MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRARIAN UNIVERSITY

Faculty of Food technologies

METHODOLOGICAL INSTRUCTIONS FOR PERFORMING QUALIFICATION WORK

field of knowledge: 18 "Production and Technology"
specialty: 181 "Food Technology"
educational and qualification level

"MASTER"

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Methodological instructions for performing qualification work for students of specialty 181 "Food Technologies" of full-time and part-time forms of study, 2nd supplemented edition // Sumy: SNAU, 2024 , 77 p.

The guidelines are aimed at providing methodological assistance to students during the implementation qualification work.

Recommended for publication educational and methodological faculty of food SNAU technologies.

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CONTENT

Introduction

The Regulation on Qualification Work is a component of the system of internal quality assurance of educational activities and the quality of higher education at Sumy National Agrarian University (hereinafter referred to as SNAU), regulates the organization of preparation and defense of the final qualification work and was developed taking into account the requirements of the Law of Ukraine "On Higher Education", instructions of the Ministry of Education and Science of Ukraine, the standard of higher education of Ukraine in specialty 181 "Food Technologies", "Regulations on the Examination Commission for Certification of Higher Education Applicants at SNAU", as well as the experience acquired by SNAU in the implementation of final qualification projects (works) by students.

Qualification work is a qualifying independent research carried out by a student at the final stage of study at SNAU. Qualification work is intended for an objective assessment of the degree of formation of knowledge and skills to solve professional tasks specified in the characteristics of the relevant educational and professional master's program, an integral part of which is scientific research.

Based on the defense of the qualification work, the Examination Commission (EC) decides on the issue of awarding the student the appropriate qualification and issuing a master's degree. In addition, during the defense of the qualification work, master's students demonstrate their skills in communicating with the audience, the ability to formulate and express opinions, and correctly and confidently answer questions from those present.

Qualification work must have a practical reflection and internal unity and fully correspond to the set goal of the chosen topic. On the one hand, qualification work has a generalizing nature, since it is a kind of summary of the master's training; but on the other hand, it is an independent original scientific and practical research of the student.

Therefore, the completion of qualification work, as the final stage of training specialists in a higher educational institution, aims to form in the student general and professional competencies provided for by the educational program for master's training.

As a result of writing the qualification paper, the student ***will be able to demonstrate:***

- the ability to act socially aware, to show initiative and resourcefulness;
- the ability to find and analyze the necessary information in scientific and technical literature, electronic databases, and choose innovative research directions taking into account economics and marketing;
- the ability to use special equipment, methods and techniques both during scientific research and in production;
- choose the most promising and rational directions of scientific and technical activity, the ability to conduct research, analyze the results obtained and draw conclusions, reproduce the results of scientific research and testing in the

production conditions of actually operating enterprises;

- the ability to develop new food products, culinary products and improve existing ones, conduct scientific research and optimize technological processes;
- ability to organize production and implement scientific and technical projects taking into account current development directions food industry;
- ability to organize a quality control system and safety of food raw materials, semi-finished products and food products products;
- ability to communicate and present the results obtained to the audience and discuss them, prepare scientific publications, security documents.

Qualification work must meet ***the requirements:***

- orientation all developments to reveal topics and tasks relevant to the agro-industrial complex and the processing industry;
- correspondence to real conditions production;
- clarity of structure and logical teaching material;
- brevity and persuasiveness of arguments and conclusions;
- validity and generalization theoretical and practical recommendations for production.

Specific tasks of the qualification work depend on its orientation (practical, scientific - research) and the object of research. The task may be the search and justification of new technologies, improvement of existing processes, creation and use of new samples of food products, in-depth study of theoretical models, mastering the methodology, techniques and modern tools of scientific research.

Qualification work must be carried out taking into account modern theoretical and practical domestic and foreign experience. Research carried out by a master can be a continuation of the student's scientific and practical work begun in previous courses and find its further development in the performance of a candidate's thesis, and can also be implemented at operating enterprises.

The qualification work is written in the state language as a manuscript. volume of 50…70 pages of typewritten text in A4 format with experimental results presented in the form of figures and tables research, depending from the research topic. It does not
should not be rewritten from textbooks or manuals of theoretical provisions, methods , etc., and only references to them are allowed. Responsibility for the reliability of the initial, calculated and adopted data in the master's thesis lies with the student - the author of the work. The supervisor helps the student to justify, determine and make the right decision, check and evaluate the decisions made.

A recommended component of the master's thesis is the preparation of a publication of an article and theses based on the results of scientific research.

The supervisor of the final qualification work is appointed by a lecturer of the department who has a doctorate or candidate of sciences degree, an academic title and conducts scientific research in the relevant field.

1. ORGANIZATIONAL MEASURES FOR THE PERFORMANCE OF QUALIFICATION WORK

1.1. Topics of qualification work

The first stage in writing a qualification paper is choosing a research topic. The topic should be relevant, practically significant, have a research character, and reflect important problems of food technology. Choosing and formulating the topic correctly means:

- to accurately determine its relevance and appropriateness, novelty and prospects;
- take into account the availability of a theoretical basis, the possibility of conducting experimental research, and the possibility of obtaining significant socio-economic results.

To do this, you need to conduct an independent search for information by familiarizing yourself with information sources (about 45…100 literary sources):

- articles in professional journals, collections of scientific works, periodicals,
- dissertation abstracts,
- textbooks and study guides,
- monographs,
- patents,
- Internet resources , in particular information from professional technological forums, exhibitions, information from domestic and foreign scientific and research institutes, restaurant and food enterprises

industry, etc.

Choosing a topic for a qualification thesis, like any scientific research work, includes several general approaches, including:

- studying the topics of the scientific plans and programs of the graduate department;
- familiarization with catalogs of previously defended diploma theses, dissertations, monographs, articles on the chosen topic;
- evaluation of known scientific and industrial solutions using classical and new research methods or from the standpoint of traditional or new theoretical knowledge.

Topics of qualification papers in specialty 181 "Food Technologies" are selected from the recommended list or independently in agreement with the scientific supervisor.

The student is given the right to independently choose the topic of the qualification work in accordance with the topic approved by the graduating department. In addition, qualification works can be carried out on the topic ordered

by state institutions, enterprises and business structures. The student, in agreement with the supervisor, can propose his research topic under the conditions of appropriate justification of the feasibility of its development (in accordance with his previous scientific research work, place of work, opportunities to obtain the necessary information at the research site).

As a rule, the topics are related to: improvement or development of new technologies of food products (dishes) due to modifications of the recipe composition and the use of various technological methods of influencing the process; research of organoleptic, physicochemical, structural-mechanical, technological properties of the dish; study of the nutritional and biological value of the developed product, etc.

The topic of the qualification work should provide for the solution of economic, organizational and social issues related to a certain area of research, take into account the real possibility of obtaining technologically new products. The solution of the tasks can be achieved by creating fundamentally new technologies, improving traditional technologies, identifying objective trends in the development of biological, chemical and mechanical processes occurring during the manufacture of specific products.

It is desirable that the work be carried out on the basis of (or on order of) an interested enterprise or organization, thanks to which its results acquire practical significance.

After studying the sources, the student draws up a plan that is agreed upon with the academic supervisor, the head of the educational and professional program, consultant, head of the graduate department, and dean.

A detailed plan is indicated in the graduation assignment. qualification work (hereinafter referred to as the Task - an example is provided in Appendix B), which, with the approval of scientific the leader, maybe to adjust. About this are being made relevant entries in the approved option.

Example of title page design qualification work is given in Appendix B.

After choosing the topic of the qualification work scientific. The supervisor and the student develop deployed individual work plan of its practical implementation. The specified plan regulates the sequence and timing of work on individual in stages writing qualifying work and includes working curriculum with passing professional practice, as well as a plan in which the execution sequence is fixed and the content of the sections and subsections of the qualification work.

Subjects of qualification work and deadlines for their completion are determined early academic year in the master's program. The student independently chooses the topic of work, with a mandatory defining the subject of research and its relevance, formulates it in a statement (Appendix A). The chosen topic is approved by the head of the department, who assigns a master's degree to a scientific supervisor. An indicative list of topics for master 's theses is presented in Appendix C.

1.2. Main stages implementation qualification work

1. Choosing a topic and object of research.
2. Receiving tasks for qualification work, drawing up a calendar plan for it execution.
3. Processing educational and scientific literature, choice of problem and assembly detailed work plan.
4. Preparing for the study: compilation programs and research plan, selection of research methods, mastery of research techniques.
5. Carrying out research.
6. Processing of factual material using a PC.
7. Writing the first text variant, presentation him for review to the manager.
8. Elimination shortcomings, writing the final version of the text, design qualification work.
9. Presentation work for review to the manager, receiving response.
10. Preliminary protection qualification work at the department.
11. Plagiarism check .

12. External review work .
13. Defense of the qualification work at a meeting of the examination committee (EC).

For the period of the qualification work, the department draws up a schedule of consultations with the scientific supervisor, according to which systematic cooperation between the student and the supervisor on the qualification work is ensured . Systematic consultations help the student in choosing research methods, in monitoring compliance with the requirements for the content and design of the work, in timely eliminating deviations. Prompt and careful implementation of the supervisor's recommendations contributes to the timely submission of the qualification work for verification and is the key to its successful defense.

Violation by a student of the calendar plan for completing the qualification work is recorded by the supervisor, who informs the head of the department.

1.3. Organization of execution qualification work

Deadline qualification work determined by the academic schedule process.

The qualification work must be performed by the student in full accordance with the approved calendar plan and tasks. In cases If the student is behind schedule, he/ she is obliged dates explanation to your manager or to the head of the department.

In case of a positive review of the scientific. The supervisor's work is registered at the department and submitted for consideration. to the head of the department, who must accept decision on admission of a student to the defense work at the EC meeting.

After the student submits the work for plagiarism checking to the department of quality of higher education. After all the necessary preliminary procedures at the department, obtaining positive Based on the results of the verification, the qualification work is submitted for review. The list of reviewers is compiled at the department and approved by the dean of the faculty in accordance with the established procedure.

In addition, before presenting qualification work to defense it is submitted for plagiarism checking to the security department quality of higher education.

1.4. Scientific head of qualification work

The scientific supervisors of the qualification work may be teachers with scientific degrees and academic titles who carry out scientific research that meets the specifics and content of the educational program.

The scientific supervisor of the qualification work is appointed at a meeting of the department where the educational program is implemented , in accordance with the academic load, scientific interests of the NPP, taking into account the wishes of applicants who have the right to choose a scientific supervisor. List of potential scientific supervisors. The heads of qualification works agree with the guarantor of the educational program.

Scientific supervisor of the qualification work:

provides scientific guidance for the preparation of the work;

forms together with the applicant tasks for its implementation;

approves the qualification work plan and, if necessary, its adjustment,

and also agrees on the object and subject of research;

recommends the necessary basic literature, reference and other materials;

monitors the student's adherence to the calendar schedule qualification work;

informs at the department meeting about the progress of the student's calendar schedule;

analyzes and professionally reviews structural parts qualification work;

systematically advises applicants (in person, according to the approved consultation schedule, or via electronic means of communication) regarding the content and procedure for writing the qualification paper, adherence to the principles of academic integrity and research ethics;

if necessary, together with the student, makes suggestions regarding adjusting the topic of the qualification work.

Changes in the wording of the name work based on the student's application involves introduction changes to the order in writing submission Head of the Department (excerpt) from the minutes of the department meeting) no later than two months before the defense;

gives written feedback on the work done qualification work;

participates in the previous defense and public defense of qualification work.

Changes in the heads of qualification works are issued by order of the university upon written request of the head of the department where the educational program is implemented , if such a need arises.

1.5. Rights and responsibilities applicant

Getter higher education has the right:

- choose a topic for a qualification study from the list

proposed topics at the department or propose your own with the necessary justification for its development (taking into account the areas of scientific interests of the department's teaching staff);

- receive advisory assistance from the manager regarding the qualification study;
- to familiarize yourself with the conclusion of the scientific supervisor and the review of the completed qualification research.

A higher education student is obliged to:

- attend general consultations, briefings on writing a qualification study;
- adhere to the calendar plan for performing the qualification work;
- to complete and formalize the qualification work in accordance with the requirements established by the higher education institution;
- comply with current legislation on the preservation of copyright;
- be responsible for the quality of the prepared qualification work, the reliability of the data obtained;
- sections of the qualification research to the scientific supervisor for processing (according to the schedule) in a timely manner ;
- take into account the recommendations of the scientific supervisor and adhere to the norms of academic integrity;
- send the completed qualification study to the department's email address to check it for borrowings;
- according to the calendar schedule, submit a completed qualification work to the department, prepare a report and presentation for defense;
- undergo the procedure of preliminary defense and defense of the qualifying research.

