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Basic Norms of Integrated Systems of Management of Quality of Meat Products

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Abstract

It was shown that the optimum system of management by activities of enterprises operated in food industry, especially in producing of meat products, should be based on use of international standards requirements ISO 9001, ISO 14001, ISO 22000 and OHSAS 18001, which norms should be observed in structure of the integrated quality management system. There were analyzed the factors that influence negatively on safety of meat foods and state of nature nearby the enterprise, and proposed methods of minimization their influence. The work carried out in analysis of provisions of listed the standards permitted to choose their articles recommended for inclusion in typical structure of the integrated system of management.

Keywords: standard, safety, management, meat products, hazards, integrated quality system, development

The modern state the global market of foods is characterised by diversity of foodstuffs and excess of their proposition. The existing tendencies of food industry progress are the permanent perfecting on manufacturing technologies of foodstuffs, evaluation grade of risks for health in their consumption and development the novel formulations of products including those ones that contain the non-traditional ingredients. The one of the most influential stimulus in introduc-

tion of innovations is the urge of producers to satisfy needs of consumers in receiving of safe foods understood as such that don't cause any harm for life and health of consumers, and state of environment at usual conditions of their producing, storage and transporting. An important aspect in evaluation the grade of foodstuffs safety is the parameter on a possibility to safe utilization of substandard foods and wastes formed in their manufacturing. In order to ensure that risk is the minimum and timely response to the emergence of hazards, it is necessary to monitor the safety of food products at all levels of the food chain, from the cultivation of food raw materials and to its appearance on the shelves of supermarkets.

The object of analysis in this work there are requirements of international standards for quality management system and identification of those that may have an impact on the achievement of food safety, the creation of comfortable working conditions and the functioning of economic entities under conditions of minimal environmental impact.

The object of research is identification the norms to be recommended for use in development of so-called "integrated" systems of quality management by activities of enterprises operated at food markets. The term of "integrated quality system" is understood as the system of operation by the business person based on observance in one time of requiremenrs several standards.

Figure 1. The probable set of normative documents of international category used in development of integrated quality management systems
Source: Bal'-Prylypko, Slobodianiuk, Polishchuk, Paska, Burak (2017).

General forms of this type systems do not exist, but it is possible to identify ten categories that in most cases include in their structure. These are senior management leadership, process analysis and management, human resource man-

agement, strategic planning, strategic information and analysis, guaranteeing the quality of manufactured products, meeting the interests of employees, optimizing their work style, and minimizing the negative impact on the state of the environment. One of possible sets of such documents put in base of the integrated quality system includes the international standards as follows (Figure 1):

– ISO 9001 (quality management),
– ISO 14001 series (environmental management),
– OHSAS 18001 (management by industrial safety and protection of labor),
– SA 8000 (social accountability and ethical management).

However, integrated quality management systems, the provisions of which cover a certain part of the enterprise, should not be identified with the general system of management and their activities, which, incidentally, includes aspects such as risk management, financial resources, etc.

The initial stage in the development of an integrated quality system in all cases is based on the using the norms of the standard ISO 9001 as a basis for the development of a comprehensive regulatory system. The next step in improving its structure should be to take into account other standards. In our case, the task is simplified by the fact that the norms of the international quality standard (ISO 9001) are in close correspondence with those on which the standard of environmental management (ISO 14001) is built. The work in development of complex system in regulation should be based in any case on taking into consideration the norms of standard ISO 9001 as the base in development of any integrated system. Finally, such system should be developed in observance of norms to minimizing of negative influence the factors of manufacture on employees` health. To do this work, one has to identify the probability of occurrence the hazardous factors of biological, chemical and physical nature classified in the first approximation as follows (Tables 1–3).

