MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal state autonomous educational institution
of higher education
«Far Eastern Federal University»
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

AGREED

Head of OP

Kalenik T.K.
(signature) (full name)
«28» September 2021 г.

APPROVE

Head of VSP

Kalenik T.K.
(signature) (full name)
«28» September 2021 г.

WORKING PROGRAM OF THE DISCIPLINE

Biotechnological features of the production of plant products
Direction of training 19.04.01 «Biotechnology»
(«Agri-Food Biotechnology»)
Form of training full-time

course 2 semester 4
lectures 9 hours.
practical classes 27 h.
laboratory work 0 hours.
including using
total classroom hours 36 hours.
independent work 36 h.
including preparation for the exam 36 hours (if the exam is provided).
control works (quantity) are not provided
term paper / term project are provided
credit not included
exam 4 semester

The program of the state final certification was compiled in accordance with the requirements of the Federal State Educational Standard in the field of study 19.04.01 Biotechnology, approved by order of the Ministry of Science and Higher Education of the Russian Federation dated August 10, 2021 No. 737.

The program at the meeting of the Academic Council of the Institute of Life Sciences and Biomedicine (School) December 21, 2021
Director of the Department of Food Science and Technology Kalenik T.K.
Compiled by: T.V. Tanashkina.

Reverse side of the title page of the RPMU

I. The work program was revised at the meeting of the department:
Protocol dated «_____» _____ 20___ № _____
Director _____ _____
(signature)(full name)

II.The work program was revised at the meeting of the department:
Protocol dated «_____» _____ 20___ № _____
Director _____ _____
(signature)(full name)

III.The work program was revised at the meeting of the department:
Protocol dated «_____» _____ 20___ № _____
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(signature)(full name)

IV.The work program was revised at the meeting of the department:
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Director _____ _____
(signature)(full name)

ABSTRACT

Bachelor's/Specialist's/Master's degree in 19.04.01 Biotechnology

Study profile/ Specialization/ Master's Program "Title" "Agri-food biotechnology"

Course title: Biotechnological features of production of plant products

Variable part of Block 1, 3**credits**

Instructor: T.V. Tanashkina

At the beginning of the course a student should be able to:

- the ability to carry out the process in accordance with the regulations and use technical means to measure the main parameters of biotechnological processes, the properties of raw materials and products;

- the ability to carry out standard and certification testing of raw materials, finished products and technological processes;

- the ability to develop the main stages of the biotechnological process.

Learning outcomes: specific professional competences (SPC)

SPC 11 – ability to provide technical discipline, sanitary and hygienic mode of operation of the enterprise, maintenance of processing equipment in proper technical condition

SPC 13 – readiness for the organization, planning and management of the operating biotechnological processes and production

SPC 14 – ability to use typical and develop new methods of engineering calculations of technological parameters and equipment of biotechnological productions

SPC 17 – readiness for pilot development of technology and scaling-up

SPC 18 – ability to develop and scientific substantiate schemes for optimal integrated certification of biotechnological products

SPC 19 – ability to analyze the indicators of the technological process for compliance with the original scientific developments

Course description: structure and chemical composition of plant raw materials; microorganisms in biotechnological production; biotechnological features of processing plant raw materials; biotechnological processes in individual food production/

Main course literature:

1. Identification and commodity examination of products of plant origin: a textbook for universities / L. G. Eliseva, M. A. Polozhishnikova, A. V. Ryzhakova [and others]; by ed. L. G. Eliseeva. - Moscow: Infra-M, 2015. - 523 p. (3 copies.) http://lib.dvfu.ru:8080/lib/item?id=chamo:779344&theme=FEFU

2. Basic principles of processing raw materials of plant, animal, microbiological origin and fish: method. directions for special students 240902 "Food Biotechnology" of all forms of training / comp. E.V. Makarova, Vladivostok: Publishing House of the Pacific University of Economics, 2009. - 80 p. (10 copies.) http://lib.dvfu.ru:8080/lib/item?id=chamo:356130&theme=FEFU

3. Measuring methods for monitoring indicators of quality and food safety: [tutorial] [at 2 o'clock]: Part 1. Products of plant origin / V.V. Shevchenko, A.A. Vytovtov, L.P. Nilova [and others]. St. Petersburg: Trinity Bridge, 2009. - 303 p. (6 copies.) http://lib.dvfu.ru:8080/lib/item?id=chamo:358418&theme=FEFU

Form of final control: exam.

1. Purpose and objectives of mastering the discipline:

The purpose of the discipline is to acquire knowledge about the features of biotechnology of food products from plant materials.

Objectives of the discipline:

– acquaintance with traditional and modern directions of using plant materials in food biotechnology;

– consideration of the structural features, chemical composition and properties of various types of plant materials intended for biotechnological processing;

– knowledge of the characteristics of biotechnology of products from plant materials;

– ability to work with normative and technical documentation in the field of circulation of vegetable raw materials and food products based on it.

As a result of studying this discipline, the following professional competencies (elements of competencies) are formed in students:

Code and wording of competency	Competency Stages	
SPC 11 – ability to provide technical discipline, sanitary and hygienic mode of operation of the enterprise, maintenance of processing equipment in proper technical condition	Knows	fundamental principles of the regulations for ensuring technological discipline and sanitary and hygienic regime of operation of a biotechnological enterprise for the processing of plant raw materials.
	Is able	plan work to ensure technological discipline and organize the technological process in accordance with the requirements of regulatory, technical and sanitary documentation at biotechnological enterprises for the processing of plant materials.
	Owns	the skills of organizing and ensuring the implementation of technological discipline and sanitary and hygienic regime at a biotechnological enterprise for the processing of plant materials.
SPC 13 – readiness for the organization, planning and management of the operating biotechnological processes and production	Knows	fundamental principles of organization, planning and management of biotechnological processes at enterprises for the processing of plant materials.
	Is able	to find optimal solutions in the organization, planning and management of biotechnological processes at enterprises for the processing of plant materials.
	Owns	organization skills, planning and effective management of biotechnological processes at enterprises for the processing of plant materials.
SPC 14 – ability to use	Knows	standard methods of engineering calculations in

