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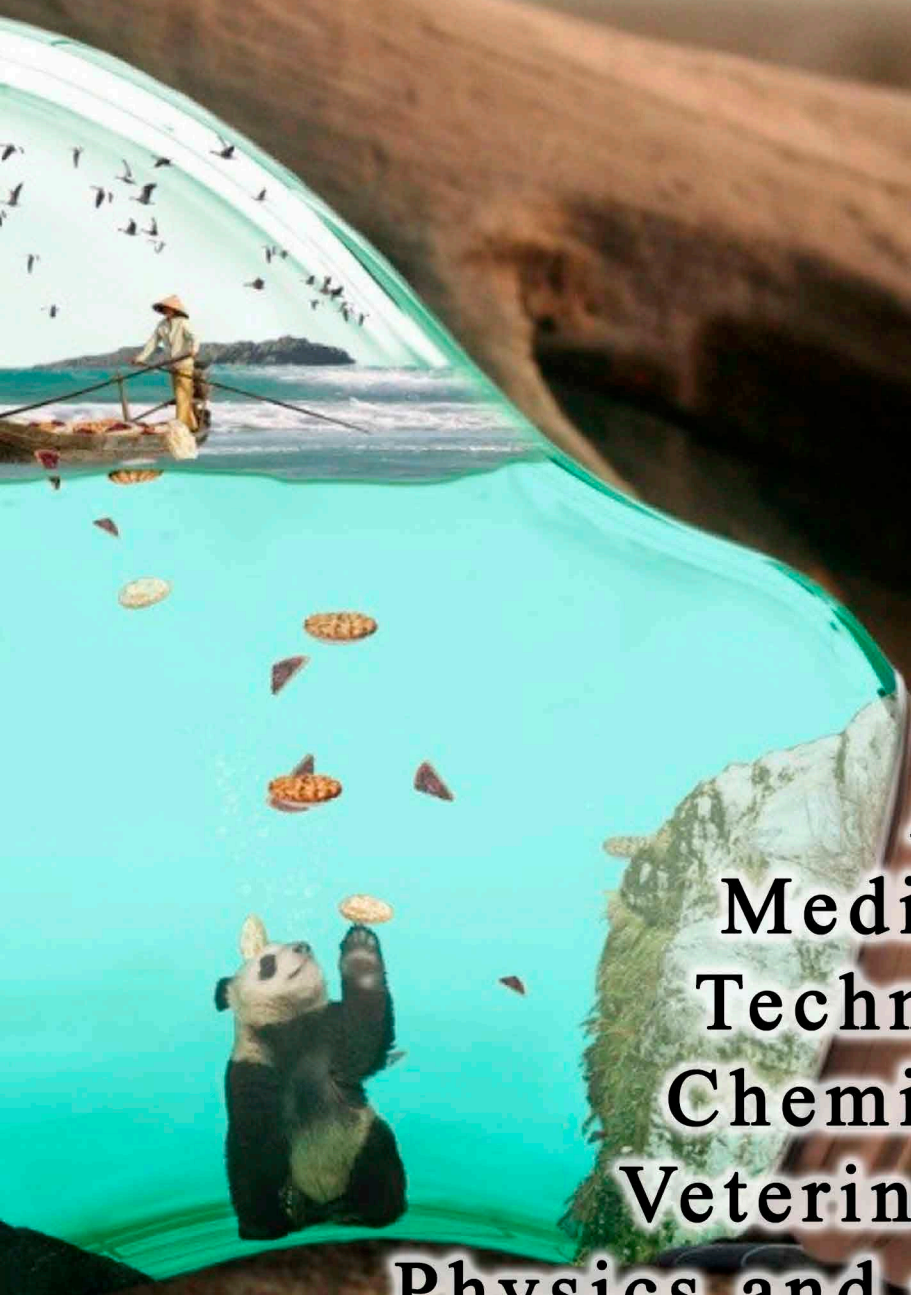

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MILK QUALITY OF DIFFERENT PRODUCERS

Abstract.
The article presents milk research and characteristics of indicators. Milk and dairy products (butter, cheese, fermented milk products and canned milk) are highly digestible and high in calories. They contain all the nutrients necessary for human life, growth and development of his body (proteins, fats, carbohydrates, mineral salts, vitamins) and are among the most complete food products. So, milk and dairy products are of great importance for the organization of healthy and high-quality nutrition for the population.

Milk is a biological fluid, the secretion of the mammalian mammary gland. It provides a young body with all the necessary nutrients, minerals and biologically active substances and is one of the main human food products and raw materials for the production of various dairy products [1].

Key words*: milk, milk fat, density, acidity, protein, consistency, taste, smell.*

Ancient philosophers and scientists called milk "well of health", "juice of life", "white blood". Indeed, in nature there is no other product, except milk, which would contain such an amount of nutritious, mineral, biologically active substances, is characterized by high digestibility, and has a positive effect on the human and animal body. The importance of milk is also explained by the fact that it contains all the substances necessary for the life, growth and development of the body.

Of the constituent components of milk, proteins are of the greatest importance in nutrition. The energy value (caloric content) of 1 g of milk protein in the human and animal body is 4.1 kcal. The assimilation of milk proteins when used in food reaches 96%. The digestibility of casein is 95%, milk albumin - 97%, which is significantly higher than the digestibility of albumin in chicken eggs [2].

The high nutritional value of milk proteins is explained not only by the high degree of their assimilation, but also by the amino acid composition. Milk proteins belong to complete proteins, which contain all the amino acids necessary for the synthesis of protein compounds in the human body. Especially important is the essential amino acids present in proteins, which are not synthesized in the human and animal body, but must be supplied with food (feed).

