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DEVELOPMENT OF AN EFFECTIVE SYSTEM FOR ELIMINATION OF RISK FACTORS IN MILK PRODUCTION ENTERPRISES

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ABSTRACT: This article discusses issues related to ensuring the safety of milk and dairy products at all stages of its production. The HACCP system was used for the analysis of hazards in the production of dairy products and the results were shown after the introduction of this system in the dairy industry, mainly in the dairy plant and dairy farms. The establishment of control points of observation in the dairy industry allowed for continuous systematic monitoring of production management. As a result of monitoring the hygienic parameters of quality and safety of dairy products at all stages of the production process, a 20% positive change in the quality and safety of the produced product was achieved.

KEYWORDS: Dairy industry, Critical control points, Hazards, Quality and Safety, Dairy farms, Assessment.

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I. INTRODUCTION

Controversy. HACCP (hazard analysis and critical control points) is a system that provides for the systematic identification, assessment, control and management of factors that threaten food safety.
Compared to traditional methods such as quality control of the ready product, the HACCP system is a tool for managing food safety during production at all stages of the life cycle, from breeding or cultivation to delivery to the end user, including the stages of processing, processing, storage and sale. Application of the HACCP system allows you to move from identifying hazards at the final stage of testing the ready product to the development of warning methods during the production process, and ensure the prevention, elimination or minimization of threats to food safety using a scientifically based approach [1, 2007; 3, 2008; 6, 2006].

The HACCP system is the only food safety management system that has proven its effectiveness and is internationally accepted [6, 2006].

Despite the development of the legal framework for food safety control in many countries, food safety remains one of the most important topics of discussion around the world in every industrialized country, because:

- Pathogens cause millions of cases of human diseases and thousands of annual deaths worldwide;
- Globalization of trade increases the risk of food infections;
- Global trade liberalization increases public concern about the safety of imported products;
- Various groups of agricultural producers and processors use the increased importance of food safety as a Defense weapon from the domestic market;
- Frequent cases of food return, animal diseases (mad cow disease, foot-and-mouth disease, etc.), food poisoning (Listeria, E. coli, dioxins, etc.) emphasize the importance of food safety control [6, 2006].

II. THE MAIN FINDINGS AND RESULTS

The modern concept of food safety management in an agricultural enterprise is based on the premise that quality and safety management activities become effective only in the production process. Elimination or control of food hazards at the source, i.e. a preventive approach, is more effective in reducing or eliminating the risk of undesirable health consequences than relying on the control of the final product, which is traditionally used as a "quality check" [2, 2011; 6, 2006; 7, 2013].

International experience has proven that product safety and quality are best provided by a comprehensive, multidisciplinary approach, taking into account the entire food chain [4, 2002; 5, 2002]. The most targeted system for ensuring food safety and reducing pathogenic hazards is the internationally recognized system for hazard analysis and critical control points (HACCP) [6, 2006].

Dairy production is the processing of milk into safe dairy products for human consumption. The integrated production chain covers the production, storage, and industrial processing of raw milk, transportation and storage of processed milk and dairy products. Products include pasteurized milk and ultra-high-temperature processed milk, butter, condensed whey, cottage cheese, ice cream, condensed milk, milk powder, whey powder, liquid and fermented milk products, natural and processed cheeses [3, 2008; 6, 2006].

The introduction of the HACCP system on farms and enterprises of the dairy industry is a guarantee of meeting the requirements for food safety.

At present, at all stages of the supply of milk and dairy products to the population, the primary processing of milk, technological processes in the production of new types of dairy products, their transportation, storage and sale, as well as product quality and safety and risk factors for consumers there is a need for reconsideration [2, 2011; 7, 2013; 8, 2016].

III.THE PURPOSE OF THE STUDY

Analysis of risk factors and establishment of critical control points in dairy enterprises.

IV.RESEARCH MATERIALS AND METHODS

The object of research was milk and dairy products produced by dairy enterprises and private farms of Fergana, Andijan and Namangan regions. Sanitary and laboratory methods were used to check the quality and safety of dairy products. The total number of inspections was 7,315.

In determining the quality and safety of milk from the following normative documents: State Standard 26932-86 in determining the amount of lead in "Raw and ready products"; State Standard 26935-86 for determining the amount of tin in "Raw and ready products"; State Standard 26927-86 for determining the amount of mercury in "Raw and ready products"; State Standard 26931-86 for determining the amount of copper in "Raw and ready products"; State Standard 26934-86 was used to determine the amount of zinc in "Raw and ready products".