typical and develop new methods of engineering calculations of technological parameters and equipment of biotechnological productions		biotechnological production for the production of food products.
	Is able	develop and produce engineering calculations in the organization of biotechnological production for the production of food from plant materials.
	Owns	methods of standard and experimental calculations in biotechnological productions for the processing of plant materials.
SPC 17 – readiness for pilot development of technology and scaling-up	Knows	principles and methods of organizing and conducting tests with the introduction of new technologies in biotechnological food production.
	Is able	organize pilot testing of technologies and scaling up processes when introducing new biotechnological food production at the enterprise.
	Owns	skills of pilot testing of new technologies for the production of food products from plant materials.
SPC 18 – ability to develop and scientific substantiate schemes for optimal integrated certification of biotechnological products	Knows	principles and methods of organizing optimal integrated certification of biotechnological products.
	Is able	substantiate and develop schemes for optimal integrated certification of food products obtained during the biotechnological processing of plant materials.
	Owns	skills of scientific substantiation and drawing up schemes for optimal integrated certification of food products obtained during the biotechnological processing of plant materials.
SPC 19 – ability to analyze the indicators of the technological process for compliance with the original scientific developments	Knows	regulations and methods for assessing the performance of the technological process in the processing of plant materials and food production.
	Is able	to assess and analyze the indicators of the technological process at food enterprises.
	Owns	methods of establishing the correspondence of the values of indicators of the technological process indicated in scientific developments to the actual data.

To form the above competencies in the framework of the discipline "Biotechnological features of the production of plant products", the following methods of active / interactive training are used: lecture-press conference, seminar-press conference, thesis, compilation of intelligence- cards, small group work, whirlpool, debriefing.

2. The complexity of the discipline and types of training sessions in the discipline

The total labor intensity of the discipline is 3 credit units (108 academic hours).

The types of training sessions and work of the student in the discipline can be:

Designation	Types of training sessions and work of the student
Lec	Lectures
Lab	Labs
Pe	Practical exercises
Oc	Online course
SR	Independent work of the student during the period of theoretical training
Control	Independent work of the student and contact work of the student with the teacher during the period of intermediate certification

Discipline structure:

The form of education is full-time.

№	Section namedisciplines	Semester	The number of hours by type of training sessions and work of the student						Forms of intermediate certification, current monitoring of progress
			Lec	Lab	Pe	Oc	SR	Control	
1	Section I. Plant materials for biotechnological production	4	5		12		36	6	Seminar, exam
2	Section II. Biotechnological features of the processing of plant materials	4	4		15				Seminar, exam
	Total:		9		27		36	36	

3. STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE

Section I. Plant materials for biotechnological production

Topic 1. Introduction to the discipline. Characterization of traditional types of plant materials for biotechnological production (1 hour, using the method of active learning lecture-press conference)

Traditional and modern areas of biotechnological production based on plant materials. The main types of plant materials in biotechnology products.

The main purpose of the lecture and press conference at the beginning of the course is to identify the range of interests and needs of students, their degree of preparedness for work, their attitude to the subject. The need to formulate a question and correctly ask it initiates mental activity, and the expectation of an answer to your question concentrates the student's attention.

Topic 2. Non-traditional types of plant materials for biotechnological production

New types of grain raw materials for biotechnological production of food products of special and functional purpose. Fruit and vegetable raw materials.

Section II. Biotechnological features of the processing of plant materials

Topic 1. Enzyme preparations in biotechnological industries, using the method of active teaching

Enzymatic preparations of plant, animal and microbial origin. Modern enzyme preparations of complex action. Features of the use of enzyme preparations for processing various types of raw materials.

Topic 2. Microorganisms in biotechnological industries, using the method of active teaching

Modern production races of yeast for kvass and brewing, alcohol production and winemaking. Modern races of baker's yeast with special properties.

Topic 3. Biotechnological features of individual food production, including 1 hour using the active teaching method

Flour and confectionery production. Kvass and brewing, winemaking, alcohol production. Juice production. Production of baby food and gerontological purposes. Carbohydrate Syrup Production.

4. STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE

Practical classes (including 8 hours using active learning methods)

Lesson 1. Characterization of grain vegetable raw materials (8 hours, including 2 hours using active learning methods, seminar, press conference, whirlpool)

1. Types of grain raw materials for the production of fermented beverages.

2. Features of the structure and chemical composition of grain cereals, "pseudo-cereal" crops.

3. Gluten-free grain raw materials.

4. Standardization of grain.

5. Compilation of analytical tables “Characterization of grain cereals and “pseudograin" crops".

The essence of the seminar-press conference method is that the teacher instructs several students to prepare reports on each item of the seminar plan on the topic of the next seminar. After a brief introduction, the leader of the seminar gives his choice of the floor to one of the students who are preparing to speak. The report lasts 10-12 minutes. Then each student asks the speaker one question. Questions and answers to them form the central part of the seminar.

The essence of the method of active learning whirlpool is to cross-evaluate the content of the material, when each student acts as an expert and evaluates the work of other students. When revealing inaccuracies, errors, insufficiency of materials, the expert makes appropriate notes in the fields of the tables. When protecting the table, the student must answer all the expert's comments. This method develops the analytical abilities of students and makes it possible to test their own knowledge on a specific issue.

Lesson 2. Malt - the main raw material for fermented beverages (4 hours using the active learning method seminar-press conference)

1. Comparative characteristics of barley malt and other types of malts.

2. Special malt for technological purposes and to adjust the organoleptic characteristics of the product.

3. Advantages and limitations of using unmalted raw materials in fermented beverage technology.

4. Standardization of malt.

The essence of the seminar-press conference method is that the teacher instructs several students to prepare reports on each item of the seminar plan on the topic of the next seminar. After a brief introduction, the leader of the seminar gives his choice of the floor to one of the students who are preparing to speak. The report lasts 10-12 minutes. Then each student asks the speaker one question. Questions and answers to them form the central part of the seminar.

