

Control of the Quality and Safety of Dairy Products in Ukraine: International and Legal Aspects

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Dairy products and derivatives of their processing are important elements of human nutrition, accordingly, the quality and safety of such raw materials must be at a sufficient and high level, which determines the relevance of the relevant topic. The purpose of this research work is to clarify the basic requirements for the safety and quality of dairy products at the international level; compliance of Ukrainian dairy products with these requirements. The main methods used in the work are: terminological method, comparative, systematic method, statistical, etc. The results of the study are to establish the level of compliance of Ukrainian standards of quality and safety of dairy products with international standards. Highlighting the priority of international requirements for the quality of dairy products as the major opportunity of Ukraine's competitive policy on the international market of dairy products trade. The article describes the main ways to improve the quality and safety of dairy raw materials and products produced as a result of its processing in Ukraine. The study also presents some statistics on the harmonization of Ukrainian and international standards of quality and safety of dairy products against the background of Ukraine's gradual accession to the European Union.

I. Introduction

Dairy raw materials and derived products are the source of most proteins of animal origin, the use of which should be present in the diet of a healthy person in sufficient quantities.¹ The study of the quality and safety of such products as the fundamental condition for their normal assimilation is the goal of the relevant research work. Recently, there has been a tendency to reduce the production of dairy products, which leads to an increase in imports of such products and the lack of the possibility of using the

potential for competitive entry into the European dairy market. In order to overcome this crisis, the head of the "Union of Dairy Enterprises of Ukraine" V. Chaharovskyy² presented the concept "Dairy industry of Ukraine and its future in 10 years: problems, national development program and state support", which involves the involvement of various types of measures to improve the relevant area. According to the analysis of the above-mentioned act, the main thing is compliance with international quality standards of international products and high level of safety of dairy raw materials, increase of in-

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of this study are available on request from the corresponding author.

- 1 Lorenzo, J.M. 2020. Quality aspects and safety of pulsed electric field (PEF) processing on dairy products. <https://cutt.ly/YBw0BTD>.
- 2 Chaharovskyy V. 2020. Dairy industry of Ukraine and its future in 10 years: problems, national development program and state support. <https://agropolit.com/blog/412-molochna-galuz-ukrayini-ta-yiyi-maybutnye-cherez-10-rokiv-problemi-natsionalna-programa-rozvitku-ta-derjavna-pidtrimka>

vestment revenues from the state in the dairy industry.

Analyzing the works of other researchers on the relevant topics, it is worth highlighting the following theses. Ye.V. Khmelnytska, Yu.H. Burhu, Z.Ya. Kotova, N.V. Hnitiy³ note that ensuring competitiveness in foreign trade can be determined by increasing the quantitative indicators of the cow population, supporting private farms. This, in turn, will increase the production and further processing of dairy products with the perspective of entering a wider international trade arena. Indeed, both the support of private farms in the field of dairy production and the increase in the number of livestock can be the main conditions for Ukraine's competitiveness in foreign trade. But the author missed such a basic requirement as compliance with all international quality standards, which allows us to talk about the safety of such products and their further demand. The author V.A. Kotelevich⁴ has a different opinion, she suggests taking into account the following aspects in order to improve the quality of the corresponding products, including: increased attention and control of dairy production facilities with a high level of risk of deviation from standards and the use of the Hazard Analysis and Critical Control Points system in the production of dairy products.

I.V. Levchenko and V.I. Ostapenko⁵ have a similar opinion, she notes that taking risks into account and eliminating them is possible through periodic inspections at dairy production facilities. It is possible to agree with the opinions of the two authors, but partially, because the use of the Hazard Analysis and Critical Control Points system is not variable, and from 2019 it is a mandatory condition for the production of dairy products at all enterprises, both large and small capacities. Research by N.V. Omelchenko, A.S. Brayilko, M.A. Soznashvili⁶ allows us to highlight the thesis that for Ukraine's successful accession to the European Union (EU) it is necessary to bring the norms of Ukrainian legislation on the quality of dairy products in accordance with European standards. The same opinion is put forward by I. Romanchuk.⁷ Indeed, harmonization, i.e. full consistency between Ukrainian and international standards and norms is a priority in ensuring the quality of dairy products in Ukraine. Further expansion of foreign trade and ensuring competitiveness in the dairy industry.

