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SCIENTIFIC AND PRACTICAL ASPECTS OF ORGANIZING CATERING SERVICES WITH CONSIDERATION OF FOOD SAFETY AND INTERNATIONAL STANDARDS

НАУКОВО-ПРАКТИЧНІ АСПЕКТИ ОРГАНІЗАЦІЇ КЕЙТЕРИНГОВИХ ПОСЛУГ З УРАХУВАННЯМ ХАРЧОВОЇ БЕЗПЕКИ ТА МІЖНАРОДНИХ СТАНДАРТІВ

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Abstract. *The paper examines the organizational and technological components of the implementation of catering services in the context of compliance with international food safety standards, in particular HACCP, ISO 22000 and GMP. The purpose of the study is to study approaches to the implementation of food safety management systems to ensure the effective operation of catering enterprises. The obtained scientific results include the development of a sequence of stages of the HACCP plan adapted to the specifics of catering, with an emphasis on the identification of critical control points (CCPs) in the supply, preparation and transportation chains. It is proven that the integration of the principles of Codex Alimentarius and ISO 22000:2018 to minimize the level of risks of biological, chemical and physical contamination at all stages of the technological cycle. A multi-level control model is proposed, covering the incoming inspection of raw materials, monitoring of temperature regimes and verification of procedures for various types of events (corporate, social). The practical value of the research is formed in the area of providing tools for optimizing production processes of catering enterprises, which contributes to reducing losses from defects and increasing competitiveness in international markets. The results can be used for certification and training of personnel, ensuring compliance with Regulation (EU) No. 852/2004 and the principles of Total Quality Management.*

Keywords: *catering, food safety, international standards, HACCP system, quality management, hygienic practices.*

Introduction.

Catering service models define a new configuration of the hospitality services market, in which the competitiveness of suppliers directly depends on the ability to design and maintain processes in accordance with food safety requirements stipulated by international standards, in particular ISO 22000, HACCP and Codex Alimentarius guidelines, covering risk management, traceability, allergen control, hygienic design of equipment and continuity of the cold chain in logistics. The organization of catering services based on food safety standards is critically important, since the modern consumer expects not only high organizational quality of service, but also

demonstrable compliance of the procedures for receiving raw materials, production, transportation and serving dishes with risk - oriented protocols, which reduces the likelihood of biological, chemical and physical hazards, ensures a prompt response to deviations and minimizes reputational and legal risks. Therefore, the systemic integration of menu planning processes, staff health training, calibration of critical control points, and internal auditing with the requirements of international standards is not just a condition for market entry, but a strategic driver of efficiency and customer trust in the catering segment.

Analysis of recent research and publications.

In the scientific discourse of recent years, there has been an intensification of attention to the issues of organizing catering services in the context of ensuring food safety and implementing international quality management standards, such as ISO 22000 and the HACCP system. According to [1], [11], catering activities are characterized by the complexity of production and logistics processes, which creates risks of microbiological, chemical and physical contamination of products, and therefore requires systematic control of critical points at all stages of preparation and service.

Studies [13] show that in most catering enterprises the level of staff qualification in food safety issues remains insufficient, which complicates the implementation of effective risk management mechanisms and product traceability. Works [2], [9] reveal practical experience in adapting HACCP principles to mobile and on-site forms of service, in particular when organizing mass events and corporate events, where temperature control, personnel hygiene and food transportation are of priority.

Research results [4] show that in many countries the system of certification of catering companies according to the ISO 22000 standard has transformed into the main criterion of customer trust and competitiveness in the food services market. At the same time, the analysis of publications [7] demonstrates that in Ukraine the issues of standardization of catering activities and its harmonization with international requirements are at the initial stage of formation, and most scientific works focus mainly on theoretical aspects and are characterized by a shortage of practical cases of

testing the food safety management system in the catering sector.

Identification of previously unresolved parts of the general problem.

Despite the presence of a significant body of research in the field of food quality management, the issues of organizing catering services based on the requirements of international food safety standards remain insufficiently studied. Approaches to integrating ISO 22000 and HACCP systems into the structure of mobile and on-site food service, which is characterized by an elevated level of risk of product contamination, are insufficiently developed. There are no methodological recommendations for the synthesis of sanitary and hygienic standards with the logistics processes of delivering ready-made meals. The mechanisms for training personnel for the implementation of safety management systems in variable service conditions have also not been studied.

The purpose of the article is to study organizational and technological approaches to the implementation of catering services based on the requirements of international food safety standards.

Presentation of the main material.

