

ПРОБЛЕМИ КЛАСИФІКАЦІЇ ТОВАРІВ

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CLASSIFICATION OF PRODUCTS FOR ENTERAL NUTRITION

The main approaches to the products for enteral nutrition classification in Ukraine and in the world are analyzed. The basic features, used for the classification of these products, and the lack of a single unified approach are established. The classification, which is based on the specifics of products for enteral nutrition production and consumption according the needs and preferences of target customers, is developed.

Keywords: products for enteral nutrition, classification approaches, consumer and technological features.

Мотузка Ю., Антюшко Д. Класифікація продуктів для ентерального живлення. Проаналізовані сучасні підходи к класифікації продуктів для ентерального живлення в Україні і світі. Встановлено основні ознаки, використовуються при класифікації цих продуктів, і відсутність єдиного уніфікованого підходу. Розроблена класифікація, в основу котрої положена специфіка виробництва і споживання продуктів для ентерального живлення з урахуванням потребностей і рекомендацій цільових споживачів.

Ключевые слова: продукты для энтерального питания, подходы к классификации, потребительские и технологические признаки.

Background. An essential part of nutritional support for wounded, injured, sick people and soldiers in emergency situations is a specialized food, which is created in accordance with specific metabolic processes of human body. The direct correlation between the severity of disease and trophic supply of victims is scientifically established: the lower the deficiency of nutrients is, the fewer there are multiple organ failure and complications [1; 2].

The most successful method of nutritional support is enteral nutrition (both tube feeding and oral nutritional supplement). This is conditioned by the fact that in critical conditions this type of nutrition prevents degeneration and atrophy of the mucosa of the gastrointestinal tract, a violation of its barrier function [3; 4].

Over the last 40 years the number and variety of enteral products that are available for use has increased dramatically. Nowadays, more than 250 items of products for enteral nutrition are produced in the world [5–7]. They differ by the specifics of their appointment, composition, energy value, the degree of splitting of macronutrient components, protein content, nature of preparation for consumption (using), physicochemical properties, etc.

Nowadays actual time requirement is the studying of special characteristics of products for enteral nutrition, their ability to satisfy the demand of consumers of these products. Quick prediction and regulation of the market situation is an effective toolkit for the detection and prevention of falsifying of the mentioned goods.

Effective preventive method of consumer protection, the expansion and diversification of the assortment of products for enteral nutrition is the analysis of the existing classification principles and their comprehensive improvement by adaptation to the modern world requirements and approaches. This will allow exploration, evaluation and better meeting the needs and expectations of target customers; elimination of ambiguities and inaccuracies; provision of industrial efficiency of manufacturers; promotion of enhanced international trade by elimination of technical barriers caused by differences in the approaches of global and national systems of standardization. An important contribution to the development and improvement of existing approaches to the classification of products for enteral nutrition has been done by foreign and domestic scientists: А. Костюченко with co-authors [1], В. Луфт [3; 10], А. Malone [5], Н. Lochs et al [8], И. Хорoshiлов [9], Ю. Лященко [11]. The basic approaches to the problematic of products for enteral nutrition classification were analyzed by author in collaboration [12].

The aim of work – detailed analysis of existing approaches to positioning of commercially available on the market products for enteral nutrition and the development of complex commodity science classification, that would allow the reception of the complete and necessary information about the properties of these products for target consumers (both victims and their doctors).

Material and methods. The study is based on the methods of scientific knowledge, systematic analysis and generalization, scientific synthesis.

Results. According to the Law of Ukraine "On the safety and quality of food products" products for enteral nutrition belong to food products for special medical purposes [13]. The Law gives the following definition of this term – "specially developed and manufactured product that is consumed under medical supervision. This product is intended for partial or total replacement of the usual diet of patients with a limited, impaired or disturbed capacity to take, digest, absorb ordinary foods or certain nutrients contained in them or their metabolites. Food products for special medical purposes also can be assigned for total or part feeding of patients with other

identified by doctor's needs that can not be met by modification of the normal diet". At the same time, in our country there is not any classification of enteral nutrition, which is approved officially.