The purpose of this research work is to clarify the basic requirements for the safety and quality of dairy

products at the international level; compliance of Ukrainian dairy products with these requirements.

II. Materials and Methods

This research was written using the following basic methods of scientific research: terminological, which allowed to identify and provide explanations of the basic concepts, the understanding of which is important in this work. For example, "raw milk", "dairy products", "international quality standards", "harmonization", etc. The method of system analysis was also used to study the state of dairy products in Ukraine in accordance with various existing standards. The comparison method allowed to consider the differences between international and Ukrainian quality standards and to identify the main reasons for their discrepancies. The next method of scientific knowledge is statistical, the use of which led to the availability of data on the level of harmonization of European and national standards. As well as quantitative indicators of dairy products consumption in Ukraine, indicators of exports outside the country and further perspectives of foreign trade development.

The study was conducted in three main stages. The first stage consisted of a theoretical review of the main concepts and terms that are closely related to the relevant topics, in particular, "dairy products and raw materials", "quality standards", "Hazard Analysis

- 3 Khmelnytska, Ye.V., Burhu, Yu.H., Kotova, Z.Ya., Hnitiy, N.V. 2021. State of the market of milk and dairy products in Ukraine. Scientific Bulletin of the Poltava University of Economics and Trade, 1(96), 62-68.
- 4 Kotelevich, V.A. 2021. Quality and safety of dairy raw materials are today's problems. In: Materials of the II international scientific conference "Problems and prospects of implementation and implementation of interdisciplinary scientific achievements" (pp. 95-97). Kyiv: International Center for Scientific Research.
- 5 Levchenko, I.V., Ostapenko, V.I. 2019. Conditions and requirements of modern milk production for quality and safety. <http://surl.li/csanf>.
- 6 Omelchenko, N.V., Brayilko, A.S., Soznashvili, M.A. Trends and legal support of the timber market in Ukraine. In: Materials of the 2nd International Scientific and Practical Internet Conference "Marketing Strategies, Entrepreneurship and Trade: Current Status, Development Directions" (pp. 87-90). Kyiv: Kyiv National University of Construction and Architecture.
- 7 Romanchuk, I. 2020. State and prospects of harmonization of national standards of the food industry with international and European ones. PUET Scientific Bulletin: Technical Sciences, 1(91), 71-80.

and Critical Control Points”, etc. The issue of the main national quality standards and legal acts regulating the safety indicators of dairy products within the state was also investigated. A study of measures to supervise and control compliance with standards for the quality and safety of dairy products and raw materials in Ukraine was also conducted. The analysis of national strategies for improvement and prospects for the development of the dairy industry in the future, including the “National Program for the Development of the Dairy Industry until 2030”,⁸ and Law of Ukraine No. 19 “On Basic Principles and Requirements for the Safety and Quality of Food Products”,⁹ which is the main one in the field of regulation of quality and safety of dairy products.

At the second stage of the research work, statistical studies were presented regarding the percentages of consumption of dairy products by individuals within the state of Ukraine in recent years. Their decrease/increase, possible deviation from the norm, and the main causes of the corresponding phenomenon were analyzed. Also, at this stage, statistical data on the level of harmonization, i.e., compliance of Ukrainian standards with European standards, on the quality and safety of dairy products are outlined. The reasons for the priority of such standards at the national level and the need for their further implementation against the background of Ukraine's accession to the EU are highlighted.

The third stage, which was the final one, is characterized by the analysis of the results obtained and their comparison with the considerations of other re-

searchers and authors who presented works on this topic. The main comments to the relevant works or agreement with the opinions on the state of the safety situation of dairy products in Ukraine were highlighted. A number of ways and measures have been identified, the observance of which will improve the safety situation within the dairy industry and increase its quality level, as the main condition for competitiveness and increasing the number of exports outside of Ukraine.

