FSSC 22000 Certification as a Food Security Tool

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Abstract. The article justifies the importance and relevance of certification and standardization in the food security system. The purpose of the FSSC 22000 certification scheme is indicated. FSSC 22000 requirements and rules are defined. The structure of FSSC 22000 is specified: requirements for food chain organizations (Part I), for certification bodies (Part II), for accreditation bodies (Part III), regulations for the Management Board (Council), which defines the rules and requirements of this Scheme (Part IV). The main measures for the formation of the IASB that meets the requirements of FSSC 22000 are specified. The main advantages of the FSSC 22000 certification scheme are deciphered: independence, transparency, a unified approach to the "food chain," program integrity. The fifth version of the FSSC 22000 v5 Certification Scheme documents, new basic requirements contained therein and improvements are described in detail.

1. Introduction
Food safety is a growing concern and has an impact on both consumers and companies around the world. Although most of the world's food market is safe, cases that have received wide public outcry regularly draw attention to the potential danger to consumers from food-related threats. From poor-quality dairy products to заражённой, cases of panic and food reviews have arisen constantly over the past decades.

Food-related diseases affect tens of millions of people and incur billions in industry and health-care costs each year. The globalization of food supply and the consolidation of the food trade industry have led to the need for an internationally recognized food safety management standard.

2. Formatting the title, authors and affiliations
The study methodology includes a combination of quantitative and qualitative approaches, systematic and comparative analysis.

The study of food security, quality and food safety is devoted to the work of many domestic and foreign researchers. A number of researchers paid attention to the problem of food security in general, among them such scientists as Altukhov A.I., Afanasyev S.G., Novitsky N.A., Pavlov V.I. and others. Studies related to food safety in the food industry are reflected in the works of Goncharov V.D., Gruzinova V.P., Sizenko E.I. and others. At the same time, many issues related to food safety,
monitoring, criteria and indicators for ensuring the reproduction of quality products in the industry require further research, which determined the choice of the topic of study.

Objective of the article: FSSC 22000 Certification Study as a Food Security Tool.

The novelty of the study is that the article is an independent scientific study of certification according to the FSSC 22000 scheme as part of the latest changes and an updated version of the standard.

3. Discussion and results

Food safety has been the subject of serious discussions in Russia over the past two decades. The increase in the pace of production and the expansion of the range of products led to the fact that the consumer needs a guarantee of the safety and quality of the products that he buys [2, p. 80]. Now, as a rule, domestic enterprises are creating conditions under which full product safety is not always ensured in the absence of modern food quality control systems. The development of this problem is influenced by a number of factors, such as: the emergence of new production systems, the emergence of new substances that pollute the environment, the emergence of new products and technologies for processing, changes in the health of people, changes in the diet, increased demand for products of the "fastfood" series, etc.

Food safety is compliance with the requirement that products are "free" from hazards with a fully acceptable level of risk. Risk can be described as the degree of probability and severity of harm to human health. Food products can be considered safe if the associated risk is at an acceptable level [4, p. 8].

The food production chain involves organizations engaged in the production of feed, primary production, direct production of food products, transportation and storage, as well as subcontractors engaged in the retail trade in food products and servicing outlets. In addition, organizations producing equipment, packaging materials, cleaning substances, additives and ingredients for food products are indirectly related to the food production chain; such organizations should include services.

The exchange of information carried out at the stages of the food production chain is very important for the identification and control of hazards affecting the safety of food products at all stages of its creation. This implies the exchange of information between organizations working at all stages of food production creation [17]. The exchange of information between consumers and suppliers regarding identified hazards and management activities clarifies the requirements of consumers and suppliers (for example, to assess their feasibility and need, as well as to determine the impact of identified hazards and final product management activities).

In recent years, many food safety standards have emerged that aim to improve food security, as well as address issues that are relevant to producers, suppliers, sellers and consumers. FSSC 22000 is one of the most comprehensive approaches to food safety management for those involved in food production. Since the standard is based on the ISO 22000 standard, it is easily integrated into other management systems, such as ISO 9001, ISO 14001 and OHSAS 18001, and allows food manufacturers to improve the quality of food products, as well as ensure their safety.