1.6. The role of the guarantor of the educational program

The guarantor of the educational program ensures the formation of a list of recommended topics for qualification works, its annual adjustment in accordance with modern challenges and development trends in the relevant field, the requirements of national and regional markets, the characteristics of the labor market, and the proposals of stakeholders .

The guarantor of the educational program ensures the organization of the procedure for applicants to choose the topic of the qualification work and scientific supervisors, agrees on the topics of the works proposed by the applicants independently, and submits the issue of approving the topics of the qualification work and scientific supervisors to the department meeting.

The guarantor may provide advice to academic supervisors and applicants regarding the compliance of the structure, object and subject of research, and the content of the qualification work with the educational program.

The guarantor of the educational program heads the relevant commissions for the preliminary defense of the qualification work and makes a decision on the admission (conditional admission, non-admission) of the qualification work to public defense at a meeting of the certification commission.

The guarantor of the educational program is, as a rule, a member of the relevant certification commission, at the meeting of which the qualification work is defended.

1.7. Research ethics

Ethical research practice requires that higher education students act openly and honestly at all stages of the research process, making every effort to ensure the reliability of their conclusions. Thus, the starting points for qualifying work are openness, honesty, thoroughness and accuracy in conducting research, as well as in recording, presenting and evaluating its results. The methods used for data collection, as well as for research and evaluation of results, should meet scientific criteria and be ethically sound.

The very formulation of the topic of a qualification study cannot be morally questionable.

Higher education students must adhere to scientific standards when planning and conducting qualifying research, reporting its results, and recording data obtained during the research.

If the qualification work aims to obtain data through surveys, questionnaires, or interviews, the ethical implications of the research must be discussed with the scientific supervisor.

The university has a responsibility to protect the privacy, health, cultural sensitivity and well-being of individuals, so supervisors and students should be aware of the ethical issues of research. Violation of research ethics will reduce the credibility of the results of the qualification work, as the data obtained should not be morally questionable.

During the preparation of the qualification work, all participants in the educational process (student, scientific supervisor) must adhere to the fundamental principles of research ethics and academic integrity (Appendix I).

2. CONTENT AND SCOPE OF QUALIFICATION WORK

2.1. Structure of the qualification work

Qualification work must have volume of 50-70 pages of text.

Content of the qualification work is determined by its theme and is reflected in a plan developed with the help of scientific supervisor. According to the chosen topic, the student independently or on the recommendation of the supervisor selects literary sources and relevant regulatory documents and drafts a plan that discusses with the manager.

The task for the qualification work (Appendix B) generally determines the content of the work. and contains the following sections in the main part:

- title of the work topic;
- summary of the text and graphic parts work (software);
- initial data for design research.

Simultaneously a calendar implementation plan is being drawn up works (Appendix B)

Regardless Depending on the specialty profile, the explanatory note to the qualification work must contain the following mandatory structural elements:

- title sheet with signatures of the student, supervisor, reviewer and be approved Head of the Graduate Department;
- assignment for qualification work, approved Head of the Graduate Department and signed by the student, supervisor, consultants from individual sections of the work;
- an annotation in the state language and one of the languages international communications (short) content of the work general no more than 150 words);
- list of abbreviations (if necessary) in alphabetical order;
- introduction (relevance, goal, objectives, object and subject of the research, research methods , scientific novelty of the results obtained and their practical significance, publications (if any) and the student's personal contribution, if published scientific works (or positive decisions and patents for inventions obtained) on the topic of the work were co- authored ;
- review literature;
- feasibility study and scientific and technical justification (if necessary) and selection of optimal options for mathematical models of the object and subject and research methods , etc.;
- sections of the main part, the content and list of which are determined by the profile of the specialty and the topic of the qualification work, and the requirements for them are specified by the graduating department in the methodological instructions for performing the qualification work in the relevant specialty;
- section of the economic part, which must contain the calculation development efficiency, calculations costs of conducting search engines project

works, manufacturing prototypes, etc.;

- conclusions in which formulated main results of the work,

results obtained, prospects and directions for further research, etc.;

- a list of used literature, in which the names of used literary sources, patents, regulatory and technical documents, addresses of Internet sites, etc. are placed in the order of appearance of links in the text of the software or in alphabetical order;
- appendices (tables, various diagrams, etc.).

The graphic part of the qualification work contains all the mandatory materials specified in the assignment, as well as additional illustrative materials (slides, posters) made to facilitate the defense (the quantity is not regulated, but they do not replace the mandatory diagrams and other illustrations).

The graphic part of the qualification work is drawn up in accordance with the requirements of current standards.

2.2. Requirements for the preparation of a qualification thesis

The work must be formatted in accordance with the State Standard of Ukraine DSTU 3008-95 “Documentation. Reports in the field of science and technology. Structure and rules of formatting” and “Methodological instructions for formatting course and qualification papers” [72]. Given the high requirements of regulatory documents, it is necessary to strictly adhere to the procedure for submitting certain types of text material, tables, formulas and illustrations.

The qualification work is printed on one side of a sheet of white A4 paper, font – Times New Roman (other fonts may be used to highlight examples, concepts, etc.), font size – 14, line spacing 1.5 intervals (up to 30 lines per page), top and bottom margins – 20 mm, left – 30 mm, right – 10 mm.

The font of the print must be clear. The density of the text must be the same. It is allowed to enter individual foreign words, formulas, and symbols in it only in black ink.

Each formula is written on a new line, symmetrically to the text. One line is skipped between the formula and the text. The conventional letter designations (symbols) in the formula are given in the text or immediately below the formula. To do this, a comma is placed after the formula and an explanation of each symbol is written on a new line in the sequence in which they are given in the formula, separated by a semicolon. The first line should begin with a paragraph with the word "where" and without any sign after it. All formulas are numbered within the section with Arabic numerals. The number is indicated in parentheses on the right side, at the end of the line, at the end of the formula. The formula number consists of the section number and

the formula serial number in the section, separated by a dot. It is allowed to perform

numbering within the entire document.

Main text works divided into sections, subsections, paragraphs, and sub-paragraphs. Headings of structural parts works: TABLE OF CONTENTS, INTRODUCTION, CHAPTER, CONCLUSIONS, LIST OF REFERENCES, APPENDICES are printed in capital letters symmetrically to the text in bold.

Headings of the structural part (sections) also print in capital letters symmetrically to the text in bold. Subsection headings are printed in small letters (except for the first capital letter) from the paragraph in bold. A period is not placed at the end of the heading. Paragraph headings are printed in small letters (except for the first capital letter) from the paragraph. A period is placed at the end of the heading. The distance between the heading except for the paragraph heading) and the text should be 3–4 spaces (2 indents).

Each structural part qualification work must be started from a new page.

To the general volume qualification work is not included applications, list of used sources, tables and figures that completely occupy area pages. At the same time, all pages of the specified elements of the work must be numbered.

Illustrative material for the defense of the qualification work can be made in the form of posters, drawings and presented using overhead projectors and computer tools. The content of the illustrative material must be sufficiently in full reflect the main provisions that are put forward for defense.

All pages of the qualification work are subject to numbering on a general basis.

The numbering of pages, sections, subsections, paragraphs, sub-paragraphs, figures, tables, and formulas is given in Arabic numerals without the number sign .

The page number is not placed on the title page, but on the following pages are numbered in the right upper corner pages without a period at the end.

section number is given. After the word "CHAPTER", after the number, do not put a period, then print the section title on a new line.

Subsections are numbered within each section. The subsection number consists of the section number and the subsection ordinal number, between which put dot. A dot is not placed at the end of the subsection number, for example: "2.3" (the third subsection of the second section). Then, on the same line, there is the subsection title.

Points numbered within each subdivision. The item number consists of ordinal numbers section, subsection, and paragraph numbers, between which put period. A period is not placed at the end of the number, for example: "1.3.2" (second point of the third first division section). Then, on the same line, there is the heading of the item. The item may not have a heading. If there is no heading, we put at the end of the number period.

Sub-paragraphs are numbered within each paragraph according to the same rules as paragraphs.

Illustrations (photographs, drawings, diagrams, graphs, maps) and tables

must be submitted directly after the text where they are first mentioned, or on the next page.

Illustrations are marked with the word "Fig." and numbered. consistently within the section, except illustrations provided in the appendices. If there is only one figure in the work, its numbered according to general rules.

illustration number should consist of the section number and the serial number of the illustration, between which a period is placed. The illustration number, its title and explanatory captions are arranged sequentially under the illustration.

Tables are numbered. consistently (except tables given in the appendices) within the section. In the upper left. The inscription " Table " is placed in front of the corresponding table heading, indicating its number. The table number should consist of the section number and the table serial number, between which a period is placed, and after the table number a dash, for example: " Table 1.2 -". If there is one table in the work, it is numbered according to general rules.

When transferring part of a table to another page, the word "Table" and its number are indicated once on the left above the first part of the table, and above the other parts, the words "Continuation of table" are written and the table number is indicated, for example, "Continuation of table 1.2."

Formulas numbered within Section. Formula number consists of the section number and the formula number in the section, between which put period. Formula numbers are written near the right margin of the sheet at the level of the corresponding formula in parentheses, for example: (3.1) (the first formula of the third section).

2.3. Registration requirements main structural elements of qualification work

Title sheet

The first page of the work is designed in accordance with the requirements state standards in library and publishing. Title page sheet (Appendix B) must contain the following details:

- name educational institution;
- name of the faculty and department;

- topic of the qualification work;
- surname, first name, patronymic of the author;
- course and its number groups;
- last name, initials, academic degree and title scientific manager;
- place and year of completion of the qualification work.

Task

The task for the qualification work contains: the topic of the qualification

work, deadlines, initial data for the work and the content of the explanatory note. An example of the task design is given in the appendices (Appendix B).

Annotation

The abstract, which is approximately 800 characters long , includes the applicant's last name and initials , the title of the qualification work, the main content and results of the research, and keywords (words of specific terminology on the topic that are most often found in the qualification work) in the nominative case. The number of keywords is 5-7.

The abstract must be written in Ukrainian, Russian and one of the foreign languages (most often English).

Content

Contents (actually working individual plan) is submitted at the beginning of the qualification work. It contains the names and numbers initial pages of all sections, subsections and paragraphs, including introduction, conclusions to chapters, general conclusions, appendices, list of used literature, etc. That is, it is a list of sequentially compiled measures that reveal the content of the topic; it's worth do expanded and detailed. The work plan consists of sections, the names and sequence of which should reflect the structure of the research topic; from general questions move on to more specific ones. In this way, the structure of each subsequent section. In the process of execution qualification work content may be adjusted (with approval) scientific manager).

List of abbreviations and conventions designations

If used in the work specific terminology, as well as used little-known abbreviations, new symbols, notations and so on otherwise, their list can be presented in the work as a separate list, which placed before the introduction. The list is worth print two columns in which left of the alphabet. For example, the abbreviation is given, and the detailed one is given on the right. decryption.

If the work contains special terms, abbreviations, symbols, and notations and so on else repeat Less three times, the list is not made, but their decoding cited in the text at the first mentioned.

Introduction

Amount introduction 4…6 pages and in it The relevance and appropriateness of the chosen topic is reflected.

The introduction reveals the essence and state of the scientific or scientific - practical problem (task) and its significance, the grounds and initial data for developing the topic, and the justification for the need to conduct research.

Next is served general description of the final project in the format recommended below sequences.

Relevance of the topic . Through critical analysis and comparison with known solutions to the problem (scientific task), justify the relevance and feasibility of the work for the development of the field of knowledge 18 "Production and Technology", especially for the benefit of Ukraine. Coverage of relevance should be concise and emphasize precisely at the heart of the problem.

Communication work with scientific program, plans, topics. Briefly explain connection selected direction research with the plans of the organization where the work was performed, as well as with industry and (or) state plans and programs.

Purpose and objectives of the study. Formulate the purpose of the work and the tasks that need to be solved to achieve. The goal should not be formulated as "Research ...", " Study ...", because these words indicate a means to an end, not the end itself.

Object of research. It processes or phenomenon that creates a problem situation and selected for study (for example, the technology of gelled sweet dishes).

The subject of research in the qualification work is the regularities of the functioning and development of the object, its various qualities, properties, etc. The subject of research is contained within the boundaries of the object.

Object and subject as categories of scientific process relate to each other as a whole and partial. Example of a subject: lemon jelly technology using furcelaran.

Scientific novelty of the obtained results results - one of the main requirements for the topic of the work. It must contain a solution to a new scientific problem or new developments that expand the existing boundaries of knowledge in a particular field of science.

