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CONVERGENCE OF NATIONAL AND INTERNATIONAL STANDARDS OF GRAIN AND WHEAT FLOUR

Summary

Topicality. The problem formulation. The article examines the problems of harmonizing national standards of Ukraine with international ones - Codex Alimentarius. An assessment of the convergence of international standards for grain and wheat flour in Ukraine was carried out. The comparative characteristics of the quality indicators specified in the international and national standards for wheat grain and flour were analyzed and carried out.

The aim of the article is to analyze and compare the international standards for wheat grain and wheat flour with the national standards of Ukraine. The subject of special attention should be the harmonization of the Technical Standardization Committees TK 64, TK 67, TK 86, TK 153, TK 170 "Cereals, legumes and their processing products". The methodological basis of this research: a systematic approach to the analysis of scientific literature, normative documents, in particular national and international standards; an abstract-logical method for summarizing research results and conclusions.

Results of the research paper. It has been established that in order to intensify the process of Ukraine's integration into the European Union, it is necessary to harmonize national standards with international. The conducted comparative analysis made it possible to outline the difference between national and international standards for wheat grain and flour. Comparisons show that the analyzed international and national standards, in addition to differences, have common features: the same indicators of moisture content of wheat grain and an indicator of ash content, which can be used to characterize the technological direction of wheat flour. It was established that the Codex Alimentarius international standards for grain and wheat flour provide general characteristics and quality requirements, unlike the national standards, which provide quality indicators for each type

of flour. **Practical value.** A comparative analysis of international and national standards was carried out for the purpose of practical use of wheat grain and flour in various branches of the food industry. **The prospect of further research** is to conduct an analysis of dietary supplements that are appropriate.

Keywords: convergence, wheat grain, international standards, wheat flour, international integration, export.

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КОНВЕРГЕНЦІЯ НАЦІОНАЛЬНИХ І МІЖНАРОДНИХ СТАНДАРТІВ ЗЕРНА ТА БОРОШНА ПШЕНИЧНОГО

Анотація

У статті розглянуто проблеми гармонізації національних стандартів України з міжнародними – Кодекс Аліментаріус. Проведена оцінка конвергенції міжнародних стандартів на зерно та борошно пшеничне в Україні. Здійснена порівняльна характеристика показників якості, які зазначені у міжнародних і національних стандартах на зерно та борошно пшеничне.

Мета дослідження – проаналізувати та провести порівняльну характеристику міжнародних стандартів на зерно пшениці та борошно пшеничне з національними стандартами України. Предметом особливої уваги повинна стати гармонізація Технічних комітетів стандартизації ТК 64, ТК 67, ТК 86, ТК 153, ТК 170 «Зернові, бобові культури та продукти їх переробляння». У статті використані такі методи дослідження: системний підхід до аналізу наукової літератури, нормативних документів, зокрема національних та міжнародних стандартів; абстрактно-логічний метод для узагальнення результатів дослідження та висновків.

Встановлено, що для інтенсифікації процесу інтеграції України до Європейського Союзу необхідна гармонізація національних стандартів з міжнародними. Проведений порівняльний аналіз дав змогу окреслити різницю між національними та міжнародними стандартами на зерно та борошно пшеничне. Порівняння свідчать, що аналізовані міжнародні та національні стандарти, окрім розбіжностей, мають загальні риси: однакові показники вологості зерна пшеничного та показник вмісту золи, за якими

можна охарактеризувати технологічне спрямування борошна пшеничного. Встановлено, що міжнародні стандарти Кодекс Аліментаріус на зерно та борошно пшеничне надають загальні характеристики та вимоги до якості на відміну від національних, в яких наведено показники якості до кожного сорту борошна.

Проведений порівняльний аналіз міжнародних і національних стандартів з метою практичного використання зерна та борошна пшеничного у різних галузях харчової промисловості. Перспектива подальших досліджень полягає у проведенні аналізу харчових добавок, які доцільно додавати до борошна пшеничного з метою покращення його технологічних властивостей.