Lesson 3. Yeast and lactic acid bacteria in the production of fermented beverages

1. Technological properties of industrial brewer's yeast.

2. Technological properties of brewing yeast production races.

3. Technological properties of the production of fermenting yeast.

4. Technological properties of industrial races of alcoholic yeast.

5. Lactic acid bacteria in the production of fermented beverages.

Lesson 4. Modern forms of yeast in the technology of drinks

1. Active dry yeast. Advantages and limitations of using dry yeast in fermented beverage technology.

2. Immobilized yeast in winemaking and brewing.

3. Genetically modified yeast in fermented beverage technology.

4. Compilation of an intelligence card on the topic “Advantages and limitations of the use of active dry yeast, immobilized and genetically modified yeast in beverage technology”.

The essence of the method of compiling intelligence cards is to structure and graphically display materials on a given topic. Work in small groups in the preparation of intelligence cards develops students' initiative and communication skills.

The essence of the method of active learning whirlpool is to cross-evaluate the content of the material, when each student acts as an expert and evaluates the

work of other students. When revealing inaccuracies, errors, insufficiency of materials, the expert makes appropriate notes in the fields of the tables. When protecting the table, the student must answer all the expert's comments. This method develops the analytical abilities of students and makes it possible to test their own knowledge on a specific issue.

Lesson 5. Enzyme preparations in biotechnological industries (2 hour using the active training method of debriefing)

1. Enzymes of plant materials and their role in food production.
2. Enzyme preparations and their importance in biotechnological industries.
3. Immobilized enzymes in food technology.

The essence of the method of active learning, debriefing is a more complete understanding by students of the material presented in the lesson, isolating the main information from the entire volume, and the possibility of generating new ideas. The method is applied after consideration of all issues in order to generalize the material and formulate conclusions.

5.TRAINING AND METHODOLOGICAL SUPPORT OF STUDENTS'S INDEPENDENT WORK

Educational and methodological support for the independent work of students in the discipline "Biotechnological features of the production of plant products" is presented in Appendix 1 and includes:

- a schedule of independent work on the discipline, including approximate norms of time to complete each task;
- characteristics of tasks for independent work of students and guidelines for their implementation;
- requirements for the presentation and presentation of the results of independent work;
- criteria for evaluating the performance of independent work.

6. CONTROL OF ACHIEVING COURSE OBJECTIVES

№	Supervised sections / topics of discipline	Codes and stages of formation of competencies		Evaluation Tools	
				current control	intermediate certification
1	Section I Plant materials for biotechnological production	SPC-18	Knows how to organize and conduct the technological process within the framework of the technology for the production of biotechnological products adopted in the organization	UO-1 - interview, UO-3 - report, communication, PR-1 - test, PR-14 - analytical tables	Exam Questions 1-16
			Able to apply methods of organizing and conducting a technological process within the framework of the technology for the production of biotechnological products adopted in the organization		
			Owns methods of organizing and conducting the technological process within the framework of the technology for the production of biotechnological products adopted in the organization		
2	Section II Biotechnological features of the processing of plant materials	SPC-11 SPC-13 SPC-14 SPC-17 SPC-19	Knows how to develop proposals for optimizing biotechnological processes and managing the release of biotechnological products	UO-1 - interview, UO-3 - report, message, PR-14 - analytical tables, PR-15 - intelligence card	Exam Question 17
			Able to apply methods for developing proposals for optimizing biotechnological processes and managing the release of biotechnological products		
			Owns how to develop proposals for optimizing biotechnological processes and managing the release of		

			biotechnological products		

Typical control tasks, methodological materials that determine the procedures for assessing knowledge, skills and (or) experience, as well as the criteria and indicators necessary for assessing knowledge, skills, and characterizing the stages of formation of competencies in the process of developing an educational program are presented in the Appendix 2.

7. LIST OF TRAINING LITERATURE AND INFORMATION AND METHODOLOGICAL SUPPORT OF DISCIPLINE

Main literature

(electronic and print editions)

1. Identification and commodity examination of products of plant origin: a textbook for universities / L. G. Eliseva, M. A. Polozishnikova, A. V. Ryzhakova [and others]; under the editorship of L. G. Eliseeva. - Moscow: Infra-M, 2015. - 523 p. (3 copies) http://lib.dvfu.ru:8080/lib/item?id=chamo:779344&theme=FEFU

2. Basic principles of processing raw materials of plant, animal, microbiological origin and fish: method. directions for students special. 240902 "Food biotechnology" of all forms of education / comp. E.V. Makarova, Vladivostok: Publishing House of the Pacific Economic University, 2009. - 80 p. (10 copies) http://lib.dvfu.ru:8080/lib/item?id=chamo:356130&theme=FEFU

3. Measuring methods for monitoring indicators of quality and food safety: [study guide] [in 2 hours]: part 1. Products of plant origin / V.V. Shevchenko, A.A. Vytovtov, L.P. Nilova [et al.]. St. Petersburg: Trinity Bridge, 2009. - 303 p. (6 copies) http://lib.dvfu.ru:8080/lib/item?id=chamo:358418&theme=FEFU

Additional literature

(electronic and print editions)

1. Kalenik, T.K. Commodity research and examination of food products obtained from genetically modified sources: quality and safety: a textbook for

universities / T.K. Kalenik, L.N. Fedyanina, T.V. Tanashkina. - Rostov-on-Don: Publishing Center "Mart"; Phoenix, 2010 .-- 223 p. - Access mode: http://lib.dvfu.ru:8080/lib/item?id=chamo{57575&theme=FEFU

2. Meledina, T.V. The physiological state of yeast [Electronic resource]: textbook / T.V. Meledina, S.G. Davydenko, L.M. Vasilieva. - The electron. Dan. - St. Petersburg: NRU ITMO, 2013 .-- 48 p. - Access Mode: https://e.lanbook.com/book/71157

3. Meledina, T.V. Unmalted materials in brewing [Electronic resource]: study guide / T.V. Meledina, I.V. Matveev, A.V. Fedorov. - The electron. Dan. - St. Petersburg: NRU ITMO, 2017 .-- 66 p. - Access Mode: https://e.lanbook.com/book/110510

4. Ermishin, A.P. Genetically modified organisms and biosafety [Electronic resource]: monograph / A.P. - Minsk: Belarusian Science, 2013 .-- 172 p. http://www.iprbookshop.ru/29440.html

