Course Unit Descriptor

Study Programme: Agronomy

Course Unit Title: Ecological biochemistry

Course Unit Code: 3DAI2041

Name of Lecturer(s): prof. dr Djordje Malenčić, assist. prof. dr Jovana Šućur

Type and Level of Studies: Doctoral academic degree

Course Status (compulsory/elective): elective

Semester (winter/summer): summer

Language of instruction: english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 10

Prerequisites: none

Course Aims:

To gain knowledge on molecular and ecological aspects of the reaction of plants to its environment. Studying of plant secondary biomolecules under conditions of different types of stresses. Communication of the plants with its environment.

Learning Outcomes:

The contribution to the new knowledge in the fields of ecological biochemistry, biochemistry of the stress and phytochemistry.

Syllabus:

Theory

Biochemical adaptation of plants to the environment. Plant toxins and their effect on herbivores and pathogens. Hormonal interactions between plants and animals. Plant-vertebrates relations, including humans. Secondary biomolecules which attract or reppel insects. Defence phytochemicals: terpenoids, alkaloids, phenolics, cyanogenic glycosides, glucosinolates and cardenolids. Allelopathy. Biochemical relation host-parasite. Higher plants-lower plants interaction. Biochemical basis of the plant tolerance to diseases. Phytoalexins and phytotoxins. The role of chemical signals in intra- and intercellular communication. Reactive oxygen and nitrogen species. Antioxidant systems in plants and oxidative stress caused by abiotic elicitors (drought, UV radiation, low and high temperatures, pesticides, heavy metals in soil etc.). Resistance mechanisms in plants towards biotic stress. Hypersensitive response in plants. Static and induced defence and resistance to stress.

Practice

Determination of the content and composition of the essential oils in aromatic plants. Antimicrobial activity of the essential oils. Isolation and determination of the total alkaloids from the spicy paprika. Determination of the carotenoids from carrot roots. Isolation and determination of the total polyphenols and tannins from the leaves of sage. Determination of the total flavonoids with $AlCl_3$. Isolation and determination of the anthocyanins and proantocyanidins from the flowers and fruits. Determination of the oxygen radicals and lipid peroxidation. Field trip.

Required Reading:

1. Popović, M., Malenčić, Đ.: Aktivni principi ukrasnog bilja (Active principles of ornamental plants), Faculty of Agriculture, Novi Sad, 2006.
2. Jeffrey B. Harborne : Introduction to Ecological biochemistry, 4th edition, Elsevier, London, 1994

Weekly Contact Hours: 8	**Lectures: 4**	**Practical work: 4**

Teaching Methods:

Lectures, practical classes, consultations, field trip, research work (optional)			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	30
Practical work		oral exam	60
Preliminary exam(s)		…….	
Seminar(s)	10		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			