

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

**METHODICAL INSTRUCTIONS FOR
PROFESSIONAL PRACTICE AT THE FOOD
ENTERPRISES OF THE INDUSTRY**

SUMY 2021

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

Faculty of Food Technology

Technology of Nutrition Department

**METHODOLOGICAL INSTRUCTIONS FOR
PROFESSIONAL PRACTICE AT FOOD
ENTERPRISES OF THE INDUSTRY**

**for 1st year students of OD "Master"
specialty 181 "Food Technology"**

SUMY 2021

UDC 621.753.4.(075.8)

M-54

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M-54 Methodical instructions for professional practice at food enterprises of the industry for students of the 1st year of OS "Master" specialty 181 "Food Technology" / style. F.V. Pertsevoi, O.Yu. Melnik, S.M. Sabadash, N.V. Bolgova, O.G. Sereda. - Sumy, 2021. - 31 p.

Methodical instructions for professional practice at food enterprises of the industry are aimed at obtaining a master's degree in the relevant specialty and aim to provide students with professional skills and abilities and perform innovative professional tasks at enterprises of the industry and restaurants.

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Considered and approved by the educational and methodical council of the faculty of food technologies. Protocol № 5 from « 24 » march 2021.

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INTRODUCTION

Master's degree is an educational degree obtained at the second level of higher education and awarded by a higher education institution as a result of successful completion of the relevant educational program by the applicant for higher education. The master's degree is obtained by educational-professional or by educational-scientific program.

The professional practice of masters is a mandatory component of the educational and professional program to obtain a master's degree in the relevant specialty and aims to provide students with professional skills and abilities and perform innovative professional tasks in enterprises and restaurants.

It is important for a master's student not only to know the basic principles characteristic of a master's thesis, but also to be able to implement theoretical knowledge in the workplace. In the process of practical training, the student acquires professional skills, starting with working positions and ending with management positions in engineering. These guidelines address the general issues of organization, conduct and summarizing the professional practice of students.

1. Basic principles of professional practice

Professional practice is an important component of the master's degree program and aims to provide students with the following competencies and learning outcomes:

- ability to generate ideas and solve complex problems and problems in food technology in professional activities, as well as to formulate and implement their own models of professional activities in the field of food technology;
- ability to organize production and practically implement scientific developments taking into account energy efficiency and resource saving and improvement of quality indicators of food products;
- to develop and implement commercial and scientific and technical projects in the field of food technology, taking into account issues of labor

and environmental protection and to develop programs for the development and effective operation of food industry enterprises and restaurants;

- ability to organize a system of quality control and safety of food raw materials, semi-finished products and food products;

- ability to interpret the obtained data, prepare scientific reports, present and discuss the results of scientific research and design decisions;

The subject of practice is:

- organizational and economic structure of the enterprise;

- system of supply of raw materials and sale of finished products;

- production processes and technological lines in individual shops and departments, organization of production, production planning and management, implementation of quality and safety management systems for food and culinary products to perform modular course (works) and write a master's thesis;

- system of ensuring the production of measures for environmental protection and labor protection;

- regulatory and technological documentation of the enterprise;

- system for ensuring the safety of food production.

2. Purpose and objectives of practice

The purpose of professional practice is to systematize, expand professional knowledge in the field of the chosen specialty, formation and development of undergraduate students' skills for independent professional activity, organization and control of the appropriate level of quality and safety of food, environmental safety and resource conservation. research work related to the study of technological processes, introduction of new and improvement of existing technologies for food and culinary production at food enterprises and restaurants, assess the probability of economic feasibility and conduct a feasibility study of an innovative project .

The main task of practice is to gain experience in the study of current issues in the industry, as well as the selection of necessary materials to perform a professional task.

During the professional practice the student must study:

- programs for the development and effective functioning of food industry enterprises and restaurants, including in the context of foreign economic relations;
- organization of work of food industry enterprises and restaurants in accordance with the requirements of life safety, resource conservation and environmental safety;
- system of quality control and safety of food raw materials, semi-finished products and food products, ensuring the quality and safety of food products at the enterprises of the branch.

Students must:

- 1 - evaluate markets and competitors, explore marketing strategy;
- 2 - to analyze and describe the organization of work of food industry enterprises and restaurants in accordance with the requirements of life safety, resource conservation and environmental safety;
- 3 - describe the main raw materials used for the production of finished products;
- 4 - describe the finished product in accordance with the requirements of applicable regulations;
- 5 - to analyze the technology of the new product and determine the dangerous factors of production of developed or improved products;
- 6 - to develop the protocol of the analysis of dangerous factors of production of a foodstuff;
- 7 - to build a block diagram of the production process with the definition of critical control points;

8 - on the basis of risk analysis and prerequisites implemented at the enterprise or in the catering institution to determine the list of possible corrective actions and procedures for their verification

3. Place and terms of practice

Professional practice is conducted in the first year of master's training of full-time and part-time students. Its duration is 8 weeks in accordance with the curricula for master's training.

