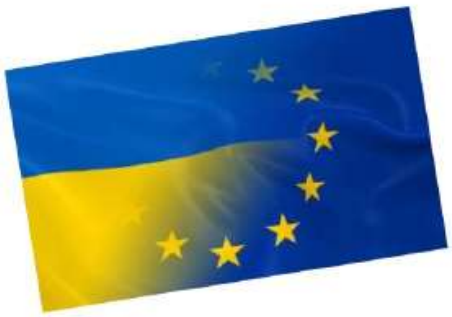

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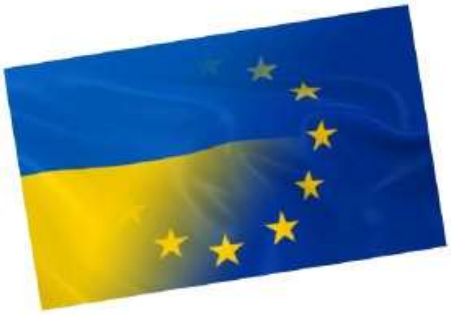

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ЕРАЗМУС+ ОФІС В УКРАЇНІ

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III МІЖНАРОДНА НАУКОВО-ПРАКТИЧНА КОНФЕРЕНЦІЯ

ЄВРОПЕЙСЬКІ ВИМІРИ СТАЛОГО РОЗВИТКУ

в рамках проектів програми ЕРАЗМУС+
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Selected papers of the III International Conference on European Dimensions of Sustainable Development, June 11, 2021. – Kyiv: NUFT, 2021. – 134 p.

Selected papers of the III International Conference on European Dimensions of Sustainable Development present abstracts of the reports of the conference, which had place on June 11, 2021 at National University of Food Technologies, Kyiv, Ukraine (online) in terms of the ERASMUS+ projects Jean Monnet EU Centre for the Circular and Green Economy JM ECO (620627-EPP-1-2020-1-UA-EPPJMO-CoE) and Jean Monnet Support to Associations EUforUA (611278-EPP-1-2019-1-UA-EPPJMO-SUPPA). Scientific articles cover economic, environmental and social aspects of sustainable development of European Union and Ukraine, as well as European Studies on the sustainable development.

Збірник наукових статей за матеріалами ІІІ Міжнародної науково-практичної конференції «Європейські виміри сталого розвитку», 11 червня 2021. – К.: НУХТ, 2021. – 134 с.

У збірнику представлено рецензовані наукові статті за матеріалами ІІІ Міжнародної науково-практичної конференції «Європейські виміри сталого розвитку», що проходила 11 червня 2021 р. у Національному університеті харчових технологій, Київ, Україна (онлайн) у рамках проєктів програми ЕРАЗМУС+ Центр Європейського Союзу Жана Моне з Циклічної та Зеленої Економіки JM ECO(620627-EPP-1-2020-1-UA-EPPJMO-CoE) та Жан Моне Підтримка Асоціацій EUforUA (611278-EPP-1-2019-1-UA-EPPJMO-SUPPA). Статті охоплюють економічні, екологічні та соціальні аспекти сталого розвитку Європейського Союзу та України, а також досвід Європейських Студій для сталого розвитку.

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OVERCOMING PROTEIN DEFICIENCY - A CURRENT ISSUE OF CONTEMPORANEITY

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The article considers actual trends in food production and consumption in modern conditions of human life and activity. Ways to solve the problem of protein deficiency in food production are given. The scientific achievements of scientists of the Department of Milk and Dairy Products Technology and the Problem Scientific Research Laboratory of the National University of Food Technologies are analyzed. The main topical issues of today regarding the possibility of creating competitive domestic products of high quality are identified.

One of the main tasks of the food industry is the production of quality and safe products that meet modern requirements of nutrition [1]. In recent years, the nature of food consumption in Ukraine has changed dramatically. Along with the excessive consumption of animal fats and easily digestible carbohydrates, there is a significant deficiency of complete proteins; polyunsaturated fatty acids; vitamins, macro- and microelements, dietary fiber. The majority of the population consumes cheap products with low biological value, but high energy consumption, which ensures the energy value of the diet [2]. Due to the reduction in the consumption of dairy products, the population of Ukraine is worse supplied with complete proteins, easily assimilated by calcium and phosphorus [3-4].