The analysis of European Union experience in the field of legal regulation of production and turnover of products for enteral nutrition allows to determine these products as a category of food products for targeted food use, which are developed and intended for the dietary nutrition of patients during treatment and recovery periods. The EU Directive 1999/21/EC "On dietary foods for special medical purposes" establishes classification of products for enteral nutrition according to their composition, which divide them into 3 categories:

- nutritionally complete foods with a standard nutrient formulation which, used in accordance with the manufacturer instructions, may constitute the sole source of nutrition for the persons for whom they are intended;
- nutritionally complete foods with a nutrient-adapted formulation specific for a disease, disorder or medical condition which, used in accordance with the manufacturer instructions, may constitute the sole source of nourishment for the persons for whom they are intended;
- nutritionally incomplete foods with a standard formulation or a nutrient-adapted formulation specific for a disease, disorder or medical condition which are not suitable to be used as the sole source of nourishment [14].

In modern national medical practice, the classification of products for enteral nutrition according its chemical composition is considered as the basic one. According to this classification criterion, which is widely used in medical practice, mentioned food products can be roughly divided into 5 groups:

- *standard* (polymeric) – balanced in their nutrient composition; used both as a single and as an additional energy supplier. The main distinguishing feature of these products is the fact that all macronutrients (proteins, lipids, carbohydrates) are presented in the intact non-cleaved form. Such enteral nutrition is appointed in most uncomplicated cases except severe disorders of digestion and assimilation of nutrients. In turn, this group of products is divided into fiber containing and fiber non-containing;
- *half-elemental* (oligomeric) – balanced in their composition and contain proteins, which are hydrolyzed to peptides and/or amino acids; lipids to medium-chain triglycerides; carbohydrates to highly hydrolyzed dextrans. Products of this group are significant alternative to parenteral (intravenous) nutrition and are appointed during violation of intracavitary and parietal digestion, which are caused by diseases or operations;
- *modular* – contain only one of macronutrients or certain amino acids (e.g., L-glutamine or L-arginine), complexes of fatty acids (omega-3, omega-6), dietary fiber (pectin), regulators of metabolism process (L-carnitine). These products are used as addition to the special diet and meet the individual needs of each person;

- *specialized* (metabolically directed) – contain specially developed compositions of nutrients for meeting the most common physiological needs of specific diseases or physiological states (e.g., diabetes, hepatic, renal and severe respiratory failures). The usage of this product group is aimed at correcting metabolic disorders;

- *immune modulating* – intended for correction of dysimmunity of patients with huge trauma and burns, severe infections, immunodeficiency. The compositions of these products are enriched with special nutrients, which enhance the immunity – L-glutamine, L-arginine, omega-3 and omega-6 polyunsaturated fatty acids, nucleotides [9; 11].

This classification of products for enteral nutrition, in our opinion, will help consumers (both victims and their doctors) to make out in the wide range of such foods, which are sold in pharmacies and specialized stores. At the same time, not all the information about properties and mechanism of meeting special metabolic needs of the human body is clear and accessible. In particular, this classification combines the direction of action (standard or special), the degree of splitting of macronutrient components (polymeric, oligomeric, monomeric) and the composition of components.

The classification was proposed by specialists of the American Society of Enteral and Parenteral Nutrition according to the content of energy in 1 cm³ of products for enteral nutrition [15]. According to it products are divided into following groups:

- *hypocaloric* (1 cm³ < 1 kcal);
- *isocaloric* (1 cm³ – 1 kcal);
- *hypercaloric* (1 cm³ > 1 kcal).

However, the specialists of the European Society of Parenteral and Enteral Nutrition [8] proposed another classification by energy content in 1 cm³ of products for enteral nutrition, which differs by its numerical values:

- *hypocaloric* (less than 0.9 kcal/cm³);
- *isocaloric* (0.9–1.2 kcal/cm³);
- *hypercaloric* (more than 1.2 kcal/cm³).