The practice is carried out at the enterprises of the branch, the student receives a task to study the food safety system implemented at the enterprise to study all the factors that affect the safety of food developed or improved according to the subject of qualification work.

Before the internship, an introductory consultation is held, which provides all the necessary information regarding the internship. Teachers - curators from the department are appointed for all undergraduates to pass the internship.

At the end of the internship, students draw up all the necessary documentation in accordance with the requirements of the internship program.

4. Organization of practice

The professional work of future masters is a necessary component of the educational process and serves as a basis for improving the effectiveness of work.

Execution of an individual task by students is carried out taking into account the chosen theme of qualifying work in the terms defined by the program of practice. Materials are included in the practice report in accordance with its structure and scope.

Internships for master's students of each specialty are conducted in accordance with the curriculum for full-time and part-time study. During the professional internship and the main tasks of the internship program, each student must receive a list of documents for the implementation of the HACCP system in the workplace, which will be reflected in the section of the master's qualification.

The internship program for master's students consists of the following parts:

- formation of an individual schedule of professional practice, review of regulatory documentation and documented information (printed literature, electronic sources), collection and processing of practical and informational material;
- assessment of economic feasibility and economic justification of the innovative project;
- study of the level of implementation of prerequisites for production and their validation, monitoring and verification;
- performance of an individual task on identification of dangerous factors which can arise on all production chain, and establishment of the control for the purpose of guarantee of safety of a product for the consumer;
- preparation of a report on professional practice and its protection.

The head of the department appoints a person responsible for professional practice at the department. To directly guide the practice of each student, the graduating department appoints a supervisor from among the teachers only with the degree of doctor or candidate of science, which usually combines these responsibilities with the responsibilities of the supervisor of the student's qualification work.

5. Content of practice

Professional practice is carried out at the enterprises of the industry by determining the forms of organization of food industry and restaurants in accordance with the requirements of safety, resource conservation and environmental safety and establishing a list of hazardous factors of production of developed or improved products, taking into account the interests and capabilities of units.

Constant changes in the external environment and the food market in which the company operates, suggest the need for innovative technologies and production of new products. To this end, even before the stage of introduction of a new

product into production, it is important to assess the probability of economic feasibility and to conduct an economic justification for the implementation of an innovative project.

The innovative project is a critical starting point and the basis of all planning and production activities of the enterprise. This is the most important source of accumulation of strategic information and a way of direct managerial influence on the future position of the enterprise, which characterizes the ways to achieve profits.

Assessing the market, the existing market (external, internal), competitiveness and the range of potential consumers are studied.

During the assessment of competitors, an analysis of the company's ability to successfully lead in national and global markets and compete with other participants. Competition policy is analyzed. Ukrainian and foreign competitors who sell the same products on the market are considered.

To propose and substantiate the expediency of changes in the marketing strategy for the implementation of an innovative project.

The development of the HACCP system involves twelve stages, shown in Figure 1. The first five relate to the preparatory stage of the HACCP plan, and the last seven involve the implementation of each of these principles.

When determining the dangerous factors of production of developed or improved products, it is necessary to dwell in more detail on the following stages:

Description and establishment of product purpose. In this step is necessary to make a complete description of the food product, including all ingredients, processing methods, packaging materials, etc., used to manufacture the product. This will help identify all possible hazards that may exist in the ingredients, packaging materials or during the application of any technological operation related to the product. This description should include the name of the product, designations and names of regulatory documents under which this product is manufactured and supplied ingredients and materials, important characteristics of

the product to promote the growth of microorganisms (water activity A_w , pH acidity, etc.), brief information about the process and technology used, the actual packaging and intended use, including the target population.