The organization of catering services based on the requirements and international standards of food safety is a complex multi-level process that covers the management of the entire chain - from the purchase of raw materials to the serving of ready-made dishes at the event venue. The modern catering industry is considered as a specific form of entrepreneurship in the food sector, the purpose of which is to provide comprehensive services for the production, transportation, serving and maintenance of culinary products outside stationary facilities. In the context of increasing requirements for food safety, the key condition for effective activity is the implementation of a food safety management system in accordance with the principles of HACCP and the international standard ISO 22000, which ensure risk control at all stages of the technological process (Table 1).

Proper catering organization should be based on compliance with technological discipline, a clear division of processes into production, logistics and service stages.

Table 1 – Sequence of stages for developing a HACCP plan for organizing catering services taking into account international safety standards

Stage	Stage name	Description of actions in the context of catering	HACCP principle and reference to the standard
1	Appointment of a responsible person and formation of a HACCP team	Form a team of chefs, logisticians, and managers to coordinate security at events (weddings, conferences).	Preparation principle; ISO 22000:2018 (section 7.1 – planning resources)
2	Description of products and raw materials	Detail the menu (hot dishes, snacks), ingredient specifications, and suppliers for mobile services.	Principle of preparation; Codex Alimentarius (HACCP Annex)
3	Intended use of the product	Identify consumers (guests with allergies, children), risks at open-air events (dust contamination).	Preparation principle; GMP (section 4 – personnel hygiene)
4	Drawing up current schemes of technological operations	Develop schemes from procurement to distribution of meals, including temporary storage in transport.	Preparation principle; ISO 22000:2018 (Annex B – Process flows)
5	Testing current schemes in practice	Test circuits in a simulated event, adjust for temperature fluctuations during delivery.	Principle of preparation; Codex Alimentarius (HACCP Guideline)
6	Drawing up a list of dangerous factors	Identify biological (salmonella in meat), physical (glass in salads), and chemical (allergens) risks for catering.	Principle 1; ISO 22000:2018 (section 8.2 – hazard analysis)
7	Drawing up a list of critical control points (CCPs)	Use a decision tree to determine CCPs, such as pasteurizing sauces before an event.	Principle 2; Codex Alimentarius (HACCP Principle 2)
8	Setting critical limits for CCPs	Fix limits (cooking temperature >75 ° C) adapted to field catering conditions.	Principle 3; GMP (section 5 – process control)
9	Installation of a CCP monitoring system	Identify checks (hourly during service), tools (temperature loggers) and responsible persons.	Principle 4; ISO 22000:2018 (section 8.4 – monitoring)
10	Establishing corrective actions	Develop plans (party cancellation, backup menu) for incidents at events.	Principle 5; Codex Alimentarius (HACCP Principle 5)
11	Establishing verification and control procedures	Conduct post-event audits and staff training to ensure compliance with standards.	Principle 6; GMP (section 6 – verification)
12	Establishing document management procedures	Create digital event logs for traceability, accessible to customers and inspectors.	Principle 7; ISO 22000:2018 (section 7.5 – documentation)

Source: based on [2], [10]

Depending on the type of event (banquet, conference, buffet, cocktail, picnic, etc.), requirements are determined for the composition of raw materials, the degree of readiness of semi-finished products, transportation conditions and temperature storage conditions. Large events are characterized by significant production loads, which require not only qualified employees, but also a clear system of internal quality control, in particular, monitoring critical control points, maintaining documentation on tracking product batches and ensuring the sanitary condition of all production areas.

The organization of the technological process in catering involves several interrelated stages. The first is the supply of raw materials and semi-finished products, which should be carried out exclusively from certified suppliers who have confirmed the compliance of their products with the requirements of the HACCP or ISO 22000 systems. At this stage, the primary control of supporting documents is carried out, labeling, expiration dates and transportation conditions are checked [6].

The second stage is the storage of raw materials, which requires maintaining optimal conditions for each type of product. Temperature regimes should be controlled by monitoring systems with automatic data recording. Production premises should be divided according to the principle of flow - that is, the paths of raw materials, semi-finished products and finished products should not intersect. The presence of refrigeration chambers, cabinets and display cases allows maintaining stable conditions for meat, fish, dairy, vegetable and confectionery ingredients. Insufficient warehouse space is compensated by planning regulated deliveries and using a high degree of readiness of semi-finished products [14].