Also this organization proposed one more classification, the base for which became the degree of splitting of the basic amount of the protein component. According to it products for enteral nutrition can be divided in a following way:

- *polymeric* – contain intact protein;
- *oligomeric* (half-elemental) – contain protein predominantly in peptide form;
- *monomeric* – contain single amino acids as a protein source [8].

The specialist in the field of products for enteral nutrition from the USA PhD of medicine *A. Malone* proposed to divide these products into 2 groups: *polymeric* and *hydrolyzed* [5].

В. М. Лыфт, Doctor of medical sciences, President of Northwest regional association of parenteral and enteral nutrition (St. Petersburg, Russian Federation), has developed the classification. According to it products for enteral nutrition were divided into 3 groups by a content of protein in 1 dm³: hiponitrous (up to 35 grams), isonitrous (35–50 grams); hipernitrous (more than 50 grams) [10]. Another classification criterion, which was suggested by this scientist, is physical properties. Thus, products for enteral nutrition were divided into *powdered* and *liquid* (ready for usage). In addition, emulsions and suspensions were pointed out among the last group [10].

According to the classification of А. Л. Костюченко, Э. Д. Костин, А. А. Курыгин four classification features of products for enteral nutrition were proposed: calorie value, osmolarity, lactose content, the amount of pharmanutrients [1].

Own approaches to the classification of products for enteral nutrition were also proposed by leading producers (companies *Nestle*, *Danone*, *Fresenius Kabi*).

The analysis of existing approaches to the classification of products for enteral nutrition from the commodity science point of view allows to recapitulate that they are not always scientifically based and they don't take into account current market trends and specifics of many scientific principles of consumer and technological characteristics. Thus, the existing classifications of the investigated products require revision.

The necessity of adequate meeting food needs for each of the defined categories of victims is aimed at restoring the body and minimization of violations of metabolic processes. This requires a differentiated approach for achieving the desired physiological effect.

Basing on the analysis, systematization of existing features and allocation of new ones, which are important for delivering necessary information about the properties of products for enteral nutrition to target consumers (both victims and their doctors), we have developed a classification that is faceted and provides parallel division of products for enteral nutrition on independent classification groups. This allows it to be flexible, easy for expanding and delving its representativeness.

Consistency was chosen as the main indicator, while selecting classification features, which lets reveal more accurately the properties and characteristics of products for enteral nutrition physiological effect on the metabolic processes of the human body. This, in turn, will allow its usage both in the field of scientifically-theoretical and practical spheres.

Two main groups of features were defined for the methodological basis for the classification of products for enteral nutrition consumer and technological (*table*).

Classification of products for enteral nutrition

Group of classification features	Classification feature	Categories of products for enteral nutrition
CONSUMER	The method of consumption (usage)	<ul style="list-style-type: none"> • for oral consumption (sip feeding); • for tube feeding; • for mixed consumption (usage)
	The ability to be the sole source of nutrition	<ul style="list-style-type: none"> • can be a sole source of nutrition; • another source of nutrition is needed
	Action	<ul style="list-style-type: none"> • standard; • specialized: <ul style="list-style-type: none"> ➢ for diabetic patients; ➢ for patients with renal insufficiency; ➢ for patients with diseases of the gastrointestinal tract and/or dysbiosis; ➢ for patients with respiratory insufficiency; ➢ for patients with hepatic insufficiency; ➢ immune modulating; ➢ others
	The character of impact on human body	<ul style="list-style-type: none"> • of mediated influence; • of complex activity; • of direct influence; • of single activity
	The caloric value	<ul style="list-style-type: none"> • hypocaloric (less than 0.9 kcal/cm³); • isocaloric (0.9–1.2 kcal/cm³); • hypercaloric (more than 1.2 kcal/cm³)
	The content of protein component	<ul style="list-style-type: none"> • hiponitrous (up to 35 g/dm³ of product); • isonitrous (35–50 g/dm³ of product); • hipernitrous (more than 50 g/dm³ of product)
	The degree of splitting its main protein mass	<ul style="list-style-type: none"> • polymeric; • oligomeric (half-elemental); • monomeric
	The regularity of product consumption (usage)	<ul style="list-style-type: none"> • for regular consumption; • for long-term consumption; • for short-term consumption; • for single consumption (fast meeting of food needs of a specific stage)
	The age of consumers	<ul style="list-style-type: none"> • for children 1–3 years old; • for children aged 4–6 years old; • for teens (7–18 years); • for adults (18–60 years); • for the elderly (over 60 years)
	TECHNOLOGICAL	The physical properties of the product (form of realization)
The origin of the protein component		<ul style="list-style-type: none"> • based on animal protein (milk (casein and/or whey protein), blood albumin, protein of eggs); • based on isolated soy proteins; • based on proteins of mixed origin
The dosage of product in packaging		<ul style="list-style-type: none"> • для разового прийому упродовж доби; • for a single reception during day; • for 3–5 receptions during day; • for multiple (more than 5) receptions per day;
The kind of packaging		bottles, jars, packages, containers, sticks, other
The material of packaging		glass, polymer materials, plastic, metal, metal foil, other