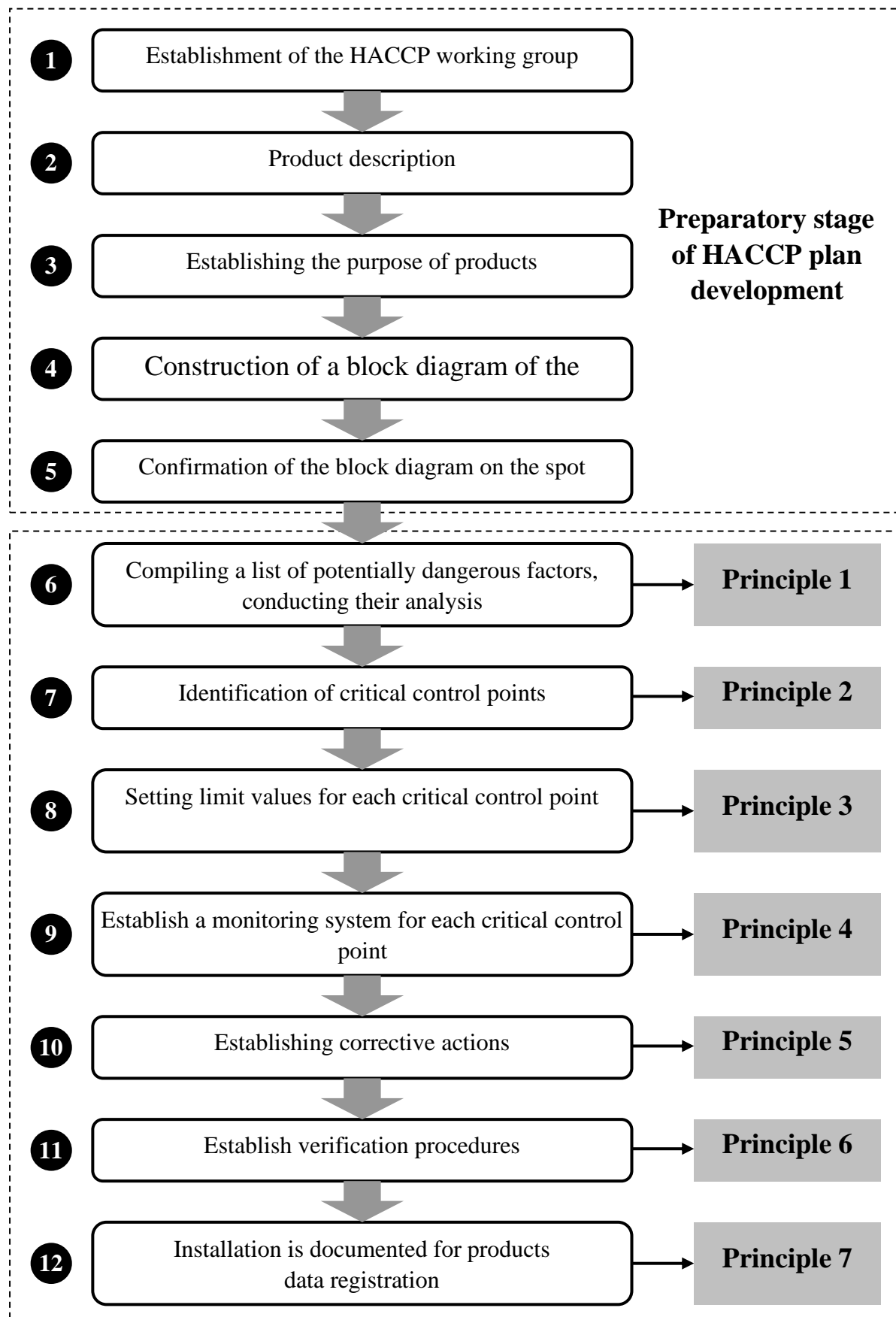


Fig. 1. Stages of HACCP system development at the enterprise.

Under the use of the product for its intended purpose understand the normal use of food by consumers in accordance with the requirements of regulations, instructions and information of the manufacturer. That is, it must be known whether the product needs to be heat treated before consumption. It is necessary to take into account possible cases of consumption of raw product, even if the manufacturer recommends cooking it before consumption. It is also necessary to establish not only how the product will be sold, but also the target group for this product, especially if the latter may be vulnerable (for example young people, the elderly, people with immunocompromised, infants or pregnant women). This information should be included in the product description.

The description of food products is desirable to give in the form of the unified form (tab. 1).

Table 1 - Product description

PRODUCT DESCRIPTION	
Product name	
Normative document	
Important product characteristics	
It should be used as a product	
Packaging (consumer and packaging)	
Expiration date	
How the product will be sold	
Special requirements for distribution	

The next step is to compile a list of ingredients and materials (including raw materials, processing additives, packaging materials, etc.) that are used in the manufacturing process of this product. You can provide a list of ingredients and materials in the form of a list indicating the regulations, or divide all components

of the category, for example, such: raw materials (meat, dairy, vegetable, etc.), other ingredients (dry, liquid, etc.), limited ingredients, preservatives, antioxidants, etc.) packaging material (film, jars, tubes, etc.) and other materials (eg drinking water, ice).

Table 2 - Analysis of ingredients and materials in the product.

LIST OF INGREDIENTS AND MATERIALS	
Raw	Normative document
Other ingredients	
Limited ingredients	
Packaging materials	
Other materials	

Construction of a block diagram of the production process. At this step it is necessary to build a block diagram of the production process, which will include all stages of the technological process of product manufacturing - from obtaining raw materials to shipment of finished products. The presence of a flowchart will simplify the identification of technological ways of possible potential contamination of the product, the choice of control methods and their discussion. The flowchart should not be too complex, but the level of detail should be sufficient to identify hazards. It is necessary to remember to consider all "inputs" of process, in particular, such as water, steam and other auxiliary technological means (fig. 2,3). The block diagram should be checked on production and specified, if necessary.