Served short annotation of new scientific or practical provisions (solutions) proposed by the student personally. It is necessary to show difference of the obtained results from previously known, describe
degree of novelty (first *obtained, improved, received further development).*

Novelty of the work and the topic are organically related. Novelty can be associated both with old ideas, which is expressed in their deepening, concretization, additional reasoning, demonstration of possible use in new conditions, in other areas of knowledge and practice, and with new ideas put forward personally by the applicant.

Publications. Indicate publications on the topic of the work, if any .

Main part (sections)

Content and results research is worth direct logically citing scholarly publications (if necessary) and avoiding unproven statements. To qualifying work has acquired logical consistency and systematicity, the main part of it is divided into sections, subsections, paragraphs and sub-paragraphs. Thus, sections, as a rule, include :

- subdivisions (numbering consists of two numbers separated by a dot),
- points (numbering – three digits),

- sub-items (numbering – four digits).

Conclusions

After the main part qualification work form general conclusions, scope which should not exceed 1.5…2 pages. Of course, the conclusions must be done for each section of qualification work (generalized results of a specific disclosed question).

The general conclusions set out the most important scientific and practical results obtained during the performance of the qualification work, which should contain the formulation of the solved scientific problem, its significance for science and practice, and answers to the tasks set.

Suggestions

Preferably offer recommendations regarding scientific and practical use acquired results. It is worth emphasizing attention to the possibility of implementation the results of their own research and development work into production.

List of used sources

When writing a paper Master's degree is a must cite the authors and sources from which borrowed materials or individual results.

List of used sources can be placed in one of the following ways:

– okay appearances references in the text,
– in alphabetical order of the surnames of the first authors or headlines,
– in chronological order.

Bibliographic description sources make up in accordance with current standards in library and publishing. Bibliographic description of the list of used sources maybe to take shape according to one of the styles assigned to the recommended list of international design styles publications or DSTU GOST 7.1:2006 “System of standards for information, library and publishing. Bibliographic record, bibliographic description. General requirements and rules of compilation”.

Applications

After the bibliographic list, the qualification work contains appendices. The appendices include supporting material necessary for completeness perception works. They are drawn up in the form of technological schemes, tables, diagrams, graphs, drawings, etc.

If applications are issued on the following pages of work, each such. The appendix should start on a new page. The appendix should have a title printed on it. small ones above capitalized symmetrically relative to the text of the page. In the middle of the line above the title, the word "Appendix" is printed in lowercase letters with the first letter capitalized and a capital letter denoting the appendix.Appendices

should be indicated sequentially with capital letters of the Ukrainian alphabet, except for the letters Г, Е, З, И, Ю, Й, О, Ч, Б, for example, appendix А, appendix В , etc. One appendix is indicated as appendix А.

Illustrations, tables and formulas placed in appendices are numbered within each appendix.

3. PROCEDURE FOR PROTECTION OF QUALIFICATION WORKS

3.1. Granting qualification work for the department

A properly completed qualification work is submitted to the department and the scientific to the manager for verification.

The qualification work is prepared in the state language and must be submitted in hardcover.

The qualification work is signed by the author, the heads of individual sections of the work (subject to the recommendations of the department), scientific Head and Head of the Department.

Qualification work in electronic and printed form and

sewn remains in the department.

According to the calendar plan, the student must submit the work in parts for review, and at the established time schedule deadline submits completed qualifying work for review scientific to the manager.

In case of a positive review of the scientific. The supervisor's work is registered at the department and submitted for consideration. to the head of the department, who must accept decision on admission of a student to the defense work at the EC meeting.

Qualification work must be peer-reviewed. *Reviewing* entrust highly qualified specialists (teachers) and scientists) SNAU (internal review), leading specialists of production, scientific and project organizations (external review). The composition of reviewers is approved by order upon submission Head of the department.

A review from the enterprise (institution, organization) on the basis of which the research was conducted is certified by its signature. supervisor and the corresponding seal. This document is necessary to confirm the authenticity of the materials provided in the final qualification work regarding activities of the enterprise under study.

When reviewing a final qualification work It is recommended to determine:

- the novelty of the production and development problems;
- using scientific research methods;
- the reasoning behind the conclusions and the validity of the proposals;
- applicant's skills educational degree Master's degree, clearly, competently

and with good arguments teach material, properly designed his;

– disadvantages and comments of the content of the work, its design;
– conclusion on the possibility of admission to defense.

The review is provided in writing. and contains a general conclusion of recommendations for protection indicating assessment according to the accepted scale of knowledge assessment in SNAU. The review form is presented in the appendix AND.

In order to determine quality and degree readiness for protection final qualification work the graduation department organizes its preliminary protection with mandatory presentation by a student of the main provisions.

The preliminary defense of the final qualification work is held with the involvement of specialized specialists of the department, with the participation of the head of the educational and professional program, and is regulated by the department's order with the presentation of the schedule, which is brought to the attention of the student.

The commission makes a generalized conclusion about the readiness of the final qualification work for defense, which it places a corresponding mark on the individual plan for the completion of the final qualification work.

After successful completion previous protection graduation qualification work is submitted for consideration to the head of the department, who makes a conclusion on recommending it for defense at a meeting of the EC.

Students whose final qualification works were positively assessed during the preliminary defense and review by the head of the graduation department are admitted by the dean to the defense at the EC meeting no later than 5 days before the start of its work (in accordance with the "Regulations on the Examination Commission for Certification of Higher Education Applicants at SNAU"). Within the same period, the student submits to the department a bound graduation qualification work.

In case of detection formal inconsistencies, including in the formulation of the topic, the name of the enterprise (organization), based on the materials of which done research etc., graduation The qualification work is not registered, is not accepted for review, and is not allowed to be defended.

The student does not have the right to make changes to the qualifying work after its registration.

Title page submitted work page contains signatures: student, researcher manager, head of the relevant educational and professional program, scientific consultant.

3.2. Protection qualification work

The defense of the qualification work takes place in the presence of the appointed examination committee with the mandatory use of electronic means (for

example, PowerPoint).

The student prepares a 10–12- minute presentation using the necessary illustrative material – a visual illustration of the relevant statements during the presentation – the content and quality of which is checked by the scientific supervisor. The number of copies of the illustrative material must correspond to the quantitative composition of the EC. A sample of the design of the title page of the illustrative material is given in Appendix G.

General provisions for writing a report.

Preparing a quality report ensures the success of the overall preparation for the defense of the final qualifying thesis. The report should contain a concise presentation main result on the topic of the final thesis and conclusions.

The overall goal of the report is not just to read prepared text, but to convey and reveal scientific results based on the work performed. Speech the speaker should show the importance and value of the work performed, the relevance of the chosen topic and reflect personal contribution of solving the problems tasks.

At the defense, the members of the examination committee (EC) evaluate, first of all,

the student's degree of readiness to defend the final qualification work, and pay attention to the following:

- relevance of the work, compliance of the conclusions with the tasks set;
- the content of the main part of the qualification work,
- sufficiency and relevance of the information presented in the handout.
- feedback from the scientific supervisor (positive aspects and shortcomings of the work);
- review (positive aspects and shortcomings of the work);
- compliance with the requirements of design, use of scientific style when writing the work;
- drawing up a list of sources used in the work.

The report for the defense of the qualification work should contain 3 main blocks:

- ***introduction and statement of the problem, determination of its relevance;***
- ***the main part is the results of the work performed;***
- ***testing of results, conclusions and recommendations.***

The structure of the report should include:

- *greeting;*
- *relevance of the topic;*
- *goal, task, object, objects;*
- *organization of research;*
- *characteristics of the technological scheme of the dish (product) - analogue;*

– *modeling of the technological process;*

– *characteristics of the quality indicators of new raw materials;*

– *results of research conducted on a given topic (physicochemical, structural-mechanical, functional-technological indicators of new raw materials and finished products);*

– *justification of the recipe composition and technological parameters of the production process of new food products;*

– *results of the assessment of the nutritional, biological value and caloric content of food products;*

– *analysis of hazardous factors in the production of this product;*

– *assessment of the economic efficiency of the production of an innovative product;*

– *list of scientific publications on the topic of the work;*

– *conclusions;*

– *end of the report.*

Based on the results of the defense and taking into account the feedback of the scientific supervisor and reviewer, the examination committee issues a grade.

3.3. General criteria for evaluating qualification work

During the completion of the final qualification work, the student demonstrates: the ability to logically and reasonably present the material, correctly use analytical, statistical, mathematical and other methods of scientific research, conduct experiments; mastery of generalization skills, formulation of conclusions; ability to work with literary sources.

Based on the results of a positive defense, the student is given a differentiated grade on a 5- and 100-point scale. The criteria for evaluating the qualification work and its defense are presented in (Table 3.1; 3.2).

Table 3.1 - Distribution of points for individual stages and elements of the qualification work

No. of the	Criteria for evaluating the performance of qualification work	Points
1	Correctness of the formulations of the object, goal and objectives of the research.	up to 2
2	The relevance of the content of the work to its topic, the literacy of the structuring of the work, the balance of its	up to 7
3	Systematic presentation of the material, absence of repetitions, logical errors.	up to 7
4	Degree of work independence (lack of academic plagiarism), the presence of references.	up to 10
5	Use and mastery of modern literature, current regulatory and legal acts; correctness of calculations, application of methods of economic and statistical analysis, etc.	up to 10

6	Theoretical validity of the main provisions of the qualification work, which are confirmed by selected and systematized factual and statistical material.	up to 10
7	Correctness of design (the work as a whole, tables, figures, references, list of sources used)	up to 7
8	Adherence to the work preparation schedule, frequency of consultations with the scientific supervisor, etc.	up to 7
	Together	No more than 60

Table 3.2 - Criteria for assessing the level of protection of the qualification by the commission
works

Number of points	Level of knowledge of a higher education	Evaluation criteria
36–40	high	The report of the higher education applicant was thoughtful, structured, contained the main results of the research conducted, the higher education applicant demonstrated fluency in the material on the topic of the research, the answers to the questions of the commission members were complete, the understanding of the material was deep, the basic skills were formed and mastered, the presentation was logical, evidence-based (reasoned), the conclusions and generalizations were accurate, the higher education applicant was familiar with the system of current legislation, the use of professional terminology was correct, the conclusions based on the research results were demonstrated using illustrative material (calculations).
32-36	sufficient	The report of the higher education applicant is well thought out, substantiated, contains the main results of the research conducted, the answers to the questions of the commission members are sufficient, the understanding of the material is deep, the basic skills are formed and mastered, the conclusions and generalizations are accurate; the higher education applicant is oriented in the system of current legislation; the use of professional terminology is correct, the conclusions based on the research results are demonstrated using illustrative material (calculations).
30-32		The report of the higher education applicant is well thought out, substantiated, contains the main results of the research conducted, the answers to the questions of the commission members are complete, the understanding of the material is sufficiently deep, the basic skills are formed and mastered, the conclusions and generalizations are accurate; the higher education applicant is oriented in the system of current legislation; the use of professional terminology is correct. But the presentation is not sufficiently systematized, there are individual errors in the definition of concepts, terminology and generalizations, which are corrected with the help of additional questions from the commission members, individual conclusions of the qualification work are not reflected during the defense, individual conclusions based on the results of the research are not demonstrated

		material (calculations).
27-30	average	Applicant's report higher education is not properly systematized , ill -conceived , the main results conducted research partially revealed , answers to questions members of the commission are unfounded, the understanding of the material is superficial ; the applicant higher education is poorly oriented in the system of current legislation ; use professional terminology with inaccuracies, individual conclusions based on the research results are not demonstrated using illustrative material (calculations).
24-27		The report of the higher education applicant is not properly systematized, ill-thought-out, the main results of the research are partially disclosed , the answers to the questions of the commission members are unfounded, the understanding of the material is superficial; the higher education applicant is not oriented in the system of current legislation; the use of professional terminology is inaccuracy . Conclusions and suggestions are insufficient are justified and have questionable applied nature; conclusions based on the research results are not demonstrated using illustrative material (calculations).
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 higher education applicant is not familiar with the system of current legislation; does not know how to use professional terminology. The work indicates insufficient the formation of the main professional skills, lack of justification of practical and applied value research, conclusions from the research results are not demonstrated using illustrative material (calculations).
0-14		The report of the higher education 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 higher education applicant is not familiar with the system of current legislation; does not know how to use professional terminology. The work indicates a lack of formation main professional skills, individual conclusions from the research results were not demonstrated using illustrative material (calculations).

The recommended form of self-assessment of qualification work by the applicant is presented in Appendix J.

4. PRACTICAL RECOMMENDATIONS FOR WRITING INDIVIDUAL SECTIONS OF A QUALIFICATION THESIS

This section discusses in detail the approaches and recommendations for writing individual sections of the qualification paper. Typical tables and calculations are provided, but all of them can be adjusted and completely changed taking into account the specifics of the topic of the paper.