The third stage is the preliminary (primary) processing of raw materials, which is carried out using modern technological equipment: vegetable cutting machines, universal food processors, combi steamers. To increase production efficiency, chilled or frozen semi-finished products are widely used, which allows to reduce the time of heat treatment without reducing the quality of dishes. All operations are carried out taking into account the requirements of occupational hygiene and sanitary control, in particular, the isolation of "clean" and "dirty" zones, the use of disinfectants, and monitoring the condition of personnel.

Special attention should be paid to the heat treatment of culinary products, because it is at this stage that the safety of the final product is formed. Production schedules should take into account the duration of heat treatment, the speed of product sales and transportation time. The use of steam convection ovens will ensure a reduction in cooking time, uniform heating and reduction of product mass losses, as well as the preservation of the natural color, taste and nutritional value of dishes. In the HACCP system, this stage corresponds to a critical control point, which requires fixing the parameters of temperature, humidity and exposure time [2].

Next comes the storage and delivery of the finished product. The process can be carried out in three ways: in a hot state (hot-holding system), in a chilled - cooking system (cook-chill) or in a frozen state (cook-freeze). The choice of method depends on the remoteness of the service facility, the duration of transportation and the requirements of the client. In this case, temperature indicators must be controlled during the entire logistics cycle - from the moment the dish leaves the kitchen to its serving.

Modern catering includes not only culinary but also organizational and logistical components. These include location selection, room design, service, menu planning taking into account dietary restrictions, staff scheduling, waste disposal and customer feedback [5]. It is advisable to pay attention to the management of risks associated with cross-contamination, allergens, non-compliance with temperature conditions or violation of shelf life. In accordance with the principles of HACCP, all these risks must be identified, assessed and taken under control through a monitoring and corrective action system.

The food safety management system in catering activities provides for a multi-level control structure. At the top level, the enterprise's policy on quality and safety is formed, responsible persons are determined, as well as documents regulating procedures. At the middle level, instructions on hygiene, technological processes, storage and transportation are implemented. At the operational level, daily monitoring of parameters is carried out, a log of inspections is kept, calibration of measuring equipment and personnel training are carried out [15].

Catering companies can specialize in different types of services. Corporate catering is focused on serving companies, educational institutions, banks, hospitals, government agencies and industrial enterprises. Social catering provides services for individuals: organizing family celebrations, anniversaries, weddings, buffets, themed parties, etc. Within each area, ISO 22000:2018 standards should be strictly followed, which provide for the interconnected action of the elements: interactive communication between suppliers and consumers, a systematic approach to management, prevention of food contamination and continuous improvement of processes.

No less important component is the training and hygienic education of personnel, because it is the human factor that most often causes violations of sanitary standards. Employees must undergo regular training in personal hygiene, disinfection of inventory, control of microbiological indicators and handling of food waste. In the HACCP system, personnel training is a mandatory element, and its effectiveness is checked through internal audits and corrective actions (Table 2) [7].

Table 2 – Plan of organization and technological support in catering under conditions of compliance with international food safety standards

No.	Operation	Dangerous factor	CCT *	Critical control measures
1	Storage of refrigerated products	Biological (bacteria)	CCT 1	Temperature +2 ° C ÷ +5 ° C; daily monitoring with thermometers (Codex Alimentarius)
2	Transporting frozen ingredients	The same	CCT 2	Temperature -18 ° C; checked every 2 hours by loggers (ISO 22000:2018)
3	Control of raw material deadlines before the event	Biological	CCT 3	FIFO method, do not exceed supplier deadlines ; pre-loading inspection (GMP)
4	Preparing meals in the kitchen	Biological and chemical	CCT 4	Temperature >75 ° C; monitoring during the process (Codex Alimentarius)
5	Catering at the event location	Physical (contamination)	CCT 5	Hand and surface hygiene; hourly inspection (ISO 22000:2018)

* Note: CCP (Critical Control Point) is a key element of the Hazard Analysis and Critical Control Point (HACCP) system used to ensure food safety.

Source: built by the author

Catering enterprises that have their own production workshops, kitchens - combinations or specialized technological platforms can produce culinary products not only for direct consumption on site, but also for further sale - in culinary shops, fast food establishments, in the corporate catering system or supply to social facilities [3]. At the same time, a feature of catering production is that the technological processes of preparing dishes, from sorting, washing, cleaning and cutting products to heat treatment, cooling and packaging must comply with uniform standards of hygiene, temperature control and labeling.

One of the central aspects is the planning of the production program, which should cover the range of dishes with different degrees of readiness, ease of transportation, speed of sale and stable sensory properties. The volume of culinary products in catering, as a rule, is much larger than in traditional catering establishments, which necessitates the need for stricter control of sanitary and hygienic parameters, temperature conditions, packaging quality and shelf life. This type of production is impossible without the use of cooling equipment, sealed containers, thermal insulation systems and vehicles that meet the standards of safe transportation of food products.

