

**Prylipko T.**

*Doctor of agricultural sciences, professor, State agrarian and engineering university in Podilya, Ukraine*

**Bukalova N.**

*Associate professor of department of veterinary examination of animals, National agrarian university in Bila Tserkva, Ukraine*

**Ilyasota V.**

*Associate professor of department of veterinary examination of animals, National agrarian university in Bila Tserkva, Ukraine*

## **FEATURES OF INTRODUCTION OF THE HACCP SYSTEM ON ENTERPRISES OF UKRAINE**

**Introduction.** Ukraine entered the World Trade Organization, thereby exacerbating the question of the effectiveness of dairy production by domestic producers and demanding significant efforts to ensure the competitiveness of the industry in the domestic and foreign markets [1].

The dairy sector of Ukraine plays an important role in providing the population with milk and dairy products and can undoubtedly become a visiting card of Ukraine's processing industry not only in our country, but also among buyers from dozens of other countries [1].

Ukraine's accession to the World Trade Organization has exacerbated the issue of the effectiveness of dairy production by domestic producers and requires significant efforts to ensure the competitiveness of the industry in the domestic and foreign markets [2, 3].

Ukraine is implementing the necessary reforms to adapt the legal regime on the safety and quality of milk and dairy products in full compliance with the WTO Agreement "On the Application of Sanitary and Phytosanitary Measures" [4].

Ukraine is implementing the necessary reforms to adapt the legal regime on food safety and quality in full compliance with the WTO Agreement "On the Application of Sanitary and Phytosanitary Measures". Thus, the adaptation of the Ukrainian legislation on food safety and quality to the requirements of the European Union is an integral part of the state policy. Ensuring the quality and safety of milk, dairy raw materials and dairy products is especially important for Ukraine's accession to the WTO and its further entry into the European Union, as well as for harmonization of national legislation in accordance with international requirements and measures for the phased introduction of food safety management systems at dairy processing enterprises. products - HACCP systems.

The Resolution of the Verkhovna Rada of Ukraine dated September 18, 2003 No. 1191-IV stipulated: "... to create and ensure the functioning of the state system of monitoring, analysis and forecasting of the agrarian market, to develop and implement national standards for agricultural and food products, harmonized with as well as to ensure the implementation by 2008 of the subjects of economic activity producing products, food safety management systems (HACCP)".

The Codex Alimentarius Commission in 1997 published a directory entitled "Principles for the Determination and Application of Microbiological Criteria for Food SAS / GL 21-1997". The Scientific Committee on Food (SCF) and the Scientific Committee on Veterinary Measures for Public Health (SCVPH) provided guidance on the principles for the development of microbiological criteria for food products in 1996 and 1997, respectively. According to the definition of the Codex Alimentarius Commission, the microbiological criterion for food products determines the acceptability of a food product or batch of food products on the basis of the presence or absence of or the quantity of microorganisms, including parasites and / or the number of their toxins / metabolites per unit mass, volume, area or lot. The main principles outlined in these three documents are based on the fact that microbiological criteria need to be developed and applied only where there is a clear need, and where their application is practically feasible [1].

The purpose of the work was to analyze the peculiarities of the introduction of the HACCP system at the milk processing enterprises of Ukraine.

**Research results.** It should be noted that on August 11, 2009, the State Committee of Veterinary Medicine of Ukraine issued an order number 278 "On the enactment of acts of the *acquis communautaire* on state control and supervision of the export of dairy products to the European Community". In order to comply with the recommendations given by the inspectors to the mission of the Food and Veterinary Office of the Directorate General for Health and Consumer Protection during his stay in Ukraine in 2008 with a verification visit to assess the implementation of state control in the production of milk and dairy products, as well as obtaining access to Ukrainian products of animal origin to international markets and obtaining the power of Ukraine to export milk and dairy products to member countries of the Euro Methodological recommendations were approved: Training system on compliance with *acquis communautaire* legislation on the issues of milk production and production of milk products; a system of general self-assessment when conducting an HACCP audit at dairy processing enterprises that export dairy products for human consumption to EU member states.

he world community is known for providing quality and safety products for food products such as: ISO 9000: 2000 "Quality management systems" and HACCP "Hazard Analysis Critical Control Points" [2, 4].