The main part is presented in the following sections:

Section I "LITERATURE REVIEW ON THE SELECTED TOPIC" (monitoring of current trends in production on the topic of work, theoretical justification of relevance, conclusions regarding the provision of target functions of the body and prospects for further research);

Section II "ORGANIZATION, OBJECT, SUBJECTS AND METHODS OF RESEARCH" (choice of research scheme, indication of object and research methods);

Section III "RESULTS OF EXPERIMENTAL RESEARCH, SUBSTITUTION OF PRODUCT COMPOSITION, TECHNOLOGY, OPTIMIZATION OF TECHNOLOGICAL SOLUTIONS FOR OBTAINING FOOD PRODUCTS" (experimental part with analysis and generalization of research results);

Section IV "ANALYSIS OF TECHNOLOGY AND DETERMINATION OF HAZARDOUS FACTORS IN FOOD PRODUCTION";

Chapter V "CALCULATION OF THE EXPECTED ECONOMIC EFFECT FROM THE INTRODUCTION OF A NEW PRODUCT" .

4.1. Literature review on the selected topic (SECTION 1)

A literature review is a written work containing a summary description of the state of a selected technological issue, necessary and sufficient for understanding by specialists in this field. In general, a literature review has a specific purpose (orientation of specialists in the information flow), is characterized by specific compositional and stylistic features, contains a summary description of the state of the issue and consists of 4 main points and a conclusion.

Technological aspects of food production on the chosen topic. It is worth exploring in more depth the problematic issues that

already raised in the introduction (" *Justification of the relevance of the selected scientific problem"*) in a logical sequence. First, it is worth investigating the current state of the industry to which the group of food products determined by the selected topic of the qualification work belongs , then - the existing technological problems and propose possible ways to solve these problems. The decisive point of this point is the choice of your path (direction) to solve problems technological issues and

scientific justification for this path.

Characteristics of prescription drugs components that are included to the composition food products on the chosen topic. For more complete analysis of the selected food production technology, diagnostics of the technological process worth provide a description of the main and auxiliary raw materials food products (in text or in the form of tables, figures, etc.).

Analysis of existing food production technologies on a selected topic. Description traditional directions of implementation of the technological process selected food products.

Justification of an innovative solution to a technological problem food product on a selected topic. It can be implemented through a number of innovative measures. For example, by changing the chemical composition of food products and obtaining ready-made innovative food products with a high content of protein, dietary fiber, vitamins, macro- and microelements, etc. As an innovative solution, offer extension of the shelf life of scientific development due to the introduction various components, etc. It is possible, for example, to improve textural characteristics of the new product (relative to a similar product), introducing various structure-forming agents, etc. A promising innovative solution is the development of resource-saving food technologies, which is achieved through a number of possibilities: replacing more expensive raw materials with cheaper ones; reducing the technological process of production, etc.

It is worth taking into account that innovative food products proposed worth compare with their analogue products in terms of chemical composition, organoleptic, physicochemical, rheological, and microbiological properties.

Conclusions: It is worth making a brief summary of the purpose and objectives of the study.

4.2. **Organization, object, subjects and methods research (CHAPTER 2)**

Research organization includes development general plan of theoretical and experimental studies, which are presented in the form of a flowchart research. The research flowchart contains a list of

sequential actions for formulating the tasks of the qualification work, selecting a number of laboratory studies (figure, table, text) and implementing the results into practice. An example of the design of a research flowchart is given in Appendix E.

The development of an experimental plan-program includes the name of the research topic, the working hypothesis, the experimental methodology, the plan for creating an experimental situation, the list of necessary materials, devices, and installations. In some cases, the plan-program includes work on the design and manufacture of devices, apparatuses, and devices, their methodological examination, as well as research programs at enterprises.

Object and subjects of research.

The object of research is the technology of the developed or improved product.

The subjects of the study are raw materials, semi-finished products used in the technology of preparation of the products being analyzed and developed. All products must comply with the requirements of current regulatory documents. This is confirmed by Table 4.1

Table 4.1 – Characteristics of products that used in work (example)

Product	Regulatory document, the requirements of which must be met by the quality of the product
Drinking water	DSTU 7525:2014
etc.	

methods . When performing qualification work, modern research methods are used - standard and special organoleptic, physicochemical, rheological, microbiological methods for determining the quality and safety of raw materials, semi-finished products and finished products; mathematical methods for planning experiments and processing experimental data using computer technology. It is necessary to provide their brief description (it is advisable to allocate up to 10 lines of printed text for each method). Only references to standard methods are allowed.

If the study uses standard methods definition individual indicators, describe these methods are not necessary, it is enough referred to the relevant standard.

The use of **modern information technologies** to increase the efficiency of development consists of collecting information, processing it, and visualizing it.
scientific research, conducting an experiment protocol, preparing a presentation and report, using various modeling methods. Using modern information technologies, the master's student acquires skills in working with the main components of modern personal computer software and technical means, gets acquainted with the basics of computer-based problem solving technology , starting from their formulation and construction of appropriate information models and ending with the interpretation of the results obtained using a computer.

4.3. **Results experimental research, justification of product composition, technology, optimization of technological solutions for obtaining food product (CHAPTER 3)**

Considering various technological factors, it is necessary to propose a draft formulation for a new food product for possibilities for further research of food products in laboratories conditions and possible adjustments based on the results of these research.

On the first stage must be guided organoleptic Then you need to confirm the

improvement by calculating nutritional and energy value in the form of a table (Appendix D).

Characteristics of the raw material-additive used

The subsection characterizes the organoleptic, physicochemical, and technological properties of the additive used, as well as the changes in the analog dish that will occur after its use.

Determining the amount of additive

At the first stage, the amount of additive is determined based on the organoleptic evaluation, which is presented in the form of Table 4.2.

Table 4.2 - Comparative characteristics of organoleptic indicators of the studied cutlet samples (example)

Product name	**Fraction walnut kernel , % of meat**	**Product rating out of five-point scale**					**General score**
		Appearance	**Color**	**Smell, aroma**	**Consistency**	a i l 2 i	
Chopped poultry cutlets	-	5	5	5	5	5	25
Sample No. 1	10	5	5	5	4	5	24
Sample No. 2	15	5	5	5	5	5	25
Sample No. 3	20	5	5	5	4	4	23

The table shows that the optimal proportion of the additive is 15% by weight. meat.

Justification of the composition and technology of food products

Analysis of the recipe composition of a new product

In addition to the text description, it is proposed to provide an analysis of the recipe composition of the new product in the form of a table of the following form: (Table 4.3.).

Table 4.3 - Analysis of the formulation of a new product

Name products	Number of raw materials per _kg (pcs.) of product, kg		Content, %	Role in technology process
	B	N		

Definition nutritional and energy value of the analogue dish and new products

The nutritional and energy value of dishes is calculated using a table, the form of which is given in Appendix D. An analysis of the results obtained is given in the form of text. The calculation is performed on the basis of data on the content of basic nutrients in raw materials and products that are part of the developed dish

(product). The calculation is carried out using reference tables "Chemical composition of food products". [23]

Determining the shelf life of food products

All food products consist of certain raw materials that are subject to decay and spoilage during storage. Deterioration and spoilage of food products cannot be prevented, but they can be slowed down.

processes deterioration of quality due to introduction of substances with preservative properties into the food product formulation, selection of a technological processing method, use of packaging, compliance with necessary storage and transportation conditions food products.

In the process of improving or developing a new technology for food production by introducing certain food additives, establishing the appropriate ratio of raw material content in the food product recipe, or changing production parameters, it is necessary to predict and determine the impact of the innovation on the shelf life of the food product and its safety.

Individual safety and quality characteristics of food products depend on the specific food product and its production technology , and can be studied through the use of physicochemical and microbiological studies.

Developing the technology of a new dish

When developing technologies, it is necessary to note:

1) names of raw materials (products) used, in technological sequence, starting with the main ones;

2) norms for laying raw materials (products) by gross and net weight , when using semi-finished products - only by net weight ;

3) the mass of semi-finished products (if necessary) obtained during the preparation of a dish (product);

4) output of semi-finished products and finished dishes (products).

In this section, it is mandatory to provide a table with the recipe of a new food or culinary product using the proposed innovative development in its composition. It is also necessary to provide a technological scheme of the development.

It is worth remembering that a technological scheme is a scheme in which each operation is characterized by all possible technological modes and parameters.

Improvement / development of the equipment and technological scheme for the production of food products

The improvement or development of the technology for producing a food product is completed by the development of a hardware and technological scheme for its production, taking into account the implemented innovations.

In this section, it is necessary to justify the choice of the proposed hardware ***and*** technological scheme for the production of the product, indicating its advantages.

When describing the hardware ***and*** technological scheme, attention should be paid to the following stages:

supply and storage of raw materials and semi-finished products;

preparation and supply of raw materials for production;

receiving finished products;

packaging and wrapping of products (if necessary);

warehousing and shipping of products (if necessary).

The description of the equipment ***and*** technological scheme should include all operations up to the stage of packaging and sending finished products for consumption or storage and indicate the production parameters, storage conditions of finished products according to regulatory documentation or conducted research. When describing technological schemes, the text should include equipment brands and indicate positions according to the equipment and technological scheme.

Optimization of technological solutions for obtaining a food product

The section is drawn up on sheets of A4 paper. Entries and drawings are placed on one side of the sheet. Printed results
implementation programs on individual assignment are filed with the diploma supplements.

Section content:

1) the goal of optimizing a specific technological process according to the topic of the research work;

2) source data, according to the individual task;

3) a figure explaining the original data (if necessary);

4) theoretical formulas and calculations based on the original data;

5) erected table source data and results or results calculations (depending on from a specific technology);

6) graph constructed based on the calculation results (if he is needed);

7) conclusions based on the results of calculations and on the work as a whole.

Modeling objects and a generalized algorithm for developing mathematical models of technological processes

Food production, as a rule, is a sequence of three main operations: preparation of raw materials, direct transformation and obtaining target products. This the sequence of operations is embodied in a single complex food technological system (HTS). Modern food an enterprise, as a large-scale system, consists of a large number of interconnected subsystems, between which there are relationships of subordination, which have hierarchical structure with three basic degrees.

The food technological system is understood as a set of physical and chemical production processes and means for their implementation. Thus, the food the technological system contains: the recipe composition, the actual process, parameters technological processes and equipment, using whose are being held various operations, means for process control and management and communication

between them.

As input parameters you can accept the number of raw materials that processed, its composition, temperature, etc.; the initial parameters can be: the amount of the finished product, concentration, rheological parameters, shelf life, temperature and other properties. To match the initial parameters to the specified they are influenced by the meaning managers variables.

Thus, HTS is enough complex object that can to decompose (decompose) into component subsystems, or elements. These subsystems are informationally connected to each other and, possibly, to the environment object.

Sequence of solving problems using experimental and statistical methods modeling

Traditional restaurant production technologies use a predominantly empirical approach to selecting the number of ingredients and parameters of technological operations, which is sometimes unjustified in terms of physicochemical processes, their optimality, and economic feasibility, without taking into account the broad capabilities of technological systems, which reduces the competitiveness of food products.

Scientifically a reasoned approach to design technological production systems food products requires active use mathematical apparatus for compiling models of the technological process, finding the optimal solution in order to rationalize the technological production cycle food products.

Problems of experimental and statistical Modeling, like any scientific and technological problems, is solved according to a certain a sequence of actions that allow you to go from setting these tasks to obtaining results. These stages will be present at the junction any practical problem based on the specified methods.

Stage 1 – formation of the goal and objectives of the research. At this stage stage directly are formulated goals and objectives that should be solved based on the results of the research. This may be, for example, the optimization problem of the object under study. Here are defined volumes and sources research funding, means for conducting them, etc.

Stage 2 – selection of response functions. At this stage , all the resulting variables of the object are analyzed and those that will be used in the study as response functions are selected . One or more resulting variables can be selected as response functions . It is clear that these variables have, first of all, meet the goals and objectives of the research, and secondly, meet the criteria established for the response functions. In addition, on this at this stage, a numerical scale is selected or, if necessary, established.

estimates of response functions, choose a method and determine the error of measuring the desired resulting quantities and registering the results of these measurements.

Stage 3 – selection of factors. Factors that will be varied in the study are selected so that they significantly affect all or the majority of response functions. In

addition, it is obvious that the factors must meet the requirements imposed on them. If necessary, an analysis of the results of previous studies can be carried out or a certain, usually insignificant, number of experiments can be carried out to check the significance of the influence of certain factors. The choice of the number of factors must be approached extremely responsibly . The introduction of unnecessary factors into the study can lead to a significant increase in the volume of experiments. At the same time, failure to include significant factors in the study will lead to incomplete and erroneous results, which will cast doubt on the study as a whole. At the same stage, the areas of determination of factors are established, their main levels and intervals of variation are selected.