Ключові слова: конвергенція, зерно пшениці, міжнародні стандарти, борошно пшеничне, міжнародна інтеграція, експорт.

Кількість джерел: 11; кількість таблиць: 2; кількість рисунків: 1.

The problem formulation. Ukrainian legislation includes a number of legal documents that require approval Ukrainian legislation with the requirements of the European Union and international legal systems. Such legal documents include food standards, in particular for grain and wheat flour. Grain and its processed products occupy an important place in the diet of the population of Ukraine and of the world. In order to increase imports of Ukrainian wheat grain and flour, national standards must to harmonize with international standards and standards countries of the EU. In accordance with the current legislation, until September on 20, 2019, all food enterprises had to introduce a food safety management system HACCP, requirements to which are built on international standards Codex Alimentarius, developed under the guidance of FAO/WHO. The aim of Codex Alimentarius standards to protect consumer health and a guarantee of fair practice in trading them [1]. So, it is advisable to conduct a comparative analysis of quality requirements for wheat grain and flour to establish convergence or divergence of international standards with national.

Analysis of studies and publications. In Ukraine, the harmonization of national standards with international standards is an important stage of economic development and removing technical barriers to trade. International standards can provide an important contribution in this direction. Thus, scientists generalize the factors of international regulation of production and turnover of organic. Thus, scientists generalize the factors of international regulation of

production and turnover of organic. Analysis of EU Regulation No. 834/2007 in the countries of the European Union shows that it is prohibited to use genetically modified organisms in any form, in particular during the production of wheat [2].

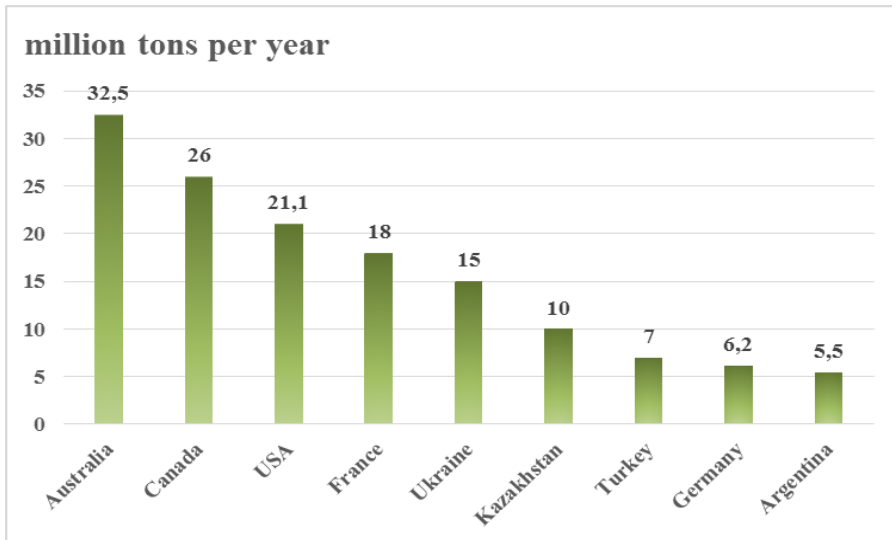
During the research of the harmonization of international standards for meat products with national standards, it was established that Ukrainian legislation in this area is imperfect. In particular, an assessment of quality requirements and evaluation of the conformity of sausage products to international standards was carried out. It was established that in order to increase the competitiveness of meat products, it is necessary to continue the implementation of European legislation through the introduction of international standards in Ukraine [3].

Conducted studies on the harmonization of national standards of Ukraine for food products show that the share of such standards is 35.8%. The number of harmonized standards by group was analysed, in particular the group under code 67.060 "Cereals, leguminous crops and their processing products". It was established the degree of harmonized standards is 26.8%. Therefore, in order to intensify the process of harmonization of national standards for food products, it is proposed to use international standards without translation [4].