5. Food biotechnology: a textbook for high schools [In 4 kn.] Book. 1. The basics of food biotechnology / I.A. Rogov, L.V. Antipova, G.P. Shuvaev. - M .: KolosS, 2004 .-- 440 p. - Access mode: http://lib.dvfu.ru:8080/lib/item?id=chamo{4242243&theme=FEFU

6. Meledina T.V. Methods of planning and processing the results of scientific research [Electronic resource]: textbook / Meledina TV, Danina MM - Electron. textual data. — SPb .: NRU ITMO, 2015. — 108 p .— Access mode: http://www.iprbookshop.ru/67290.html

7. Schmid, R. Visual biotechnology and genetic engineering [Electronic resource] / R. Schmid; trans. with him. - 2nd ed. (email). - The electron. text data (1 pdf file: 327 s.). - M.: BINOM. Knowledge Lab, 2015. - Access mode: http://znanium.com/bookread2.php?book=541279

Regulatory Materials

1. GOST 5060-86 Brewing barley. Technical conditions - Enter. 1988-07-01. - M .: Standartinform, 2010 .-- 6 p. - Access mode: http://gostexpert.ru/gost/gost-5060-86

2. GOST 16990-2017 Rye. Technical conditions - Enter. 2019-01-01. - M .: Standartinform, 2017 .-- 7 p. - Access mode: http://internet-law.ru/gosts/gost/65485/

3. GOST 19092 - 92 Buckwheat. Requirements for procurement and supplies. - Enter. 1993-06-01. - M .: Standartinform, 2010 .-- 6 p. - Access mode: http://www.internet-law.ru/gosts/gost/2547/

4. GOST 27186-86 Grain harvested and supplied. Terms and Definitions. - Enter. 1988-01-01. - M .: Standartinform, 2010 .-- 6 p. - Access mode: http://gostexpert.ru/gost/gost-27186-86

5. GOST 29294-2014 Brewing malt. Technical conditions Enter 2016-01-01. - M .: Standartinform, 2014 .-- 26 p. - Access mode: http://gostexpert.ru/gost/gost-29294-2014

6. GOST 31711-2012 Beer. General specifications. - Enter. 2013-07-01. - M .: Standartinform. 2013.15 p. - Access mode: http://gostexpert.ru/gost/gost-31711-2012

7. GOST R 52061-2003 Dry rye malt. Technical conditions - Enter. 2004-07-01. - M .: Standartinform, 2006 .-- 27 p. - Access mode: http://gostexpert.ru/gost/gost-52061-2003

8. GOST 9353-2016 Wheat. Technical conditions - Enter. 2019-07-01. - M .: Standartinform, 2016 .-- 11 p. - Access mode: http://www.internet-law.ru/gosts/gost/62924

The list of resources of the information and telecommunication network "Internet"

1. http://elibrary.ru Scientific electronic library eLIBRARY.RU
2. The electronic library system "Doe" http://e.lanbook.com/
3. The electronic library system "IPRBOOK" http://www.iprbookshop.ru
4. Scopushttp database: http://www.scopus.com/home.url

5. Web of Science Database http://apps.webofknowledge.com/

6. Database of full-texting academic journals in China http://oversea.cnki.net/

7. The electronic library of dissertations of the Russian State Library http://diss.rsl.ru/

8. EBSCO Electronic Databases http://search.ebscohost.com/

8. METHODOLOGICAL INSTRUCTIONS FOR THE DEVELOPMENT OF THE DISCIPLINE

In accordance with the curriculum in the discipline "Biotechnological features of the production of plant products / Lecture, practical classes, as well as independent work of the student.

At lectures, the student is provided with basic information on the course, the basic concepts are revealed, the main provisions of theories, hypotheses are stated. The most important task of the lecture course is the formation of the skills to highlight problems, formulate and test hypotheses, and evaluate the current state of science. Lectures lay the foundations of scientific knowledge among students, are a method and means of forming scientific thinking. Lecture material is necessary for students to further work on mastering the discipline program.

In practical classes, self-preparation of students on the topic of classes, which is announced to teachers in advance, is of great importance. Also, at the beginning of the semester, students are provided with a plan and a calendar schedule for practical classes.

In preparation for the practical lesson, it is necessary to build on the theoretical knowledge gained in the lecture, which should be expanded, deepened and illustrated using additional sources of information. At the same time, important attention should be paid to the structuring and systematization of the material presented. In case of preparation of the message, it is necessary to provide it with a presentation.

The independent work of the student is an integral element of the discipline program. This part of the planned educational work is carried out on assignment and with the methodological guidance of the teacher, but without his direct participation. Independent work is aimed at mastering the system of scientific and professional knowledge, the formation of skills, gaining experience in independent creative activity. Tasks for independent work of students and its educational and methodological support are presented in Appendix 1.

Only those students who do not have arrears in the current control, i.e. they successfully completed individual tasks, passed test tasks. To prepare for the exam, students are offered questions that cover and systematize both theoretical and practical material of the course.

Students should master theoretical knowledge regularly, systematically, sequentially from lesson to lesson, carefully prepare for practical exercises, perform individual tasks, tests, etc. in the allotted time. Only in this case, one can expect a high level of assimilation of the material, the formation of the necessary competencies and, how successful exam.

9. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Lecture and practical classes are held in the classroom equipped with multimedia equipment. For independent work of students, reading rooms of the FEFU scientific library and computer classes of the School of Biomedicine with free access are used.

Laboratory of General Food Biotechnology Vladivostok, Russian island, p. Ajax 10, Building 25.1, aud. M 311. The classroom for lectures, practical and laboratory classes, group and individual consultations, ongoing monitoring and interim certification.	Training furniture for 25 workplaces, teacher's place (table, chair). Analytical and technological equipment (M311): Milk centrifuge with heating ЦЛМ 1-12; Liquid thermostat LOIP Lt-208a, volume 8l, 120x150 / 200mm; Analyzer of milk quality Lactan 1-4 mod. 230; PH-millivolmeter with tripod pH-150MI; VSP 1.5-2-3T scales; Refrigerator "Ocean-RFD-325B"; Drying cabinet, stainless steel chamber. steel, 58l; electric stove 111CH 101-226589; PE-6110 magnetic stirrer with heating; VNZh-0,3-KhS3 viscometer (d-1.41) glass capillary; Tripod PE-2710 lab. for burettes.