Stage 4 – selection of the type of experimental and statistical model and experimental plan. At this stage, in accordance with the task and preliminary data on the type of response functions, the order of the future experimental and statistical model is selected (nonlinear programming method, multifactorial experiment). Taking into account the number of factors selected for research, the general type of model is obtained. Based on the selected type of model, the experimental plan is selected, and based on the selected plan, the number of individual experiments and the conditions for their conduct are established. In addition, the number of experiments that must be conducted at the same levels of factors – the so-called parallel experiments – is also established here.

Stage 5 – implementation of the experimental plan. At this stage, the experimental research is carried out directly. It is clear that the research is carried out under the conditions provided for in the plan. From a statistical point of view, when implementing experiments, it is necessary to adhere to the principle of randomization . This principle implies that individual experiments should not be carried out sequentially as specified in the plan, but in random order. This is especially true for parallel experiments.

Stage 6 – regression analysis. This stage is also sometimes called mathematical processing of the experimental results. Regression analysis involves solving the following tasks: assessing the reproducibility of experiments and identifying gross errors in their conduct, calculating numerical estimates of the coefficients of the experimental-statistical model, assessing the significance

individual components of the model – regressors , and assessment of the adequacy of the resulting model to the object of study.

Stage 7 – direct implementation of the research goal, solving the problems set in the first stage stage based on the developed experimental - statistical models.

4.4. **Analysis of technology and identification of hazardous factors in food production (CHAPTER 4)**

Producing safe products is the primary goal of every food industry enterprise.

To ensure consistently high quality and safety of finished products, the State Standard and laws of Ukraine provide for the mandatory implementation of the international food safety assurance system HACCP at food industry enterprises.

HACCP System (**Hazard** Analysis **and Critical Control** Point – **Analysis**

Hazard Analysis and Critical Control Points (HACCP) is a warning system for ensuring food safety. It is based on the judicious application of technical and scientific principles to the entire food production chain: from field to fork.

The purpose of HACCP is to identify factors dangerous to consumers that may arise throughout the production chain, and to establish controls to ensure product safety for the consumer.

The modern HACCP system is based on seven principles :

Principle 1. Conduct a hazard analysis.

Principle 2. Identification of critical control points.

Principle 3. Setting limit values.

Principle 4. Introduction of a CCP control system.

Principle 5. Establish corrective actions to be taken when observations indicate that a particular CCP is out of control.

Principle 6. Establish a verification procedure to confirm that the HACCP system is operating effectively.

Principle 7. Develop methods for documenting all procedures and maintaining records related to the application of these principles.

This section of the qualification work is carried out during professional practice at the enterprises of the industry by developing a HACCP plan for the production of products on the topic of the qualification work. To write this section, you must use the methodological instructions for professional practice at food enterprises of the industry for masters [31].

4.5. **Calculation of the expected economic effect of introducing a new product (CHAPTER 5)**

The calculation of the economic part of the qualification work should be performed based on the received tasks for the qualification work. It is proposed to

consider 2 calculation options.

OPTION A – "Production in a separate unit"

The practical part of calculating the economic efficiency of implementing an innovative product should begin with developing a production program. A feature of forming a production program in market conditions is taking into account the role of marketing in forming a plan for the production and sale of the enterprise's products.

A production program is a system of targeted production tasks and delivery of products to consumers in a wide range, assortment, of appropriate quality and within the established deadlines according to supply contracts.

- *Nomenclature* is list of names individual types of products
- The *assortment* is variety of products within this nomenclature.

Indicators production program	**Natural –** characterize production specialization of the enterprise and its frequent in the commodity market
	Valuable – give generalized assessment of the company's performance, expressed in monetary terms

The volume of production can be calculated through the amount of resources:

$$VP\ (TP) = Ч*П,$$

where *Ch is the number of employees, people .*

P – labor productivity, which can be expressed as output, UAH/person.

or

$$VP = P*\ Kv\ ,$$

where *P is the design production capacity of the enterprise, UAH.*

Kv – utilization factor of the design production capacity

The results of the production program calculation are recorded in Table 4.4.

Table 4.4 - Amount production products in value terms

Product type	**Annual volume production, t**	**Wholesale selling price, UAH.**	**Cost of sales, thousand UAH.**
Total :			

Calculation of capital investments (if any)

To determine capital investments for the purchase, delivery and installation of

equipment, an estimate and financial calculation is made in the form given in Table 4.5.

Table 4.5 - Estimated costs for the purchase, delivery and installation of equipment

Name	Number of units	Price per unit , UAH	Cost in thousand UAH.
Total equipment			
Transportation costs (5% of the cost of equipment)			
Installation costs (20% of the equipment cost)			
Together			

Calculation of working capital ratio

To ensure the smooth and efficient operation of the enterprise, it is advisable to calculate the working capital ratio.

The norm of working capital advanced for raw materials, basic materials and purchased semi-finished products is determined by the formula:

$$H = P * D ,$$

where H is the standard of working capital in stocks of raw materials, basic materials and purchased semi-finished products;

P - average daily consumption of raw materials, materials and purchased semi-finished products (based on technological calculations)

D is the stock rate in days.

The average daily cost for the nomenclature of consumed raw materials, basic materials, and purchased semi-finished products is calculated by dividing the sum of their costs for the corresponding quarter by the number of days in the quarter.

Determining the stock rate is the most laborious and important part of rationing. The stock rate is set for each type or group of materials. If many types of raw materials and materials are used, the rate is set for the main types, which take up at least 70-80% of the total cost.

Calculation of product cost

The calculation of the cost of production and sales of products consists of calculating the following main items:

The article "Raw materials and basic materials" provides for the calculation of the cost of raw materials and basic materials (excluding VAT) and the costs of their transportation.

Table 4.6 - Costs of raw materials and basic materials

Raw	Norm per kg/1000kg	Price, UAH/t (m3)	Cost, UAH
Together			

The item "Auxiliary materials" includes costs for the purchase of packaging material and containers.

Recent marketing research shows that 85% of consumers pay attention to food packaging first. Therefore, the effectiveness of product sales can depend on packaging.

Table 4.7 - Costs for auxiliary and packaging materials

Raw	Norm per kg/1000kg	Price, UAH /t (m3)	Cost, UAH
Together			

To calculate the article "Energy consumption", the norms of electricity and energy resources consumption per unit of output (steam, electricity, water, cold) are used. The student receives the norms of consumption and the actual amount of energy resources consumed during observation during production practice at the enterprise.

Table 4.8 - Energy consumption for technological purposes

Raw	Norm per kg/1000kg	Price, UAH /t (m3)	Cost, UAH
Water, m^3		13.0	
Electricity, kWh		1.93	
…		…	
Together			

Expenses under the article " Main" salary "

Payroll fund – the total amount of all expenses for paying employees of the enterprise and benefits social nature. Consists of: a tariff wage fund for hourly and piecework workers, additional payments under bonus systems.

In the calculation we will accept:

Annual effective working time fund per 1 worker.

Calendar fund 365 days.

Holidays are 10 days.

Weekends 104 days.

The nominal working time fund is 251 days.

Shift duration 8 hours.

Annual effective working time fund per employee: 1770.4 hours.

Minimum wage: from December 1, 2016 – 1600 UAH (hourly 9.59 UAH); from January 1, 2017 - 3200 UAH (hourly rate 20.18 UAH).

The production rate is determined by dividing the annual production volume by the amount of time worked.

We determine how many hryvnias of the basic salary are allocated to 1 ton of product:

Basic salary / Annual production volume

Table 4.9 - Basic salary

Employee	Hourly tariff rate, UAH / hour.	Main salary , UAH	Additional salary , UAH	Deductions for social events, UAH	Total wage fund, UAH
Technologist	26.15				
Stacker - packer	20.18				
…					
Together					

Expenses under the item "Additional salary" are accepted in the amount of 10% of the basic salary.

We accept expenses under the item "Social insurance deductions" in the amount of 37.5% of the total payroll (basic and additional salaries in total).

We accept expenses related to the preparation and development of production in the amount of 2% of the basic salary.

The costs of maintaining and operating machinery and equipment are determined depending on the complexity of the innovative solution:

4.6. we accept 20% of the basic salary in the absence of capital investments;

4.7. is calculated by groups of fixed assets as a percentage of the original cost using the initial data given in Table 4.10 (if there are capital investments).

Table 4.10 - Calculation of depreciation and repair costs

Fixed assets	Amortization		Costs for major and current repairs		Expenses, thousand UAH.
	%	thousand	%	thousand	
Buildings and structures	4.5		5		
Machinery and equipment	12		5		
Others	6		5		
Together					

We accept overhead costs at 50% of the basic salary.

The production cost is the sum of the above cost items.

Administrative costs account for 1.5% of the production cost of products.

Sales costs account for 10% of the production cost of products.

Other operating expenses account for 5% of the production cost of products.

The total cost is the sum of production costs, selling expenses, administrative and other expenses.

Table 4.11 - Costs of production and sales of products

Expense item	Cost amount , UAH
Raw materials and supplies, UAH	
Auxiliary materials, UAH	
Energy costs, UAH	
Wage fund, UAH	
Deductions for social events, UAH	
Development costs, UAH	
Equipment repair and maintenance costs, UAH	
Production cost, UAH	
Administrative expenses, UAH	
Other expenses, UAH	
Sales costs, UAH	
Full cost, UAH	

In market conditions, an approach to pricing that takes into account key technological indicators is important for improving the quality of products of processing enterprises, which leads to an increase in yield and improvement in the quality of finished processed products.

Pricing is the process of justifying, approving, and revising prices for new and existing goods and services.

Table 4.12 – Pricing methods

Pricing methods	
1. The " cost + profit " method	2. Obtaining the target rate
C= SV+P, where Ts is the price of the product, CV – cost of production unit, P – expected profit per unit of output	profit C= In $_{cm}$ + ((In $_{the\ post}$ + P $_{total}$)/N), where T is the price of the product, V $_{change}$ – variable costs per unit products, In $_{post}$ – fixed costs, P $_{total}$ - expected profit, H - rate of profit

3. Evaluation of consumer value	4. Proportional pricing
5. The “expected profit” method	6. Fast method return expenses

1. Gross profit, thousand UAH:

$P = B - C$, where, P – profit, thousand UAH;

B – cost of products sold, thousand UAH;

C – cost of production, thousand UAH;

where *Ch* is the number of employees, people ;

5. Return on investment (subject to calculation of capital investments), UAH;

6. Payback period of capital investments (subject to calculation of capital investments), year.

Capital investments should be understood as additional investments. funds for implementation production of a new product (purchase of new equipment, construction technological room, etc.).

The main technical and economic indicators of the project are presented in the form of Table 4.13.

Table 4.13 - Main technical and economic indicators of the project

Indicators	Units of measurem	Indicator
Production capacity of the enterprise by main types of products	t/year	
Annual volume raw material procurement	t	
Receipts from implementation	thousand	
Number of industrial and production personnel	Man .	
Production output per employee	thousand	
Complete cost of goods manufactured	thousand	
Costs per UAH 1 of produced goods	UAH	
Gross profit	thousand	
Clean profit	thousand	
Production profitability products	%	
Cost of capital investments	thousand	
Payback period	years	
Fund return		

Draw conclusions about the feasibility of introducing a new product.

When drawing conclusions, one should remember not only the economic, but also the social significance of the resulting dishes.

The social efficiency of the food industry is manifested in improving health, increasing working capacity and life expectancy of the population, as well as in the level of general professional development of employees, better quality of work, etc. From the point of view of public interests, this is a comparison of the actual level

of food consumption with a scientifically based norm and the total volume of consumption in kilocalories and in terms of basic food products.

It is advisable to analyze the social effectiveness of the specified project using the following indicators.

- Consumption of staple foods per capita.
- The level of satisfaction of the population's needs for basic food products is calculated as the ratio of the average per capita consumption of basic food products to the scientifically based physiological norms of their consumption.
- Calorie content of average food consumption per capita.
- The level of satisfaction of needs in the total volume of food products (calculated as the ratio of the actual calorie content of the average daily consumption per capita to scientifically based physiological norms).
- Average daily consumption of micro- and macronutrients by the population .
- Volume's production dietary food products, products for children food, products with medicinal properties etc. and the level of satisfaction of their needs.
- Specific weight of expenses .

Calculation example economic efficiency of work (food product) is presented in Appendix J.

OPTION B – "Improvement existing recipe for a dish from the menu"

Restaurant establishment must be competitive, meet customer needs in service and delicious food. Therefore, a diverse menu is the main thing in a full and effective the functioning of the cafe.