The implementation of these systems in Ukraine is carried out on the basis of harmonized with international national standards DSTU ISO 9001-2001 [3], DSTU 4161-2003 [4] and DSTU ISO 22000: 2007 [5] concerning strategic decisions of the highest management of the enterprise for the purpose of quality improvement, safety and competitiveness of domestic food products that protect the interests and health of consumers, promote the expansion of markets in the domestic and world economic space, increases the credibility and image of Ukraine as a whole.

Particularly relevant is the implementation of the HACCP system at dairy enterprises, since, according to the list of food products, the degree of microbial contamination and the incidence of food poisoning developed by the World Health Organization, milk and dairy products are classified in category I as often serve as a direct source of food poisoning. System HACCP - this is a precautionary system for assessing the control of hazardous factors in food raw materials, processes and finished products, which greatly reduces the level of risks to life and health hazards. The HACCP system is based on 7 principles that are the core of this system.

Principle 1. Making a list of potentially dangerous factors and conducting their analysis.

Principle 2. Definition of critical control points (CPCs).

Principle 3. Determination of critical boundaries for each CPC.

Principle 4. Development of monitoring system for critical control points.

Principle 5. Development and application of corrective actions.

Principle 6. Introducing verification procedures to confirm the effectiveness of the HACCP system.

Principle 7. Introducing a system for documentation and data registration.

Advantages for dairy processing enterprises in the application of the HACCP system: gives consumers the confidence that products are produced in accordance with the rules of hygiene and safety; demonstrates the desire of the company to use the necessary precautionary measures and to closely monitor hygiene in the manufacture of products; the number of inspections by the consumer partners (second party audit) decreases, and accordingly the financial expenses are reduced, time is saved; reduces costs associated with product recalls, increases profits; costs are decreasing, due to better relationships with state food safety oversight bodies; production monitoring is carried out in real time; the effectiveness of the food safety management system is increased due to the optimal allocation of resources in the most critical for the safety of food.

Advantages of the HACCP system for the international market: Promotes international trade; Supports the World Food Safety Management System, harmonized international and national food safety requirements, sanitary and phytosanitary regulations.



The introduction of such a system at a dairy enterprise allows us to determine how well it controls the production process, assesses the level of food safety in accordance with established international standards.

The role and responsibility of senior management in the HACCP system should be noted. National Standard DSTU 4161-2003 "Safety Management Systems for Food Products. Requirements" stipulates that the top management is responsible for bringing to all levels of the enterprise the importance of meeting the legislative and regulatory requirements for the safety of food products, the relevant requirements of consumers and the results of the functioning of the HACCP system as a whole.

Senior management should provide evidence of fulfilling its obligations to develop and implement a system and continually improve its effectiveness, using: bringing to all levels the importance of complying with legislative and regulatory requirements for food safety and the relevant requirements or expectations of consumers; definition of food safety policy; system analysis; provision of resources.

The senior management is responsible for the results of the operation of the system and must realize that the quality and safety of dairy products at the enterprise can always be what they want to see, decide on the beginning of the development and implementation of the HACCP system and to determine the policy on food safety [6].

Senior management defines the organization's policy on the safety of dairy products and ensures distribution, clarity and support at all levels of the organization and should understand that the quality and safety of dairy products is not the price but the priceless pride, image and authority of the enterprise in relation to market partners [7].

The senior management appoints the head of the safety group (HACCP system coordinator) and approves the safety group (HACCP working group), organizes staff training, and, with planned frequency, analyzes the HACCP system for its suitability, adequacy, effectiveness and improvement, in particular regarding food safety policy.