That is why in modern conditions of human life and activity it is important to increase the biological value of consumer products, which play a key role in improving overall health and preventing a number of diseases. Under such conditions, the use of protein concentrates in food technology becomes one of the ways to solve a number of problems that arise in the food system of modern consumers [5].

In 2021, Ukraine joined the meeting of the FAO World Food Security Committee for the first time [6]. The event included a report of a group of experts on the creation of a global concept of food security and nutrition by 2030.

One of the most difficult tasks is to ensure sufficient consumption of animal products, namely meat, fish, milk and dairy products, eggs, which are sources of complete proteins, polyunsaturated fatty acids, vitamins, macro-and micronutrients.

It is known that the average supply of animal proteins in Ukraine is lower than the achieved level of developed countries by 30-35% [7]. The total protein deficit on the planet is estimated at 10-25 million tons per year [8]. Thus, according to preliminary estimates of experts, every second inhabitant of the planet suffers from a lack of protein, which is not only an economic but also a social problem of the modern world.

The purpose of the article is to investigate the possibility of using protein concentrates in dairy products technologies.

Current trends in food production, in particular dairy, are focused on the production of food products with improved composition of essential nutrients, especially with high protein content.

To increase the proportion of protein in human nutrition, it is advisable to use milk protein in concentrated form. In this regard, MPC (milk protein concentrates) became widespread: food casein, caseinates, coprecipitates, protein concentrates obtained using membrane techniques, etc. [9].

Many countries around the world are now developing new technological processes for the isolation and concentration of protein and create modern high-performance equipment. Methods of obtaining milk protein concentrates are reflected in numerous works of ukrainian and foreign scientists: PF Dyachenko, AG Khramtsov, MM Lipatov (senior), T. Senkevich, A. Tepel, V. Belitzer [10-14]. In Ukraine, the works of such scientists as SS Gulyaev-Zaitsev, VM Kozlov, GV Deinichenko, EA Izbash, TI Yudina, and others are devoted to this issue. [15].

For many years, there has been increased interest in the use of MPC in various sectors of the food industry, including dairy.

Protein concentrates - powdered products that are obtained from sources of plant or animal origin by heat, mechanical and chemical treatment and contain 35… 100% natural protein. Protein concentrates are classified by origin, protein concentration and physical properties [16].

By origin, they are divided into animal (dairy - whey, casein; egg; beef; collagen), vegetable (soy, rice, pea, wheat, hemp) and products of microbial origin (yeast).According to the physical properties of protein concentrates are divided into dry and liquid (gel, paste).

The protein concentration is divided into isolates (ppm ≥ 75%), concentrates (ppm - 70… 75%) and hydrolysates (ppm ≥ 50%).

A distinctive feature of animal proteins is the technology of their production, which includes only physical and thermal processes, without treatment with chemical reagents. These are, as a rule, exclusively natural products, the production of which is based only on thermal (degreasing, dehydration) and mechanical (grinding) processes [17].

The great interest in animal proteins in terms of technology is due to their unique properties. The combination of milk base and animal proteins provides great opportunities for creating high-quality chemical composition and technological properties of food [18].

Caseinates. Sodium and calcium caseinates as water-soluble casein salts are most often used in the food industry (dairy, meat processing, baking and confectionery industries). It is obtained by dissolving acid casein in sodium hydroxide, followed by drying to obtain a dry fine white powder with a light cream tint. A technological feature of caseinates is the ability to reduce surface tension more effectively than whey proteins, gelatin or soy protein, because they diffuse faster to the phase boundary and are adsorbed on it. At almost neutral acidity, sodium caseinate solutions have the highest foaming ability.

The main functions of casein and caseinates in food products are emulsification, moisture binding, structure stabilization, formation of surface films [19].

Micellar casein is obtained by micro- and ultrafiltration from skim milk without the use of acids and high temperatures. This method allows to preserve the native structure of the protein and its natural properties (high solubility in water and emulsifying and foaming activity), in contrast to casein, obtained by thermoacid coagulation of milk. Micellar casein has a high level of digestibility and natural anabolic properties, fresh smell and mild taste. Micellar casein is popular in sports nutrition products because it has a full amino acid profile. Depending on the purification method, micellar casein contains from 70.0 to 85.5% of high quality protein.