Table 1. Identification of hazards of biological nature

Probable hazard	**Measures of control**
1	***2***
Raw and auxiliary materials	
Meat Presence of putrid and pathogenic microorganisms and toxic products of their metabolism	– inspection of raw materials – control of conditions of storage and shipping of raw materials – control of hygienic state of places of storage and means of transporting of finished foods
Water Presence of stocks of bacteria (coliform and fecal microorganisms etc.), cysts and cells of animalcular intestinal bacteria, eggs and larva of helminths	– control of state of sources of supply of water – observance of normalized procedures of decontamination of piped water

1	*2*
Packing materials Presence of spores of pathogenic fungus and bacteria	– control of state of packing materials – observance of normalized conditions of their storage at storehouses
Equipment Presence of pathogenic microorganisms	Observance of norms of good manufacturing and good hygienic practices (periodical cleaning, disinfection and washing of technological equipment)
Stages of manufacturing	
Receiving of raw materials – improper disinfection of means of transport – contaminating of raw materials during the time of their shipping to places of destination	– observance of the normalized conditions of their shipping – observance of established norms of transporting – observance of norms of good hygienic practice
Storage of raw materials	
Contamination of raw materials by microorganisms in cases of infringement of norms of storage Contamination of raw materials by microorganisms in violation of norms of operation	– observance of norms of storage – control of cleanness of warehouses – observance of norms of good hygienic practice – control of cleanness of warehouses
Storage of packing materials Ingress of microorganisms into the mass of materials in infringement of norms of their storage	– observance of norms of good hygienic practice – control of cleanness of warehouses – observance of norms of storage
Washing of raw materials Ingress of microorganisms with water used for washing	Observance of norms of good manufacturing and good hygienic practices
Inspecting of state of raw materials Ingress of microorganisms in violation of norms of storage and transporting	Observance of norms of good manufacturing and good hygienic practices
Blanching, proportioning Ingress of microorganisms in contact with air	Observance of norms of good manufacturing and good hygienic practices
Packing of finished products Pollution of content of packs in breaking of their packing	Screening and cull of spoiled packing materials
Labeling, stacking, storage of finished products – ingress of bacteria spores in use of contaminated packing materials – ingress of microorganisms and breeding of undesirable microflora in breaking of packing materials – ingress of bacteria in finished products because of non observance of norms of hygiene by laborers ingress of microorganism in breaking of integrity of packing – breeding of microorganisms remained after producing of products in cases of non-observance of recommended temperature of their storage	– observance of norms of hygiene by laborers – observance of norms of cleanness of warehouses – continuous control of temperature of storage of finished products

Source: *Basic Texts on Food Hygiene* (2003).

Table 2. Identification of hazards of chemical nature

Probable hazard	Measures of control
Ingredients and materials	
Meat – residues of pesticides – residues of heavy metals	 – purchasing of pure raw materials – observance of norms of transporting
Water – undue quantities of inorganic pollutants: lead, fluorine, selenium, aluminum, arsenic, nickel etc. – undue quantities of halogenated hydrocarbons – high level of radionuclides	 – control of purity of water – control of cleanness of sources of supply of water
Equipment Residues of detergents, lubricants, staining agents	Observance of norms of good manufacturing and hygiene practices (through washing, cleaning of equipment, control of its serviceability)
Stages of manufacturing	
Disinfection of water Contamination of foodstuffs by hazardous compounds in use of polluted water	Observance of established norms of purification of water
Storage of raw materials Contamination of foodstuffs by foreign chemicals in process of their storage	 – observance of normalized conditions of storage – control of cleanness of warehouses
Storage of packing materials Pollution of packing materials by foreign chemicals because of improper conditions of their storage	 – observance of normalized conditions of storage – control of cleanness of warehouses
Washing of raw materials Contamination of products by pollutants contained in water used for washing	Control of cleanness of water
Producing of foodstuffs Contamination of products by residues of disinfecting materials contained on improperly cleaned equipment	Observance of norms of good manufacturing and hygienic practices
Storage of finished products Contamination of products by foreign chemicals incoming inside their packs through the damaged packing materials	 – control of conditions of storage of products – observance of norms of good hygienic practice

Source: *Basic Texts on Food Hygiene* (2003).

Table 3. Identification of hazards of physical nature

Probable hazard	Measures of control
Ingredients and materials	
1	***2***
Ingredients Contamination by foreign particles (dust, dirt, stones, particles of glass, wood, metal etc.)	 – inspection of raw materials – observance of norms of storage and use
Water Presence of suspended particles	 – proper cleaning and filtration of water – control of cleanness of sources of supply of water
Equipment Contamination by dirt, dye, metal, lubricants etc.	 Regular cleaning of working surfaces