The top management provides promotion of the enterprise's achievements in the field of food safety management in the media through participation in contests, exhibitions, fairs and other events.

To ensure the effectiveness of the functioning of the HACCP system, responsibilities and authorities must be identified, documented and communicated to the performers.

Performers should have clear responsibilities and authority in relation to: the identification and registration of any problems associated with food products, processes and the system; initiating measures to control and correct non-conformities of products; initiate preventive action against any non-compliance of products, processes, systems.

He enterprise should: determine the necessary level of competence of the personnel involved in the work, from which the safety of food products may depend; organize training of personnel; evaluate the effectiveness of the measures taken; to ensure that staff are aware of the appropriateness and importance of their activities and their contribution to the management of food safety; to record the data on education, professional training, qualifications and experience of the involved personnel.

Planning and preparation for the development of the HACCP system. Where to start? Before starting to develop the HACCP system, the senior management of the enterprise should deliberately choose in favor of the HACCP system and support it - morally, financially and materially.

By order of the senior management it is necessary to appoint the head of the safety group - the coordinator of the HACCP. The HACCP coordinator may be a quality assistant, chief technology officer, head of the production and control laboratory, and others, but in no case should a person have the skills to manage and have the resources necessary for the implementation of the company's food safety policy.

The HACCP coordinator, regardless of other responsibilities, is entrusted, with the appropriate authority, responsibility for: ensuring the development and maintenance of the system in accordance with the requirements of the standards that are standardizing the HACCP; organization of safety group work (HACCP group); reporting to senior management on the functioning of the HACCP system and the need for its improvement.

To create, implement, maintain, review and improve the system by order of senior management a safety group is created (HACCP group). Members of the safety group must have the necessary knowledge and experience regarding the food products, processes and hazardous factors that fall within the scope of the system. This group should not duplicate experts in the quality management system. The HACCP team should be **multidisciplinary**, it should involve specialists in the field of: food technologies; microbiology; technical sciences (technological equipment); food chemistry; standardization; **sanitary-and-prophylactic** sphere; quality management, familiar with domestic and international regulatory framework.

Permanent service of the HACCP system is based on the day-to-day management of the HACCP, which is facilitated by the monitoring and daily checking of the records of the CPC. The reporting documentation on compliance with food safety commitments and the implementation of appropriate corrective actions also clarifies the measures taken and helps to ensure that the persons concerned were promptly notified of the problem identified.

EU countries have developed a common strategy for the implementation of microbiological criteria in accordance with the provisions of the European Parliament and Council Regulation (EC) No. 853/2004 on food hygiene. This strategy involves:

defining the microbiological criterion used in the Community legislation; Principles of developing and applying criteria and proposals on the measures to be taken [2]. These microbiological criteria indicate the acceptability of food products and processes for their production. However, the use of microbiological criteria has certain limitations. Due to reasons of sampling, methodology and uneven spread of microorganisms, only microbiological studies can never guarantee the safety of the studied food. Thus, the safety of food products can in principle be guaranteed through the use of a structured preventive approach that includes the proper product and the organization of the process of its production, as well as the application of proper hygienic practice (GHP) and a system for analyzing hazardous factors and critical control points (by the HACCP system) ), set out in the Regulation No. 852/2004 on general hygiene rules and Regulation No. 853/2004 on the approval of specific hygiene rules for food of animal origin [3,5].

The microbiological criterion consists of the following components: the indication of certain microorganisms or their toxins / metabolites and the negative effects that they can cause; analytical research methods, including, where appropriate, tolerable deviations; a plan that determines the number of samples and the size of the analytical unit; microbiological limits that are appropriate for a food product at certain points in the food chain; number of analytical units that must meet these limits.