III. Results

Dairy industry is one of the most important in the whole processing and nutrition industry. It includes different types of production, facilities and farms, for example, those that are qualified in the production of cheese, cream products, powdered milk, etc..¹⁰ The production of dairy products is mainly entrusted to agricultural production facilities by regions. It is worth noting that in recent years there has been an imbalance between the number of internal needs of the population for the consumption of dairy products and the production capacity by which these needs are met. Ukrainian capacities are not able to satisfy the needs of the population in the consumption of dairy products, so about 0.7% of gross milk production, which is up to 67 thousand tons of dairy products, is imported from other countries (Table 1).

Source: Zainchkovsky, A. 2021. Trends in the functioning and development of enterprises in the dairy industry of Ukraine. *Economic Discourse*, 3-4, 14-27.

The quality and safety of dairy products is regulated by a number of legal acts of Ukraine, among which are the following:

1. Law of Ukraine No. 47 “On milk and dairy products”;¹¹
2. Law of Ukraine No. 19 “On Basic Principles and Requirements for the Safety and Quality of Food Products”;¹²
3. Order of the Ministry of Agrarian Policy and Food of Ukraine No. 118 “On Approval of Requirements for the Safety and Quality of Milk and Dairy Products”;¹³
4. Order of the Ministry of Agrarian Policy and Food of Ukraine No. 590 “On the approval of Requirements for the development, implementation and application of permanent procedures based on the

8 Chaharovskyy V. 2020. Dairy industry of Ukraine and its future in 10 years: problems, national development program and state support. <https://agropolit.com/blog/412-molochna-galuz-ukrayini-ta-yiyi-maybutnye-cherez-10-rokiv-problemi-natsionalna-programa-rozvitku-ta-derjavna-pidtrimka>

9 Law of Ukraine No. 19 “On Basic Principles and Requirements for the Safety and Quality of Food Products”. 1998. <https://zakon.rada.gov.ua/laws/show/771/97-вп#Text>

10 Samimi, A. 2020. Investigation of risk management in food industry. *International Journal of Advanced Studies in Humanities and Social Science*, 9(3), 195-204.

11 Law of Ukraine No. 47 “On milk and dairy products”. 2004. <https://zakon.rada.gov.ua/laws/show/1870-15#Text>

12 Law of Ukraine No. 19 “On Basic Principles and Requirements for the Safety and Quality of Food Products”. 1998. <https://zakon.rada.gov.ua/laws/show/771/97-вп#Text>

13 Order of the Ministry of Agrarian Policy and Food of Ukraine No. 118 “On Approval of Requirements for the Safety and Quality of Milk and Dairy Products”. 2019. <https://zakon.rada.gov.ua/laws/show/z0593-19#Text>

Table 1: Data on consumption of dairy products per capita by region as of 2020

Region	Consumption per person, kg	Percentage of provision, %
Dnipropetrovsk	196.4	44.4
Donetsk	171.2	22.1
Kyiv	209.4	38.6
Luhansk	150.6	34.5
Kharkiv	202.6	87.7
Odessa	180.2	72.4

principles of the Food Safety Management System (HACCP)”¹⁴

In the Law of Ukraine No. 19 “On Basic Principles and Requirements for the Safety and Quality of Food Products”¹⁵ there are interesting provisions on ensuring the safety of products during primary production, storage, transportation, among which:

- maintaining the healthy condition of animals whose products will be consumed by humans;
- maintenance of production facilities and elements that are designed to store feed in a clean disinfected form;
- maintenance of cleanliness and systematic disinfection of inventory, equipment;
- maintenance of proper hygiene of animals involved in the production of food products;
- during production at the facilities it is necessary to clean water for further prevention of contamination;
- admission of personnel to production is allowed only if there is documentary evidence of a health condition that does not pose a threat to the safety of food products at production;
- implementation of prevention and preventive actions against pests at the facilities;
- safe utilization of waste;
- timely notification of the competent authorities about disease outbreaks at the facilities associated with the emergence of new animals.