Currently, the FSSC 22000 certification scheme is designed to audit and certify food safety systems of enterprises producing:

- Perishable products of animal origin (meat, poultry, eggs, dairy products, fish and processed products);
- Perishable products of plant origin (packed fresh fruit and freshly squeezed juices, canned fruit, packed fresh vegetables, canned vegetables);
- products of long-term storage at ambient temperature (preserves, confectionery, snacks, oil, drinking water, drinks, pasta, flour, sugar, salt);
- (bio) chemical products for food production (food ingredients - vitamins, additives and biocultures);
- different types of food packaging (primary packaging, secondary packaging, etc.);
- animal feed.
The requirements and rules of FSSC 22000 are described in an introduction document and four parts. Parts I to III contain the following requirements:
- to food chain organizations (Part I);
- certification bodies (Part II);
- Accreditation bodies (Part III).

Part IV establishes provisions for the Management Board (Council), which defines the rules and requirements of this Scheme.

Let us dwell a little more on Part I "Requirements for organizations for certification," which establishes the requirements that must be met by an organization that wishes to be certified according to the FSSC scheme.

The "Scope" section of Part I defines which requirements and to which participants in the food chain are applicable. The scheme can certify value chain enterprises regardless of size, complexity, profitability and ownership [11, p. 14].

The section "Requirements to the food safety management system" of Part I lists the requirements for the development, implementation and maintenance [4, p. 8]. The food safety management system shall comply with ISO 22000 Food Safety Management System. Requirements for organizations in the food production and consumption chain "[58].

Preconditions programs shall be developed, implemented and maintained in accordance with the requirements of ISO 22000 paragraph 7.2 and the requirements of the technical specification for the relevant SSP sector, e.g. PAS 220:2008 for food and ingredients manufacturers. In addition, the section includes a guide to the application of these requirements. For the food safety management system, these recommendations are set out in the ISO/TS 22004:2005 Technical Specification "Food Safety Management Systems - Recommendations for the Application of ISO 22000:2005." The section clarifies the concept of food safety, establishes a unified approach to ensuring food safety in the food production and consumption chain, and also emphasizes the list of applicable regulatory requirements that should be defined and implemented in the organization.

Appendix IA contains additional requirements, which, along with the list of applicable regulatory requirements, include requirements for specifications for services provided to the enterprise (including water, heat, power, etc., transportation services and equipment maintenance), which may affect food safety, as well as requirements for ensuring effective control of personnel for correct application of principles and practices of food safety.

Appendix IB "How to Apply for Certification" describes key aspects of FSSC 22000 certification. To obtain a certificate, it is necessary to obtain a positive decision of the certification body based on the results of the certification audit. The certification authority shall be approved and licensed by the owner of the FSSC certification scheme according to the requirements set out in Part II of the FSSC scheme.

Details of the main measures for the formation of a food safety management system that meets the requirements of FSSC 22000 are presented in Table 1.

Independence. The FSSC 22000 scheme is managed by the Board of Stakeholders, which includes representatives of industry associations, certification bodies, the IAF International Accreditation Forum, the ISO International Organization for Standardization, as well as commercial organizations - manufacturers, catering companies, retail chains, etc. The Food Safety Certification Fund, which owns FSSC 22000, is a non-profit organization independent of revenue from any organization or individual [2, p. 48].

Transparency. The FSSC 22000 circuit is completely transparent. All information can be found in the public domain on the FSSC official website - all the requirements of the scheme, council decisions, a list of licensed certification bodies, a list of accreditation bodies recognizing the FSSC, the names of board members, etc.
Table 1. Specification of the main measures for the formation of the food safety management system that meets the requirements of FSSC 22000.

| Stage | Actions |
|-------|---------|
| Stage 1. Work Planning | Collection and analysis of evidence on the state of the food safety system  
Formation of a food safety group to implement a food safety management system  
Schedule Work |
| Stage 2. System Design | FSSC 22000 Basic Training for Food Safety Team  
Development of a set of documents:  
- production process maps;  
- a list of potentially dangerous factors, maximum permissible parameters, monitoring procedures, description of corrective actions, control schemes and procedures, procedures for recording results;  
- HACCSR plan with mandatory preliminary action programmes with reference points.  
Final Risk Analysis Report including justifications and controls for each identified hazard |
| Stage 3. Implementation of the system | Reorganization of the food safety system in accordance with the requirements of FSSC 22000 and implementation of the food safety management system |
| Stage 4. Verify that the system meets the requirements of the FSSC 22000. | Internal inspections (audits)  
Management review |
| Stage 5. Corrective actions based on the results of the system analysis by management | Identification and execution of corrective actions  
Validation decision (confirmation of compliance) and final selection of certification body  
Assistance in drawing up an application to the certification body |