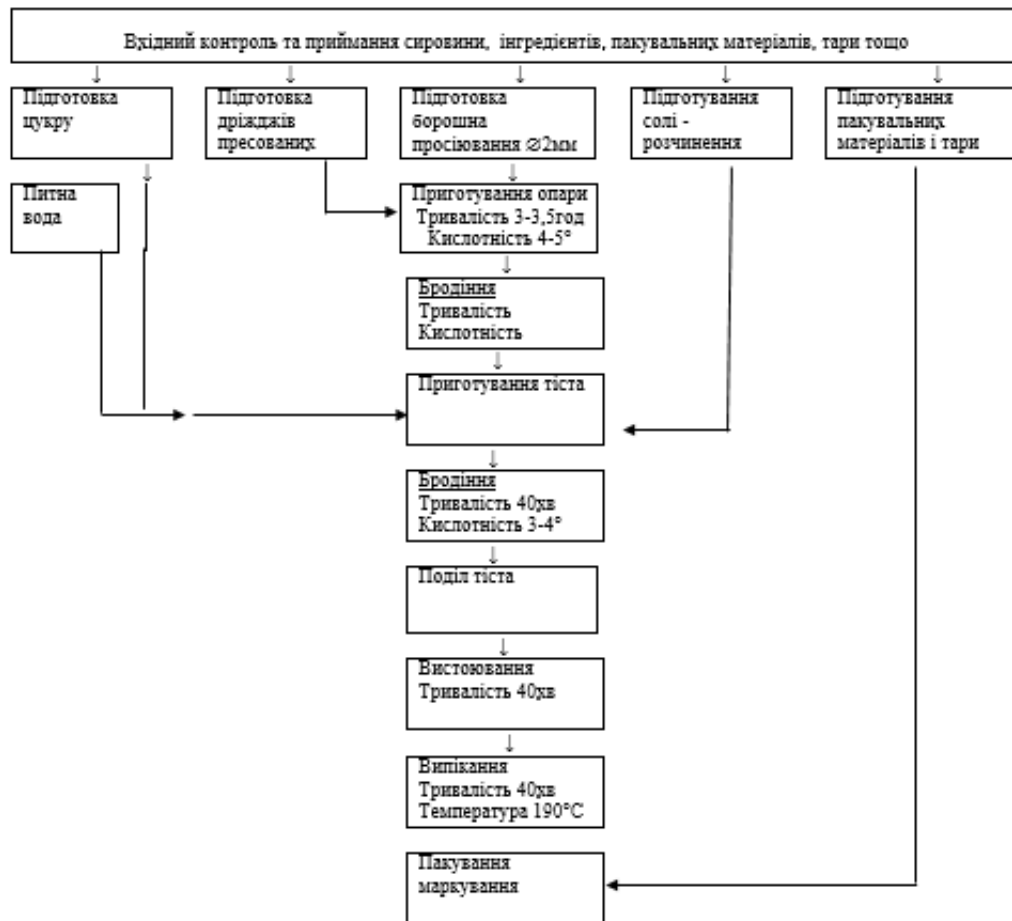


Fig. 2 - Example of a block diagram of bread production

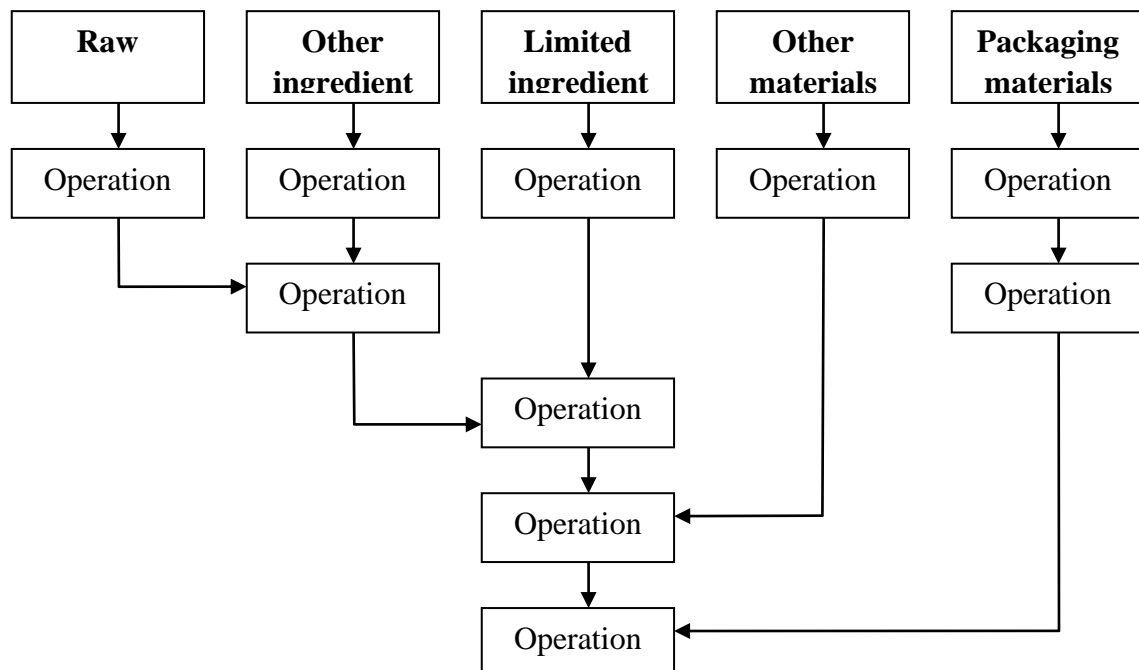


Fig. 3 - Example of a block diagram of food production

Compiling a list of potentially dangerous factors. The process of analysis of hazards includes two stages: identification of hazards factors and analysis of hazards factors.