The last two regulatory acts are also important for consideration in the entire dairy industry of the

country, as they ensure the harmonization of national and international requirements for the quality and safety of dairy products. They also allow to improve technological requirements for the processing of such products and abolish norms that do not meet modern quality standards in the dairy sector. HACCP (Hazard Analysis and Critical Control Points) is a particular system that contains standards, principles and requirements for food quality and industry. This system has several fundamental principles, including: the presence of a control and verification procedure for the proper functioning of the system, the development of actions to correct situations where control has shown non-compliance with the system, analysis of risk factors that may occur in production¹⁶ The system covers a significant number of industries and enterprises, including: food production facilities, retail establishments, catering establishments, farms, agricultural production facilities, agricultural firms.¹⁷ It is also important to note that HACCP is applied at all facilities in-

14 Order of the Ministry of Agrarian Policy and Food of Ukraine No. 590 “On the approval of Requirements for the development, implementation and application of permanent procedures based on the principles of the Food Safety Management System (HACCP)”. 2012. <https://zakon.rada.gov.ua/laws/show/z1704-12#Text>

15 Law of Ukraine No. 19 “On Basic Principles and Requirements for the Safety and Quality of Food Products”. 1998. <https://zakon.rada.gov.ua/laws/show/771/97-bp#Text>

16 Priya, M., Namratha, S., Asha, R.K., Bhuvaneshwari, M., Ezhilarasan, K. 2017. Quality Standards Maintenance using Electronic Sensors in Dairy Products. *International Journal of Computer Applications*, 174(22), 20-24.

17 Morales-de la Peña, M. 2019. Novel technologies to improve food safety and quality. *Current Opinion in Food Science*, 30, 1-7.

volved in the production of food products in the European Union, it is regulated by Council Directive 79/112/EEC “On the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs for sale to the ultimate consumer”.¹⁸ The main requirements for the safety and quality of dairy products under this system are:

- the availability of proper condition of premises, equipment, as well as protection of food products from pollution;
- proper planning of production facilities to avoid cross-contamination;
- proper condition of communications within the production facilities;
- safety of auxiliary raw materials, materials necessary for processing of food products;
- effective setting up of systematic and high-quality cleaning of premises, surfaces;
- regulated system for handling production waste, garbage;
- systematic control and prevention of pests at the facilities;
- availability of proper conditions for storage and transportation of products.¹⁹

Since 2019, the implementation of the HACCP system in Ukraine has also become mandatory for all types of enterprises and industries related to the food industry and dairy products in particular. Control over this is entrusted to the State Service of Ukraine on Food Safety and Consumer Protection. The implementation of the Order of the Ministry of Agrarian Policy and Food of Ukraine No. 118 “On Approval of Requirements for the Safety and Quality of Milk and

Dairy Products”²⁰ is also regulated by the imposition of penalties on violators, which provide for a penalty of 15 to 30 minimum wages.

Dairy products of Ukrainian production became available in the EU markets with the signing of the Association and Cooperation Agreement, that is, since 2016, taking into account this, its quality and safety must comply with the import standards provided for by the Regulations and Directives of the European Union, which are based on HACCP standards.²¹ That is why the introduction of such an international standard and its consolidation in all forms of dairy production is important for the complete and effective entry into the foreign trade market in the dairy industry. To enter the European market, it should also be taken into account that a number of standards are involved in the implementation of HACCP principles, compliance with which is important, in particular ISO 22000 (International Organization for Standardization), FSSC 22000 (Food Safety System Certification), which is an improved version of the first standard. That is why the introduction of such an international standard and its consolidation in all forms of dairy production is important for the complete and effective entry into the foreign trade market in the dairy industry. To enter the European market, it should also be taken into account that a number of standards are involved in the implementation of HACCP principles, compliance with which is important, in particular ISO 22000, FSSC 22000, which is an improved version of the first standard. And also IFS Food Standard, which is one of the internal standards of European retail chains and industries.²²

In particular, it is advisable to provide some requirements necessary for the import of food and, in turn, dairy products to the countries of the European Union according to the relevant standards:

- import of dairy products intended for further human consumption must meet the criteria of animal health indicators to prevent the entry and further spread of infectious diseases in the territory of the respective country;
- the presence of an appropriate veterinary certificate certifying the health status of the animal whose origin the dairy products are;
- the relevant documents, food and accompanying, must be checked and then confirmed by the veterinary competent authorities upon arrival at the borders of the EU Member States;

18 Council Directive 79/112/EEC “On the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs for sale to the ultimate consumer”. 1978. https://zakononline.com.ua/documents/show/159842___159842

19 Popescu, L. 2021. Effects of natural bioactive compounds on microbial safety and quality of dairy products. *Journal of Engineering Science*, 28(2), 149-160.