The microbiological criterion should also determine: the food products to which this criterion applies; food chain points in which the criterion applies; measures that need to be taken in the event of non-compliance with the criterion and may be used differently depending on the place of its application and the action to be taken in case of non-compliance.

The criteria for end products (food safety criteria) can be applied to foods ready to be placed or already placed on the market. These criteria apply at the stage of food sales, their delivery to end consumers, as well as to retailers, as well as these criteria apply at points of introduction of food products into the EU if they are imported from third countries.

The criteria determined for technological processes - criteria of hygiene of technological processes - apply only to food companies that make or produce food products. These criteria are set for a food product at certain stages of its production and are not applicable to foods **already** on the market. This kind of criteria is usually used to verify the manufacturing processes and production of food products. They, for example, can point to proper hygiene practices, as well as help to understand how well the HACCP system works.

The criteria for food safety are mandatory by nature, and the criteria for hygiene of technological processes are rather recommendations. Failure to comply with a mandatory type of criteria leads to the loss, sorting, processing, or removal of certain



foods or their batches from the market. Non-compliance with the criteria that form recommendations is usually only leads to the application of corrective actions to the processing of food products or handling them. The content of corrective actions is determined by operators of the food market.

The main objective of the food law of the European Community is to ensure a high level of protection of the health of the population. As microbiological hazards in foods are one of the main sources of food poisoning in humans, food business operators must comply with relevant microbiological criteria in the event of the implementation or adoption of these hygienic procedures and measures, in accordance with European legislation.

Commission Regulation No. 2073/2005 specifies that food business operators must develop sampling programs and microbiological research programs for these samples in order to comply with the microbiological criteria [4]. These programs should be part of the implementation of procedures developed on the basis of proper hygienic practices and principles of the HACCP system. The sampling frequency should be based on the own risk analysis, correspond to the nature and size of the food business, and should take into account other factors, such as the properties of the raw material, the final product, the production process, etc.

Microbiological criteria are usually not suitable for monitoring the critical boundaries defined in the HACCP plan. Monitoring procedures should be able to detect loss of control over critical points and ensure timely provision of such information for use of corrective actions to restore control. Consequently, measurement of physical and chemical parameters (for example, acidity, pH, water activity) that can be carried out at enterprises in real time should be used instead of research on compliance with microbiological criteria.

EU Member States are obliged to apply the microbiological criteria set out in Commission Regulation (EC) No 2073/2005. In this document, pathogens are directly related to the type of food product. These pathogens may be present in other types of foods (eg, *Vacillus cereus*). In addition, there are certain pathogens that are not regulated by EU legislation (eg, *Smylobacter*, *Clostridium perfringens*). In such cases, the EM Member States may adopt national laws or regulations governing the production of food products at the national level.

In Ukraine, there are special requirements for microbiological safety criteria for food products that can be used only in the domestic market. At the same time, these criteria can not be used for the export of food products to the European Union market.

Commission Regulation 2073/2005 sets the microbiological criteria for certain pathogens in certain foods, and sets criteria for *Listeria monocytogenes* for all ready-to-eat foods. Yes, the food safety criteria are defined in: stuffed foods and semi-finished products for consumption in raw form (*Salmonella*); gelatin and collagen

(Salmonella); raw, butter and sour cream made from raw milk (Salmonella, staphylococcal enterotoxins); dry milk and dry whey (Salmonella); ice cream made from milk (Salmonella); egg products (raw) (Salmonella); boiled crayfish and shellfish (Salmonella); live bivalve molluscs and live echinoderms (Salmonella, E. coli); seedlings of seeds (Salmonella); dry mixtures for infants and dry diet foods for special medical needs (for infants under 6 months of age) (Salmonella, Cronobacter); dry mixtures for infants over the age of 4 months (Salmonella).