In the framework of ensuring food safety, incoming control of raw materials is of particular importance. It is carried out on the basis of the Good Manufacturing Practice (GMP) system, which is an integral part of the ISO 9001 and ISO 22000 standards. The purpose of control is to prevent the use of poor-quality, spoiled or expired products, as well as to prevent the ingress of dangerous food additives and contaminants. Acceptance of raw materials should be accompanied by verification of certificates of conformity, labeling, expiration dates, transportation conditions and the availability of documents confirming the absence of GMOs or allergens, if required by the customer [8].

Storage conditions of raw materials and finished products must ensure the prevention of the development of pathogenic microorganisms and chemical reactions that can affect food safety. The main requirement is to maintain the appropriate temperature regime, humidity and insulation of various types of products - meat, fish, dairy, vegetable. Violation of these conditions is one of the main causes of product

spoilage, so modern enterprises are implementing automated monitoring systems that record temperature changes in real time. The integration of ISO 9001, ISO 22000 and HACCP standards creates a single quality and product safety management system, which is the basis of the Total Quality Management (TQM) concept. It involves continuous process improvement, efficiency assessment, use of consumer feedback and implementation of corrective actions. (Fig. 1.).

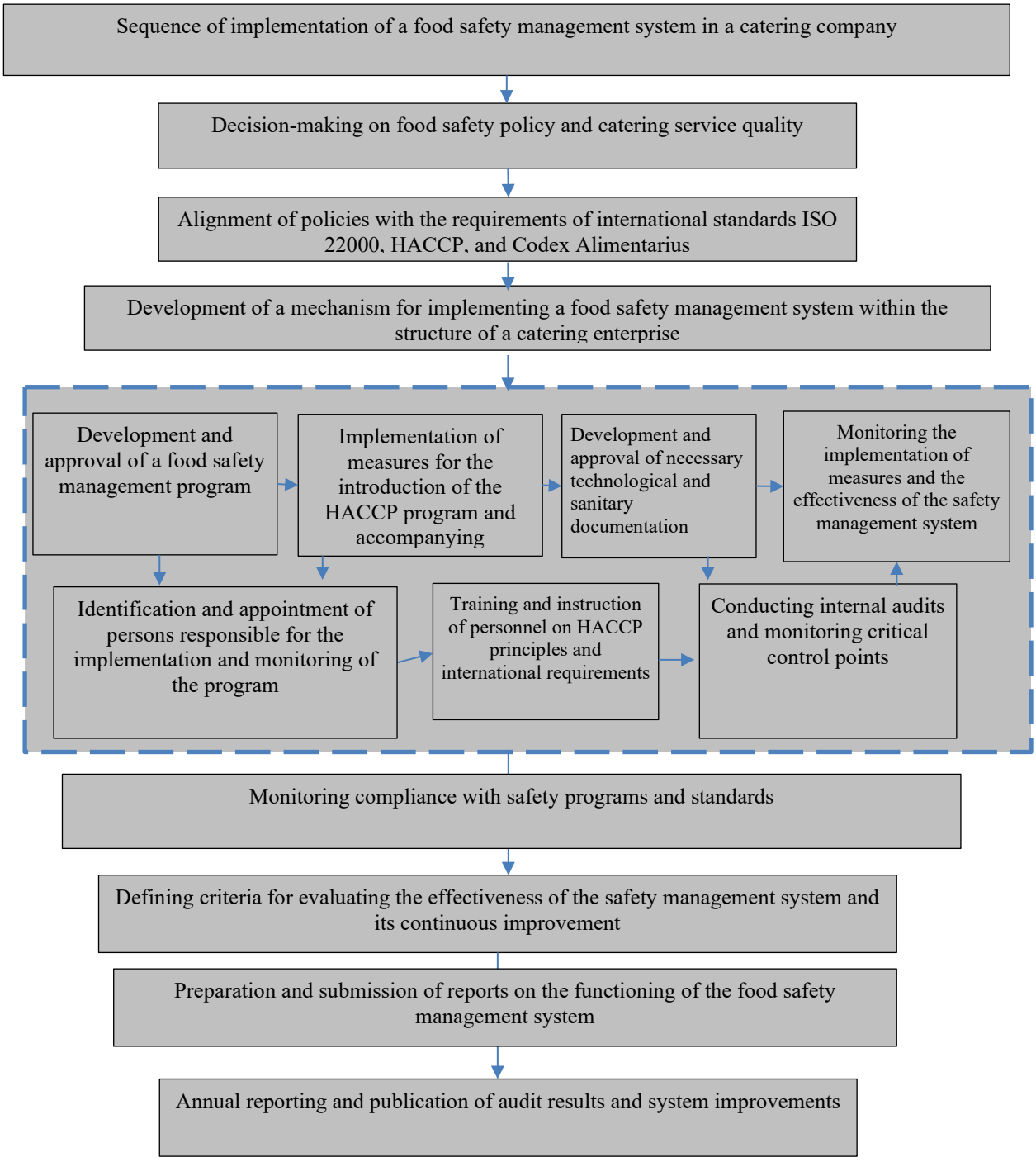

Figure 1 – Mechanism for implementing a food safety management system in the catering activities of an enterprise

Source: built by the author

EU legislation and the international regulatory framework on food safety stipulate that the producer is personally responsible for the quality and safety of his products. This principle is enshrined in Regulation (EC) No 852/2004 on the hygiene of foodstuffs, which establishes the obligation of economic operators to carry out risk analysis and control critical points in production [12]. For catering, this means monitoring each phase of the process: receipt of raw materials, processing, cooking, cooling, packaging, storage and transport.

In general, it can be stated that the organization of catering services in accordance with international food safety standards constitutes a comprehensive system that integrates technological, managerial and legal components. It is based on the principles of prevention, traceability, documentation and responsibility of each participant in the process. The implementation of such systems contributes not only to ensuring the safety of food products, but also to increasing management efficiency, optimizing resource use and strengthening consumer trust.

Conclusions.