20 Order of the Ministry of Agrarian Policy and Food of Ukraine No. 118 “On Approval of Requirements for the Safety and Quality of Milk and Dairy Products”. 2019. <https://zakon.rada.gov.ua/laws/show/z0593-19#Text>.

21 Filippis, F. 2021. Environmental microbiome mapping as a strategy to improve quality and safety in the food industry. *Current Opinion in Food Science*, 38, 168-176.

22 Fusco, V. 2020. Microbial quality and safety of milk and milk products in the 21st century. *Comprehensive Reviews in Food Science and Food Safety*, 19(4), 2013-2049.

Table 2: Data on differences in quality indicators of dairy products from Ukrainian and European producers

	Fat content, %	Protein content, %	Bacterial contamination, in cubic cm
Ukraine	3.4	3.0	<100000
European Union	4.2	3.4	<24999

- control over the presence of permissible deviations of contaminants in dairy products in the territory of the European Union, as well as pesticide residues in it, veterinary drugs;
- availability of control checks on the safety of dairy products that are further intended for human consumption;
- Ukraine also has the right to import dairy products to the EU Member States if such products meet all the requirements for labeling, availability of relevant documents, passing the necessary thermal treatment.²³

Despite this, the quality of Ukrainian milk is significantly lower than that of European milk, which leads to a reduced demand for imports of Ukrainian dairy products to EU member states (Table 2).

Source: More, S.J. 2021. An evaluation of four private animal health and welfare standards and associated quality assurance programmes for dairy cow production. *Food Policy*, 105, 102-169.

Analyzing Table 2, it should be noted that Ukrainian dairy products, which are considered to be first-class, are equal in quality to the products of the European Union, which are of a lower class. The content of bacteria in dairy products of Ukrainian origin exceeds the permissible 25 thousand units per 1 ml of milk, and the indicators of fat and proteins are significantly lower than the norm at 4.2 and 3.4% respectively. Given these data, it is logical to conclude that Ukraine cannot compete in the European market as an exporter of high quality dairy products. Representatives of associations to improve the state of the dairy sector of the country decided to introduce some steps to improve the state of the dairy industry, which were represented in the “National Program for the Development of the Dairy Industry until 2030”. This program is still under development, although the representative staff named the main principles that make up the framework of the concept of

improving the condition and quality of dairy products in Ukraine. Among them it is advisable to highlight the following:

- increase in the number of cattle at all dairy production facilities;
- increase in dairy production from 6.5 million tons to 10 million tons;
- growth of milk processing processes;
- from 185 kg of dairy products per person, this index should be increased to 250 kg;
- increase of investments by the state in the dairy industry;
- ensuring the competitiveness of the dairy industry in foreign markets.²⁴

In order to ensure the implementation of such a program, it is necessary not only the activities of the state to adopt it, but also to provide enterprises with investments, as well as legislative changes to harmonize international and national norms governing the quality and safety of dairy products in Ukraine. Not only Ukraine's accession to the European Union determines the existence of such a need, but also the need of the country's population to obtain a high-quality and safe dairy product, the production of which at all stages was carried out in compliance with international standards and norms.²⁵ The harmonization of national standards with European standards is being implemented by the Technical Committee for Standardization under code 140 “Milk, meat and

23 Suryanto, T. 2019. Effect of mandatory adoption of international financial reporting standard (IFRS) on supply chain management. *Uncertain Supply Chain Management*, 7(2), 169-178.