Formulation of the aim, objectives and tasks. The purpose of the article is to analyse and compare the international standards for wheat grain and wheat flour with the national standards of Ukraine. The subject of special attention should be the harmonization of the Technical Standardization Committees TK 64, TK 67, TK 86, TK 153, TK 170 «Cereals, legumes and their processing products».

Results of the research paper. Wheat is among the main grain crops have an important economic importance. The main exporters of wheat are China, India, USA, Australia and the countries of the European Union. At the same time, the share of wheat production in the countries of the European Union is 134.3 million tons. According to statistical data, Ukraine ranked tenth among wheat exporting countries from 2022 to 2023, which is due to russia's military aggression [5]. In

the pic. 1 presented statistical data on the export of wheat from different countries of the world from 2022 to 9 months 2023 year.



Draw. 1. World wheat export volumes by 2022-2023*

*Source: elaborated by authors based of source [5].

Data analysis of pic. 1 presented the main exporter of wheat is Australia, the smallest amount of wheat is produced by Argentina. The volume of wheat exports in Ukraine is 46.1% less than that of the largest exporter, Australia.

Most countries export soft wheat (*Triticum aestivum L.*) and hard varieties (*Triticum durum*). In the countries of the European Union, the quality of wheat is determined according to the Codex Alimentarius CXS 199-1995 standard «Standard for wheat and durum wheat», in Ukraine SSTU 3768:2019 «Wheat. Technical specifications». According to the analysis of literary sources, the harmonization of national standards for grains and their processing products was carried out with such categories of international standards as EN, Codex Alimentarius, ISO, in particular quality requirements. Codex Alimentarius CXS 199-1995 applies to wheat grain and durum wheat grain, but is not intended to determine the quality of processed products of this grain. According to national regulatory documents, wheat grain is divided into four classes, each of which has its own quality indicators.

The comparative characteristics of the quality and standards for wheat in the countries of the European Union and Ukraine presented in Table 1. First class wheat grain and wheat grain were used for comparison *Triticum aestivum L.*

Table 1

Comparative characteristics of wheat grain quality*

<i>Indicator name</i>	<i>Premium wheat (according to SSTU 3768:2019)</i>	<i>Wheat grains Triticum aestivum L. (CXS 199-1995)</i>
Moisture content, %	14,0	14,5
Debris impurity, %, not more than	1,0	0,05
Weight fraction of protein, in terms of dry substance%, not less than	14,0	-
Mass fraction of crude gluten,%, not less than	28,0	-
Quality of gluten: units of the device VDK	45-100	-
Falling number, s, not less than	220	-
Toxins, mg/kg	132,44	2
Pesticide	The pesticide residues for which wheat grain is controlled depends on its use in a specific territory, and it is coordinated with the services of the Ministry of Health and Veterinary Medicine of Ukraine	Wheat and durum wheat shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity [8]

*Source: elaborated by the author on the basis of works [6-8].

The analysis of the results of the study shows the absence in the Codex Alimentarius standard of such indicators of grain quality as nature, vitrification, mass fraction of protein, mass fraction of crude gluten, quality of gluten, falling number. These indicators are specified in other Codex Alimentarius standards. It is worth paying attention to the indicator of impurities, which is implemented in the European standard as organic (foreign seeds, stems) and inorganic impurities (stones, dust), the maximum permissible level of which is 1.5% and 0.05%,

respectively. Regarding poisonous and harmful seeds, the European standard regulates their absence in quantities which may pose a danger to human health. Data on contaminants and toxins in food products are given in the Codex Alimentarius CXS 193-1995 standard [8].