Dangerous factor - a biological, chemical or physical factor or condition of a foodstuff with the potential for adverse effects on human health.

In order to identify and analyze hazards, a literature search should be conducted to provide the latest scientific data on food safety controls for the process and products in question.

The main focus should be on establishing the following factors for the analyzed product:

- the probability of various dangerous factors;
- localization of places of non-compliance with the rules of handling the product or equipment;
- frequency of inspection of means of transport;
- factors that contribute to food contamination, such as, for example, these tables. 3.

All potential biological, chemical and physical hazards associated with the product, from raw materials to consumption, should be considered and analyzed.

To describe the biological hazards should fill in table. 3, which provides a recommended list of factors that contribute to the contamination of raw materials and finished products.

Table 3 - Biological hazards

BIOLOGICAL HAZARDOUS FACTORS	
Product name: _____	
Factors contributing to the pollution of raw materials and finished products	
Raw	
Personnel	
Cross-contamination	

Sanitation	
Products from hazardous sources	
Pipelines, containers, work tanks	
Chemical reagents	
Residues of toxic substances	
Storage	

To describe the chemical hazards, fill in table. 4, which provides a recommended list of chemicals that contribute to the contamination of raw materials and finished products.

Table 4 - Chemical hazards factors

CHEMICAL DANGEROUS FACTORS	
Product name: _____	
Chemicals that occur naturally	
Added chemicals	
Chemicals from packaging materials	

To describe the physical hazards factors should fill in the table. 5, which provides a recommended list of physical substances that contribute to the pollution of raw materials and finished products.

Table 5 - Physical hazards factors

PHYSICAL DANGEROUS FACTORS	
Product name: _____	

<i>Factors that increase the possibility of injury</i>		
Material	Potential injury	Source
Glass
<i>Factors affecting the safety of raw materials and finished products, as well as the viability of microorganisms and their toxins</i>		
Heat treatment, duration		
Heating		
Acidity		
Storage		
Cooling		
Expiration date		
Salt for pickling		
Water activity		

To simplify the procedure of analysis of hazards factors, it is necessary to analyze the input materials and evaluate technological operations.

Analysis of input materials. For a detailed implementation of this work use the product description, list of ingredients and materials of the product. Analyze the information in the product description and determine how this information can affect the analysis of the technological process.

It is recommended to put the letters B, H, F next to each ingredient and packaging material in the list, which indicate the possibility of biological, chemical or physical hazards, using previously studied sources of information.

Table 6 - Example of hazard analysis of ingredients and materials

LIST OF INGREDIENTS AND MATERIALS	
Product Name: _____	
1	2

Raw	Types of dangers
Raw materials 1	B
Raw materials 2	H
Raw material n	F, H
Other ingredients	
Ingredient 1	B, H, F
Ingredient 2	F
Ingredient n	H
Limited ingredients	
1	2
Packaging materials	
Other materials	

Evaluation of technological operations in relation to hazardous factors.

The purpose of this step is to identify all potentially dangerous factors associated with each technological operation. To do this, analyze the block diagram of the technological process as follows:

- assign a number to each stage (operation) of the technological process on the block diagram, for example, from left to right and from top to bottom from the receipt of raw materials to shipment (transportation);

- investigate each stage on the block diagram of the technological process and according to the processed sources of information determine the existence of hazards (biological, chemical or physical) associated with this operation;

- enter the letter "B" for the biological, "H" for the chemical and "F" for the physical hazard at each stage of the flowchart where such hazard has been identified.

The assessment of the block diagram on hazards is presented in fig. 4.

Identification of critical control points. Critical control point (CCP) - a stage at which control is possible and essential to prevent or eliminate hazards to food, or reduce them to an acceptable level. CCP can be raw materials, location of the food business and its premises, production practice, procedures (techniques), product composition or technological process, where measures can be applied to prevent or minimize the impact of hazards factors on food safety.

