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SUMMARIZING DEMANDS TO SAFETY AND QUALITY OF FOODS IN NORMATIVE DOCUMENTS IMPORTANT FOR REGULATION OF FOOD SECURITY ISSUES

***K.V. Kopylova**, D-r of Science, Agriculture,*
Deputy Director on the Scientific and Innovation Work,
***S.B. Verbytskyi**, Ph.D., Technique,*
head of Department of Informational Support, Standardization and Metrology,
***O.V. Verbova**, Researcher,*
Food Resources Institute of NAAS

Food safety and quality take an important place among the criteria for food security. In particular, an important issue is the achievement of proper physical and chemical parameters of food products used for state reservation. As a result of the research carried out, it is considered advisable to develop special standards that will normalize the specifications for food products intended for reservation, or to complement existing standards with provisions that contain special requirements for the foods being used for reservation purposes. To rationalize the fulfillment of this task, the "Database of food products dealing with food security issues of the state and their characteristics" was developed. The said database is compiled in accordance with the requirements for food safety and quality in the following groups: meat and meat products, canned meat and meat, dairy canned and dried milk products, butter, frozen fish, canned fish, cereals and flour, bakery products and flour, butter and fatty foods, sugar, tea. For all specified groups of food products and food raw materials represented by the current standards, typical lists of safety and quality indicators are given.

***Key words:** food safety, food security, quality of foods, standards, state reservation, technical regulation*

УЗАГАЛЬНЕННЯ ВИМОГ ЩОДО БЕЗПЕЧНОСТІ ТА ЯКОСТІ ХАРЧОВИХ ПРОДУКТІВ У НОРМАТИВНИХ ДОКУМЕНТАХ, ВАЖЛИВИХ ДЛЯ РЕГУЛЮВАННЯ ПИТАНЬ ПРОДОВОЛЬЧОЇ БЕЗПЕКИ

***К.В. Копилова**, д. с.-г.. н., с.н.с,.*
заст. директора з наукової та інноваційної роботи,
***С.Б. Вербицький**, к. т. н.,*
зав. відділу інформаційного забезпечення, стандартизації та метрології,
***О.В. Вербова**, н.с.,*
Інститут продовольчих ресурсів НААН

Серед критеріїв продовольчої безпеки важливе місце посідають питання безпечності та якості харчових продуктів. Зокрема, важливим питанням є дотримання належних фізико-хімічних показників харчових продуктів, залучених для державного резервування. У результаті виконаних досліджень визнано за доцільне розроблення спеціальних стандартів, що нормуватимуть технічні умови щодо харчових продуктів, призначених для резервування або доповнення чинних стандартів положеннями, які містять особливі вимоги у разі використання нормованих цими стандартами харчових продуктів з метою резервування. З метою раціоналізації виконання зазначеного завдання створено «Базу даних харчових продуктів, залучених для вирішення завдань продовольчої безпеки держави та їхніх характеристик». Ця база даних складена відповідно вимог щодо показників безпечності та якості харчових продуктів за наступними групами: м'ясо та м'ясні продукти, консерви м'ясні та м'ясорослинні, консерви молочні та продукти молочні сухі, масло вершкове, риба заморожена, консерви рибні, крупи та борошно, вироби хлібобулочні та борошняні, олія та продукти жирові, цукор, чай. Для всіх

зазначених груп харчових продуктів і продовольчої сировини, представлених чинними стандартами, наведено типові переліки показників безпечності та якості.

Ключові слова: *безпечність харчових продуктів, державне резервування, довготривале зберігання, продовольча безпека, стандарти, технічне регулювання, якість харчових продуктів*

Scientists and specialists have already proposed numerous definitions of such a concept as "food security". In particular, according to the terminology of Food and Agriculture Organization of the United Nations [1], this term is defined as "compliance with a set of criteria providing in the aggregate physical and economic access to all persons at any time to safe and adequate foods sufficient to meet physiological needs and ensure active and healthy life". The concept of "food security" has been minutely worked out by the scientists dealing with economical issues, there are also certain scientific approaches to this concept, based on the principles of healthy nutrition of population basing on the proper nutritional value of the foods consumed. However, technical and technological aspects of ensuring food security have not yet been adequately reflected in scientific works.

