the Customs Union "On Milk and Dairy Products Safety" (TR CU 033/2013) and comply with statutory requirements. It means that the developed technologies of products are safe to introduce to the diet of people of various age groups and as on the expiry date they contain 1-107 CFI/G of revivable germs (Moliboga 2016a; Moliboga 2016b; Moliboga 2015; Lisin 2015).

The traditional technology of producing processed cheese products supposes to include various dairy products in the receipt. Their mixture is usually exposed to fine grinding and mixing with emulsifying salts. The structure formation of such multi-component mixture is a comprehensive process that depends on a number of factors.

The technology of above processed analogue cheeses for specialized nutrition is peculiar by the fact that the main raw materials are represented by two components:

- Cheese and/or cheese mass for processing with the accelerated term of maturing and vivid ability for changing the phase state as influenced by emulsifying salts,
- Functional ingredient that contains prebiotic and probiotic that allows considering it a synbiotic biocomponent.

To combine these two components into a single structure, the impact of the structure former was additionally researched. It contributes to binding adherent moisture, prevents syneresis when storing processed analogue cheeses. To stipulate the essence of structure formation and level of the stabilization system impact, the work used the method of relaxation (nuclear magnetic resonance, NMR) to define the relative number of the binding and adherent water in

dairy products (Gavrilova 2015; Moliboga 2010).

When defining promising areas for the development of import substitution of cheese and processed analogue cheeses by local analogues, the work took into account the volumes of import, cost of import, and cost of analogous local products and expenses for creating technologies of local products that can compete with import goods.

3. Results

3.1 Analysis of the market of Imported Cheese and Processed Analogue Cheeses in the Russian Federation.

Table 5 shows the data characterizing the volumes of dairy products' import (including cheeses) in the Russian Federation (Official website of the Federal Customs Service of the Russian Federation, 2017).