The study showed that effective organization of catering services based on international food safety standards requires a holistic approach to managing the entire technological chain, from receiving raw materials to serving ready-made dishes at the event venue. It was found that the integration of HACCP principles and ISO 22000 requirements ensures systematic risk control at each stage of production, transportation and service. This will minimize the likelihood of biological, chemical or physical contamination of products, and will also guarantee compliance with sanitary and hygienic standards in the dynamic conditions of mobile catering.

The results of the analysis confirmed that the technological structure of catering production requires deep adaptation to the specifics of mobile service, which combines high loads, compressed deadlines and dependence on logistical conditions. It was identified that the highest risks arise during storage, transportation and heat treatment of products, therefore their control should be based on a system of critical control points taking into account the requirements of Codex Alimentarius and Good Manufacturing Practice (GMP). The introduction of digital monitoring logs, automated temperature

loggers and verification procedures will create conditions for increasing the level of management efficiency, ensuring product traceability and transparency of all processes, which is a basic requirement of ISO 22000:2018.

It has been established that personnel training, the formation of a food safety culture and systematic internal audits play a critical role in ensuring consistent quality. The use of an integrated system of ISO 9001, ISO 22000 and HACCP forms the basis for the implementation of the TQM concept, which synthesizes safety, efficiency and customer orientation in a single management model.

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Анотація. *В роботі розглядаються організаційні та технологічні складові імплементації кейтерингових послуг у контексті дотримання міжнародних стандартів харчової безпеки, зокрема HACCP, ISO 22000 та GMP. Метою дослідження є вивчення підходів до впровадження систем управління безпечністю харчових продуктів для забезпечення ефективної діяльності кейтерингових підприємств. Отримані наукові результати включають розробку послідовності етапів HACCP-плану, адаптованого до специфіки кейтерингу, з акцентом на ідентифікацію критичних контрольних точок (ККТ) у ланцюгах постачань, приготування та транспортування. Доведено, що інтеграція принципів Codex Alimentarius і ISO 22000:2018 для мінімізації рівня ризиків біологічного, хімічного та фізичного забруднення на всіх етапах технологічного циклу. Запропоновано модель багаторівневого контролю, що охоплює вхідний огляд сировини, моніторинг температурних режимів та верифікацію процедур для різних типів заходів (корпоративні, соціальні). Практична цінність дослідження сформована у площині виділення інструментарію для оптимізації виробничих процесів кейтерингових підприємств, що сприяє зниженню втрат від браку та підвищенню конкурентоспроможності на міжнародних ринках. Результати можуть бути застосовані для сертифікації та навчання персоналу, забезпечуючи відповідність Регламенту (ЄС) № 852/2004 та принципам Total Quality Management.*

Ключові слова: *кейтеринг, харчова безпека, міжнародні стандарти, система HACCP, управління якістю, гігієнічні практики.*

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