	Multimedia equipment: Monoblock Lenovo C360G-i34164G500UDK; Screen with electric 236 * 147 cm Trim Screen Line; DLP projector, 3000 ANSI Lm, WXGA 1280x800, 2000: 1 EW330U Mitsubishi; Subsystem of specialized hardware mounts CORSA-2007 Tuarex; Video Switching Subsystem: DVI DXP 44 DVI Pro Extron matrix switcher; Extender DVI over twisted pair DVI 201 Tx / Rx; Subsystem of audio switching and sound reinforcement; ceiling mount speaker SI 3CT LP Extron; Sennheiser EW 122 G3 UHF Microphone Lavalier Radio System with a wireless microphone and receiver; DMP 44 LC Extron digital audio processor; Extron IPL T S4 Network Management Controller; Wireless LANs for students are provided with a system based on 802.11a / b / g / n 2x2 MIMO (2SS) access points.
Reading rooms of the FEFU Scientific Library with open access to the fund Vladivostok,Russian island. settlement Ajax 10, building A - level 10	Reading room equipment of the FEFU Scientific Library: HP All-in-One 400 All-in-One Monoblock 400 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD +/- RW, GigEth, Wi- Fi, BT, usb kbd / mse, Win7Pro (64-bit) + Win8.1Pro (64-bit), 1-1-1 Wty Internet access speed of 500 Mbps. Workplaces for people with disabilities are equipped with braille displays and printers; equipped with: portable devices for reading flat-printed texts, scanning and reading machines with a video enlarger with the ability to control color spectra; magnifying electronic magnifiers and ultrasonic markers
Computer class Vladivostok, Russian Island, 10 Ajax, Building 25.1, aud. M621. The classroom for lectures, practical exercises, group and individual consultations, ongoing monitoring and interim certification.	Training furniture for 17 workplaces, teacher's place (table, chair), Monoblock Lenovo C360G-i34164G500UDK 19.5 "Intel Core i3-4160T 4GB DDR3-1600 SODIMM (1x4GB) 500GB Windows Seven Enterprise - 17 pcs; Wired LAN - Cisco 800 series; Wireless LAN for students with a system based on 802.11a / b access points / g / n 2x2 MIMO (2SS).

10.VALUATION FUNDS

Code and wording of competency	Competency Stages	
SPC 11 – ability to provide technical discipline, sanitary and	Knows	fundamental principles of the regulations for ensuring technological discipline and sanitary and hygienic regime of operation of a biotechnological enterprise for the

hygienic mode of operation of the enterprise, maintenance of processing equipment in proper technical condition		processing of plant raw materials.
	Is able	plan work to ensure technological discipline and organize the technological process in accordance with the requirements of regulatory, technical and sanitary documentation at biotechnological enterprises for the processing of plant materials.
	Owns	the skills of organizing and ensuring the implementation of technological discipline and sanitary and hygienic regime at a biotechnological enterprise for the processing of plant materials.
SPC 13 – readiness for the organization, planning and management of the operating biotechnological processes and production	Knows	fundamental principles of organization, planning and management of biotechnological processes at enterprises for the processing of plant materials.
	Is able	to find optimal solutions in the organization, planning and management of biotechnological processes at enterprises for the processing of plant materials.
	Owns	organization skills, planning and effective management of biotechnological processes at enterprises for the processing of plant materials.
SPC 14 – ability to use typical and develop new methods of engineering calculations of technological parameters and equipment of biotechnological productions	Knows	standard methods of engineering calculations in biotechnological production for the production of food products.
	Is able	develop and produce engineering calculations in the organization of biotechnological production for the production of food from plant materials.
	Owns	methods of standard and experimental calculations in biotechnological productions for the processing of plant materials.
SPC 17 – readiness for pilot development of technology and scaling-up	Knows	principles and methods of organizing and conducting tests with the introduction of new technologies in biotechnological food production.
	Is able	organize pilot testing of technologies and scaling up processes when introducing new biotechnological food production at the enterprise.
	Owns	skills of pilot testing of new technologies for the production of food products from plant materials.
SPC 18 – ability to develop and scientific substantiate schemes for optimal integrated certification of biotechnological products	Knows	principles and methods of organizing optimal integrated certification of biotechnological products.
	Is able	substantiate and develop schemes for optimal integrated certification of food products obtained during the biotechnological processing of plant materials.
	Owns	skills of scientific substantiation and drawing up schemes for optimal integrated certification of food products obtained during the biotechnological processing of plant materials.
SPC 19 – ability to analyze the indicators of the technological process for compliance with the original scientific developments	Knows	regulations and methods for assessing the performance of the technological process in the processing of plant materials and food production.
	Is able	to assess and analyze the indicators of the technological process at food enterprises.
	Owns	methods of establishing the correspondence of the values

		of indicators of the technological process indicated in scientific developments to the actual data.

Criteria for grading a student in an exam in the discipline

"Biotechnological features of the production of plant products":

Exam grade	Requirements for formed competencies
“excellent”	The student is rated as “excellent” if he has deeply and firmly grasped the program material, sets out it comprehensively, consistently, clearly and logically in order, knows how to closely relate theory to practice, freely copes with tasks, questions and other types of application of knowledge, and does not have difficulty the answer when modifying tasks, uses the material of monographic literature in the answer, correctly substantiates the decision made, has versatile skills and techniques for performing practical tasks. The competencies of PK 11, PK 13, PK 14, PK 17, PK 19 are fully formed.
«good»	The student is rated “good” if he knows the material well, correctly and essentially sets out it, avoiding significant inaccuracies in answering the question, correctly applies theoretical principles when solving practical questions and tasks, and possesses the necessary skills and techniques for their implementation. The competencies of PK 11, PK 13, PK 14, PK 17, PK 19 are formed at the level of knowledge and skills.
"satisfactorily"	A student is rated “satisfactory” if he has knowledge of only the basic material, but has not learned its details, admits inaccuracies, insufficiently correct wording, violations of the logical sequence in the presentation of program material, and has difficulty performing practical work. The competencies of PK 11, PK 13, PK 14, PK 17, PK19 are formed only at the level of theoretical knowledge.
"Unsatisfactory"	Evaluation of "unsatisfactory" is given to a student who does not know a significant part of the program material, makes significant errors, uncertainly. with great difficulty performs practical work. As a rule, the rating “unsatisfactory” is given to students who cannot continue their studies without additional classes in the relevant discipline. The competencies of PK 11, PK 13, PK 14, PK 17, PK19 are not formed.