Table 5. Volume of /milk and Dairy Products' Import in the Russian Federation

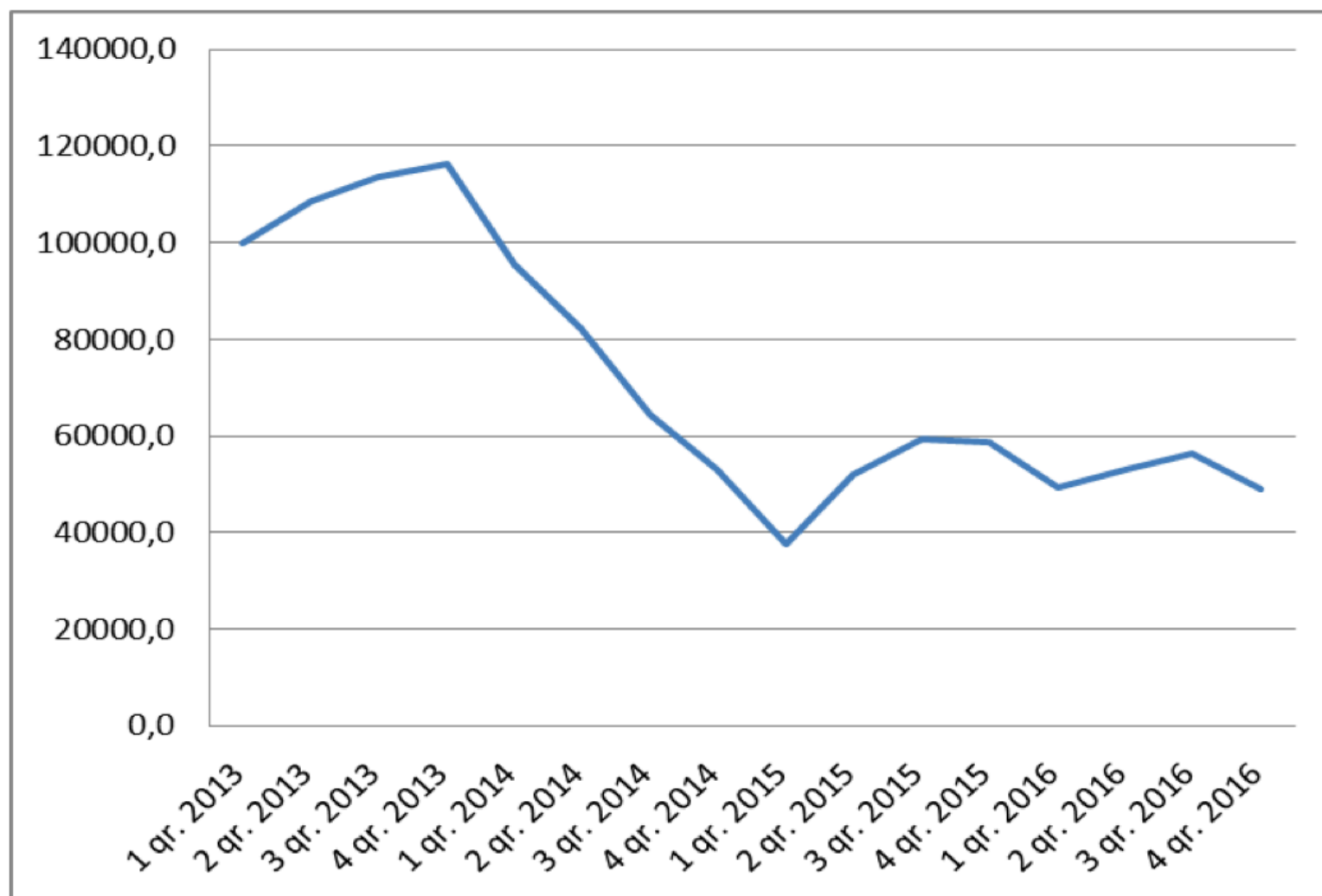
Indicator	2014	2015	2016	2016 in % as to 2014
Import volume, tons				
- milk and cream, condensed or sweet (0402)	194,058	204,824	220,956	113.9
- butter and other fats and oils; dairy pastes (0405)	150,375	80,926	99,036	65.9
- cheeses and cottage cheeses (0406)	316,095	207,825	207,927	65.8
Import volume, thous. USD				
- milk and cream, condensed or sweet (0402)	657,346.3	421,071.5	478,708	72.8
- butter and other fats and oils; dairy pastes (0405)	742,235.5	75,951.9	376,236	50.7
- cheeses and cottage cheeses (0406)	1,582,036.4	742,525.6	696,946	44.1
Average annual rate of USD as to RUR *	37.81	60.63	67.03	x
Import volume, mln. RUR				
- milk and cream, condensed or sweet (0402)	24,854.3	25,529.6	32,087.8	129.1
- butter and other fats and oils; dairy pastes (0405)	28,063.9	4,605.0	25,219.1	89.9
- cheeses and cottage cheeses (0406)	59,816.8	45,019.3	46,716.3	78.1

*Note: *According to the Official Website of the Central Bank of the Russian Federation, 2017*

The above data say about the considerable decrease in the volume of cheeses import in the Russian Federation. During the period since 2014 to 2016 the import of cheeses and cottage cheeses decreased by 35%. The decrease is caused by the sanctions introduced against the Russian Federation by a number of countries in the late 2014 and the relevant response of

Russia. As a result, in the 1st quarter of 2015 the volume of cheese and cottage cheeses import was only 37,726 tons (Figure 1).

Figure 1. Dynamics of Cheese and Cottage cheeses' Import in the Russian Federation in 2013 – 2016, tons



As a result of the continuing sanction policy in relation to Russia and taking response measures, the volume of milk and dairy products import had decreased down to 207,927 tons and was 65% as to 2014. The share of import milk and cream in Russia decreased from 60.5% in 2013 down to 56.4% in 2015, cheese - from 48% in 2013 down to 23.3% in 2015 (Table 6). For nine months of 2016 the share of import cheese made up 24.1%. Thus, cheeses from the European Union and the USA disappeared from Russian stores. Thanks to this, national producers got great opportunities to win over consumers. In 2016 the cost of cheese and cottage cheeses' import was USD 696.9 mln. or RUB 46,716.3 mln.

