SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO

Biotechnological use of waste

Educational subject description sheet

Basic information

Field of study Biotechnology	**Didactic cycle** 2023/24
Speciality -	**Subject code** BBTBTjS_D.340K.01635.23
Organizational unit Faculty of Biology and Biotechnology	**Lecture languages** english
Study level first cycle (engineering degree)	**Mandatory** Elective subjects
Study form full-time studies	**Block** Major subjects
Education profile General academic	**Disciplines** Biological sciences

Coordinator	Katarzyna Pobiega
Teacher	Katarzyna Pobiega, Anna Kot

Period Semester 7	**Examination** Pass with grade **Activities and hours** Lecture: 15	**Number of ECTS points** 1

Goals

Code	Goal
C1	The aim of the course is to familiarize students with the possibilities of biotechnological waste utilization.

Entry requirements

Information on the basics of microbiology and biotechnology.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the industrial waste in terms of its composition and the possibility of using it as valuable substrates in the cultivation of microorganisms	BTj_K3_W01_inz, BTj_K3_W09	Written credit
Skills – Student can:			
U1	select a substrate for the biosynthesis of a specific metabolite	BTj_K3_U01_inz, BTj_K3_U05_inz	Written credit
Social competences – Student is ready to:			
K1	to active actions aimed at ecological waste disposal	BTj_K3_K04, BTj_K3_K05	Written credit

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	The industrial waste management in the biotechnological production of biomass of microorganisms and their metabolites. Examples of biotechnological management of products from the potato industry (deproteinized potato waste water, potato pomace, potato peelings), fruit and vegetable (fruit and vegetable pomace), dairy, oil (cake), cellulose, sugar (pulp, molasses), fish, biofuels and others will be presented. Chemical compositions of microbiological media obtained from industrial waste will be compared. Examples of microorganisms that have the possibility of growth and production of metabolites in these media will be discussed.	W1, U1, K1	Lecture

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture, E-learning - lecture part

Activities	Examination method	Percentage
Lecture	Written credit	100%

Activities	Credit conditions
Lecture	Obligatory participation in lectures. Written exam in the form of a test. The test is passed when the student obtains a positive grade, i.e. a minimum of 51% of the test points.

Literature

Obligatory

1. Kot A., Pobiega K., Piwowarek K., Kieliszek M., Błażejak S., Gniewosz M., Lipińska E., 2020: Biotechnological Methods of Managementand Utilization of Potato Industry Waste—a Review. Potato Research, 63, 431–447
2. Kieliszek M., Piwowarek K., Kot A., Pobiega K., 2020: The aspects of microbial biomass use in the utilization of selected waste from the agro-food industry. Open Life Sciences 15(1), 787–796

Optional

1. https://link.springer.com/article/10.1186/2043-7129-1-21
2. https://www.sciencedirect.com/science/article/abs/pii/S0956053X19302454
3. https://www.sciencedirect.com/science/article/pii/S2666016421000803
4. http://apsciarchives.com/id/eprint/471/
5. https://www.sciencedirect.com/science/article/pii/S1359511314003961?casa_token=JdPrETGkORkAAAAA:lP97qtLV3c8oocaqvTooLhF34ltoaPnH3_oB6L-DSN3ht6ZZIjQMHYb3wPdGsSJMUijw2nyAW4k

Calculation of ECTS points

Activity form	**Activity hours***
Lecture	15
Preparation for the exam	10
Student workload	**Hours** 25
Number of ECTS points	**ECTS** 1

* hour means 45 minutes

Effects

Code	Content
BTj_K3_K04	The graduate is ready to initiating and actively participating in the development and implementation of research and social projects;
BTj_K3_K05	The graduate is ready to for thinking and acting in an entrepreneurial way
BTj_K3_U01_inz	The graduate can utilise proper techniques and knowledge related to biotechnology in practice, under the care of a supervisor;
BTj_K3_U05_inz	The graduate can understand and explain chemical processes forming a basis for explaining biochemical reactions, and able to apply proper techniques for their investigation;
BTj_K3_W01_inz	The graduate knows and understands technologies of performing biotechnological processes
BTj_K3_W09	The graduate knows and understands living organisms and their place in the natural environment, and how they can be used for the good of humanity;