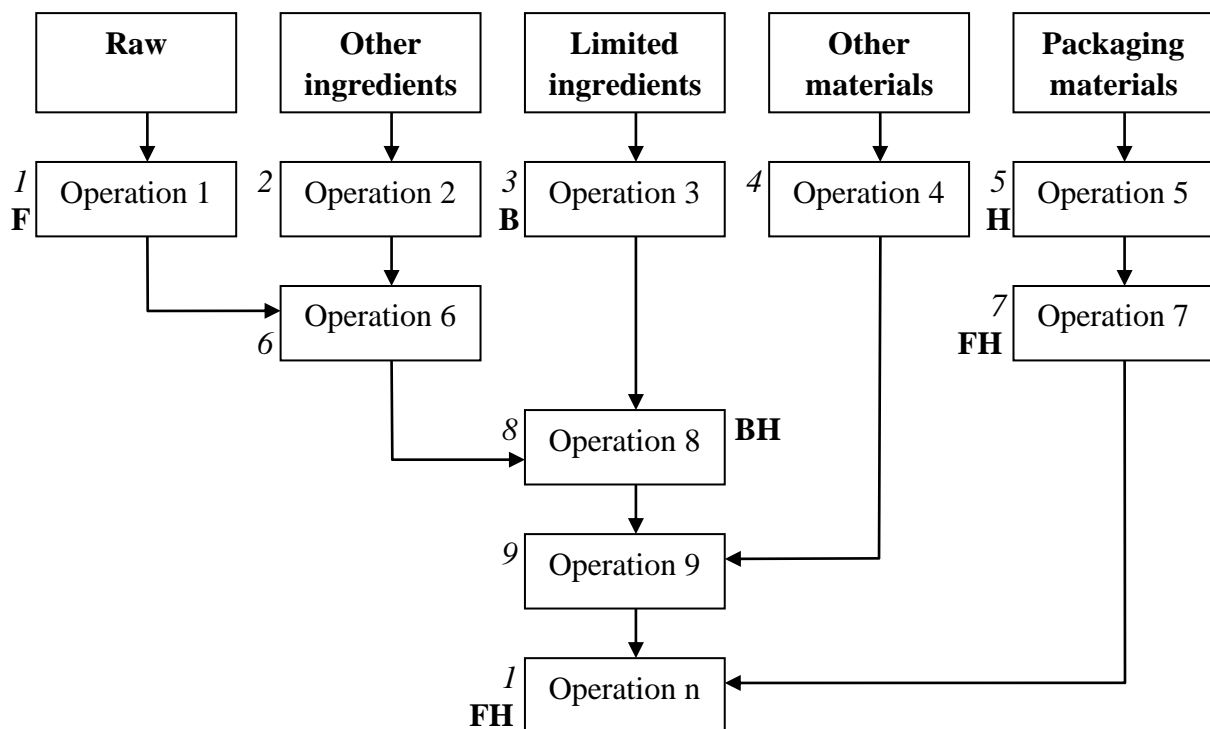


Fig. 4 - Hazard flowchart assessment.

Identification of critical control points. Each critical control point is identified by the letter code "CCP" and a number with the letter "B", "H" or "F" for biological, chemical or physical hazard, respectively. For example, the first identified critical control point to control a biohazard will be designated as CCP-1B. If the second identified critical control point controls the chemical hazard, it is recorded as CCP-2H. If the fifth critical control point will control both biological and chemical hazard for the same technological operation, it is designated as CCP-5BH.

After determining all the critical points, their identification designations of

critical control points are applied to the block diagram of production (Fig. 5).

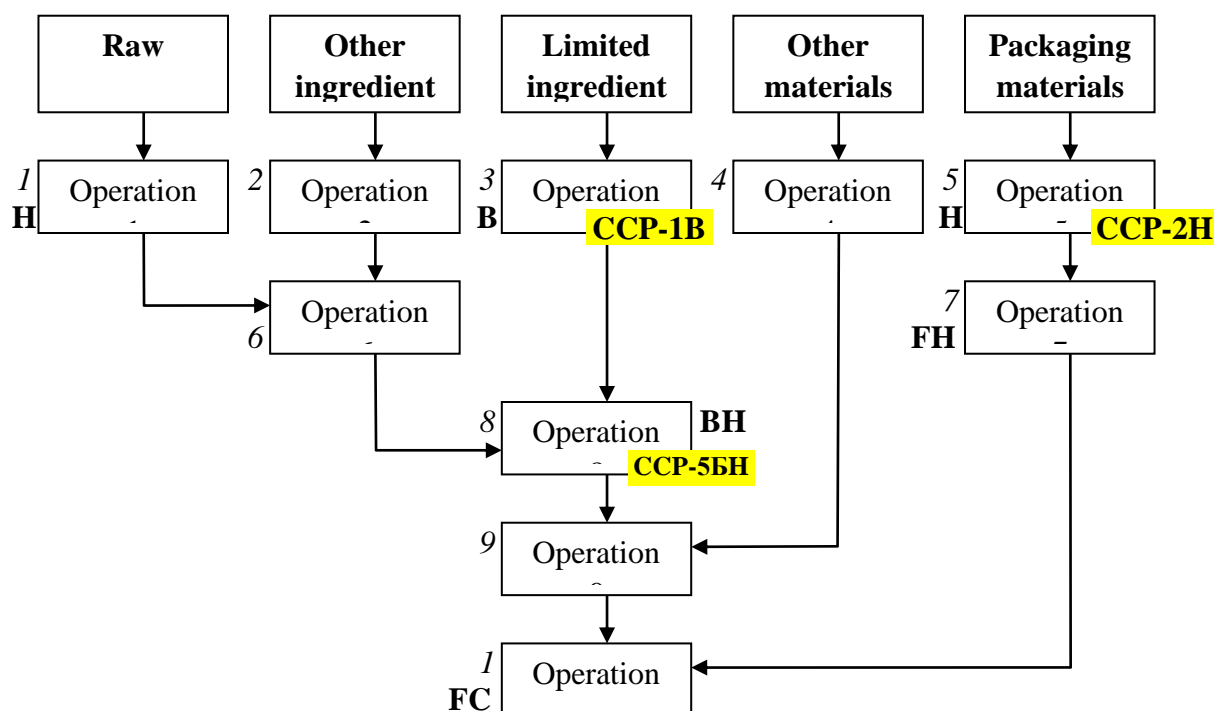


Fig. 5 - Identification of critical control points.