Table 6. Share of Import of Some Products in Their Marketable Resources in the Russian Federation, %

Item	2013	2014	2015	January-September 2016
Dried milk and cream	60.5	49.4	56.4	60.6
Cheeses	48	37.3	23.3	24.1

In the context of counter-sanctions, the sector also improved its investment activity. Russian enterprises started launching new capacities to use their brands when producing those types of cheese that used to be imported. Thus, in November 2015 the Russian JSC Molvest (holding the third place in the Russian Federation in terms of the volume of milk processing) and the Dutch company Arla Foods established the production of cream cheese with the project capacity of 9 thous. t (the volume of investments was RUB 60 mln.) at their enterprise in the Voronezh

Region. In its turn in September 2015 in the Smolensk Region Krasnaya Gorka Agro-Industrial Complex opened Phase 1 of the section on producing goat cheese with the project capacity of 35 t. of cheese per year. After opening Phase 2, the volume of production capacities will increase up to 120 thous. t. The cost of the project will be RUB 250 mln.

Among new projects it is also possible to mention the launch of the cheese and cottage cheeses' line at the Derevenskoe Molochko LLC in Tomsk (one of the leading milk processing enterprises of Siberia) that took place in November 2015. The investments were RUB 10 mln. At the same time the investment council at the administration of the Ruzskiy municipal area of the Moscow Region provided the Terehovo Association of Peasants' and Farmers' Households with 200 ha of land for constructing an enterprise on producing analogues of such types of cheese as mozzarella, gorgonzolla, cachotta, buratta, parmesan, mascarpone, etc.

In 2016 the investment activity decreased in the area. It is indirectly proved by slowing down the tempos of the production increase. In January-August 2015 the production of cheeses increased by 25.1% (up to 389 thous. t.) per year, and for eight months of 2016 it increased only by 1% (up to 394 thous. t.). According to the estimates of IndexBox, it is related to decreasing the real income of the population (minus 5.8% of the annual income in January-August) and the value appreciation of the cheeses production cost. Two-digit tempos of the area growth in 2014-2015 were achieved through not only import substitutes, but also cheeses of the low price segment and analogue products of low quality.

In 2016 there is a tendency of inconsiderable increase in the volumes of cheese import. However, as compared to 2013, the volume of cheese import decreased by 53%. Specialists relate the outlined increase in milk and dairy products import with the consumers' disappointment by the quality of Russian cheeses and need to develop technologies of high quality cheese and analogue cheeses. At the same time it is possible to solve this problem by using technologies with the decrease in the main dairy raw materials during dairy production, i.e. milk content productions.

The decrease in milk and dairy products' import made producers solve the problem about substituting withdrawn volumes of goods by domestic dairy products.

Over the recent 2 years the government of the Russian Federation has activated its work on developing its own dairy and milk-containing products with low milk content.

In addition to material and technical resources, in order to successfully develop the cheese area, Russian producers need scientific developments in this area to provide efficiency of all stages of the scientific and technical progress.

3.2 Analysis of Opportunities to Import Substitute Cheese and Processed Analogue Cheeses by Local Analogues

Research laboratories of the Omsk State Agrarian University systematically create technologies of various specialized milk-containing products for functional nutrition.

The characteristics of new products shown in Table 7 can be a good substitution to those products that are imported to the Russian Federation, because it is a domestic product adapted for the ecological and economic situation in the country.

Table 7. Characteristics of Qualitative Indicators of Processed Products to Distribute in Sales and Catering Points in the Western and Eastern Siberia, Southern Ural, and Central Part of Russia*

Indicator	Products' characteristics			
	"Otlichnik"	"Studencheskiy"	"Diabeticheskiy"	"Gerodieticheskiy"

Weight content of moisture, %	58.0±1.0	54.5±0.5	48.0±1.0	56.0±0.5
Weight content of proteins, %	21.0±0.2	16.5±0.5	17.0±0.5	13.0±0.5
Weight content of fat, %	15.0±0.5	24.0±0.5	22.0±0.5	17.5±0.5
Weight content of carbohydrates, %	1.0±0.1	1.1±0.1	-	8.5±0.5
Calcium, mg/100g	590.0±10.0	-	-	-
Dietary fibers, %		-	-	2.0±0.5
Amount of fermented dairy probiotics microflora: acidophilus bacterium;	- 1·10 ⁸ 1·10 ⁷	4.0·10 ⁸ - 1.0·10 ⁷	1.0·10 ⁸ - 1.0·10 ⁷	1·10 ⁸ - 1·10 ⁷
bifidus bacteria, CFU/G not less than	- -	1.0·10 ⁸ 1.0·10 ⁷	- -	- -
propionibacteria of Lactobacillus bulgaricus				
Caloric content, kcal/kJ	149.0/623.83	171.00/715.94	158.00/661.51	198.50/831.08
Total number of amino acids, mg/100g	20,167.00	19,267.0	17,176.0	13,576.0
Organoleptic indicators of processed analogue cheeses				
Structure - elastic				
Taste and odor – Cheese				
Color – Cream white				

