



Co-funded by the  
Erasmus+ Programme  
of the European Union



**Project “Enhancing capacity of universities to initiate and to participate in clusters development on innovation and sustainability principles” (UniClaD)**  
Program Erasmus +, projectKA2 n° 609944-EPP-1-2019-1-LT-EPPKA2-CBHE-JP

# Ecological food safety

**Editor: Liudmila Fedotova Comrat State University**



## Learning outcomes of the whole course

"Environmental food safety" refers to the stage of the part of the professional cycle of the main educational program of masters of the direction 161. Agricultural sciences. The course is aimed at the methods of masters of the theoretical base and practical skills sufficient for participation in nutrition management at the regional level and ensuring the formation of functions of complex analysis of the state of the environment, studying state environmental legislation and modern approaches to safety management.

The purpose of the discipline is to improve the level of students' general fundamental natural science education, as well as their environmental literacy.

The objectives of the discipline are:

- to form a system of knowledge of the main theoretical provisions on environmental food safety;
- to study the main contamination of food raw materials and food products;
- to reveal the measures of toxicity of substances;
- to form students' knowledge of food contamination by microorganisms;
- to study methods for determining and monitoring food contamination

**The student is able:**

As a result of studying the disciplines, the student should know:

**Know:** the basics of safety of plant products and rational use of natural resources; the task



of safety and solutions related to development; the concept of basic safety; the basic principles and concepts include development; Fundamentals of state policy in the field of safety and environmental protection.

**Must be able to:**

- apply international experience in the field of environmental food safety;
- use regulatory and legal documentation in the field of environmental food safety;
- determine the structure of factors influencing environmental safety, give a qualitative assessment of such factors influencing the environmental situation;

**Possess:**

- the fundamentals of environmental safety;
- methods of implementing environmental safety and the concept of sustainable development;
- the fundamentals of the possibility of solving environmental problems by applying the achievements of scientific and technological progress;

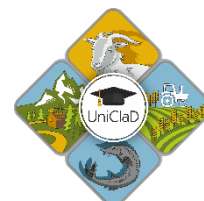
## Overall structure of the course

Hours				Evaluation	
Lectures	Seminars, practical	Individual	Total	Form	Credits
20	16	114	150	Exam	5

## Unit description

### Description of Unit 1

<p><b>Name of the Unit 1:</b> <b>FOOD QUALITY AND FOOD SAFETY</b></p>	<p><b>Estimated duration for students:</b> <b>Hours</b></p>			
	<p><b>Lectures</b></p>	<p><b>Seminars, practical</b></p>	<p><b>Individual</b></p>	<p><b>Total</b></p>
	<p><b>2</b></p>	<p><b>2</b></p>	<p><b>8</b></p>	<p><b>12</b></p>
<p><b>Content:</b> Introduction to the discipline “Ecological food safety”</p>	<p><b>Competences:</b> The learner is able to ... -apply international experience in the field of environmental food safety; - use regulatory and legal documentation in the field of environmental food safety;</p>			



Assessment / Certificate of Performance	Oral survey			
<b>Description of Unit 2</b>				
<b>Name of the Unit 2:</b> <b>The main routes of contamination of food products and food raw materials</b>	<b>Estimated duration for students:</b> <b>Hours</b>			
	<b>Lectures</b>	<b>Seminars, practical</b>	<b>Individual</b>	<b>Total</b>
	<b>10</b>	<b>8</b>	<b>73</b>	<b>91</b>
<b>Content:</b> 1.Contamination of food raw materials and food products with food xenobiotics of chemical and biological origin. 2.Pollution by microorganisms and their metabolites. 3. Pollution by chemical elements. 4.Pollution by substances used in plant growing and livestock farming. 5.Pollution by dioxins and polycyclic aromatic hydrocarbons.	<b>Competences:</b> The learner is able to ... - fundamentals of environmental safety of plant products and rational use of natural resources; - tasks of environmental safety and the concept of sustainable development;			
Assessment / Certificate of Performance	Oral survey			
<b>Description of Unit 3</b>				
<b>Name of the Unit 3:</b> <b>Food counterfeiting</b>	<b>Estimated duration for students:</b> <b>Hours</b>			
	<b>Lectures</b>	<b>Seminars, practical</b>	<b>Individual</b>	<b>Total</b>
	<b>8</b>	<b>6</b>	<b>35</b>	<b>47</b>
<b>Content:</b> 1.Metabolism of foreign compounds. 2.Anti-alimentary nutritional factors. 3.Assortment falsification. 4.Qualitative and quantitative falsification.	<b>Competences:</b> -the fundamentals of environmental safety; - methods of implementing environmental safety and the concept of sustainable development; - the fundamentals of the possibility of solving environmental problems by applying the achievements of scientific and technological progress			

### Director's plan

The following information content will be used

<https://www.navitassafety.com/4-sustainable-food-safety-practices/>

<https://www.efsa.europa.eu/en/topics/topic/climate-change-and-food-safety>



## Assessment / Certificate of Performance



To consolidate knowledge, at the end of the course a conference will be held with presentations by students on this course and research.