A unified approach to the "food chain." Initially, the scope of the FSSC 22000 scheme was extended only to food manufacturers and food ingredients. As ISO and commercial organizations develop technical specifications with precondition program (SSP) requirements for other parts of the food chain, FSSC expands the scope of the scheme. The first additional documents with requirements for SGP were developed for manufacturers of packaging materials, producers of animal feed, the agricultural sector and the catering sector. The ISO has decided to develop technical specifications for each sector of the food production and consumption chain. This will extend the scope of the FSSC 22000 certification scheme to the entire food production and consumption chain.

Program integrity. Audit integrity is a critical condition for ensuring trust in certification. To do this, all licensed certification bodies must be accredited according to the requirements of ISO/IEC 17021 standard by accreditation bodies and meet the requirements of the FSSC itself. In addition, FSSC 22000 has its own audit program for all accredited certification bodies, which includes the audit of audit reports by an independent expert, the establishment and analysis of KPI implementation, the appeals and complaints procedure, and a risk-based audit program.

In May 2019, the FSSC Food Safety Certification Fund published the fifth version of the documents of the FSSC 22000 v5 Certification Scheme [9].
The updated version of the standard presents two interconnected levels of the PDCA cycle - for the food safety management system as a whole and for operational activities for the production of products/services based on the principles of the HACR and the organization as a whole.

As in the previous version, the new version of the FSSC 22000 schema also consists of three main sections:

1. Requirements of ISO 22000:2018;
2. Requirements for the SGP program used (e.g. ISO/TS 22002-x series or similar);
3. Additional FSSC 22000 requirements.

In fact, the ISO 22000:2018 standard, which, as before, is the basis for the FSSC scheme, has introduced all its new basic requirements and improvements into the scheme. For example, such as:

- A high-level ISO structure (HLS - high level structure), the purpose of which is to improve consistency between ISO standards for management systems (for example, 10 sections, as in ISO 9001:2015).
- Application of the process approach, in combination with the PDCA cycle;
- Risk-oriented thinking - risk management at the organizational level;
- Risk-oriented thinking based on the principles of HACCP at the production (operational) level, etc.

The new section for the integrated control system FSSC 22000-Quality that appeared in the new version of the diagram, in addition to FSSC 22000, also contains the requirements of ISO 9001:

- ISO 22000:2018 requirements;
- ISO 9001:2015 requirements;
- Requirements for the SGP program used (e.g. ISO/TS 22002-x or similar);
- Additional requirements of FSSC 22000.

Requirements for the SGP program used (e.g. ISO/TS 22002-x series or similar) "are essentially a set of the following standards or similar (applicable): ISO/TS 22002-1 "Food production," ISO/TS 22002-2 "Catering," ISO/TS 22002-3 "Agriculture," ISO/TS 22002-4 "Food packaging production," ISO/TS 22002-5 "Transportation and storage," ISO/TS 22002-6 "Animal feed and food production," etc.

4. Conclusions

Thus, FSSC 22000 is one of the most comprehensive approaches to the food safety management system for those involved in the food production process. Since the standard is based on the ISO 22000 standard, it is easily integrated into other management systems and allows food organizations to improve the quality of food products, as well as ensure their safety. FSSC 22000 requirements and regulations include those for food chain organizations (Part I); certification bodies (Part II); accreditation bodies (Part III); Regulations for the Management Board. Ultimately, FSSC 22000 is a business management tool that links food security and business processes with the ability to meet growing global consumer requirements to qualify as an approved supplier with a certified food safety system.

Ultimately, FSSC 22000 is a business management tool that links food security and business processes with the ability to meet growing global consumer requirements to qualify as an approved supplier with a certified food safety system.

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