Recommendations for independent work of students

Student's independent work (SIW) in the discipline "Biotechnological features of the production of plant products" includes the following activities:

- study of educational material (lecture notes, educational and scientific literature, normative and normative-technical documentation);
- preparation for practical exercises;
- Preparation of messages and presentations on given topics;
- preparation and implementation of reporting materials on the topics of practical training;
- preparation and writing of term paper;

- preparation for testing;

- exam preparation.

It is recommended that you spend an average of 2 hours a week on independent work.

Guidelines for the implementation of the SIW

The development of educational material using lecture notes, educational and scientific literature, normative and regulatory technical documentation, sanitary legislation documentation, etc. should be carried out regularly, sequentially throughout the semester. This will allow you to successfully master the following topics.

One of the types of SIW in the discipline is the preparation of reports and multimedia presentations on given topics.

Report topics

1. The structure and chemical composition of the grain cereal, "pseudo-cereal" crops.
2. Gluten-free grain raw materials.
3. Standardization of grain. Mandatory and special metrics.
4. Special malts for technological purposes.
5. Special malt to adjust the organoleptic characteristics of the product.
6. Unmalted raw materials in fermented beverage technology.
7. Unconventional types of malts in the technology of low alcohol drinks: rye, oat, millet, buckwheat.
8. Standardization of malt.
9. Technological properties of production races of yeast.
10. Technological properties of production races of brewer's yeast.
11. Technological properties of the production of fermenting yeast.
12. Technological properties of industrial races of alcohol yeast.
13. Lactic acid bacteria in the production of fermented beverages.
14. Active dry yeast. Advantages and limitations of using dry yeast in fermented beverage technology.
15. Use of immobilized yeast in beverage technology.
16. Genetically modified yeast in fermented beverage technology.
17. Enzymes of plant materials and their role in food production.
18. Enzyme preparations and their importance in biotechnological industries.
19. Immobilized enzymes in food technology.
20. Biotechnological processes in certain types of food production.

When preparing reports, it is necessary to use the sources of educational, educational, methodical, scientific literature, patent and regulatory documents. It is recommended to attract scientific articles not only from Russian, but also from

foreign authors. The data selected for communication should be carefully analyzed, clearly structured and presented mainly in the form of analytical graphic materials (diagrams, tables, figures, graphs, charts, etc.).

When preparing reports, you must adhere to the following recommendations. The duration of the performance should be no more than 15 minutes. The content should cover all issues necessary for consideration. You should use only those terms and concepts whose meaning is known to the speaker and, if necessary, he can give explanations to the audience. The speaker should know well the material on the topic of his speech, quickly and freely navigate it. The content of the presentation should be followed. It is not permissible to read or repeat the text of the slides by heart. Speaker's speech should be clear, intelligible, moderate pace. After the presentation, the speaker should be able to essentially answer the questions of the audience.

In preparing the presentation should be guided by the following recommendations. The first slide should reflect information about the title of the topic (message) and the author of the presentation. Each slide should have a title, the information on it should correspond to the content of the report. The slide should have a minimum amount of text, information should be presented in the form of tables, diagrams, graphs, figures, diagrams, etc. For all presentation slides, the same layout should be used. The font for the title is at least 24 pt., For the main text - at least 14 pt. For color design - no more than 3 colors on one slide. All slides must be numbered.

Reports and presentations are evaluated on a 10-point scale. Correspondence of the content to the report subject, completeness and structuredness of the presented material, presentation of the material, contact with the audience, answers to questions are taken into account.

In the preparation of the course work, it is necessary to draw up a course work plan, determine the issues to be considered, and determine the necessary information resources. It is recommended to perform the work in accordance with the schedule proposed by the teacher. Written parts of the work should be sent for examination to the supervisor, and for final verification to the teacher of the discipline. The defense of the term paper takes place in a practical lesson in discipline in the presence of students and a special commission, which includes teachers of the department and academic advisors. Assessment for term paper is set by the commission collegially.

Assessment of term paper is carried out on a 5-point scale. The content is consistent with the topic of the course work, the completeness and structure of the submitted material, the design of the course work, the presentation of the material, the quality of the presentation prepared to protect it, and the answers to questions.

Guidelines that determine the procedures for assessing the results of mastering the discipline

Current student certification. The current certification of students in the discipline "Biotechnological features of the production of plant products" is carried out in accordance with local regulations of the FEFU and is mandatory.

The current certification in the discipline "Biotechnological features of the production of plant products" is carried out in the form of control measures (speaking with a message on practical work, drawing up analytical tables, intelligence cards, evaluating the work of other students, testing) to assess the actual learning outcomes of students and carried out by a leading teacher. The objects of evaluation are:

- academic discipline (activity in the classroom, timeliness of the various types of tasks, attendance of all types of classes in the certified discipline);
- the degree of assimilation of theoretical knowledge;
- the level of mastery of practical skills in all types of educational work;
- results of independent work.

The degree of assimilation of theoretical knowledge is evaluated during an interview, testing. The level of mastery of practical skills - while listening to messages on a given topic, the quality of presentations prepared by students. The results of independent work - in the preparation of analytical materials in the form of tables, diagrams, diagrams, figures, etc.

Interim certification of students. Interim certification of students in the discipline "Biotechnological features of the production of plant products" is carried out in accordance with local regulations of the FEFU and is mandatory. In accordance with the curriculum, the type of intermediate certification is an exam. Students who have fully completed the academic tasks in the discipline are allowed to the exam. The exam takes the form of an oral answer to the questions of the exam ticket. The student has 40 minutes to prepare. In the course of the answer, he

is asked clarifying and additional questions to assess the degree of ownership of the material.

