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DEVELOPMENT OF THE FOOD MARKET OF THE REPUBLIC OF KAZAKHSTAN IN THE SYSTEM OF ENSURING FOOD SECURITY IN THE FIELD OF MILK PROCESSING

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Food security is a complex concept. Food quality and safety involves the production of domestic food to meet dietary needs and food preferences for healthy lifestyles.

The development of the dairy industry around the world is gaining large-scale momentum since milk and dairy products are relevant for consumption by all segments of the population.

Therefore, the development of the dairy industry and providing the population with affordable and high-quality dairy products is of strategic importance for each country.

At the moment, Kazakhstan has adopted a state program for the development of the agro-industrial complex of the Republic of Kazakhstan for 2021-2025, in which one of the main goals is to increase gross output from agricultural raw materials, as well as increase exports.

In recent years, due to the increased growth in dairy industry production in the Republic of Kazakhstan, the level of exported dairy products has also risen.

The main exported goods are milk, fermented milk products, cheese and cottage cheese. Export of cottage cheese and cheese amounted to 7%.

Production waste remains during the production of cottage cheese and cheese. It is called – whey. With the increase in production volumes of cottage cheese and cheese, the volume of whey also increases. Unfortunately, in Kazakhstan, a small part of the whey is processed, and the rest is discharged into the sewer system, even though whey is a valuable biological raw material.

In general, about 4.2 million tons of whey are produced in the world per day. Although many businesses have found ways to make a profit from this industrial byproduct, more than half of it is simply discharged into wastewater.

One dairy plant can produce from 20 to 100 tons of whey or more per day. Due to the low value of whey, many Kazakh enterprises prefer to simply pour it out. Another option is to sell it to feed farm animals. However, it is not always financially beneficial for the enterprise due to high transportation costs. Nowadays, in Kazakhstan only 10% of whey is processed, the rest is discharged into rivers and lakes, which is harmful to the environment.

Enterprises do not want to invest in whey processing due, since it is too expensive given the small volumes. However, strict environmental requirements and competition will soon leave them no choice.

The most rational solution to this issue is the development of whey-based food technology. Considering that whey has a sour, neutral taste, it is necessary to enrich it with plant materials. The use of local plant raw materials will contribute to the rational use of natural raw materials in Northern Kazakhstan, and, moreover, will diversify the range of dairy products.

Monitoring research and the market for whey drinks and cheeses to determine rational ways of using whey in the technology of drinks and cheese has shown that the most promising is the use of whey in the technology of economy-class drinks and cheeses.

Overall, whey has significant nutritional value, containing up to half the milk solids, up to 95% lactose, 20% protein and 10% milk fat. Effective usage of all the components of milk, gain additional profit and eliminate environmental pollution, more and more enterprises in the world prefer to process whey using modern technologies.

In many countries, it is prohibited to discharge the by-product into water, and progressive enterprises are installing systems for processing whey. This is what a large European manufacturer of dairy products, Arla Foods (Germany), does. The holding creates innovative products based on highly processed products. The company recently introduced sparkling protein water specifically for athletes, which is made from whey hydrolysate.

The technology to produce whey drinks involves the usage of whey as a base. Flavoring additives are added to it, which create the taste and aroma of the drink. These include juices, sweeteners, and flavorings. The whey that goes into the production of whey drinks can be fresh or fermented, this affects the taste, but the protein-salt balance does not change. Sodium citrate and citric acid are used as preservatives - substances that are safe for health, as well as lactic acid contained in the fermented whey itself.

These whey drinks are a good source of whey proteins, accessible to the entire population, moreover to athletes and even to athletes with lactose or casein intolerance. It can be considered as a first-stage sports nutrition drink, as it enriches the diet with healthy whey proteins. If desired, you can use it to mix protein shakes from dry powder mixtures that tolerate an acidic base.

Whey produced by the Factory of the Kazakh Academy of Nutrition "Amiran" is presented on the Kazakhstani market.

The market also offers drinks made from whey - “Actual” (Russian Federation). These drinks are combination of whey and natural fruit juice, which gives the product a bright, rich taste. The drinks are made from whey “Actual” contain rich vitamin and mineral complex (B1, B3, B6, E, D, copper, zinc, calcium). There are five flavors presented: “orange-mango”, “peach-passion fruit”, “strawberry-raspberry”, “blueberry-blackcurrant” and “watermelon”.

Whey drinks were obtained in laboratory conditions using curd whey, which was a waste product of Astana Onim JSC. The ultrafiltration method was used to process the whey. Basic tests were carried out on the resulted whey to confirm its food safety.

All juices produced were tested for vitamins and minerals. The resulted drinks show an increased content of vitamin B and vitamin C. Also, high amount of calcium, magnesium and iron were found in the drinks.

Table 1- Vitamin composition of whey-based juices

The name of indicators, mg in 100g	Example 1 - whey drink with saskatoon berry juice	Example 2 - whey drink with chokeberry juice
vitamin B1	0,024±0,0012	0,036±0,001
vitamin B2	0,11±0,005	0,13±0,006
vitamin B3 (PP)	0,281±0,014	0,243±0,012
vitamin B4	-	-
vitamin B5	0,218±0,01	0,276±0,013
vitamin B6	0,13±0,006	0,1±0,005
vitamin B9	-	-
vitamin C	2,213±0,11	4,084±0,20

Also, whey-based cheese was obtained during the work process. Whey cheese is not inferior to classic soft cheese in terms of taste. However, this cheese has 60/40 whey to skim milk ratio.

The main physical and chemical indicators of the resulted cheese were determined. In general, the cheese has all the characteristics of natural cheese, but its cost is 3 times less.

In general, the processing of whey is relevant and requires further research.

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