The task of the food industry is to adequately supply all the consumers with safe, affordable and nutritious foods. The total world population is predicted to reach 9 billion people in 2050. The problem of providing them with foods can not be solved only by increasing the volumes of their production, but also due to a significant reduction in losses during processing of food raw materials along the entire chain from field to fork, as well as due to the increase in the nutritional value of the food produced, the enhancing of their shelf life due the proper observance of food safety requirements and complete preservation of quality. Therefore, in order to solve the problem of global food security, an integrated multisectoral approach is needed, in which aspects related to the food and processing industry should take their proper place [2]. Industrial food production requires proper application of scientifically based approaches to the storage of food, that is, the possible inhibition of their natural damage. Of course, it is impossible to completely stop this process; however, the change in the quality of products during storage should occur in a predictable and controlled manner. This is facilitated by a significant improvement in the methods of preparation and processing of raw materials, packaging and distribution of the food products manufactured [3]. Improving quality and safety of food, as well as proper compliance with food security conditions, is still an urgent problem in the food industry. Currently, research is being carried out and developments are underway to create new packaging materials and food storage technologies, these expected to positively influence compliance with food safety criteria [4]. In the local conditions, the solution of food security problems requires the proper application of advanced technologies for harvesting, storing and processing food materials with the use of advanced technologies and developments, both inland and foreign [5]. Among the principal factors determining the effectiveness of the food safety system, there is also the promotion of the use of advanced technologies in production, processing and storage of food raw materials and foodstuffs. At the same time, it is important not only to meet the food safety criteria concerning the volume of foods, but also to ensure their compliance with the principles of healthy nutrition, quality and safety requirements through proper coordination of agriculture with food enterprises [7].

The issue of the impact of technical regulation in general and standardization, as one of its directions, in particular, on solving problems, has not yet been properly studied. Until recently, Ukraine had had a system of standardization of foods and food production complying with the conditions of the administrative and planned management of the national economy. But the actively implemented contemporary approach, namely the concept of standardization on the basis of non-mandatory standards, eliminates the administrative burden on producers and promotes the development of food production based on market competition [8]. Indispensable trait of the technical regulation at the present stage is openness and transparency meaning the spread of the concept of food security to other levels – up to individual households. This requires

a new approach to communication on this issue, which should consist in proper openness of information about the criteria for food safety, the nomenclature of food products, their safety, and quality in its broad sense – concerning physical, chemical and sensory characteristics, as well as socio-cultural, natural, ethical factors established traditions etc. [9]. It is necessary to inform consumers timely and fully through the press, radio, television, on-line resources on the basics of rational nutrition, to conduct open analyzes of the most socially significant foods and to publish the results of the analysis performed, etc. [10]. These analyzes shall be conducted according to recognized methods set forth in international and national standards, standards of professional associations, private standards of authoritative market operators and the like.

While dealing with the issues of food safety and quality, as important components of the overall food security structure of the state, consolidated targeted actions in such areas as food security, technical regulation, safety and quality of food are necessary. Due account shall be taken of the foundations of food security in the development of technical regulation and standardization, the calculation of rational consumption norms, the formation of state food resources, ensuring food safety and quality of processes, organizations and food products [8]. The state should in an effective way control the food market, covering production estimates, providing with products and inventory, controlling the movement of bulk consignments of food products in conditions of special regimes, assessing the quality of food products for compliance with environmental and sanitary and epidemiological requirements. The fulfillment of the tasks of observing the criteria of food security, to a large extent, belongs to the sphere of competence of the State Material Reserve. This structure is intended to provide state support to various sectors, enterprises and organizations; the provision of humanitarian assistance and the provision of regulatory impact on the market. The said directly influences such important indicators of food security as the economic accessibility of food, the stability of the food market, the degree of independence of the food market, the quality and safety of food, etc. [11]. At the same time, the practice of developing standards for food products used for state reservation indicates that the physical and chemical characteristics of these products correspond to typical conditions of their market turnover, apart from, however, special requirements for its reservation and long-term storage. We believe that it is expedient, in this sense, to develop special standards, standardize the technical conditions for food products intended for reservation; supplement existing standards with provisions that contain special requirements when using food products rationed with these standards for the purpose of reserving and develop, if necessary, the standards for methods for determining the indicators of food production, these being important in terms of its preparation and practical implementation of the reservation with the use of long-term storage facilities [12]. Although the current concept of standards, including national ones, implies their voluntary use, this does not apply to the standards their provisions being included in the Laws of Ukraine and relevant acts of central executive bodies. Among them the regulatory acts of the State Reserves of Ukraine, registered in accordance with the Law of Ukraine "On State Material Reserve" [13], are the legal basis for bringing the standards in line with the specified regulatory acts enactments [14].

Purpose of the article is to generalize the results of research on the nomenclature of foods, these possible and appropriate to be used in solving food security issues, and quality and food safety indicators of the said foods, by creating a "Database of food products dealing with food security issues of the state and their characteristics".

