

Some Questions for Using Specialized Products Based on Goat Milk

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Abstract

Some issues of the use of adapted nutritious baby formula based on goat milk are considered. Proteins and fats of goat milk in some parameters of composition, structure and physico-chemical properties differ from cow and have certain advantages.

Keywords: *Pediatrics; Goat Milk; Nutritional and Biological Value*

Milk evolutionarily from the moment of birth is for the newborn the main product that provides growth, development and vital functions. Milk is a product of normal physiological secretion of mammary glands. The optimal food product for the baby in the first months of life is breastfeeding with mother's milk, which ensures the normal development of the baby's body. Refusal of newborns from the use of breast milk is due to various reasons, but the consequences of dairy-free feeding for the development of the child are usually unfavorable. In this regard, raw materials for the production of infant formula milk must meet the requirements of compliance with food and biological value and food safety. The following types of dairy raw materials are distinguished - cow milk, goat, mare, sheep, etc.

In modern conditions of global change in natural resources, the solution to the problem of food safety in agriculture of the raw material component for the production of dairy products, including for baby food, is focused on high-quality, environmentally friendly products using modern biotechnologies. The Scientific Research Institute of Baby Food has developed "Guidelines for the organization of a specialized raw material zone for the production of sanitary safe raw materials for milk for the production of baby food", which establish requirements for the ecological state of raw food zones and epidemiological well-being; production processing, storage and transportation of milk; feed; technological, sanitary and hygienic indicators and the procedure for monitoring indicators of quality and milk safety.

On average, the content of basic food nutrients in milk is: protein from 2.2% to 5.6%, fat from 1.9% to 7.8%, carbohydrates from 4.5% to 5.8%, calcium - from 89 mg% to 178 mg%, phosphorus - from 54 mg% to 158 mg%. Milk proteins have high amino acids of high biological value and are normally absorbed by 98%. In the analysis of domestic experience in the use of raw milk products, it was shown that "goat milk" in the nutrition structure takes the 2nd place after the "cow" milk. But at the same time, the survey reveals a lack of scientific information and a low level of knowledge about the physicochemical and technological properties of goat milk, which undoubtedly interferes with its active introduction into the formulations of dairy products with high nutritional and biological value.

In recent years, according to the literature review in various countries (Australia, Spain, USA, etc.), a number of well-organized, randomized, double-blind, controlled studies on the nutritional effectiveness of goat milk formulas have been carried out. In 2012, the European Food Safety Authority EFSA developed a legal framework for the use of goat milk as a source of protein for children of different age groups [7]. The biological value of goat milk in terms of the content of easily digestible food nutrients and its ability to compete with cow milk have been confirmed at a high evidence level. Proteins and fats of goat milk in some parameters of composition, structure and physicochemical properties differ from cow and even have certain advantages over it [1]. According to Spanish researchers, goat milk is

better absorbed in the gastrointestinal tract (GIT) of infants, due to a number of biochemical characteristics of its main food components. It contains the optimal amount of micro and macro elements (selenium, iron, zinc, calcium, magnesium), vitamins A, D and C, omega-3 (ω -3) fatty acids, medium chain triglycerides; it contains a high level of certain amino acids contained in human milk, including lysine and cystine, which facilitate the absorption of minerals and increase the formation of antibodies to microbes. It is proved that the absorption and absorption of iron (30%) and calcium (up to 58%) of goat milk is better than cow's (respectively 10 and 38%), but does not reach the level of absorption of iron and calcium (> 50%) of human milk [3].

Goat, like cow's milk, is not the main product of feeding young children (especially the 1st year of life); The "gold standard" is breastfeeding with human milk, but the properties of goat milk allow it to be used as the basis for the creation of modern substitutes for human milk - adapted milk formula. Protective properties of biologically active substances (growth factors, lysozyme, nucleotides, polyamines, free amino acids, vitamins, minerals, etc.), β -lactose and membrane proteins of goat milk fat globules, identical to female, positively affect the intestinal mucosa, and also contribute to increasing adaptive capabilities and antioxidant protection of a functionally immature child's body, preventing deficient conditions, reducing colds and infectious diseases, reducing their frequency and duration.