Developed classification of products for enteral nutrition is based on the requirements, established by specialized world organizations (in particular, ASPEN and ESPEN), advertizing information from producers, distributors and retailers, and modern commodity science approaches to the classification of food products.

Conclusion. Developed classification of products for enteral nutrition, that was presented, reflects the basic approaches to their production and consumption according to the interests and preferences of target customers. In turn, while updating and expanding the assortment of researched products in Ukraine and in the world, presented classification may be supplemented and updated.

The prospect for further researches is the development of unified with international and national medical researchers, manufacturers and specialized sales representatives classification of products for enteral nutrition, which would be fixed on the state regulatory level.

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Мотузка Ю., Антюшко Д. Класифікація продуктів для ентерального харчування.

Постановка проблеми. Невід'ємною частиною нутритивної підтримки постраждалих в умовах надзвичайних ситуацій є спеціалізоване харчування, створене у відповідності зі специфікою метаболічних процесів організму. Найбільш вдалим методом проведення нутритивної підтримки є ентеральне харчування (як зондове, так і пероральне), якого на сьогодні виробляється понад 250 найменувань, які відрізняються за специфікою своєї дії.

Мета роботи – аналіз існуючих підходів до позиціонування наявних на ринку продуктів для ентерального харчування та розробка комплексної товарознавчої класифікації, щоб уможливила одержання повної та необхідної інформації про властивості таких продуктів для цільових споживачів (як постраждалих, так і їх лікарів).

Матеріали та методи. В основу дослідження покладено методи наукового пізнання, системного аналізу, узагальнення та наукового синтезу.

Результати досліджень. Аналізуючи існуючі підходи до класифікації продуктів для ентерального харчування з товарознавчої точки зору, встановлено, що вони не завжди є науково обґрунтованими та враховують сучасні тенденції розвитку ринку й специфіку багатьох наукових принципів споживчих і технологічних ознак.

На основі систематизації існуючих ознак і виділення нових розроблено фасетну класифікацію властивостей продуктів для ентерального харчування. Вона передбачає паралельний розподіл цих продуктів на дві незалежні класифікаційні групи за такими ознаками: *споживчими* (спосіб споживання (використання), здатність бути єдиним джерелом харчування, направленість дії, характер впливу на організм, енергетична цінність, вміст білкової складової, ступінь розщеплення її основної маси, регулярність вживання продукту, вік споживачів) та *технологічними* (фізичні властивості продукту (форма реалізації), походження білкової складової, дозування упаковки, вид і матеріал пакування).

Висновки. Запропонована класифікація продуктів для ентерального харчування відображає основні підходи до їх виробництва та споживання з урахуванням потреб і рекомендацій цільових споживачів і може доповнюватися при оновленні та розширенні асортименту цієї продукції в Україні та світі.

Ключові слова: продукти для ентерального харчування, підходи до класифікації, споживчі та технологічні групи ознак.