Experiment and research methods. Within the framework of the research fulfilled, the principles of a systematic approach to the study of factual materials, normative and legal acts, normative documents and the like were used as well as abstract logical approach to the generalization of research results and the formulation of conclusions.

Results and discussion of research. Food security indicators these recognized by scientists and practitioners relate to safe and quality of raw food materials as well as processed foods in the assortment acceptable for the rational nutrition of the consumers, should be reflected in the national system of technical regulation. The directions of the consideration of the

principles of food safety and safety in the framework of the development of technical regulation and standardization are indicated in Table 1 [8].

Table 1

Principal directions of implying food security fundamentals in the frames of technical regulation and standardization [8]

NN	Elements of food security system	Corresponding measures concerning technical regulation system
1	Foods	National standards, standards of other levels, specifications concerning agricultural raw materials and foods
2	Rational consumption norms	As such, are not the subject to standardization, however, their definition requires the selection of appropriate standardized methods for monitoring certain physical and chemical indicators.
3	State food resources	Since the formation of a material reserve requires the storage of food raw materials and foods in special storage facilities and long-term storage warehouses, it is advisable to adequately reflect the relevant technical conditions in existing standards, or (as an option) to develop special food standards concerning the state food reserve. These standards should contain provisions on the possibility of using products from the state reserve after its renewal – both for food and for other purposes.
4	Food safety	It is determined by the relevant regulations of the EU, the Technical Regulations on Labeling, as well as national standards – in cases specified by law. An obligatory condition is the introduction of a food safety management system (most often a control system in critical points – HACCP), the requirements of which are determined by the relevant international and national standards – for example, ISO 22000 group of standards and the relevant harmonized national standards. Proper use, actualization of existing and development of new standards for determination of indicators of safety and quality of food raw materials and foods.
5	Quality of processes and organizations involved in formation of food security system	It is determined by the relevant international and national standards for quality management systems – for example, ISO 9000 group of standards and relevant harmonized national standards.
6	Quality of foods	It is determined by mandatory requirements for certain quality indicators in accordance with the Law of Ukraine "On Basic Principles and Requirements for Safety and Quality of Food Products" set force in 15, as well as the requirements of national standards, other standards and specifications. Development of standardization in organic production of food raw materials and food products, dietary and functional products.

The current nomenclature of normative documents in force at the national level is represented by such normative documents as DSTU (national standards of Ukraine), GOST (interstate standards being in force in Ukraine according to the established procedure), the RST (republican standards that were had been developed in Ukraine and introduced before its independence). A significant part of the DSTU national standards are the standards harmonized

with international standards (for example, DSTU ISO standards that implement ISO standards in Ukraine) and European standards (DSTU EN standards that implement the standards of the European Committee for Standardization CEN in Ukraine). A certain small part of the standards in force in Ukraine are GOST normative documents, which are the harmonized interstate standards. Among the regulatory standards in force in Ukraine, a significant part are those establishing specifications for foods and food raw materials or those containing guidelines on the methods of determining physical, chemical and sensorial parameters of these standardization objects. According to the current information, the fund of effective regulatory documents on processing of agricultural products is 2457 titles. The nomenclature of standards of the classification code 67 in accordance with DC 004:2008 "Ukrainian Classifier of Regulatory Documents" [16] and their number as of October 2, 2017 is presented in Table. 2. The information was processed and summarized, and "Database on normative documents on the joint sphere of food safety, food safety and quality control" was created on its basis.

Table 2

Structure of the current regulatory documents under classification code 67 "Technology of food production" in DC 004-2008 [16] (as of October 2, 2017)

Code according to DC 004-2008	Group title according to DC 004-2008	Number of standards in a group
1	2	3
67.020	Technological processes in food industry	39
67.040	Foods in common	26
67.050	General methods for testing and analyzing foods	120
67.060	Cereals, legumes and products of their processing	290
67.080	Fruit. Vegetables	302
67.100	Milk and milk products	255
67.120	Meat, meat products and other animal produce	388
67.140	Tea. Coffee. Cocoa	67
67.160	Beverages	266
67.180	Sugar. Sugar products. Starch	96
67.190	Chocolate	7
67.200	Food oils and fats. Seeds of oil plants	236
67.220	Spices and seasonings. Food additives	118
67.230	Packed foods and cooked foods	28
67.240	Sensorial analyzing	44
67.250	Materials and items in contact with foods	29
67.260	Appliances and equipment for food industry	146
Total for classification code 67		2457