Given the versatility of functional-technological and rheological properties of animal proteins, they can be used in combination with vegetable, which reduces the cost of products, as well as - to increase the nutritional value of the product, improve its taste and appearance [20].

The traditional way to increase the resources of food protein is to increase crop and livestock products based on modern technologies for processing legumes, oilseeds and cereals, used for both food production and animal feed.

The most popular of these are ***soy protein concentrates*** - products of deep processing of soy.

Compared to soybean meal, the value of soy concentrates is purchased by the majority, the level of oligosaccharides and antigenic factors is very low. The most important products that are processed among themselves: whole soy, soybean meal, fermented soy, soy concentrate [21].

It should be noted that soy protein is almost 2 times higher than meat, and the quality is close to the world etalon (chicken egg white) [22]. If to take the nutritional value of chicken egg whites per 100 units, then for boiled soybeans it is 94.5 units, soy flour - 91.7, and soy milk - 95.3.

Soy proteins are slightly less nutritious than beef proteins and are equal to milk in this respect [23].

The value of soy as a food product lies primarily in the rich biochemical composition, especially in the presence of such deficient amino acids as lysine, tryptophan, threonine, vitamin E, macro - and micronutrients. In terms of the composition of most essential amino acids, soy protein is similar to animal proteins.

Protein soy concentrates are made from flour and petals of this culture. Petals contain,%: proteins - 67.1… 71.0%, fat - 0.3… 2.4%. Protein isolates are made from meal or soybean seeds. Soy isolate from meal, depending on its varieties, contains%: fat - 0.2… 4.0, protein - 85… 97, ash - 0… 5.5 [24].

Soy proteins contain essential amino acids; g / kg of dry matter: lysine - 21.9, methionine - 4.6, cystine - 4.6, arginine - 25.6, leucine - 41.0, phenylalanine 16.0, threonine - 12.6, valine - 16 , 0, tryptophan - 3.6, histidine - 8.0. Total 154. In terms of protein content, soy is almost twice as high as peas, three times as much as wheat and oats, four times as much as corn, and as much as it is significantly more than the sum of the most important amino acids.

An urgent issue today is the development and implementation of competitive products in the Ukrainian market through the use of functional and technological ingredients of domestic production [25-27].

NUFT scientists have developed a technology for new types of frozen desserts with a soy component [28-29]. The chemical composition of the developed frozen desserts determines the high level of assimilation of all nutrients by the body, which is a particularly valuable characteristic of food. It was found that the introduction of protein enrichment in ice cream will increase the biological value of ice cream by 12%. Developed products with natural biologically complete ingredients, which determines the approximation of the product to the optimal ratio of essential nutrients, can be implemented in the dairy industry, restaurants, low-power shops on freezers of periodic action. The inclusion of the above frozen desserts in the diet of both adults and children will help meet the daily physiological needs of essential nutrients and energy.

In the framework of the state budget research work "Implementation of resource-saving methods of modification of functional and technological characteristics of whey in the technology of food products" (state registration number - 0120U00868) developed a new technology of resource-saving dairy products, including the use of whey, in particular by its fermentation and combination with protein-containing vegetable and animal raw materials.

It should be noted that the market of protein-containing whey products is represented by dry whey, whey concentrates, demineralized whey, concentrated and condensed whey.

The use of whey protein concentrates and isolates in the production of various products is determined by their properties (functional and technological) and composition, primarily the mass fraction of protein [30].

According to the composition, there are concentrates of whey proteins obtained by ultrafiltration (WPC-UF) with a mass fraction of protein in the dry matter: 35, 55… 60, 70...85%. Isolates are characterized by a mass fraction of protein 90…100%. Their functional properties include: high nutritional and biological value, high amino acid score, antioxidant activity, easy digestibility [31-32].

Scientists of the Department of Milk and Dairy Products Technology have studied the possibility of using protein concentrates in different groups of dairy products. The technological efficiency of using whey protein concentrate in sour cream has been proved [33]. For industrial implementation, the recipe of sour cream with a mass fraction of 10% fat, which includes 0.6% whey protein concentrate, is recommended. Strengthening the structure of the sour cream clot will make it possible to produce sour cream with a mass fraction of fat of 10% by tank method without reducing its organoleptic quality.