1	*2*
Packing materials Pollution by foreign particles (dust, dirt, stones, glass, wood, metal etc.)	– inspection of packing materials – observance of norms of storage and use
Stages of manufacturing	
Receiving of raw materials contamination of products in loading infringement of conditions of transporting and unloading	– observance of norms of transporting and loading/unloading – observance of norms of operation by personnel
Obtaining of packing materials Ingress of foreign particles in damage of packing materials	– observance of norms of transporting, storage and use – observance of norms of hygiene
Storage of raw materials Ingress of foreign particles, dirt and dust	– observance of norms of storage – keeping of cleanness of warehouses
Storage of packing materials Pollution of packing materials in contact with foreign materials and substances	– observance of norms of storage – keeping of cleanness of warehouses
Washing of raw materials Non-adequate protection of lines for washing against ingress of foreign particles	Observance of norms of good manufacturing and hygienic practices
Inspecting of state of raw materials Contamination of raw by foreign materials	Observance of norms of good manufacturing and hygienic practices
Producing of foodstuffs Pollution by metal, wooden and glassy particles from technological and lighting equipment etc.	Observance of norms of good manufacturing and hygienic practices
Packing of finished products Pollution by foreign particles coming from dosing equipment	Observance of norms of good manufacturing and hygienic practices
Labeling, stacking, storing Pollution by foreign particles in improper storage of finished products	observance of norms of storage keeping of cleanness of warehouses

Source: *Basic Texts on Food Hygiene* (2003).

The chapters of standards we recommend to use to prevent occurrence of hazards listed above are (Table 4).

Observance of listed norms and their including in structure of the integrated quality system would permit the business person to solve numerous problems of operation even in time of its development. The principal advantages of their including in structure of such system are:

– understanding by directorate of the enterprise of generalized details of management, hence rising of effectiveness of administration,

– avoiding of need in founding of complementary managing departments responsible for organization of work in each sphere of operation,

– avoiding confusion and increasing the effectiveness of the company in the complex of work performed,

– decreasing of expenses in certification of activities and maintaining of validity of obtained certificates,

– decreasing of quantity of external audits and carrying out of inner audits instead.

Table 4. The norms of international standards recommended for use by enterprises of food industry in development of integrated quality management system

Object of standardization	Numbers of chapters and articles of standards			
	ISO 9001	ISO 14001	OHSAS 18001	ISO 22000
Documenting of the system				
Development of documentation	4.2, 4.2.1	4.4.4	4.4.4	4.2, 4.2.1
Operation by documentation	4.2.3	4.4.4	4.4.5	4.2.2
Operation by records	4.2.4	4.5.3	4.5.3	4.2.3
Responsibility of upper management				
Policy	5.3	4.2	4.2	5.2
Purposes	5.4.1	4.3.3	4.3.3	
Planning	5.4.2	4.3.3	4.3.1	5.3
Responsibility and authorities	5.5.1	4.4.1	4.4.1	5.4
Representative person of upper management	5.5.2	4.4.1	4.4.1	5.5
Inner informing	5.5.3	4.4.3	4.4.3	5.6.2
Analysis by upper management	5.6	4.6	4.6	5.8
Management of resources	6.1–6.4	4.4.1, 4.4.2, 4.3, 4.4	4.4.2	6.1–6.4
Identification of requirements to:	production 7.2.1–7.2.5	protection of environment 4.3.1, 4.3.2	industrial safety and protection of labor 4.3.2, 4.4.6	stages of processes and measures of management 7.3.5
Management by basic activities	4.4.6	–	–	–
Managing by	inadequate production 8.3	operation in emergency 4.4.7	operation in emergency 4.4.7	discordance 7.10
Monitoring and measurements	8.2	4.5.1	4.5.1	8.3
Inner audit	8.2.2	4.5.4	4.5.4	8.4.1
Correcting and preventive measures	8.5.2, 8.5.3	4.5.2	4.5.1, 4.5.2	7.10.2
Steady betterment	8.5.1	4.3.4	4.3.4	8.5.1

Source: ISO Guide 72:2001.

Conclusion

It was shown that the normative documents the most appropriate for development of complex quality systems used in operation of meat-processing enterprises (the so-called *integrated quality management systems*) are international standards of ISO 9001, ISO 14001, ISO 22000 and OHSAS 18001.

To clarify the basic points of regulation, there were analyzed hazards occurred typically in producing of foods and influenced negatively on state of surrounding nature. There were proposed the techniques of minimization their influence on meat products safety and recommended for use the clauses of international standards to be observed in process of development the integrated quality management systems.

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