Early It should be determined for whom the product will be produced. innovative improved product, i.e., to determine price audience of consumers.

Next, we determine the composition of the components of the new dish compared to the traditional one.

Table 4.14 - Costs of raw materials and basic materials

Raw	**Traditional product**			**Innovative product**		
	Norm for 1 serving, g	**Price, UAH /kg**	**Cost, UAH**	**Norm for 1 serving, g**	**Price, UAH /kg**	**Cost, UAH**
Together:						

The item "Auxiliary materials" includes costs for the purchase of packaging material and containers.

Recent marketing research shows that 85% of consumers pay attention to

food packaging first. Therefore, the effectiveness of product sales can depend on packaging.

Table 4.15 - Costs for auxiliary and packaging materials

Raw	**Traditional p product**			**Innovative product**		
	Norm for 1 dish , g	**Price, UAH /kg (m3)**	**Cost, UAH**	**Norm for 1 dish , g**	**Price, UAH /kg (m3)**	**Cost, UAH**
Together:						

For calculation " Energy consumption " articles use norms expenses electricity and energy resources for production units of production (steam, electricity, water, cold). Norms costs and actual quantity consumed energy resources the student receives in the process of observation during industrial practice at the enterprise.

Table 4.16 - Energy consumption for technological purposes

Raw	**Traditional product**			**Innovative product**		
	Norm per kg/1000kg	**Price, UAH /t (m^3)**	**Vartis hryvnia**	**Norm per kg/1000kg**	**Price, UAH /t (m^3)**	**Cost , UAH**
Water, m^3		11.40			11.40	
Electricity, kWh		1.9302			1.9302	
Steam, t		36.0			36.0	
Cold						
Together:						

Yes, the order of formation food prices and culinary products in establishments (enterprises) of the restaurant industry is regulated by the Law of Ukraine dated 03.12.90 No. 507-XII "On Prices and Pricing". According to this law, institutions (enterprises) of the restaurant industry self- install selling prices for own products production and purchased goods.

Calculation Costs for kitchen products are recorded in Calculation Cards, separately for each dish (portion). The calculation is made by leaving the account for 100 portions or for a separate portion. To assemble calculations determine assortment dishes and culinary products of the enterprise and the norms of laying raw materials according to the Collection of recipes and prices for raw materials.

Calculation cards are registered in a special register after being signed by the persons responsible for the correct setting of sales prices.

Table 4.17 - Calculation of an updated menu dish

Name products (components of the dish)	**Consumption rate per 1 serving, g**	**Price, UAH**	**Total cost for 1 dish, UAH**	**Margin level, %**
x	x	x		

Restaurant enterprises' markups can range from a minimum (zero) to a maximum (limit) level and are set depending on the enterprise's pricing policy, which takes into account various pricing factors. At the same time main the price-forming factor is the cost of raw materials and the mark-up that set as a percentage of the cost of each individual product regardless from the fact that for the manufacture whose dishes this product is consumed. However, process pricing can to be determined also market conditions and demand, and an approach that chooses a company, it depends from the concept of a restaurant establishment to specific menu items.

It is advisable to differentiate markups by types and categories of enterprises, and within each category, markups should be set depending on the type and group of products to which a given dish or culinary product belongs . Classification of dishes and culinary products to that or other group is carried out according to their labor intensity. For example, if we take the unit mark-up for gastronomic products that do not require heat treatment, then the marginal mark-up can be set proportionally to the corresponding labor intensity coefficients, which are: for cold appetizers with a side dish - 1.5; for lunch dishes - 2.0; for cheap dishes of increased labor intensity (flour, cereal, vegetable) - 2.5.

Calculation selling price is carried out as follows:

- determine assortment dishes according to the menu plan, according to which make up calculation account;
- establish norms investment raw materials separately dish according to recipe books;
- determine prices for raw materials to be included in the calculation;
- calculate for sale cost of raw material set portions of food by adding cost of raw materials of each item and adding to this amount the amount of the public premium food and value added tax cost.

Important: the cost of salt and spices used in cooking dishes or are served to the table, include in the calculation of the cost of first, second courses and cold appetizers based on the norms of their investment per 100 servings of dishes at the selling price.

Installed the price of the dish remains the same until the set of raw materials changes or its cost.

Table 4.18 - Calculation selling prices and planned gross income from the sold innovative product

No.	Group of dishes	Daily production volume, units	Leave price, UAH	Cost of sales, thousand UAH (daily)	Cost of sales (gross income), thousand UAH (annual)
Together:		x	x		

Note: the cost of sales for the year is determined by multiplying the cost of sales per day by the number of workers days per year.

Based on the calculation of the cost of products sold, it is necessary to calculate the production program for this product of the restaurant establishment, which will make it possible to determine the main indicators of the project's effectiveness.

The calculation of the production program is presented in Table 4.19.

Table 4.19 - Volume of production in value terms

Name products	Production output per year, units.	Current wholesale price for 1 serving (__ g), UAH.	Cost of marketable products, thousand UAH.
Innovative product			
Traditional product			

Let's summarize the main technical and economic indicators for the production of an innovative product for a specific restaurant establishment.

Table 4.20 - Main technical and economic indicators of the project

No.	Indicators	Units of measureme	Traditional product	Innovative the product
1	Production capacity of the enterprise by main types of products	portions		
2	Sales revenue	UAH		
3	Full cost of goods manufactured	UAH		
4	Costs per UAH 1 of produced goods	UAH		
5	Gross profit	UAH		
6	Profitability	%		

Make conclusion of the feasibility of introducing a new product into the menu.

Calculation example economic efficiency of work (culinary dish) is presented in Appendix C.

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APPENDICES

Appendix A
Application to the head of the graduate department regarding approval of the topic of the qualification work

To the Head of the Department

Full name of the head of the department

Student's full name, group ___, course,

specialty, specialization, faculty

Statement

I would like to ask you to approve the topic of the final qualification work:

according to materials

full legal name enterprises/organizations/institutions

date student signature

Appendix B
Qualification work task form
MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRARIAN UNIVERSITY

Faculty of Food Technology
Department of Food Technology
Higher education degree Master's degree
Specialty: 181 "Food Technology"

APPROVE
Head of the
Department of Food
Technology **Last name**
I.B.

" __ " 20__ year

TASK
for the qualification work of the student
Ivanov Ivan Ivanovych
(last name, first name, patronymic)

1. Topic of the qualification work: Improving the technology of dessert paste using walnut kernel concentrate. Qualification work supervisor

(academic degree, academic title, last name, first name, patronymic)

approved by order of the higher educational institution dated "___"___20__ .
No.___

2. **Deadline for student submission of work _____**
3. **Initial data for work _____**

4. **Contents of the calculation and explanatory note** (list of issues that need to be developed): Introduction; Section 1. Analytical review of the literature; Section 2. Organization, object, subjects and methods of research; Section 3. Justification of the content of the studied additive / recipe of a new product / parameters of the technological process of food production; Section 4. Improvement / development of food technology / study of quality indicators of new food products; Section 5. Analysis of hazardous factors in food production (HACCP); Section 6. Analysis and generalization of the results of economic research on the technology of the selected product and ways of its application in production conditions; Conclusions; List of sources used; Appendices.
5. List of graphic material (photographs, drawings, diagrams, graphs, tables) Visual support of qualification work using Power Point

6. Work section consultants

Section	last name, initials and position	Signature, date	
		the task was given	accepted the task
Chapter 6			

7. Date of issue of the task _____

CALENDAR PLAN

No. of the company	Name of the stages of qualification work	Deadline for completion of qualification work stages	Manager's signature
1	**Section 1** Analytical review of literature (on the selected topic).		
2	**Chapter 2** Organization, object, subjects and methods of research.		
3	**Section 3** Justification of the content of the investigated additive / formulation of a new product / parameters of the technological process of food production.		
4	**Section 4** Improvement / development of food technology / study of quality indicators of new food products.		
5	**Chapter 5** Hazard Analysis and Critical Control Points (HACCP) in Food Production		
6	**Chapter 6** Analysis and generalization of the results of economic research on the technology of the selected product and ways of its application in production conditions.		
7	Text of conclusions, proposals, formation of annexes		
8	Submitting an electronic version of the work to the repository		

Student _____

(signature) (surname and initials)

Work supervisor_____

(signature) (surname and initials)

Appendix B
Title sheet work (example)

MINISTRY OF SCIENCE AND EDUCATION OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

Faculty of Food Technology

Department of Food Technology

The Head of the Department
of Food Technology is allowed
to defend
Last name I.B.

QUALIFICATION WORK

for the second level of higher education

on the topic: " Improvement " technology of filling based on sour milk cheese for pancakes using sesame seed concentrate "

Done by:

(підпис) (last name, initials)

Group:

Scientific mentor:

(підпис) (прізвище, ініціали)

Sumy 202-

Appendix D
Illustrative material (example)
Sumy National Agrarian University
Department of Food Technology

ILLUSTRATIVE MATERIAL
TO THE DEFENSE REPORT
QUALIFICATIONWORKS
on the topic:

topic name

Student of ___ course, __ groups, ____ *student signature* Прізвище, ім’я, по батькові
specialties (code, name) specializations (name)
Scientific head scientific degree
signature of the manager Прізвище, ім’я, по батькові
scientist rank

Sumy 20

Appendix D

Table D.1 - Characteristics of nutritional and energy value of dishes (example)

No. of the company	Dish and ingredients	Index according to nutritional value tables	Net weight	Contents								Energy value kcal	
				Protein, g			Fats, g			Carbohydrates, g			
				In 100g	In the dish	Including animals	In 100 g	In the dish	Including vegetable	In 100 g	In the dish	In 100 g	In dishes and
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
	Semolina porridge with apples	1.205											
	Cereals manna		19	10.3	1.9		1.0	0.19	0.19	67.7	12.8	238	45.22
	Milk	Pasteurized , 3.5% fat content	195	2.79	5.4	5.4	3.5	6.8		4.69	9.1	61	118.9
	Apples		35	0.4	0.14		0.4	0.14	0.14	9.0	3.15	45	15.75
	Butter	Unsalted	5	0.5	0.02	0.02	82.5	4.1		0.8	0.04	748	37.4
	Sugar		10	–			–			99.98	9.9	387	38.7
	Total I		230		7.46	5.42		11.23	0.33		34.9		255.9
	Total II		100		3.24	2.35		4.83	0.13		15		110.1
	Total including losses		100		3.2	2.3		4.7	0.1		14.8		108.9

Appendix G
Example
Economic justification of the production of yeast puff pastry in the confectionery shop of the supermarket "Domashny"

The purpose of this work is a project for the production of yeast puff pastry in the confectionery shop of the supermarket with a capacity of 50 kg per shift to satisfy demand population at the expense of creation cost-effective their production in order to obtain stable income.

The calculation of the production program is presented in Table 1.

Table 1 – Volume of production in value terms

Product type	Amount production per shift, kg	Cost of sales, UAH
Dough	50	2,000.0
Together:		**2,000.0**

To ensure the production of products that meet modern requirements, the workshop does not require radical reconstruction, both in terms of replacing outdated equipment and introducing modern technologies .

on project calculations on technology and data technological practice we make a calculation raw material and the main materials for production dough.

Table 2 - Calculation raw material costs and the main materials

Type of raw material	**Raw material requirement per shift, kg**	**Purchase price per 1 kg, UAH.**	**General cost of raw materials, UAH**
Flour in g	25.0	9.5	237.5
Eggs	2.0	20.0	40
Butter	12.5	60.0	750
Milk	12.5	6.0	75
Sugar	1.0	12.0	12
Salt	0.3	5.0	1.5
Yeast	0.2	90.4	18.08
Together:	x	x	**1134.08**

Next, we determine the quantity and cost of auxiliary materials for dough production. In this case, only the cost of auxiliary materials for technological purposes is taken into account, which is calculated directly, based on the costs of the entire production output and the cost of auxiliary materials.

The calculations are presented in Table 3.

Table 3 - Calculation of the cost of auxiliary raw materials and materials

Type of raw material	**requirement , kg (pcs.)**	**Purchase price per 1 kg, UAH.**	**Total cost, UAH**
Food film	2.6	4.5	11.7
Together:	x	x	**11.7**

Let's calculate the salaries of employees in the confectionery department of a supermarket.

Table 4 - Calculation of the payroll fund

Number of employees	**Main salary, UAH**	**Additional salary, UAH**	**Accruals for wages (37.5%), UAH.**	**Basic salary fund, thousand UAH.**
2	240.0	24.0	99.0	**363.0**

The calculation of energy costs is carried out based on the norms of energy consumption per ton of product and their cost, based on the data of the energy and electrical engineering calculation of the project, which are given in the feasibility study.