The production of goat and human milk is characterized by the apocrine type of secretion. With it, the cell is partially destroyed and cellular contents (pyacrine), biologically active substances and other cellular components, enter the milky ducts [3]. Cow's milk, on the contrary, is characterized by a merocrine type of secretion, in which the cell remains intact and the cellular elements do not enter the milk. Therefore, biologically active substances in cow's milk contains significantly less than in goat's milk. The protein composition of goat's and cow's milk is identical, but it has been proven that the α S1-casein protein level in goat's milk is lower than that of cow's milk; therefore, allergy to goat's milk proteins is much less common than to cow's milk - not more than 1% of cases [4]. The high amino acid rate of the goat protein, an adequate level of micronutrients, and the energy density of goat's milk make it possible to reduce the number of feedings per day and facilitate the formation of taste preferences and diet in the child. If children are intolerant of cow's milk protein, some pediatricians recommend the use of goat milk-based mixtures.

However, the modern generally accepted approach to diet therapy for young children with allergies to cow's milk proteins is the appointment of mixtures based on highly hydrolyzed milk proteins (European Association of Allergists and Clinical Immunologists - EAACI, European Society of Pediatric Gastroenterologists, Hepatologists and Nutritionists - ESPGHAN, American Association of Pediatricians AA), and with severe manifestations of the disease, amino acid mixtures are recognized as the first choice [5]. In the Russian Federation, at the XVI Congress of Russian Pediatricians, the National Program for Optimizing the Feeding of Children of the 1st Year of Life (2009) was approved.

Food, as a source of nutrients and energy, largely determines the state of health and the development of the child's body. With frequent regurgitation after feeding, the positive effect of the use of adapted goat milk-based mixtures has been proved, since a lower concentration of α S1-casein in goat milk leads to the formation of a soft curd clot, which allows more efficient digestion of α -lactoglobulin and accelerates the absorption of goat milk components. The trypsin enzyme present in the baby's digestive system breaks down up to 96% of goat casein (for comparison: 76 - 90% of cow casein) [10]. Beta-lactoglobulin (β -LH) of goat milk is better absorbed than β -LH of cow milk [8]. It should be noted that a lack of protein in the diet causes serious disturbances in the body - in the functioning of the intestine and the immune system; in children growth and development slows down, the protein composition of the body changes, resistance to infectious diseases decreases, mental and mental development suffers.

Goat milk-based mixtures do not contain demineralized whey, are physiological for healthy children and children with minimal digestive dysfunctions. For example, Kabrita® products use goat milk protein recommended by the FDA (List of Safe Ingredients GRN No. 644) for the production of mixtures for children from birth. The presence of an improved fat composition, promotes easier digestion, eliminates constipation, reduces bloating and colic. The lysozyme content gives goat milk additional bactericidal properties, supporting barrier intestinal function. Mixtures based on goat milk are adapted in accordance with the structural and functional features of the baby's digestive tract, taking into account the qualitative characteristics of food substances, their digestibility and digestibility.

The outpatient practice of observing children with adapted goat protein-based mixtures in their diets, analysis of anthropometric indicators (weight gain, growth rate), data on the modulation of immune responses and metabolic processes revealed a positive dynamics in physical development - one of the main indicators of health status and primary monitoring the state of metabolic metabolism in the body of the child. With a pathology characterized by a lag in physical development, a lack of body weight (hypotrophy), and gastrointestinal dysfunction, it is advisable to use an adapted mixture of goat milk as the basis for a healthy and nutritious diet and comfortable digestion.

The use of adapted goat milk-based mixtures in the nutrition of young children is justified in various clinical situations, they can serve as an effective alternative to cow's milk and substitutes based on it, especially in children with intolerance to cow's milk and manifestations of pathological reactions to its proteins. Factors contributing to the development of intolerance to protein of cow's milk in children include antenatal sensitization, feeding a newborn with milk formula in a maternity hospital, transferring a child to mixed or artificial feeding with cow's milk mixtures [9].

The high biological and nutritional value of goat's milk, a number of its advantages over cow's milk (easier protein and fat digestibility, optimal bioavailability of trace elements, low allergization) make it possible to purposefully affect metabolic metabolism and impaired digestion and absorption, make it possible to use it in nutrition weakened and often sick children, with diseases of the digestive system (gastroesophageal reflux disease, peptic ulcer of the stomach and duodenum), the use of ca basic nutrition in the treatment of rickets, immune deficiency, during rehabilitation after surgery and bone fracture [2,6].