24 Chaharovskyy V. 2020. Dairy industry of Ukraine and its future in 10 years: problems, national development program and state support. <https://agropolit.com/blog/412-molochna-galuz-ukrayini-ta-yiyi-maybutnye-cherez-10-rokiv-problemi-natsionalna-programa-rozvitku-ta-derjavna-pidtrimka>

25 Gandhi, K. 2020. Safety and Regulatory Aspects of Dairy Industry. In: *Chemical Quality Assurance of Milk and Milk Products* (pp. 273-312). Singapore: Springer

processed products" (TC 140). As of 2019, it is possible to say that in percentage terms the level of compliance with the standards has reached 50.5%. That is, out of 202 existing international standards, including ISO and EN (European Norm), which implement the principles of HACCP, Ukraine and TC 140 have harmonized 102 standards, most of which define safety data for raw milk and products made from it. The situation is worse with standards aimed at regulating technical conditions for the output of products, about 36% of them are harmonized.²⁶

The priority of implementing the principles and requirements of the HACCP system is to increase safety and quality indicators at enterprises producing food, including dairy products. This will lead to an increase in competitiveness through higher product quality indicators, and also plays an important role in reducing the risks of withdrawal of dairy products that do not comply with the standards and negative feedback from consumers, as a result – reducing the possibility of financial losses.²⁷ It is also important to improve quality control during the production of dairy products, based on the requirements of ISO standards and combining such aspects as the fundamental principles of HACCP, interactive information.²⁸ In order to implement such standards at the enterprises, it is necessary to carry out technological operations in such a way as to avoid possible contamination of raw milk and products derived from

it. The outputs and inputs of all technological flows should not intersect to avoid potential contamination; systematic washing, disinfection, deratization and disinsection of not only production facilities, but also inventory items, equipment, etc. Improvement of hygienic requirements for personnel is also necessary, in particular, it is important to allocate buffer zones at enterprises intended for bathrooms.²⁹

IV. Discussion

The subject of research work is quite interesting for analysis and is present in the considerations of many authors and researchers, largely because recent years have been difficult for the dairy industry of Ukraine and are characterized by the degradation of the relevant sector. That is why a number of researchers are trying to offer their vision of the development of the relevant industry and its improvement.³⁰ For example, N.O. Avercheva³¹ proposes to increase the level of control over the quality and safety of finished dairy products by using international experience, in particular Polish experience. To implement the creation of family-type dairy farms, cooperatives, to direct more investments to the development of the dairy industry as one of the most promising in the foreign trade market. A similar opinion is held by S. Shupyk.³² He believes that in order to improve the competitiveness of Ukraine on the foreign market in the dairy sector, it is necessary to introduce state programs to support small family farms, subsidies from the authorities for the increase in cattle, etc.

Indeed, it is advisable to agree with the proposals of the authors. Interesting is the thesis about state support for increasing the number of cows at production facilities. This plan is also included in the "National Program for the Development of the Dairy Industry until 2030", which shows the interest of the private sector in improving the state of the industry and its development. The state only needs its support and further adoption. Similar to the Polish experience is also the Irish experience, where the consolidation of cooperatives engaged in the production and processing of dairy products was introduced. Also, the Irish Dairy Industry Committee was established, whose work involves the performance of functions to support the export potential of the country's dairy products. The opposite opinion is held by O. Bozulenko and A. Choban.³³ He argues that the quality

26 Gawai, K.M. 2019. Quality and Safety Management in the Dairy Industry. In: Engineering Practices for Milk Products (pp. 205-222). Palm Bay: Apple Academic Press and CRC Press

27 Hogan, P. 2018. The dairy industry: process, monitoring, standards, and quality. In: Descriptive Food Science (pp. 3-25). London: IntechOpen

28 Velázquez-Ordoñez, V., Carranza, V.B., Tenorio-Borroto, E. 2019. Microbial contamination in milk quality and health risk of the consumers of raw milk and dairy products. In: Nutrition in Health and Disease – Our Challenges Now and Forthcoming Time (pp. 1-25). London: IntechOpen.