To test the student's knowledge, he is offered a test.

### Test tasks

1. Bacterial toxicoses include:

- a) ergotism;
- b) alimentary-toxic aleukia;
- c) staphylococcal food poisoning;
- d) botulism.

2. Food toxicoinfection is caused by:

- a) viruses;
- b) dyes;
- c) salmonella;
- d) flavor enhancers.

3. Antialimentary factors include:

- a) antienzymes;
- b) enzymes;
- c) vitamins;
- d) antivitamins.

4. Antialimentary factors are compounds:

- a) toxic;
- b) not generally toxic;
- c) capable of impairing the absorption of nutrients;
- d) capable of blocking the absorption of nutrients.

5. Safety criteria include definitions of the following groups of microorganisms:

- a) pathogenic (including salmonella);
- b) yeast, mold;
- c) coliform bacteria;
- d) potentially pathogenic microorganisms.

6. Check the chemical elements whose content is controlled in international food trade:

- a) copper;
- b) potassium;
- c) iodine;
- d) cadmium;



d) calcium;

e) lead.

7. Causes of contamination of food products with chemical elements:

- a) transport emissions;
- b) mining;
- c) distribution of industrial waste;
- d) all of the above.

8. Tin:

- a) its necessity for the human body has not been proven;
- b) actively participates in metabolic processes;
- c) causes poisoning;
- d) low toxicity.

9. Sources of tin contamination of food products:

- a) fertilizers;
- b) tin cans;
- c) iron and copper kitchen boilers;
- d) containers made using tinning.

10. In order to increase productivity and prevent diseases in animal husbandry, the following are used:

- a) tranquilizers;
- b) amino acids;
- c) mineral substances;
- d) enzymes.

11. Antibiotics used in animal husbandry:

- a) can have a toxic effect on the human body;
- b) can have an allergic effect;
- c) are completely harmless to humans;
- d) can be useful for humans in small quantities;
- d) in some cases determine the taste and dietary properties of the product.

12. Pesticides are used in crop production to destroy:

- a) weeds;
- b) rodents;
- c) insects;
- d) pathogens of plant diseases.

13. Pesticides:

- a) are the most dangerous for human health;



- b) do not affect human health;
- c) have a positive effect on the human body.
14. The highest concentrations of nitrates are found in:
- a) beets;
  - b) drinking water;
  - c) fermented milk products;
  - d) turnips.
15. The content of nitrates is most significantly reduced during cooking:
- a) when washing, soaking;
  - b) when boiling;
  - c) does not decrease at all.
16. According to FAO/WHO, the ADI of nitrates is (mg / kg body weight):
- a) 2;
  - b) 5;
  - c) 10.
17. Dioxins are:
- a) fertilizers for soil fertility management;
  - b) plant growth regulator;
  - c) a potentially dangerous contaminant of food products.
18. Sources of pollution with dioxins and dioxin-like compounds are:
- a) plants producing bleach;
  - b) food industry enterprises;
  - c) pulp and paper industry enterprises;
  - d) light industry enterprises.
19. Benzopyrene is:
- a) an antibiotic used in animal husbandry;
  - b) a chemical agent to increase crop yields;
  - c) PAH (polycyclic aromatic hydrocarbon).
20. Benzopyrene is not found in:
- a) fresh pork;
  - b) coconut oil;
  - c) refined olive oil.
21. Of great importance in the prevention of radioactive exposure are:
- a) bone meal;
  - b)  $\beta$ -carotene;



c) fish pulp;

d) kelp.

22. The use of polymeric and other materials as packaging is aimed at:

- a) maintaining the shelf life of the product;
- b) changing organoleptic indicators;
- c) preserving nutritional value.

23. The following are used for packaging food products:

- a) cardboard;
- b) polymeric materials;
- c) aluminum foil;
- d) multilayer films (such as cellophane-polyethylene).

24. The following is not taken into account in the hygienic assessment of the suitability of materials for contact with food products:

- a) the absence of organoleptic changes in the product;
- b) the absence of migration of foreign chemical substances into food products;
- c) the absence of a stimulating effect of the material on the development of microflora;
- d) all of the above are taken into account.

25. Chemical preservatives must ensure:

- a) improved organoleptic indicators;
- b) increased nutritional value;
- c) long-term storage.

26. The following are used as thickeners:

- a) gelatin;
- b) cellulose;
- c) pectin.

Assessment criteria:

- the grade "passed" is given to the student if the number of correct answers in the test tasks is 14 or more;
- the grade "not passed" - the number of correct answers is less than 12.

## Bibliography

1. Food safety implications from the use of environmental inhibitors in agrifood systems

URI <https://openknowledge.fao.org/handle/20.500.14283/cc8647en>

2. Summary report of the webinar on food safety implications from the use of environmental inhibitors in agrifood systems

URI <https://openknowledge.fao.org/handle/20.500.14283/cd1278en>

3. Integrating food safety and nutrition in agri-food systems

URI <https://openknowledge.fao.org/handle/20.500.14283/cb6679en>