The next stage of the research is the analysis and provision of comparative characteristics of wheat flour in accordance with international and national standards. In Ukraine, 4 types of wheat flour are produced: high, first, second and wallpaper. According to the national standard, the quality of flour is determined by organoleptic, physical and physical and chemical properties [9]. In the countries of the European Union, each country has its own types of flour. So, in Italy flour of types "00", "0", "1", "2" and whole soft wheat flour are produced; in France - "45", "55", "65", "80", "110", "150"; in Germany - wheat flour 405, 550, 812, 1050, 1600, Durum wheat flour - 1600, spelled flour - 630, 812, 1050; in Austria - W480, W700, W1600 [10]. Despite the variety of types of flour in Europe, their quality must comply with the Codex Alimentarius CXS 152-1985 "Standard for wheat flour" [11]. Comparative characteristics of wheat flour standards in Ukraine and Europe is given in Table 2.

The comparative characteristics of wheat flour standards show that the European Codex Alimentarius standard provides general indicators of its quality, and each country of the European Union sets standards for moisture, ash content and protein content in terms of dry matter in accordance with current legislation. The national standard for wheat flour specifies the quality requirements for each of the four varieties and regulates the total content of proteins, fats and carbohydrates in 100 g of flour.

It is worth noting that the technological direction of wheat flour in the European standard is determined by the content of moisture, ash and proteins. According to the chemical composition, the ash content indicates the amount of mineral elements in the flour and is the main indicator of the type of flour: the higher the grade or type of flour, the lower the ash content and, accordingly, the lower the quality of the flour. It is advisable to use flour with low ash content in the production of flour confectionery products (biscuits, cakes, waffles), pancake

dough, etc. Proteins are essential in determining the quality of wheat flour and its technological properties. Thus, the protein content of wheat flour produced in Italy ranges from 9 to 12%. In France and Germany, the technological purpose of wheat flour is determined only by moisture content and ash content, in Austria – by ash content and amino acids.

Table 2

Comparative characteristics of the quality of wheat flour

<i>Indicator name</i>	<i>Wheat flour of the highest grade (according to ISTU 46.004-99)</i>	<i>Wheat flour of the first grade (according to ISTU 46.004-99)</i>	<i>Wheat flour of the second grade (according to ISTU 46.004-99)</i>	<i>Wheat flour (CXS 152-1995)</i>
Moisture content, %	15,0	15,0	15,0	15,5
Ash	0,55	0,75	1,25	Buyer Preference
Fat acidity, mg/100 g	-	-	-	70
Protein, %	10,3	10,6	11,7	MIN: 7.0% on a dry weight basis (5,7)
Carbohydrates, %	70,0	68,0	64,0	-
Fats, %	1,1	1,3	1,8	-
Vitamins, minerals, amino acids	-	-	-	Conform with legislation of the country in which the product is sold
Particle size, %	5 fabric № 43 or № 49/52 PA	2 fabric № 35 or № 33/36 PA	2 fabric № 27 or № 27PA-120	98% or more of flour shall pass through a 212 micron (№. 70 sieve)
Raw gluten, - amount, %, not less	24,0	25,0	21,0	-

*Source: elaborated by the author on the basis of works [9; 11].

In the national standard, the technological direction of flour is most often determined by the content and quality of gluten, moisture and number falling.

Conclusions and discussion of results. Standards in the field of food products, in particular for wheat grain and its processing products, should have a single goal - to establish quality requirements which would be understood by internal and external business entities. Therefore, there is a need to harmonize national standards with international ones. The conducted comparative analysis made it possible to outline the difference between national and international standards for wheat grain and flour. Comparisons shows that the analyzed international and national standards, apart from differences, have common features:

- the same humidity indicators of wheat grain (Table 1);
- the ash content indicator can characterize the technological direction of wheat flour.

It was found that the Codex Alimentarius international standards for wheat grain and flour provide general characteristics and quality requirements, unlike the national standards, which provide quality indicators for each type of flour. Therefore, the level of harmonization of national standards for wheat grain and flour with international standards can be characterized as divergent and require further processing by national technical committees in the sector of "Grains, legumes and their processing products".

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