Evaluation tools for intermediate certification

Questions for exam preparation

1. Grain raw materials for biotechnological industries.
2. Unconventional types of grain for the production of malt.
3. Gluten-free grain raw materials.
4. Grain raw materials for specialized and functional food products.
5. Standardization of grain.
6. Brewing malt, rye malt and non-traditional types of malt in biotechnological industries.
7. Special malt for technological purposes and to adjust the organoleptic characteristics of the product.
8. Standardization of malt.
9. Fruit and vegetable and vegetable raw materials in biotechnology products.
10. Enzyme preparations of plant, animal and microbial origin.
11. Microorganisms as raw materials for biotechnological industries.
12. Production races of yeast for biotechnological industries.
13. Modern forms of yeast for biotechnological industries.
14. Biotechnological techniques in the processing of plant materials.
15. Biotechnology of baby food and gerontological purposes based on plant materials.
16. Biotechnological production of carbohydrate-containing syrups.
17. Biotechnological processes in certain types of food production (kvass and brewing, production of malt, low alcohol drinks, alcohol, flour confectionery, sugar confectionery, carbohydrate-containing syrups, bakery, etc.).

Sample Examination Ticket

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ
Федеральное государственное автономное образовательное учреждение высшего образования

«Дальневосточный федеральный университет»

ИНСТИТУТ НАУК О ЖИЗНИ И БИОМЕДИЦИНЫ (ШКОЛА)

19.04.01 Биотехнология

Дисциплина *Биотехнологические особенности продуктов растительного происхождения*

Форма обучения *очная*

Семестр *осенний 2019 - 2019 учебного года*

осенний, весенний

Департамент пищевых наук и технологий

реализующийдепартамент

Examination ticket № 1

1. The structure, chemical composition of the grain of cereal and pseudograin crops.
2. Pressed baked, dried, instant, yeast milk, liquid yeast.

Director of the
Department of Food Science and Technology ***T.K.Kalenik***

Sample topics of term paper in the discipline

"Biotechnological features of the production of plant products"

1. Biotechnological features of the production of combined foods based on plant materials.
2. Enzyme preparations in the production of soft drinks based on grain raw materials.
3. Enzyme preparations in the production of low-alcohol drinks based on grain raw materials.
4. Malt drinks: production methods and quality assessment.
5. Technology of wheat wort.
6. Unconventional grain raw materials for glucose-fructose syrups.
7. New production races of yeast for baking.
8. Raw materials of wild plants of the Far Eastern region for the production of functional foods.
9. Features of the technology of wines from local grape varieties.
10. Functional foods based on plant materials.

Criteria for grading a student for term paper in the discipline

"Biotechnological features of the production of plant products":

Term paper grade	Requirements for the content, design, protection of term paper
«excellent»	Is given to the student if the student fully presented the material on the formulated problem, argued for it, precisely determined its content and components. The data of domestic and foreign literature, statistical information, regulatory information are given. The student knows and possesses the skill of independent research work on the topic of research; methods and techniques of analysis of theoretical and / or practical aspects of the study area. Graphically, the work is framed correctly. The report and presentations are made at a high level. When defending the work, comprehensive answers to questions are given.
«good»	the work is characterized by semantic integrity, coherence and consistency of presentation; no more than 1 mistake was made in explaining the meaning or content of the problem. For argumentation, data from domestic and foreign authors are given. Demonstrated research skills. There are no actual errors related to understanding the problem. Minor errors in the design of the work. When answering questions, inaccuracies were made.
"satisfactorily"	the student conducts a fairly independent analysis of the main stages and semantic components of the problem; understands the basic foundations and theoretical justification of the chosen topic. The main sources on this topic are brought. No more than 2 errors were made in the sense or content of the problem, the design of the work. The student has difficulty answering questions.
"Unsatisfactory"	the work is a completely rewritten source text without any comments, analysis. The structure and theoretical component of the

	topic is not disclosed. The bibliography contains a limited number of sources. Three or more errors were made in the semantic content of the disclosed problem and in the design of the work. The student is poorly oriented in the material presented, is experiencing serious difficulties in answering questions.

Evaluation tools for ongoing certification

The following are used as means for the current certification in the discipline "Biotechnological features of the production of plant products":

- Messages and presentations prepared by students on a given topic;
- preparation of analytical tables, intelligence cards;
- testing.

Evaluation criteria for oral presentations made in the form of presentations

Report Evaluation	Content Requirements
10-9 points	are given to the student if the student expressed his opinion on the formulated problem, argued for it, accurately determining its content and components. The data of domestic and foreign literature, statistical information, regulatory information are given. The student knows and possesses the skill of independent research work on the topic of research; methods and techniques of analysis of theoretical and / or practical aspects of the study area. There are no factual errors related to understanding the problem; graphically, the work is framed correctly
8-7 points	the work is characterized by semantic integrity, coherence and consistency of presentation; no more than 1 mistake was made in explaining the meaning or content of the problem. For argumentation, data from domestic and foreign authors are given. Demonstrated research skills. There are no actual errors related to understanding the problem. One or two errors in the design of the work
6-5 points	the student conducts a fairly independent analysis of the main stages and semantic components of the problem; understands the basic foundations and theoretical justification of the chosen topic. The main sources on this topic are brought. No more than 2 errors were made in the meaning or content of the problem, the design of the work
less than 5 points	the work is a retransmitted or completely rewritten source text without any comments or analysis. The structure and theoretical component of the topic is not disclosed. Three or more than three errors were made in the semantic content of the disclosed problem and in the design of the work

Presentation Evaluation Criteria:

Rating	less than 5 points (unsatisfactory)	5-6 points (satisfactory)	7-8 points (good)	9-10 points (excellent)
Criteria	**The content of the criteria**			
Disclosure of the problem	The problem is not solved. Missing conclusions	The problem is not fully disclosed. Conclusions are not made and / or conclusions are not substantiated.	The problem is solved. The analysis of the problem without involving additional literature. Not all conclusions are made and / or substantiated	The problem is fully disclosed. The analysis of the problem with the involvement of additional literature. The conclusions are justified.
Performance	The information provided is not logically related. No professional terms used	The information provided is not systematized and / or inconsistent. 1-2 professional terms used	The information provided is not systematic and consistent. More than 2 professional terms used.	The information presented is systematized, consistent and logically connected. More than 5 professional terms used.
Design	Not used Power Point technology. More than 4 errors in the information provided	Partial Power Point technology used. 3-4 errors in the information provided	Used Power Point technology. No more than 2 errors in the information provided	Widely used technology (Power Point, etc.). There are no errors in the information provided.
Answers on questions	No answers to questions.	Only answers to basic questions	Answers to questions full and / or partially complete	The answers to the questions are complete, with the appearance of examples and / or explanations