Setting limits for each critical control point. Limit values are defined and set in each CCP. Limit values are defined as criteria that separate valid and invalid values. Limit values are the limits that indicate the manufacture of a safe product in this operation. In other words, limit values are the maximum or minimum values at which a biological, chemical or physical parameter must be monitored in the CCP to prevent, eliminate or reduce to an acceptable level the hazard in a food product. Limit values can be set for factors such as temperature, time (minimum exposure time), physical size of the product, water activity (Aw), moisture level, pH, titratable acidity, salt concentration, organoleptic information (odor and appearance), etc. These parameters, if kept within the appropriate limits, will confirm the safety of the product. Examples of CCP limit values are presented in application L.

Establishing corrective actions. *An important task of corrective action is to prevent food that can be dangerous from getting to consumers.* Wherever there is a deviation from the set limits, corrective action is required.

Deviation - non-compliance with the limit value. Procedures should be put in place to identify, isolate and evaluate products when CCP limits are exceeded.

Deviation control must be carried out by identifying and isolating the affected products and their evaluation.

Corrective action procedures. Corrective action procedures are needed to determine the cause of the problem, take measures to prevent recurrence, and follow up through monitoring and re-evaluation to ensure confidence in the effectiveness of the measures taken.

After determining the limit values and corrective action make a plan HACCP according to table. 7.

Table 7 - HACCP plan

HACCP plan					
Product name _____					
Stage of the process	CCP	Description of the dangerous factor	Limit value	Monitoring procedure	Corrective action
Stage 1					
Stage n					

The expected results from professional practice are the ability to:

- to organize the work of food industry enterprises and restaurants in accordance with the requirements of life safety, resource conservation, environmental safety, quality management and food safety, the introduction of best manufacturing practices in production;

- to use pedagogical tools of personality formation in professional activity, to form and implement own models of professional activity taking into account the best experience of the organization of scientific and industrial activity

- plan and manage taking into account the current state of science and technology in food technology, analyze and take into account in practice the trends of scientific and technical development of food science, conduct research, analyze the results, draw conclusions, choose the most promising and rational areas of scientific and technical activities;

- use professional knowledge in the field for the development and implementation of quality management systems and safety of HACCP products;

- to develop programs of development and functioning of the enterprises of branch, to introduce rational methods of management of production processes, to plan need for resources;

- objectively, critically evaluate social information, harmonization of human relations, work effectively individually and in a team;

- to present the results of scientific and production tests in the form of scientific and technical documentation, scientific reports, security documents, articles, abstracts of scientific conferences;

- to develop, implement innovative technological solutions in solving existing problems and further development of food technologies, to implement the results of scientific research and testing in the production conditions of real enterprises;

- to assess markets and competitors, to study marketing strategy, to promote the development of foreign economic relations of food industry enterprises and restaurants;

- to implement knowledge and skills on waste-free technologies in the conditions of existing food industry enterprises and restaurants;

- to offer and implement the use of new methods of canning and storage of food, including the use of bioplastics.

6. Summing up the practice

Following the results of practice the student submits to the department the written report on practice.

After registration of the report on professional practice and its check by the head the student reports on the executed work according to the established schedule.

Attestation based on the results of the internship is carried out on the basis of the defense of the report and the response of the head of the internship to the commission, which includes the supervisor of the master's program, the supervisor of the undergraduate and the head of the internship.

Based on the results of the positive attestation, the student is given a differentiated grade on a 5 and 100 point scale (Table 8.9). Assessment in practice is equated to assessments in the disciplines of theoretical education and is taken into account when summing up the results of intermediate (session) certification of students.

Table 8 - Distribution of points for individual sections of the report of professional practice

№ s / n	Performance evaluation criteria	Bali
1	Enterprise structure, main, auxiliary and by-products	to 2
2	Technical and economic performance of the enterprise, product range	to 2
3	Basic and auxiliary raw materials. Requirements for quality and safety of raw materials	to 2
4	Chemical-technological and microbiological quality control of raw materials and finished products	to 10
5	Proposals for innovation in the enterprise in terms of implementation of new technological processes and equipment	to 10
6	Assessment of economic feasibility and	to 5

	economic justification of the innovative project	
7	Description of production technology for which the task is to develop a HACCP plan	to 5
8	Block diagram of production	To 4
9	Analysis of dangerous factors	to 10
10	Development of the HACCP plan on production according to the individual task on an example of technology of a separate food product	to 10
	Together	Not more than 60