The first stage of development and generalizing the information on the normative documents important for ensuring food security was creating the "Database on normative documents on the combined sphere of food safety, food safety and quality control". The said database contains the necessary information about the entire normative base of the standards of nation-wide sphere, these related to foods, methods of determining safety and quality indicators, and specialized technological equipment for the food and processing industry. At the same time, the studies fulfilled have shown the necessity to create a specialized database of standards for the nation-wide level normalizing specifications for foods and food raw materials that are used or can be used to solve strategic problems of food security by creating long-term storage reserves. Unlike the "Database on normative documents on the joint sphere of food safety, food safety and

quality control", newly developed "Database of food products dealing with food security issues of the state and their characteristics" was compiled in accordance with the requirements for safety and quality indicators. The need for generalization and systematization of these indicators determined the order of grouping of constituents of the base, which differs in a certain way from the order of presentation of these elements, typical for DC 004:2008 "Ukrainian Classifier of Regulatory Documents" [16]. Thus, the following groups of elements of the base were identified: meat and meat products, canned meat and canned meat/vegetables, canned milk and dry milk products, butter, frozen fish, canned fish, cereals and flour, bakery and flour products, butter and fat products, sugar, tea.

For all specified groups of food products and food raw materials, represented by the relevant standards in force in Ukraine, practical lists of safety and quality indicators are given. For example, for a group of canned milk and dry milk products these are: the presence of nitrites, nitrates, copper, iron, fat, peroxidase, phosphatase, calcium, potassium, sodium, magnesium, iodine, pesticides; industrial sterility; moisture, dry matter, microorganism toxins, yeast, molds; acidity, viscosity, density, purity, lactose temperature and relative humidity of the medium. Such a grouping of normative documents and indicators should help to optimize further work on implementing food safety requirements to the elements of the current system of technical regulation. A fragment of the "Database of food products dealing with food security issues of the state and their characteristics" is presented in Fig. 1.

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	C	D	E	F	G
1	Database of food products dealing with food security issues of the state and their characteristics				
2	NN	Code according to DC 004:2008	Number	Title	Safety andquality parameters to be controlled
3	1	2	3	4	5
4	*Meat and meat products*				
5	1	67.120.10	DSTU 4426:2005	Meat. Beef cuts. Specifications	The content of nitrites, nitrates, ash, nitrogen, protein, moisture, chlorides, fat, total phosphorus, hydroxypropylene, glucono-delta-lactone, L- (+) - glutamic acid, dyes, glucose; pH; bacteriological parametrs; the content of technologically added water (for poultry meat); temperature and relative humidity of the medium.
6	2	67.120.10	DSTU 6030:2008	Meat. Beef and veal in carcasses, semi-carcasses and quarters. Specifications.	
7	3	67.120.10	DSTU 7158:2010	Meat. Pork carcasses i halves. Specifications	
8	4	67.120.10	GOST 10.76-74	Meat. Horse-flesh for export. Technical requirements	
9	5	67.120.10	GOST 1935-55	Meat-mutton and goat's meat in carcasses. Specifications	
				Frozen beef, quarters for	

Fig. 1. Fragment of "Database of food products dealing with food security issues of the state and their characteristics"

Conclusion

The physical and chemical characteristics of food products used for state reservation often do not fully correspond to the typical conditions of their market turnover, reflected in standards of different levels, normalizing the specifications for the said products. So, it is expedient to develop special standards, standardize the technical conditions for food products

intended for reservation or to complete existing standards with provisions that contain special requirements to food products which are probable to be used for the purpose of reserving and to develop, if necessary, the standards for methods for determining different indicators of food produces, which are important in terms of their processing, preparation and practical implementation of the said reservation.

The processing and generalization of information concerning regulatory documents important for ensuring food security within the framework of the "Database on normative documents on the combined sphere of food safety, food safety and quality control" to have been created earlier, showed the need to create a more precisely specialized base of standards of the state power, which standardize the specification for foods and food raw materials being used or probable to be used to solve in the principal objectives of food security by creating long-term reserves of storage – "Database of food products dealing with food security issues of the state and their characteristics". The said database is compiled in accordance with the requirements for safety and quality parameters. The necessity of generalization and systematization of these indicators determined the order of grouping of the constituents of the base, somewhat different from the order of representation of elements, characteristic for DC 004:2008 "Ukrainian Classifier of Regulatory Documents". The following groups of elements of the base were identified: meat and meat products, canned meat and canned meat/vegetables, canned milk and dry milk products, butter, frozen fish, canned fish, cereals and flour, bakery and flour products, butter and fat products, sugar, tea.

Typical lists of safety and quality parameters are given for all the specified groups of foods and food raw materials, represented by the corresponding standards in force in Ukraine. Such grouping of normative documents and parameters is probable to facilitate the further work on implementing food safety requirements to the system of technical regulation in Ukraine.

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