Table 5 - Calculation of fuel and energy costs for production products

Types of fuel and energy	**Norm per 1000 kg of product**	**Production cost rate per shift**	**Cost per unit , UAH**	**Total expenses thousand UAH.**
Electricity	65 kW	3.25	1.93	6.28
Water	9 m^3	0.45	13.0	5.85
Total	x	x	x	**12.13**

The costs of maintaining and operating machinery and equipment are determined depending on the complexity of the innovative solution:

- we accept in the amount of 20% of the basic salary in the absence of capital investments = **48 UAH** .

We accept general production costs at 50% of the basic salary = **120 UAH.**

Administrative costs are 1.5% of the production cost of products = **25.33 UAH.**

Selling expenses are 10% of the production cost of products = **UAH 168.89.**

Other operating expenses are 5% of the production cost of products = **89.9 UAH.**

After the calculations are made, a summary table of costs is compiled for production .

Table 6 - Production cost products

No.	**Expense items**	**Amount, thousand**
1	Raw materials and supplies	1134.08
2	Supporting materials	11.7
3	Fuel and energy for technological purposes	12.13
4	Salary with deductions	363.0
5	Equipment maintenance and operation costs	48.0
6	General production costs	120.0
7	Production cost	**1688.91**
8	Administrative costs	25.30
9	Selling expenses	168.89
10	Other expenses	**89.9**
11	Full cost price	**1973.00**

The summary indicators of the enterprise's activities are given in the table

Table 7 - Technical and economic indicators of the enterprise

Indicators	**Unit measurement**	**Value**
Amount of output at current prices	UAH	**2000.0**
Total production costs and product sales	UAH	**1973.00**
Costs per UAH 1 of produced goods	UAH	**0.99**
Profit from production activities	UAH	**27.0**
Production profitability products	%	**1.3**
Number of industrial and production personnel	persons	**2**
Labor productivity	UAH/person	**1000.0**

The calculations made showed the feasibility of introducing production yeast puff pastry dough in the confectionery shop of a supermarket. Profit The enterprise will pay 27 UAH per shift. Despite the minimal profit, the product is distinguished by high quality. And therefore, obtaining profit is expected from the sale of finished dough products - pies, buns etc.

Appendix C
Example
Development of an innovative product – beef stew with kelp

When developing a new recipe for meat stew with kelp, the concept of consumer market marketing research was taken into account. It was determined that for a restaurant establishment bringing such a product to the market Of course accompanied by some degree risk. Therefore, it was decided to execute some economic calculations that would help to find out which one profit maybe get enterprise thanks to implementation of this novelty for the production of a dish from the menu. The cost of production is one of the most important indicators of the efficiency of production of any product. It accumulates all current costs and includes the totality of costs, expressed in monetary terms, for the production and sale of products.

The aim of expanding the restaurant menu thanks to creation a new dish – meat stew with kelp – is provided demand population in these types of products. The main consumers are people who suffer iodine and microelement deficiency, athletes and those who seeks to lose weight. After all Seaweed strengthens the body, saturating it its useful substances.

To ensure release products that meet modern requirements, the hot shop of the facility does not require radical reconstruction, both in terms of replacing equipment and in terms of implementing modern technologies. Therefore, it was it was decided not to carry out additional capital investments.

on project calculations on technology and data technological practice we make a calculation raw material and the main materials for production canned food products (Table 1).

Calculate the cost of new manufactured products is appropriate based on the cost of raw materials and energy costs and sales costs due to possible advertising on the tables of a new product from the establishment's menu. Indicators such as wages, depreciation reimbursement special tools and equipment purpose - built and other special costs, equipment maintenance and operation costs, general production costs etc. to count in this case is not appropriate, because they apply to everything assortment dishes of the establishment.

To the article “Raw materials” and materials” includes the cost of raw materials that are part of products that is produced. In addition, this article includes the cost of purchased materials to ensure a normal technological process and product packaging.

Table 1 - Costs of raw materials and basic materials

Raw	**“Stewed beef with kelp”**			**Traditional product**		
	Norm for 1 serving, g	**Price, UAH /kg**	**Cost, UAH**	**Norm for 1 serving, g**	**Price, UAH /kg**	**Cost, UAH**
Beef 1 grade	300	29	8.7	370	29	10.73
Beef fat	100	10	1	100	10	1
Laminaria	52	389	20,228	0	0	0
Together:			**29.92**			**11.73**

The costs of auxiliary materials are summarized in Table 2.

Table 2- Costs for auxiliary materials

Raw	**“Stewed beef with kelp”**			**Traditional product**		
	Norm for 1 serving, g	**Price, UAH /kg**	**Cost, UAH**	**Norm for 1 serving, g**	**Price, UAH /kg**	**Cost, UAH**
Table salt	1.2	3.0	0.0036	1.2	3.0	0.0036
Fresh onion	40	2.0	0.08	40	2.0	0.08
Black pepper	0.5	189.0	0.0945	0.5	189.0	0.0945
Allspice	0.3	223.0	0.0669	0.3	223.0	0.0669
Bay leaf	0.2	376.0	0.0752	0.2	376.0	0.0752
Water	100	2.5	0.25	100	2.5	0.25
Together			**0.57**			**0.57**

Energy costs are entered in Table 3.

Table 3 - Energy consumption for technological purposes

Raw	Traditional stew / Stew with kelp		
	Norm per 100kg	Price, UAH /t (m^3)	Cost, UAH
Water, m^3	7.58	11.40	86.4
Electricity, kWh	33.97	1.78	60,463
Steam, t	4.6	36.0	165.6
Together:			312,463
For 1 serving			0.31 UAH

It is advisable to set the price for a new dish, taking into account demand, at 30% higher than traditional products.

Table 4 - Calculation of an updated menu dish

Name of products (components of the dish)	Consumption rate per 1 serving, g	Price, UAH	Total cost for 1 dish, UAH.	Margin level, %
Beef 1 grade	300.0	29.0	8.7	30%
Beef fat	100.0	10.0	1	30%
Laminaria	52	389.0	20,228	30%
Table salt	1.2	3.0	0.0036	30%
Fresh onion	40.0	2.0	0.08	30%
Black pepper	0.5	189.0	0.0945	30%
Allspice	0.3	223.0	0.0669	30%
Bay leaf	0.2	376.0	0.0752	30%
Water	100	2.5	0.25	30%
Together:			30.50	41.0

Let's summarize the production cost of the newly created and traditional product:

Table 4 - Costs of production and sales of products

Raw	Traditional product	Beef with kelp
Raw materials and supplies,	11.73	29.92
Auxiliary materials, UAH	0.57	0.57
Energy costs, UAH	0.31	0.31
Production cost, UAH	12.61	30.8
Sales costs, UAH	1.26	3.08
Full cost, UAH	**13.87**	**33.88**

Sales costs are taken as 10% of production costs.

cost price

Summing up regarding conducted calculations, the economic efficiency of the improvement project should be analyzed recipes according to the main indicators.

The main technical and economic indicators of the project are presented in the form of Table 6.

Table 6 - Calculation of selling prices and planned gross income from the sold innovative product

No.	**Dish**	**Daily amount production, units**	**Selling price, UAH**	**Cost of sales, thousand UAH (daily)**	**Cost of sales (gross revenue), UAH (annual)**
1	Beef stewed with kelp	3.0	41.0	123.0	41000.00
2	Beef stewed	3.0	30.0	90.0	30000.00

Let's summarize the main technical and economic indicators for the production of an innovative product for a specific restaurant establishment - beef stew with kelp.

Table 7 - Main technical and economic indicators of the project

No.	**Indicators**	**Units of measurement**	**Traditional product**	**Beef with kelp**
1	Production capacity of the enterprise by main types of products	portions	1000	1000
4	Sales revenue	UAH	30000.0	41000.0
5	Full cost of goods manufactured	UAH	18000.0	33800.0
6	Costs per UAH 1 of produced goods	UAH	0.60	0.82
7	Gross profit	UAH	12000.0	7200.00
8	Profitability	%	40.0	17.5

Conclusion:

The calculations carried out lead to the conclusion that the production of a new product will be expedient. The price for 1 serving of such stew will be 41.0 UAH/serving. Which is 30% more than the traditional product. But taking into account the demand among the selected category of the population for such a product,

the production will be profitable.

The social effect of producing kelp stew will be to improve the functional nutrition of the population of the Sumy region (which, according to research by domestic scientists, does not receive enough iodine components by 54%), especially in the difficult ecological situation after the Chernobyl disaster.

APPENDIX G
Mathematical modeling process heat treatment of semi-finished shellfish products freshwater

Current task research on the technology of semi-finished mollusk products freshwater is process optimization heat treatment using mathematical modeling, namely using an orthogonal central compositional plan to determine rational cooking time. During optimization, the interdependence and magnitude of four factors are taken into account: moisture content , degree of penetration and the value of structural-mechanical indicators and organoleptic research indicators . Data on chemical composition and structural- mechanical indicators we take those that obtained in the process of researching raw materials - soft bodies of freshwater mollusks. The basis is taken developed technology of semi-finished mollusk products freshwater. The response function is interpreted and investigated, after which conclusions are drawn regarding the optimization of the heat treatment time .

The problem is determining the optimal time of heat treatment, since the soft body of freshwater mollusks has increased rigidity, which is associated with a high content of collagen fibers, so in order to satisfy organoleptic preferences and at the same time maximally preserve the consumer properties of the semi-finished product from freshwater mollusks , which is difficult to carry out experimentally, since the scope of the study is too large.

To achieve the set goal was met following tasks:

– development of an orthogonal central compositional plan with four (n) factors for optimizing the heat treatment time with each factor fixed at five levels, taking into account the minimum and maximum cooking time of a semi-finished product from freshwater mollusks with unchanged basic characteristics of the raw materials;

– organoleptic evaluation properties each parallel determined during the experiment;

– to present the results obtained are presented in the form of a 3D model to determine the optimal heat treatment time.

Organoleptic The quality assessment of the finished product was carried out using analytical methods - qualitative and profile analysis.

The essence of the profile method is that the complex concept of one of the organoleptic indicators (consistency, taste and smell, color) were presented as a set of components (descriptors) which
were evaluated by experts according to indicators quality, intensity and order of manifestation.

For conducting optimization, the response function is formed as a complete second -order quadratic polynomial for n=4, which is given in (Form.1).

To determine coefficients of the polynomial are used orthogonal second -order central compositional plan (CCP). $Y=b_0+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_{12}x_1x_2+b_{13}x_1x_3+b_{14}x_1x_4+b_{23}x_2x_3+b_{24}x_2x_4+b_{34}x_3x_4+b_{123}X_1X_2X_3+b_{124}X_1X_2$

$X_4 + b_{234} X_2 X_3 X_4 + b_{1234} X_1 X_2 X_3 X_4 + Y_p X_2 + Y_{22} \wedge 2^+ \wedge 33 \wedge 3^+ Y_{44} X_4$ (1)

Orthogonal the central compositional plan is such a plan that matrix The planning X is constructed so that the matrix $C = X_t X$ turned out diagonal. We use this approach when constructing second-order plans.

A plan is called central if all the dots symmetrically arranged regarding the center of the plan. OCCP – central symmetrical rectangular compositional plan.

To define the OCCP as such can be used in research, 3 criteria are applied , the data on which are well known:

1. t - test / Student's t -test – general name for the class methods of statistical hypothesis testing (statistical criteria) based on comparison with the Student distribution. The most common cases application of the t -test related to checking the equality of the mean values in two samples.

2. Cochrane Criteria – used to compare three and more selections the same volume

3. F -test or **Fisher's exact test** (F -test, φ *-test) is called any a statistical criterion whose test statistic when the null hypothesis is met has a Fisher distribution (F -distribution).

parameter is the optimal heat treatment time (cooking) semi-finished shellfish product freshwater at approx. maximum values changes in chemical composition, structural and mechanical parameters and values organoleptic.

In the central compositional plan, each factor is fixed on five levels, considering the maximum and minimum values indicators of the selected factors while leaving the main one’s unchanged properties semi-finished product, which is given in Table 4.5.

Table 1

Optimization factors and their fixation levels affecting the optimization of the heat treatment time of a semi-finished product from freshwater molluscs

Factors that pour into optimization		Levels of fixation of factors and their magnitudes				
		–1.414	–1	0	1	1,414
x1	Shear stress, kPa	9.1	14.7	17.3	20	25.5
x2	Cutting work, kJ	132.2	126.6	133.3	140	134.4
x3	Penetration , kPa	3.4	8.6	10.3	12	24
x4	Moisture content, %	78.1	74.8	79.9	85	81.7

Experimental plan, results direct measurements and their initial. The analysis is presented in Table 2 and Table 3, respectively.