Criteria for hygiene of technological processes are defined in: minced meat (the number of aerobic colonies); pasteurized milk and pasteurized liquid dairy products (enterobacteria); raw, made from milk and serum, which has undergone a heat treatment (E. coli); raw, made from raw milk or milk, heat treated at temperatures below the pasteurization temperature (coagulase-positive staphylococci); butter and sour cream (E. coli); dry milk and serum enterobacteriaceae and coagulase-positive staphylococci); ice cream and frozen milk desserts (enterobacteria); dry blends for babies under 6 months of age and dry blends for babies over the age of 4 months of eating (enterobacteria and probable Bacillus cereus); egg products (enterobacteria); pre-sliced fruits and vegetables (ready for consumption) (E. coli); not pasteurized fruit and vegetable juices (ready for consumption) (E. coli).

For most criteria, a certain type of food is indicated. This does not apply to Listeria monocytogenes, which may be related to almost all ready-to-eat foods. Listeria monocytogenes is a pathogen that is transmitted by food and can cause human disease. Listeria monocytogenes often predominate in the environment: soils, vegetation and faeces of animals. Microorganisms can be found in raw foods, such as fresh meat, raw milk and fish. Listeria monocytogenes is a major risk factor for the production of food products, which is widely distributed and enhanced in comparison with most other microorganisms, the ability to grow or survive in a cooled environment. This is especially true for ready-to-eat foods that are not heat-treated in the production process, as well as foods that can be contaminated through the environment, including the production environment, in the process of their production.

For this reason, it is very important that producers of ready-to-eat foods (designated by their producer for direct human consumption without the need to heat or otherwise process them for destruction or reduction to a suitable level of microorganisms) have taken measures to control Listeria monocytogenes, as well as its growth in food products by the end of their usefulness; Accumulate knowledge about the potential growth of bacteria in foods and document these facts. The manufacturer must take this into account when determining the shelf life of a food product; the shelf life is the time during which the food product remains safe and meets quality requirements subject to compliance with its storage and use requirements.



The shelf life of a food product determines its durability and is expressed as the date of "take up" on the label of a food product in accordance with Articles 9 and 10 of Directive 2000/13 / EC [5].

If necessary, the OCP responsible for the production of food products undertakes to conduct research to verify compliance with safety criteria during the shelf life. In particular, it concerns ready-to-eat food products that can support the growth of *L. monocytogenes*, which, in turn, may pose a threat to public health. In order to assist food industry representatives in deciding on the need to conduct research on the ability to maintain pathogenic growth, guidelines were developed [6, 7]. These studies, in particular, include: the determination of the physical and chemical properties of the food product, for example, the level of acidity (pH), water activity (aw), salt content, the concentration of preservatives and the type of packaging, taking into account the storage and processing conditions, the potential for contamination, the prescribed shelf life ; providing advice, based on available scientific literature and research data on the ability to grow and survive certain microorganisms.

Where necessary, based on the above studies, food business operators carry out additional studies that may include: predictive mathematical modeling for certain foods using critical growth rates and survival of these microorganisms in foods; the study of the ability of properly sowed certain microorganisms to grow and survive in food products under various reasonably foreseeable storage conditions; studies to assess the growth and survival of certain microorganisms that may be present in foods during the period of shelf life under reasonably foreseeable conditions of distribution, storage and use.

Where necessary, based on the above studies, food business operators carry out additional studies that may include: predictive mathematical modeling for certain foods using critical growth rates and survival of these microorganisms in foods; the study of the ability of properly sowed certain microorganisms to grow and survive in food products under various reasonably foreseeable storage conditions; research to assess the growth and survival of certain microorganisms that may be present in foods during the shelf life under reasonably foreseeable conditions of distribution, storage and use. Especially for *Listeria monocytogenes* growing *Listeria monocytogenes*, the central EU reference laboratory for the study developed *Listeria* Guidelines for the study of finished foods on their content [7,8]. At the end of the shelf life of the food product, the amount of *Listeria monocytogenes* should not exceed 100 CFU / g.