We give clinical examples from outpatient practice: A child aged 1 month from 1 independent birth, held on the 39th week; fetal position - head presentation, childbirth without features. The condition of the newborn is satisfactory. Body length - 52 cm, body weight - 3200g, at discharge - 3000g, Apgar score - 8 - 9 points. Vaccinations against tuberculosis, hepatitis B - in the maternity hospital, screening in the maternity hospital without pathology. Discharged on the 5th day. In the history of nutrition in the mother, intolerance to cow's milk was not noted. Parents deny bad habits and occupational hazards.

At the appointment with the pediatrician, this child is 1 month old. Body length - 53 cm (increased by 1 cm), body weight - 3500g. Weight gain for the 1st month is insufficient - 300g. As a child's nutrition, they received a standard adapted mixture based on cow's milk from birth. According to the mother, the baby is active, sucks well, sometimes is excited, cries a lot. Sprinkles with a mixture 2 - 3 times a day (volume - 15 - 20 ml). Mom notes frequent colic in the child, especially in the evening and at night. The chair is mushy, with undigested particles. On examination: active, the gaze fixes, the skin is clean. The head holds well for several seconds. Motor development - by age. Reflexes of the newborn fade away. For organs without features. For comfortable digestion, an adapted mixture for healthy children from birth and children with gastrointestinal dysfunctions Kabrita® GOLD1 was prescribed, containing a combination of pre- and probiotics, nucleotides and carbohydrates; improved fat profile of the mixture is comparable to the fat profile of breast milk. Kabrita® GOLD1 does not contain maltodextrin, crystalline sugar, artificial flavors and flavors.

After 2 weeks (1.5 months of life), the weight of the child was 4000g (weight gain + 500g was recorded). The child was examined and examined by a neurologist. Conclusion of a neurologist, diagnosis: Perinatal encephalopathy, autonomic dysfunction syndrome. Ultrasound: screening without pathology. Clinical blood test without pathology. At 2 months: height 56 cm (+ 4 cm), weight 4700g (increase + 1200g per month). Spitting up and colic on the adapted Kabrita GOLD1 mixture have stopped, the amount of food is completely retained.

At 6 months, anthropometric indicators were examined: body length - 60 cm, body weight - 7100g. Throughout the entire observation period, the child was active, body weight and length were added well, and there was no allergic reaction. The sleep is good. The chair is regular 1 - 2 times a day, mushy. Clinical laboratory tests without features. Thus, the child's condition has improved; he tolerates the adapted Kabrita® GOLD 1 mixture in an average daily volume of 500 - 700 ml; pathological reactions and complaints ceased; the chair became regular - 1 - 2 times a day, mushy; regurgitation stopped; an increase in body weight and body length was recorded; psychomotor development corresponded to age.

Since the most common causes of pathological symptom complexes in young children include cow's milk proteins, dietotherapy is assigned a leading role in the management of these children along with the standard of care. To date, the literature has accumulated a lot of data on the beneficial properties of mixtures and substitutes for human milk, created on the basis of goat milk, and their differences from cow milk.

In the therapeutic nutrition of young children, the most important role is played by the selection of physiologically complete mixtures that do not contain cow's milk proteins. Adapted goat milk based formulas should be considered as an appropriate alternative for healthy children with minimal gastrointestinal dysfunctions. In case of a violation, decrease or absence of lactational ability in the mother, which has recently become a trend, the use of products similar in nutritional composition to human milk is required (adapted products, including complementary foods, such as cottage cheese, milk pastes, milk porridges, cheeses).

The use of adapted goat milk-based mixtures in healthy full-term babies provides prevention of functional disorders of the digestive system, nutritional deficiency conditions, promotes the formation of a microbial ecosystem and the development of good indicators of mental and physical development. In recent years, adapted mixtures and dairy products based on goat milk of various manufacturers have appeared on our market that fully comply with all Russian and European requirements for food products for young children.

Given the basic biomedical characteristics and chemical composition of goat's raw materials, the inclusion of young children in the diet should be considered as a targeted effect on the somatic health of the child's body. The effectiveness of this effect is subject to comprehensive evaluation in further clinical studies.

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