A method of production of enriched casserole and milk-plant souffle is proposed [34-35]. Using of whey protein concentrate as a thickener improve the functional and technological properties of the milk-protein system (moisture binding, emulsification, thickening, stabilization of the structure).

The use of whey protein concentrate in combination with skimmed milk powder has been tested in food systems such as fermented milk drinks. The result of the study was the creation of a method for the production of kefir enriched with protein [36]. The use of whey protein concentrate has a positive effect on the structure and consistency of the finished product and gives it a delicate creamy taste, mimicking the presence of milk fat, as whey proteins are substances related to mimetics. The mass fraction of protein of this kefir is 5.4…6.5%, thus 100 g of product provides a daily protein requirement of 5.3… 6.4%.

Studies have been conducted on the interaction of whey protein concentrate, sodium caseinate and beet and apple puree in ice cream [37]. The advantage of the complex application of apple puree and sodium caseinate was substantiated, which makes it possible to obtain a fine emulsion "fat/water" due to the synergistic interaction between the functional and technological components. Milk-protein concentrates in this technology had moderate surface activity, and fruit and vegetable purees were surface-neutral components. Due to the combination of the surface activity of milk proteins and the stabilizing ability of pectin-containing purees, it is technologically feasible to use protein-pectin complexes in the prescription composition of ice cream of the classic range.

The possibility of combining protein concentrates with fruit and vegetable raw materials was considered in the technology of production of low-fat milk and vegetable ice cream [38]. Development of new types of ice cream with vegetable pectin-containing raw materials, enriched with protein, allows to reduce the sugar content in the product due to the presence of high amounts of natural carbohydrates in vegetable raw materials; provide dietary properties by reducing the energy value; increase the protein content, which acts not only as an enrichment but also as a structurant. According to the results of the study, the use of whey protein concentrate in the composition of ice cream promotes the formation of a creamy homogeneous structure, which is explained by the complexation between whey proteins and pectin substances of vegetables.

The possibility of using a protein composition (soy protein isolate, sodium caseinate, whey protein concentrate) in the production of acidophilus-whey ice cream was studied [39]. The proposed composition of proteins in the prescription composition of a new type of ice cream provides a mass fraction of protein in the finished product at the level of 5… 6% and increases the biological value by 15% (compared to control).

Thus, the use of protein concentrates in dairy technologies, first of all, will solve the problem of balance of the finished product in terms of protein content, secondly, improve the technological and functional properties of dairy systems, namely moisture binding, emulsification, thickening, structure stabilization.

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ЕКОЛОГО-ЕКОНОМІЧНІ ОСОБЛИВОСТІ ВИРОЩУВАННЯ В РІК ДВОХ РЕПРОДУКЦІЙ РОСЛИН ЯЧМЕНЮ ЯРОГО В УМОВАХ СВІТЛОКУЛЬТУРИ

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При вирощуванні ярого ячменю в світлокультурі під лапами ЛБ-40, ДРЛФ-400, ДРФ-1000 та E27ES(енергозберігаючі) показано, що найбільш ефективною була установка з лампами ДРФ-1000, яка характеризувалася порівняно високим виходом насіння і найменшими затратами електроенергії на 1г вирощеного матеріалу. Не дивлячись на те, що дослідження були проведені 2004-2005 рр. але результати не були опубліковані, актуальність їх залишається і на даний час. Особливо акцентується увага на результатах використання енергозберігаючих ламп, які потребують суттєвого удосконалення при вирощуванні селекційного матеріалу зернових культур.

Inna Adamovych, Volodymyr Dubovy, Oleksii Dubovy ECOLOGICAL AND ECONOMIC FEATURES OF GROWING IN THE YEAR OF TWO REPRODUCTIONS OF SPRING BARLEY PLANTS IN THE CONDITIONS OF LIGHTCULTURE

When growing spring barley in light culture under the paws of LB-40, DRLF-400, DRF-1000 and E27ES (energy saving) it was shown that the most efficient was the installation with DRF-1000 lamps, which was characterized by relatively high seed yield and lowest electricity consumption per 1 g grown. material. Despite the fact that the research was conducted in 2004-2005 but the results were not published, their relevance remains today. Particular attention is paid to the results of the use of energy-saving lamps, which need significant improvement in the cultivation of breeding material of cereals.