Test tasks on the topic "Quality and standardization of grain"

Sample

Variant 1

1 The state of barley grain, intended for malting, should be:
a. very dry
b. dry
c. medium dry
d. wet

2 The mass of 1000 grains characterizes:
a. grain shape
b. amount of substance
c. fineness
d. filmy

3 To the grain damaged in the field include:
a. frozen
b. sprouted
c. frost
d. with mechanical damage

4 The proportion of endosperm in grain is higher:
a. high filmy
b. shallow
c. spherical
d. accomplished

5 In the grain of wheat intended for malt, the protein content is allowed:
a. same as in malting barley
b. lower than malting barley
c. higher than malting barley
d. not standardized

6 Match:
a. grain mass e .descriptive or quantitative values of quality
b. grain properties f. weediness, pest infestation, grain condition
c. norms of quality indicators g. grain features
d. required indicatorsfor all crops h. batch of grain to be processed, stored, used

7 Brewing malts include:
a. rye
b. barley
c. oat
d. wheat

8 Germination ability is determined in grain:
a. immediately after cleaning
b. at any shelf life after cleaning
c. not earlier than 90 days after cleaning
d. not earlier than 45 days after cleaning

9 Grain defects in which it cannot be used to obtain malt
a. grain harvested in the rain
b. damaged by one-day dry wind
c. frost
d. afflicted with fungal diseases

10 Choose the wrong statements:
a. grain extractivity does not depend on starch content
b. grain content is not affected by grain extractivity
c. grain extractivity depends on protein content
d. the extractivity of one grain is always the same

11 Tetrazole-topographic method allows to identify:
a. living fetus
b. dead fetus
c. colored embryo
d. unpainted germ

12 Grain quality indicators that are not mandatory for all crops:

a. humidity
b. Colour
c. weediness
d. protein content

13 The state of barley, which is not standardized:
a. dry
b. wet
c. medium dry
d. wet

14 For food purposes grain is not used:
a. with mechanical damage
b. with a defect of self-heating of the 2nd degree and above
c. with defect of self-heating of the 4th degree
d. 1st degree tick-infected

15 In the grain that was stored for 60 days after harvesting, determine:
a. germination ability
b. viability
c. germination energy
d. germination index

16 Self-heating is characteristic of grain:
a. dry wind
b. frozen
c. with mechanical damage
d. damaged by pests

17 Choose the correct statements:
a. all types of grain intended for brewing malt
b. all types of grain intended for malt
c. the higher the film, the better grain
d. the smaller the film, the better grain

18 Grain quality indicators, which are mandatory only for wheat:
a. gluten amount
b. vitreous
c. pest infestation
d. viability

Criteria for assessing the implementation of test tasks "Quality and standardization of grain":

Credited – 12-18 points
Not credited – less than 12 points

Test tasks on the subject “Quality and standardization of malt”

Sample

Variant 1

1. Malt for technological purposes is:
a. sour
b. burnt
c. fermented
d. caramel

2. The protein content in the malt affects:
a. carbonated drink
b. shelf life of the drink
c. foaming ability of the drink
d. soluble protein content in the wort

3. The degree of uniformity of the malt affects:
a. the taste and aroma of the drink
b. extract yield upon mashing
c. duration of storage of malt
d. malt crushing processes

4. Select the correct statement:
a. vitreous does not affect the quality of the malt
b. the lower the glassiness, the higher the quality of the malt
c. glassiness affects the quality of the malt
d. the higher the glassiness, the better the quality of the malt

5. Too low moisture content in the malt:
a. indicates high quality of malt
b. reduces the proportion of flour during crushing
c. no problems when filtering mash
d. leads to a more complete yield of the extract during mashing

6. The smell of malt depends on:
a. type of malt
b. varieties of source grain
c. duration of storage of malt
d. storage conditions of malt

7. The extractivity of the malt is:
a. the sum of all malt substances
b. soluble malt only
c. only soluble mashing substances
d. both soluble substances and those converted into soluble during mashing

8. Caramel malt is used for:
a. short malt replacement
b. to improve the taste of beer

c. to prevent clouding of the drink
d. getting dark beer

9. Set the correspondence between the value of the Kolbach number and its characteristic:

a below 35%	e satisfactory
b over 41%	f good
c 35-38%	g unsatisfactory
d 39-41%	h very good

10. Select Invalid statement:
a. wort transparency is not an indicator of malt quality
b. high quality malt must be transparent
c. in malt of lower quality, wort opalescence is allowed
d. opalescence is not allowed for wheat malt wort

11. The difference in mass fractions of the extract in the CB malt of fine and coarse grinding indicates:
a. degree of cytolytic dissolution of malt
b. endosperm protein content
c. endosperm starch content
d. malt quality

12. Acidity depends on:
a. grain quality
b. barley varieties
c. the degree of dissolution of the malt
d. humidity malt

13. Choose the correct statement:
a. glassy grains of malt float to the surface
b. glassy grains of malt sink to the bottom
c. buoyancy of malt indicates its solubility
d. the buoyancy of the malt is not related to its solubility

14. Indicators of proteolytic dissolution of malt:
a. protein content
b. β glucan content
c. Kolbach number,%
d. amine nitrogen content, mg / 100 g CB malt (120-160)

15. Bringing unmalted raw materials into bed (rice):
a. increases the content of free amino acids in the wort
b. increases foaming
c. reduces production costs
d. increases the yield of the extract during mashing

16. The malignancy of the malt is a criterion:
a. endosperm solubility
b. grain species
c. protein content
d. starch content

Criteria for assessing the implementation of test tasks "Quality and standardization of grain":

Credited – 11-16 points
Not credited – less than 11 points