Table 9 - Criteria for assessing the level of protection of the report of professional practice by the commission

Scores	The level of the knowledge of the applicant for higher education	Evaluation criteria
36 – 40	high	The report of the higher education student was well thought out, structured, contained the main results of the individual task, the higher education student demonstrated fluency in the topic, the answers to the questions of the commission members are complete, the understanding of the material is deep, the basic skills are formed and mastered.), conclusions and generalizations are accurate. The applicant of higher education is guided in the system of current legislation, the use of professional terminology is correct, the conclusions based on the results of professional practice are presented and demonstrated with the help of illustrative material
32-36	sufficient	The report of the higher education applicant is well thought out, substantiated, contains the main results of the individual task, the answers to the questions of the commission members are complete, the understanding of the material is deep enough, the basic skills are formed and mastered, conclusions and generalizations are accurate; the applicant of higher education is guided in the system of the current legislation; the use of professional terminology is correct, the conclusions based on

		the results of professional practice are demonstrated with the help of illustrative material.
30-32		The report of the higher education applicant is well thought out, substantiated, contains the main results of the individual task, the answers to the questions of the commission members are complete, the understanding of the material is deep enough, the basic skills are formed and mastered, conclusions and generalizations are accurate; the applicant of higher education is guided in the system of the current legislation; the use of professional terminology is correct. But the presentation is not systematized enough, in the definition of concepts, terminology and generalizations there are some mistakes that are corrected by additional questions of commission members, some conclusions on the results of professional practice are not reflected in the defense and not demonstrated by illustrative material.
27-30	average	The report of the applicant for higher education is not properly systematized, ill-considered, the main results of the individual task are partially disclosed, the answers to the questions of the commission members are unfounded, the understanding of the material is superficial; the applicant of higher education is poorly oriented in the system of current legislation; use of professional terminology with inaccuracies, some conclusions based on the results of professional practice are not demonstrated with the help of illustrative material.
24-27		The report of the applicant for higher education is not properly systematized, ill-considered, the main results of the individual task are partially disclosed, the answers to the questions of the commission members are unfounded, the understanding of the material is superficial; the applicant for higher education is not oriented in the system of current legislation; use of professional terminology with inaccuracies. Conclusions and proposals are insufficiently substantiated and have a dubious applied nature, conclusions based on the results of professional practice are not demonstrated with the help of illustrative material.
14-24	low	The report of the higher education applicant is not properly prepared, the answers to the questions of the commission members are unfounded or absent, the understanding of the material is superficial; the applicant for higher education is not oriented in the system of current legislation; does not know how to use professional terminology. The work testifies to insufficient formation of basic professional skills, there is no substantiation of practical and applied value of the performed individual task, conclusions based on the results of professional

		practice are not demonstrated with the help of illustrative material.
0-14		The report of the applicant is not prepared, the answers to the questions of the commission members are unfounded or absent, the understanding of the material is superficial; the applicant for higher education is not oriented in the system of current legislation; does not know how to use professional terminology. The work shows that the basic professional skills are not formed, some conclusions based on the results of the individual task are not demonstrated with the help of illustrative material.

7. Report structure

To take a test of professional practice, the student must draw up a report, which must contain information about the specific work performed by the student during the internship, as well as the characteristics of the company or its individual shop, where the internship was conducted.

The report includes: title page (Appendix 1), table of contents, introduction, main text, conclusions and suggestions, list of used sources of information and literature, appendices.

The structure of the main part of the report should contain the following sections:

1. Enterprise structure, main, auxiliary and by-products.
Production capacity of the enterprise. Number of employees. Power address.
2. Technical and economic performance of the enterprise, product range.
3. Main and auxiliary raw materials. Requirements for quality and safety of raw materials.
4. Chemical-technological and microbiological quality control of raw materials and finished products.
5. Proposals for innovation in the enterprise in terms of implementation of new technological processes and equipment.
6. Assessment of economic feasibility and economic justification of the innovative project

7. Description of production technology for which the task is to develop a HACCP plan.

8 Block diagram of production.

9 Analysis of dangerous factors.

10. Development of the HACCP plan on production according to the individual task on an example of technology of a separate food product.

The report on the practice must have a clear construction, logical sequence and specificity of the material, the accuracy of the wording.

8. Development of presentation material

In defense of the report on professional practice, students prepare a presentation material, which with the help of the presentation highlights the main activities for the analysis of the technology of a new product; assessment of the sales market and competitors, marketing strategy; construction of a block diagram of the production process, identification of dangerous factors in the production of developed or improved products; development of a protocol for the analysis of dangerous factors of food production; with the definition of critical control points; determining the list of corrective actions and the verification procedure.

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SUMY 2021

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METHODICAL INSTRUCTIONS FOR PROFESSIONAL PRACTICE AT THE FOOD ENTERPRISES OF THE INDUSTRY

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Signed for printing: ____

Format A4:

Headset Times New Roman

Circulation: ____ copies

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conditionally printed sheets 1,3