29 Adley, C. 2021. A comparison of analytical test methods in dairy processing. Food Control, 121, article number: 107637.

30 Chatellier, V. 2021. International trade in animal products and the place of the European Union: main trends over the last 20 years. Animal, 15, 100-289.

31 Avercheva, N.O. 2019. Improving the quality of milk as a basis for product competitiveness on the European market. Agrosvit, 22, 19-30.

32 Shupyk, S. 2021. Functioning of dairy breeding of agricultural enterprises under the conditions of Ukraine's membership in the SOC. Economic Discourse, 1-2, 74-81.

33 Bozulenko, O., Choban, A. 2019. Quality control of dairy products and analysis of modern methods of milk research to ensure environmental safety. Bulletin of the Student Scientific Society "VATRA", 77, 67-73

and safety of dairy products depend on sufficient opportunities to implement innovative ways to control these indicators. And outdated methods used at Ukrainian production facilities slow down such implementation.

Of course, outdated methods of control over the quality and safety of dairy products play a significant role in the competitiveness of Ukraine. However, it is also worth adding that the lack of total compliance of national standards with international ones further worsens these indicators and makes it impossible for the country's dairy products to enter the foreign trade market. One of the most problematic issues related to the relevant subject is the low quality of primary raw materials against the background of its production not at large capacities, but, in most cases, at small farms. The introduction of common international and European standards for both external and internal markets will improve the quality and safety of dairy products. It will reduce the level of costs required to confirm the compliance of export dairy products with international standards. Also, according to the authors, it would be advisable to introduce a control group that will provide direct supervision and monitoring at all dairy enterprises. Control over the implementation by personnel and market operators of the standards underlying the requirements of HACCP. After all, it can be seen that the quality indicators of Ukrainian dairy products are significantly lower than those of European producers. Irish researcher P. Hogan³⁴ emphasizes the need for continuous quality control of dairy products at all stages of its production. He also adds that a sufficient number of tests for chemical and bacteriological contamination of dairy raw materials are also important.

A.E. Velichko³⁵ proves that to improve control over the quality and safety of dairy products it is necessary to increase cooperation between producers and processors of milk. It would also be advisable to establish communication with consumers, increase investment in the dairy industry by the state. A. Zainchkovsky³⁶ has similar considerations and identifies promising directions for the development of the dairy sector of the state. Their success depends on the indicators of consolidation of efforts of dairy producers, suppliers, processors and one of the most important subjects of this industry – the state. State support can be a crucial aspect in the development and improvement of quality and safety indicators of

dairy products in Ukraine. It would be reasonable to agree with the opinions of both authors and suggest some additional ways to improve the state of control actions on the quality and safety of dairy products in Ukraine. They will be important both for the internal consumer and for entering the international dairy trade arena.

Thus, it is reasonable to take into account the considerations of the American author E. Angel³⁷, who described the experience of the United States of America in combining the joint efforts of farmers, service providers and processors. This allowed to establish effective communication between the above-mentioned entities in the dairy sector and, through dialogue, quickly and efficiently solve problematic issues arising in the industry. An important aspect to which attention should be paid is the availability of new technologies in the field of dairy production and their continuous improvement, systematic skill development of employees at the facilities. It will also be important to increase production volumes that would exceed internal demand, because some regions of Ukraine, in particular Dnipropetrovsk and Kyiv, do not have enough dairy products to satisfy the demand of people. Thus, increasing milk production and processing volumes will not only balance supply and demand, but also allocate a significant part for export to other countries. A significant factor in the development of the dairy industry in any country, including Ukraine, is the state support of the sector. For example, in the United States, this is manifested in the policy on imported dairy products, which is aimed at protecting the national product and provides for the presence of no more than 2% of foreign dairy products in trade enterprises.^{38,39}

34 Hogan, P. 2018. The dairy industry: process, monitoring, standards, and quality. In: Descriptive Food Science (pp. 3-25). London: IntechOpen

35 Velichko, A.E. 2021. State and prospects of development of the market of milk and dairy products of Ukraine. *Agrosvit*, 16, 62-68.