Commission Regulation (EC) No 2073/2005 sets out the frequency of sampling for carcasses of cattle, pigs, sheep, goats, horses and poultry on slaughterhouses and at facilities producing minced meat and meat semis. These products have a high risk of microbial contamination. Other foods are classified as an average risk.

The high risk category includes: carcasses, fresh meat, meat semis, ready-made foods for consumers of certain risk groups (infant formulas). The average level of risk includes all other foodstuffs specified in the Regulation. With satisfactory results for a long time (30 weeks or 15 months), it is possible to reduce the frequency of sampling. At a low risk level, which includes all the other food products, structured sampling is unnecessary.

Laboratories conducting research for food business operators, as well as methods for testing microbiological criteria and matrix for research have been accredited (according to ISO 17025) [8] by the National Accreditation Board or, in its absence, by an equivalent organization recognized by the European Agency for Accreditation or International Accreditation Association of Laboratories.

## CONCLUSION

As a result of continuous tracking of data under the HACCP system, the top management is able to receive daily objective information on the safety of food products produced at this dairy business.

When introducing the HACCP system, independent or integrated, dairy processing enterprises can claim this in advertising information about the quality and safety of their products, as well as to carry out certification of the HACCP system in the established manner.

The EU Regulation on microbiological criteria is reviewed in the light of scientific, technological and methodological progress, the emergence of new pathogenic microorganisms in foods and information derived from risk assessments.

Observation of the microbiological criteria of hygiene of technological processes gives an opportunity to check the manageability of production processes. Food business operators should also analyze the trends of microbiological sampling results, as well as take measures in the event of poor results or trends in their receipt.

## BIBLIOGRAPHICAL REFERENCES

1. Yakubchak O.M. Milk and Dairy Products (GMP, HACCP) / Ed. OHM. Yakubchak - K.: "The company **Bioprom**", 2010. - P. 10-25.
2. HACCP: An Analysis of Dangerous Factors and Critical Control Points in the Production of Food and Food Raw Materials: A Manual. - Kyiv: **UkrNDNTS**, 2005. - 70 p.
3. Prilipko T.M. Indicators of safety of livestock products / T.M. Prilipko // Food industry of **agroindustrial** complex. - 2012. - No. 2. - p.33-35.
4. On the basic principles and requirements for the safety and quality of food products: Law of Ukraine / In the wording of the Law No. **1602-VII** of 22.07.2014, **BBP**, 2014, No. 41-42, **ст.2024**, as amended in accordance with Laws No. **67-VIII**

from 28.12.2014, BBP, 2015, № 4, ст.19 № 867-VIII from 12.08.2015, BBP, 2016, № 4, item 40.

5. Prilipko T.M. Control of quality indicators of yoghurts of various milk processing enterprises / T.M. Prilipko, O.V. Ovcharuk, L.P. Hawkey // Food Industry. - 2013. - № 5. - P. 14-15

6. Prilipko T.M. Microbiological processes in milk at different storage temperatures / T.M. Prilipko, VI Gonchar, O.V. Ovcharuk // Sb. sciences Works of Podilsky State Agrarian University: Agricultural Sciences. - Vip 22. - Kamyanets-Podilsky, 2014. - P. 98-101.

7. Bukalova N.V. Evaluation of indicators of safety and quality of drinking cow milk from domestic producers / N.V. Bukalova, T.M. Prilipko // Mat. international sci. pract. conf. "Biological and technological aspects of livestock production and processing in the context of European integration" devoted to the 90th anniversary of the Podilsky State Agrarian and Technical University (May 21-23, 2009). - Kamyanets-Podilsky: PDATU, 2009. - p. 24-26.

8. Cow's milk is not assembled. Requirements for the purchase: DSTU 3662-97 (with changes in 2007). - [Effective as of 01.01.1998]. - K.: Derzhspozhyvstandart of Ukraine, 1998. - (National standard of Ukraine).