Table 2

Orthogonal central compositional plan with four (n) factors of heat treatment time optimization semi-finished product from clam freshwater

No.	x 0	x 1	x2	x3	x4	x and - 0.8	*chi* - 0.8	x and - 0.8	x 4 - 0.8
1	1	1	1	1	1	0.20	0.20	0.20	0.20
2	1	–1	1	1	–1	0.20	0.20	0.20	0.20
3	1	1	–1	1	–1	0.20	0.20	0.20	0.20
4	1	–1	–1	1	1	0.20	0.20	0.20	0.20
5	1	1	1	–1	–1	0.20	0.20	0.20	0.20
6	1	–1	1	–1	1	0.20	0.20	0.20	0.20
7	1	1	–1	–1	1	0.20	0.20	0.20	0.20
8	1	–1	–1	–1	–1	0.20	0.20	0.20	0.20
9	1	1	–1	1	1	0.20	0.20	0.20	0.20
10	1	–1	–1	1	–1	0.20	0.20	0.20	0.20
11	1	1	1	1	–1	0.20	0.20	0.20	0.20
12	1	–1	1	1	1	0.20	0.20	0.20	0.20
13	1	1	–1	–1	–1	0.20	0.20	0.20	0.20
14	1	–1	–1	–1	1	0.20	0.20	0.20	0.20
15	1	1	1	–1	1	0.20	0.20	0.20	0.20
16	1	–1	1	–1	–1	0.20	0.20	0.20	0.20

Table 3

Результати безпосередніх вимірювань

No.	y 1	y 2	y 3	y 4	*in 1*		*IN*	*in*	5 and bell
1	2	3	4	5	6	7	8	9	10
1	8.8	11.9	31.7	12.41	16.2	109.56	16.2	16.3	0.017
2	7.8	10.1	25.9	10.56	13.6	68.73	13.6	13.7	0.005
3	6.9	10.1	31.5	13.71	15.6	120.36	15.6	15.4	0.037
4	6.4	11.4	26.1	11.67	13.9	71.99	13.9	13.7	0.038

1	2	3	4	5	6	7	8	9	10
5	8.0	7.1	31.1	14.16	15.1	123.82	15.1	15.3	0.034
6	7.4	8.4	25.7	11.02	13.1	72.41	13.1	13.3	0.033
7	6.5	8.4	31.3	12.75	14.7	128.23	14.7	14.7	0.007
8	5.6	6.6	25.5	13.26	12.7	83.61	12.7	12.6	0.019
9	7.1	11.6	31.7	11.64	15.5	120.55	15.5	15.6	0.006
1	2	3	4	5	6	7	8	9	10
10	6.2	9.8	25.9	10.20	13.0	76.64	13.0	13.0	0.000
11	8.6	10.3	31.5	14.22	16.2	110.24	16.2	16.0	0.020
12	8.0	11.6	26.1	11.61	14.3	64.33	14.3	14.2	0.020
13	6.3	6.9	31.1	12.53	14.2	134.33	14.2	14.3	0.017
14	5.8	8.1	25.7	12.26	13.0	78.82	13.0	13.1	0.017
15	8.2	8.6	31.3	14.01	15.5	117.50	15.5	15.5	0.001
16	7.2	6.8	25.5	11.26	12.7	76.60	12.7	12.6	0.007

As a result of the research, the coefficients of the regression equation were obtained. A statistical analysis of the model as a whole and its coefficients separately was carried out. The results are summarized in Table 4.

Table 4

Results of statistical analysis of the experiment

(n=5, P≥0.95)

	x0	x1	x2	x3	x4	* 2 - 0.8	* 2 - 0.8	in 2 * 3 - 0.8	2 * 4 -0.8
∑xi* yc p	358.6	21.1	5.6	8.1	4.3	0.0	–0.6	0.6	–0.7
∑xi^2	25	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0
bi	14.34	1.05	0.28	0.41	0.22	0.00	–0.07	0.08	–0.09
S2{ bi }	15.13	1.61	1.61	1.61	1.61	4.04	4.04	4.04	4.04
S{ bi }	3.89	1.27	1.27	1.27	1.27	2.01	2.01	2.01	2.01
you	3.69	0.83	0.22	0.32	0.17	0.00	0.04	0.04	0.04
ti – tcr	1.63	1.23	1.84	1.74	1.89	–2.06	–2.02	–2.02	–2.02

	x1x2	x1x3	x1x4	x2x3	x2x4	x3x4	x1x2x3	x1x2x4	x2x3x4	x1x2 x3x4
∑xi* yc p	1.8	0.6	–1.3	0.5	0.1	0.0	–1.3	–0.1	–0.1	0.5
∑xi^2	16	16	16	16	16	16	16	16	16	16
bi	0.11	0.04	0.08	0.03	0.00	0.00	–0.08	–0.01	–0.01	0.03
S2{ bi }	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
S{ bi }	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42

you	0.08	0.03	0.06	0.02	0.00	0.00	0.06	0.00	0.01	0.02
ti – tcr	–1.98	2.03	2.00	2.04	2.06	–2.06	–2.00	–2.06	–2.05	2.04

∑Sj2	2421.28	∑ Sad	0.466	Sy2	96.85
Sj2max	134.33	Sad^2	0.0233		
G	0.06	F	0.000240	α	0.05
m–1	3.00	k1	4		
N	25.00	k2	20	f_1	24.00
G_{kr}	0.19	$F_{kp\ (table)}$	2.87		
$G – G_{кр} =$	–0.13	$F – F_{kp} =$	–2.86975952	t_T	2.06
($G < G_{кр}$) the dispersion is homogeneous		$F < F_{kp}$ statistical m equation reg	del significant, resii reliable		

After constructing the central compositional plan, performing all necessary calculations , and determining the regression equation as reliable, the coefficients in formula 1 are replaced by those determined in the studies, which makes it possible to determine the optimal time for heat treatment of the semi-finished product.

As a result, the obtained regression model in coded units has the form:

$$Y=14.34+1.05x_1+0.28x_2+0.41x_3+0.22x_4+0.11x_1x_2+0.04x_1x_3–0.08x_1x_4+0.03x_2x_3–0.08x_{AND}X_2X_{WITH}-0.01x_{and}X_2X_4-0.01X_2X_{WITH}X_4+0.03x_{AND}X_2X_{WITH}X_4-0.07\%\left|+0.08\%3-0.09x4\right. \quad (2)$$

To determine the optimal heat treatment time according to the given parameters, a 3D model was constructed by the least squares smoothing method using the software package for statistical analysis Statistical, which is shown in Fig. 1.

After studying graphical data, direct measurement results, and regression equations, the optimal heat treatment time was determined for 11 samples.

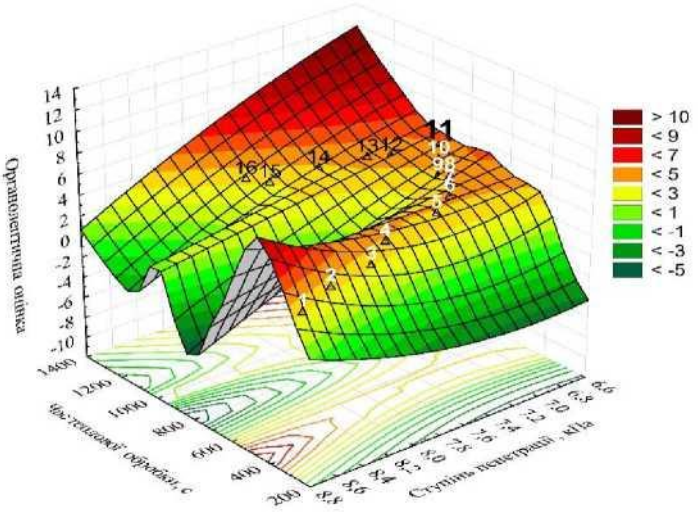

Fig. 1. 3D model of optimization of heat treatment time of semi-finished product from freshwater mollusk

Translating the model into the language of the experimenter is called the interpretation of the model. The influence of a factor on the optimization parameter is equal to the magnitude of the regression coefficient. Since Y tends to a maximum, an increase in coefficients with a "+" sign is favorable for the optimization parameter. Factors whose coefficients are insignificant (from the point of view of an experimenter with experience in the field under study) are not interpreted and do not have a significant impact on the optimization parameter.

Therefore, after studying the graphical data, the results of direct measurements and interpreting the regression equation, the optimal heat treatment time was determined to be (15±1) minutes, at which the values of structural and mechanical indicators and moisture content are closest to the optimal with an organoleptic assessment of 14.25.

An indicative list of topics for qualification papers.

1 . Improving the technology of minced poultry products using dietary fiber.
2 . Improving the technology of dishes with sour milk cheese using berry kylix.
3 . Improving the technology of bars using cashew nuts.
4 . Improving the technology of dumplings using modified starch.
5 . Improving the technology of bakery products using amaranth processing products.
6 . Improving the technology of chopped semi-finished products using plant raw materials.
7 . Improving the technology of cold fish dishes using sesame.
8 . Improving pizza dough technology using cuttlefish ink.
9 . Improving the technology of sugar cookies using nut meal.
10 .Improvement of bakery technology using heat-stable filling.
11 .Improvement of snack product technology using flax seeds.
12 .Improving the technology of health drinks using plant raw materials.
13 .Improvement of the technology of culinary products using walnut cake .
14 .Improvement of the technology of semi-finished meat products in a dough shell for functional purposes.
15 .Improvement of pasta technology with increased nutritional value.
16 .Improving the technology of culinary products using gluten-free flours.. Development cheese technology snacks.
17 . Improvement bakery products technology using processed products viburnum.
18 . Improvement cheese technology balls with natural food additives.
19 . Improvement semolina pudding technology using sesame processing products.
20 . Improvement butter technology bun using apricot powder.
21 . Improvement technology of cheeses based on secondary raw materials.
22 . Improvement enriched yogurt technology dietary fiber.
23 . Development meat technology semi-finished products with elongated expiration date.
24 . Improvement production technology cheese halloumi.
25 . Improvement marinade manufacturing technologies natural meat products and semi-finished products.

26 . Development cider technology based on processing derivatives chokeberry.
27 . Development food technology dyes based on processed derivatives mulberries.
28 . Improvement technology of drinks for children based on recycled materials.
29 . Improvement production technology ice cream functional purpose.

Appendix I

Declaration of Academic Integrity

I, _____ ,
the Sumy National University group _____
of the Agricultural University , I undertake to adhere to the principles of academic integrity during the performance of the qualification work. I am informed that in the event of my violation of academic integrity during the performance of the qualification work, I will have to bear academic and/or other types of responsibility and disciplinary measures may be applied to me for violation of academic integrity and ethics of academic relations, including the cancellation of the qualification work with subsequent expulsion from the university.

also realize that in the future, the procedure for depriving me of my higher education degree and corresponding qualification may be applied to me if a knowingly committed violation of academic integrity is not detected during the verification of the qualification work for the presence of text borrowings in accordance with the procedure established at the university using licensed software products.

∂ama *signature*

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

REVIEW

position, last name, first name, patronymic of the reviewer
for the qualification work
SVO "Master"
specialty 181 "Food Technology"

Student _____

Groups _____ course _____

Topic
Review content

1. Scope of qualification work _____ number of sheets of explanatory note (A4) _____

2. Relevance of the topic to the direction of training _____

3. Assessment of the quality of the graphic part (compliance with standards) ESKD): _____

4. Positive qualities of the work in general: _____

5. Main disadvantages: _____

6. General work evaluation: _____

Reviewer_____
signature date

Recommended form of self-assessment of qualification work applicant

Criterion	Level			Comment
Review literature built around the main problem, used the most relevant modern research on the topic, the connection is clearly reflected between the tasks set in the work and previous research	+	+ +	+ + +	
Specific and accurate information is provided about methods and data (quantity, temperature, duration, sequence, conditions, location, dimensions , etc.), methods are related to other studies.	+	+ +	+ + +	
Specific results are presented with explanations and analysis, comparison with the results of other studies is provided, and a clear connection is shown. problems with the results obtained,	+	+ +	+ + +	
Provided by suggestions for improvement that supported by appropriate justifications (forecast, model, etc.)	+	+ +	+ + +	
The conclusions provide a link to the most important aspects of the previous sections, a summary of key findings, demonstrate the connection between this work and existing research , focus on significant findings, indicate their possible applications, and present limitations that should be addressed in future research.	+	+ +	+ + +	
List of links is complete and sufficient to solve the problems research	+	+ +	+ + +	
fully completed in accordance with the requirements	+	+ +	+ + +	
The work does not contain typographical or grammatical errors. errors	+	+ +	+ + +	

METHODOLOGICAL INSTRUCTIONS FOR PERFORMING QUALIFICATION WORK

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