36 Zainchkovsky, A. 2021. Trends in the functioning and development of enterprises in the dairy industry of Ukraine. *Economic Discourse*, 3-4, 14-27

37 Angel, E. 2019. Cow raw milk quality and its factors of influence in relationship with milk price. *Scientific Papers: Management, Economic Engineering in Agriculture & Rural Development*, 19(1), 421-440.

38 Qazalbash, U.R., Inam-ur-Raheem, M., Khan, A.W., Arshad, R.N., Zengm X.-A., Aadil, R.M. 2021. Innovations in high-pressure technologies for the development of clean label dairy products: a review. <https://cutt.ly/cBw2VyZ>.

39 Zhanabayeva, D.K., Paritova, A.Y., Murzakaeva, G.K., Zhanabayev, A.A., Kereev, A., Asauova, Z.S., Aubakirov, M.Zh. 2021. Pcr diagnosis for the identification of the virulent gene of salmonella in poultry meat. *OnLine Journal of Biological Sciences*, 21(3), 235-244. <https://doi.org/10.3844/ojbsci.2021.235.244>

The Ukrainian version of state support for the dairy industry may consist in the direct work of the legislative and executive authorities on more intensive harmonization of European and national standards. Also in investing in the development of the relevant sector. It is possible to introduce state support to stimulate the work of small and medium-sized enterprises in accordance with international quality standards for dairy products, which will allow unimpeded export of high quality milk products. It is also advisable to modernize capacities in accordance with modern environmental standards, which will significantly reduce the consumption of non-renewable energy sources and financial costs. The problem of the industry is the insufficient number of qualified employees involved in the work. Systematic training and advanced training should be mandatory with further monitoring of the progress of the enterprise by state control bodies. It would also be appropriate to create a special training center that would conduct both pre-work training of industry specialists and advanced training in international standards of quality and food safety control based on the principles of HACCP. Taking into account the relevant proposals will improve all aspects involved in the mechanism of the dairy industry in Ukraine and will not allow its degradation processes to develop. And improved control over the safety situation and quality of dairy products will open new ways for trade in the international arena, will be one of the factors in the development of the country's competitiveness in the future.

V. Conclusions

Thus, taking into account the data obtained during the study, it can be argued that the situation of the dairy sector of Ukraine is currently in a state of transition. This is accompanied by the transition from outdated standards of quality and safety of dairy products to international standards through their harmonization, that is, the establishment of compliance between them. It is worth noting that in the field of dairy products the percentage of such harmo-

nization is about 50%, which is a good initial indicator and indicates the potential for the development of the relevant industry. It is necessary to work with standards aimed at regulating technical conditions for the production of products, about 36% of which are harmonized. The problem remains the low level of support of the dairy sector by the state, lack of investment, which in turn leads to insufficient supply of dairy products to people in some regions. Among them are Kyiv, Dnipropetrovsk, Odesa, etc. As a result, we have a low ability of self-sufficiency in dairy and its products, which necessitates its import.

The solution to this problem is possible only with total support from the state, that is, the introduction of subsidies to dairy producers, financial support, investments. The involvement of international experience, actions to unite production and promote their effective communication, the introduction of a system according to which imported dairy products will make up less than half of the trade establishments, etc. An important decision on the part of the state will be the adoption of a private initiative to improve the dairy sector, which is reflected in the development of the "National Program for the Development of the Dairy Industry until 2030". The harmonization of national and European standards of quality control and safety of dairy products will also lead to the equalization of indicators of proteins, fats, bacterial contamination, which will improve the image of Ukraine as an importing country of high-quality dairy products. It will prove its competitiveness. Also, taking into account foreign, for example, the experience of the United States of America in conjunction with the work of TC 140, which is engaged in harmonizing national and international standards for the quality and safety of dairy products, will regulate and improve the state of the dairy sector of Ukraine, stop its slow degradation. Research work in this area is not limited exclusively to this topic. The following studies, according to the authors, should be devoted to the issues of historical review of state support for the dairy sector, the state of the dairy sector in different countries of the world, analysis of measures of the EU member states on the development of the dairy industry.