In dairy products, aflatoxin M_1 was detected by thin-layer chromatography and guideline 4082-86 was used in the assessment. Detection of pesticides was carried out on chromatographs "COLOR". State Standard for hygienic assessment of pesticide residues 23452-93 "Dairy products". Methods for the determination of residues of organochlorine pesticides, Sanitary Rules and Norms 42-123-4540-87 "Maximum permissible levels of pesticides in food and methods for their detection" were used. Recommendations of V.P. Sayapin and co-authors were used in the determination of nitrates (1988). Determination of bacteriological indicators of dairy products was carried out on the basis of State Standards 9225-84, 10444.11-89, 10444.15-94. State Standard 26669-85 for the preparation of sample samples was used to determine microbiological parameters. The total number of microbes in dairy products, coli-titer, and coli-index were determined. State standard 3623-90 "Dairy products" in determining the effectiveness of pasteurization in dairy farms and dairy plants. The pasteurization detection method was used.

The data obtained were statistically processed using a package of statistical analysis applications that included arithmetic mean (M), standard deviation (s), standard errors (m), and relative measurements (frequency%). The accuracy level of $R < 0.05$ was accepted as a statistically significant change.

V. RESEARCH RESULTS

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In dairy enterprises, 14 points were identified as risk factors and control was established at these points based on the principles of the Codex Alimentarius. Measures to eliminate the risk factor were developed at these control points (Table 1).

Table 1: The Degree of Control of Risk Factors in the Dairy Industry

№	Stages of Critical Checkpoints (CRCs)	Potential risk factors	CRC control times	Measures to eliminate the risk factor
1.	Animal food ration	High chemical and microbiological harmful factors	Chemical and microbiological control of the product batch	Changing the training organization
2.	Curdled milk	Other substances in milk (blood)	Checking the milk of each cattle	Veterinary measures (for dairy cattle)
3.	Sanitary treatment of the udder	High levels of microbiological contamination	Check that the udder has been sanitized before milking	Sanitary treatment of udder on the basis of instructions
4.	Operation of the milking machine	High levels of microbiological contamination	Sanitary examination of the udder before milking	Disinfection of the milking machine according to the instructions
5.	Milk transportation (pipes, tanks)	Microbiological contamination of milk, air accumulation, poor washing, stagnation of milk flow	Daily inspection of the vacuum pump, log recording, visual and laboratory inspection	Carrying out engineering maintenance work on vacuum pumps on the basis of instructions
6.	Filtering	Contamination of milk with foreign residues	Continuous visual inspection of filtered bags	Replace filters after each milking
7.	Cooling and storage of milk	High microbial contamination, when pathogenic microbes are detected, when hot and cold milk are mixed	Constant temperature control during storage	Adherence to the temperature regime of rapid (4-6 ° C) cooling of milk and the shelf life of milk on the farm
8.	Volumetric tanks for milk	High status of microorganisms in the samples obtained	Carry out daily visual and laboratory inspections	Wash and disinfect according to instructions
9.	Milk transportation trucks	High levels of germs in milk	Daily quality control of dairy products loaded on trucks	Monitoring of special transport conditions and state
10.	Sick animals treated with antibiotics	When antibiotics are detected in milk	Daily monitoring of isolated animals	Do not mix healthy and sick cattle milk
11.	Raw materials	Chemical and microbiological contamination of raw materials	Chemical and microbiological analysis	Application of administrative measures
12.	Health and personal hygiene	Lack of personal hygiene, lack of medical examination, lack of sanitary clothing, violation of working conditions, lack of hygienic knowledge	Systematic control of personal hygiene, adherence to the terms of medical examination, hygienic training	Creating conditions, organizing medical examinations, hygienic training of staff
13.	Packaging quality and type	No other elements in the packaging marials	Examination of each batch in the laboratory	Prohibition of packaging materials that do not stagnate and form foreign substances
14.	Compliance with technological regulations	Lack of pasteurization temperature, interruption of heat supply, low cooling capacity, the formation of milk stones, high levels of microbiological contamination, non-compliance with technological parameters,	Daily monitoring of the effectiveness of the pasteurization device. Microbiological control of each batch of pasteurized milk. Establish control in step-by-step production, checking each batch	Normalization of heat capacity and freons. Carrying out engineering maintenance of equipment and tools, compliance with technological parameters

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		cleanliness of additives	attachment	

As can be seen from the table above, in order to obtain quality dairy products, it is advisable to set up a control system from the animal's diet to the ready product for sale.

