



## Subject card

Subject name and code	Biologically Active Plant Substances, PG_00058235						
Field of study	Biotechnology						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Barbara Kusznierewicz					
	Teachers	dr hab. inż. Barbara Kusznierewicz dr inż. Karol Parchem					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		5.0		25.0	75
Subject objectives	The aim of the course is to familiarize students with the classification, occurrence and biological activity of plant secondary metabolites, methods of their acquisition and analysis, and to present their role in plant life, practical importance for humans and biotechnological methods of their production.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] has advanced knowledge of structure and activity of enzymes and biologically active compounds also in pharmacological context, knows basic instrumental methods of qualitative and quantitative analysis and activity studies of biomolecules	The student distinguishes between different classes of phytochemicals, knows their potential use in various industries and is able to adapt analytical procedures to qualitative and quantitative determinations as well as biological activity.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K7_W07] knows issues related to plant and animal raw materials, their quality, impact on human health, processing technology and chemical and biological hazards resulting from process treatment and storage	The student has knowledge of plant raw materials, their quality, biological activity and methods of processing and use in industry.	[SW1] Assessment of factual knowledge
	[K7_U05] is able to apply instrumental methods of quantitative and qualitative analysis and studies on activity of biomolecules, select and apply diagnostic and analytical methods in the field of his/her specialty with particular emphasis on genetic, molecular and microbiological diagnostics and diagnostics based on antigen-antibody reaction	The student selects appropriate techniques and performs analyzes of individual groups of phytochemicals. Analyzes the obtained results and evaluates the quality of the tested material in the context of its biological activity.	[SU1] Assessment of task fulfillment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	[K7_K03] is conscious and able to explain the importance of the development of science and technology for the economy	The student understands the importance of continuous acquisition of knowledge and conducting scientific research as key elements of the development of civilization.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U04] is able to predict potential properties of biomolecules and biologically active compounds on the basis of knowledge of their chemical structure and apply methods of molecular modelling of biomolecules	The student is able to predict the potential properties of biologically active compounds based on the knowledge of their chemical structure.	[SU1] Assessment of task fulfillment [SU3] Assessment of ability to use knowledge gained from the subject	
Subject contents	Lectures: The history of the use of plant materials by man. The form of plant material and its classification. Principles of plant harvesting, modern methods of testing biologically active plant substances. Definition and systematics of plant secondary metabolites. The most important products of plant secondary metabolism, including: terpenes, phenolic compounds, compounds containing nitrogen and sulfur. Information will be given on the role they play in both plant and animal organisms, as well as examples of biotechnological methods of their production and the use of entire groups and/or individual compounds in various industries. Laboratories: 1. Determination of the effect of elicitation on the antioxidant properties of plant sprouts. 2. Purine alkaloids - isolation and quantification. 3. Isolation of essential oils and the use of TLC bioautography. 4. Determination of the antimicrobial activity of essential oils. 5. Establishing and running a microalgae culture. 6. Analysis of the grown microalgae.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	50.0%	50.0%
	Lecture	50.0%	50.0%
Recommended reading	Basic literature	- Biochemia Roślin, Jerzy Kączkowski PWN  - Farmakognozja, Stanisław Kohlmunzer, Wydawnictwo Lekarskie PZWL  - Biotechnologia farmaceutyczna. Kayser O., Müller R. PZWL	
	Supplementary literature	- Plant Secondary Metabolites, Alan Crozier Michael N. Clifford Hiroshi Ashihara, Wiley	

	eResources addresses	Adresy na platformie eNauczenie: BIOLOGICZNE AKTYWNE SUBSTANCJE ROŚLINNE 2024 - Moodle ID: 36004 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36004">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36004</a>
Example issues/ example questions/ tasks being completed	Definition and classification of plant secondary metabolites. What are the functions of secondary metabolites in the plant? Examples of the use of phytochemicals in various industries. What biological activities can be expected from particular groups of plant secondary metabolites. Methods of isolation, analysis and detection of bioactive phytochemicals.	
Work placement	Not applicable	