Note: *According to the experiments made by the authors

It goes from the table that processed analogue cheeses used as functional food are characterized by high biological value and can be considered as a result of implementing the comprehensive technology of processed analogue cheeses that allows achieving the goal set in the research work.

In addition to the qualitative indicators, new products are characterized by the content of functional food ingredients that allow considering them as functional food and recommending them for specialized nutrition of the population of various age groups to sanitize it and decrease risk of diseases development.

3.3 Promising Areas of Developing Import Substitution of Foreign Products by Technologies of Russian Producers

The first promising area of developing import substitution is the saving of the main milk raw materials in cheese and processed analogue cheeses production technologies.

When developing the offered technologies of analogue cheese production, the main task was to decrease milk capacity and, as a consequence, to decrease the cost and increase the profitability of production. The main ways to decrease milk capacity include the prior processing and enrichment of raw materials, decrease in wastes during production, and the use of new equipment and advanced technologies.

Another area is the use of biologically proper vegetable raw materials both in the normalized mixture and receipts of cheese and processed analogue cheeses.

4. Discussion

The obtained results of the research allow to make a conclusion about rather specific prospects of developing import substitution by Russian cheese and processed analogue cheeses. At the same time, it is necessary to understand that the above areas of developing import substitution require special attention of the state. On the one hand, it is stipulated by ensuring food safety and decreasing the dependence on import of one of the key agricultural areas in the Russian Federation. On the other hand, agricultural producers cannot efficiently develop biotechnological area without the state support due to its high capital capacity and long term of returning investments. Taking into account the fact that applying both traditional and innovative approaches to developing technologies of high quality ecologically friendly food allows obtaining and introducing a new range of milk-containing products to the market (when using the created base of the developed innovation technologies), far from every investor will be interest in this project.

The above areas of developing import substitution of cheese and processed analogue cheeses are focused on long-term perspective and will contribute to improving sustainability of milk processing area in the Russian Federation.

5. Conclusion

Russia is still one of the leading net importers of dairy products. The internal market of dairy products shows the sustainable availability of import and the growth of its share in the product offering. The export increases slowly. The growth by 8% in 2016 is explained, in addition to the political reasons, by the increasing poverty of the country population who has to save on food, which stimulates producers to search for new sales channels. The change of the ruble and basic currencies rate correlation that made export attractive is also important.

In 2016 the domestic consumption of milk and dairy products by the country population was 33 mln. t., with above 7.3 mln. t. being imported. It is possible to say that the deficit of milk is still high – 7.8 mln. t. - because today there are limits as for importing dairy products in the form of food embargo, and the decreased demand due to the reduced revenues can be recovered in the future. High price segments of cheeses and other dairy products remain unfilled. This is about 1 mln. t. more.

When considering the import substitution of domestic cheese and processed analogue cheeses, this research did not touch upon the organization of technological process and biotechnology in the Russian Federation. At the same time it is necessary to understand that the only wish of producers to move to domestic production technologies may not be enough, because these technologies must be fully tested. The more efficiently technological production processes are organized, the more competitive domestic technologies are. This issue becomes especially urgent taking into account the possible need in the nearest future to compete with foreign

technologies obtained by applying technologies of creating modified additives. Today the law prohibits using such technologies in the Russian Federation. However, the existing world and internal tendencies of developing the statutory base point at the fact that in the near future legal limitations will be discharged. As a result, domestic producers will have to compete with foreign producers on equal terms.

For the dairy industry to become a key national export cluster, and for Russia to transform from a net importer into the net exporter country in the future, today it is necessary to focus efforts on developing dairy farming. It requires hard work of countrymen and efficient support from the state.

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