For humans, 10 amino acids are considered essential: arginine, valine, histidine, isoleucine, lysine, leucine, methionine, threonine, tryptophan, phenylalanine.

The biological significance of milk fat lies not only in its energy value, but also in its participation in complex biochemical processes of the body. Milk fat is a carrier of fat-soluble vitamins, as well as a source of essential amino acid synthesis. The energy value of fat is very high - when 1 g of milk fat is broken down in the body, 9.3 kcal are formed. Milk fat, along with other products, is absorbed by 95%, while meat fat is absorbed by 90%. Milk fat differs significantly from other types of dietary fats in that it contains more different fatty acids [4].

Milk sugar - lactose is the main energy source of biochemical processes in the human and animal body. The energy value of 1 g is 4.1 kcal, and its absorption in the body is 98%.

The total energy value of 1 kg of milk is 672 kcal. Mineral substances of milk, especially calcium, phosphorus, potassium, sodium, magnesium, iron, are of great physiological importance for the metabolism in the body. Most of them are found in milk in an easily digestible form. Microelements - zinc, copper, manganese, cobalt, iodine, arsenic, etc. are extremely important for the metabolism in the body.

The nutritional value of milk largely depends on the content of vitamins in it, the most important of which are A, D, B1, B2, C, PP. Biochemically important qualities of individual components of milk form a whole physiological valuable nutritious product [5].

Milk samples were analyzed according to the following indicators:

mass fraction of fat - investigated by the acid method (GOST 5867-90),

mass fraction of protein - by formol titration (GOST 25179-90),

density - with a hydrometer (GOST 3625),

acidity - by titration (GOST 3624-92),

moisture and dry matter - (GOST 3626-73),

the duration of rennet circulation - by rennet sample (GOST 9225-84).

The organoleptic characteristics of the milk samples under study must comply with the requirements specified in DSTU 36626: 2018 Raw cow milk.

Milk quality research methods can be conditionally divided into chemical and physicochemical. There is a separate group of methods for researching milk quality - these are express methods related to instrumental control methods and consist in the quick and ef-

ficient determination of milk quality and safety indicators. Rapid methods are based on the same or similar chemical reactions and standard analytical methods. Today, the classical standard acid method is most often used to determine such a quality indicator of milk as the content of milk fat. This method of determining the mass fraction of fat involves several operations. Sulfuric acid and isoamyl alcohol are added to the test milk sample in order to destroy the shells of the fat globules, the test sample is heated and centrifuged. The butyrometer is used to calculate the percentage of milk fat in the milk. The error in measuring fat should not exceed 0.5%. The indicators of the properties of milk fat are called numbers, or constants, and are evaluated according to standard characteristics (Reichert-Meissl number and iodine number). A feature of milk fat is the presence in it of low molecular weight fatty acids (caproic, caprylic, lauric, myristic), which provide milk fat with a pleasant taste. Saturated high molecular weight fatty acids prevail in milk fat, and oleic acid prevails among unsaturated ones. For example, when determining the Reichart-Meisl number, animal and vegetable fats are identified. Another constant by which milk fat differs from vegetable fat is the iodine value. It characterizes the content of unsaturated fatty acids in milk fat itself and is expressed by the iodine content in grams per 100 g of fat. However, the fact that the so-called tropical fats (palm oil), which are most widespread today, are closest in iodine value to milk fat, depreciates this control method [6].

One of the most important default parameters of milk, which must be monitored when receiving milk, is the density, which must be at least 1023 kg/m^3. The density of milk consists of the density of its components and reflects their quantitative ratio and ranges from 1027 kg/m^3 to 1032 kg/m^3, and the density of skim milk is higher than the density of whole milk and is 1036 kg/m^3. The density in milk is normalized by the areometric method and depends on the temperature of the milk and its components. When natural milk is mixed with water, the density decreases and approaches unity. At the same time, every 10% of added water reduces the density of milk by about 3 kg/m^3 [3].

A study of 3 milk samples was carried out. The organoleptic results are shown in Table 1.

Table 1

Organoleptic characteristics of milk

Indicator	Characteristic		
	Sample 1	1 Sample 2	Sample 3
Consistency	Homogeneous liquid without protein flakes and sediment.		
Taste and smell	Clean, inherent in fresh milk, without foreign aftertastes of odors		
Color	White to light cream		

According to the organoleptic examination carried out, the milk samples comply with the current legal requirements for the safety and quality of milk and dairy products.

The results of physical and chemical indicators of milk samples are shown in table 2.

Table 2

Milk chemical composition

Indicators	Sample 1	Sample 2	Sample 3
Mass fraction in milk, %			
fat	3.2	3.3	3.2
protein	2.8	2.9	2.9
dry matter	11.8	12	11.8
SOMO	8.4	8.6	8.8
Density, kg/m^3	1027.8	1028	1027.5
Acidity, °T	17	16.7	16.3

Conclusions. Analyzed the main methods of control of the normalized characteristics of milk to ensure its environmental safety. Analysis of standard methods for determining the quality of milk showed a number of their advantages and disadvantages. Chemical methods are accurate, sensitive, selective, but require sampling, maintenance personnel, a laboratory and are long-term. Physicochemical methods are fast, accurate, and provide a way to automate the process, but are expensive. Based on the foregoing, it is possible to formulate the basic requirements for the improvement and development of new approaches to determine the parameters of milk quality - they must be sufficiently accurate and reliable, that is, the process of identifying milk parameters should be prompt, fast, simple and provide the ability to automate and computerize the determination process.

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