Quantitative indicators of hazardous chemicals after the establishment of the existing control system and measures in the production of dairy products are given in Table 2.

Table 2: Changes in Indicators after the Introduction of the Existing Control System and Measures in the Production of Dairy Products

Hygienic indicators of milk	The norm (SEM)	Before the event,M±m	After the event, M±m	P
Organoleptic	Unique	Good	Good	-
Fatness, %	3.2	2.8±0,1	3,2±0,2	>0,05
Density, г/см^3	1,027	1,020±0,02	1,026±0,01	>0,05
Acidity, ^{0}T	16-20	18±0,5	17±0,4	>0,05
Protein, %	4	4,0±0,4	4,7±0,3	>0,05
Aflotoxin M_1, mg / kg	0,0005	0,00045±0,00005	0,00028±0,00007	<0,001
Lead, mg / kg	0,5	0,195±0,02	0,021±0,007	<0,01
Copper, mg / kg	1,0	0,49±0,03	0,024±0,009	<0,001
Mercury, mg / kg	0,005	0,0041±0,0002	0,0045±0,0001	>0,05
DDT , mg	0,05	0,0025±0,0004	0,0024±0,0003	>0,05
HCH (α, γ), mg	0,002	0,00008±0,000002	0,00004±0,000008	<0,001
UMS, CFU /g	5	7,2±0,6	3,8±0,4	<0,001

As can be seen from the data in Table 2, some of the negative factors in the existing system were found to be above hygienic standards due to lack of control. Once critical control points were established, quantitative indicators of risk factors improved within the reliability threshold. After the implementation of measures in the production of dairy products, milk fat increased by 15%, density from 1,020 to 1,026 g / cm3, acidity by 6%, protein by 13%, heavy metals and pesticides.

Each country develops an effective, self-contained system of food system control. Such a developed system should ensure a unique nutritional status and health of the entire population. In connection with the entry of Uzbekistan into the world market, in turn, the practical development of the principles and recommendations of the Code Alimentarius in the hygiene of the food industry serves as a reliable scientific basis for food quality control.

VI. CONCLUSION

A system has been developed to ensure the quality and safety of products aimed at protecting the health of the population at all stages, from the enterprise producing milk and dairy products to sales outlets.

Systematic step-by-step research and generalization of results provide sufficient information on the substantiation of quality and safety measures in the production of milk and dairy products in the workplace and in the external environment. Establishment of critical control points in production, regular monitoring, and assessment of hygienic parameters at all technological stages of production of dairy products have ensured a 20% increase in product quality.

VII. REFERENCES

[1] Anisimova N.V., Karpova O. V. (2007) Sanitary and epidemiological quality control of dairy food products // *Hygiene and sanitation*. No. 1. - pp. 48-49.

[2] Normatova Sh.A., Bakhritdinov Sh.S. (2011) Actual consumption of milk and dairy products and assessment of their pollution // *Hygiene and Sanitation*. – Moscow. №2. - pp. 65-67.

[3] Smirnov A. A. (2008) Hygienic principles of quality and safety of dairy products in modern production conditions // St. Petersburg. – p. 153.

[4] FAO/WHO Pan – European Conference on Food Safety and Quality 25-28 February 2002, Budapest, Hungary. Final report. Rome, Food and Agriculture Organization of the United Nations, 2002 (PEC/ REP1).

[5] Global food safety strategy safer food for better health (http.www. Who. int/fsf/FOS Strategy - Eg. Pdf). Geneva, World Health Organization, 2002 (accessel 13 September, 2002).

[6] Hazards and Controls Guide for Dairy Foods HACCP Guidance for Processors Version 1.1, June 16, 2006.

[7] Normatova Sh.A., Bakhritdinov Sh.S. (2013) Hygienic evaluation of milk and dairy products consumption and degree of their contamination // *European Applied Sciences.* –Germany. №9-1. –Pp. 26-28.

[8] Normatova Sh.A. (2016) Hygienic assessment of persistent onganochlorine pesticides in milk products // *European science review.* – Austria. Vienna. № 3–4. – pp. 140-142.