

Study Programme: Doctoral Academic Studies in Biochemistry
Course Unit Title: Metabolism and pharmacological activities of essential oils
Course Unit Code: DSB-610
Name of Lecturer(s): associate professor, Dejan Orčić
Type and Level of Studies: PhD degree
Course Status (compulsory/elective): elective
Semester (winter/summer): winter
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 15
Prerequisites: None
<p>Course Aims:</p> <p>(1) provide knowledge about the chemical structure, biochemical methods of synthesis and degradation of the volatile compounds in plants, (2) introduce students to the ecological roles of essential oils and interactions with abiotic and biotic factors, (3) familiarize students with the importance of essential oils in modern phytotherapy and alternative medicine techniques, (4) introduce students to the latest scientific literature in the field of essential oils research.</p>
<p>Learning Outcomes:</p> <p>After successful completion of the course the student is able to: (1) explain the importance of essential oils in adaptive mechanisms of plants, (2) explain the connection between the biological and pharmacological effects of essential oils with the chemical structure of their individual constituents, (3) critically assess the validity of application of some aromatic drug medications, (4) critically analyse scientific papers in the field of essential oils research, (5) independently set up and conduct experiments for determination of chemical composition and biological activities of essential oils, to process and report the obtained results.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>General pathways of terpenes biosynthesis. Biogenetic isoprene rule. Mevalonic acid biosynthesis. Biosynthesis of mono- and sesquiterpenes. Acyclic precursors in the biosynthesis of monoterpenes. Secondary transformation of mono- and sesquiterpenes. Catabolic fate of monoterpenes. Essential oils: distribution, localization, and chemical composition. Methods for isolation and analysis of essential oils. Physiological, environmental, and pharmacological activities of essential oils. Chemotaxonomic significance. Aromatic drugs and application of essential oils in phytotherapy. Application of GC-MS technique in essential oils analysis.</p> <p><i>Practice</i></p> <p>Independent student's laboratory work in the frame of scientific research project related to the investigation of the quality of essential oils from selected aromatic plants.</p>
<p>Required Reading:</p> <ol style="list-style-type: none"> 1. Boža Pal, Mimica-Dukić Neda, Božin Biljana i Anačkov Goran: Biologically Active Compounds in the Fruška Gora mountain: Vol II – Terpenoids and Essential oil. Odeljenje za prirodne nauke Matica Srpska, Novi Sad (2007). 2. Jančić, R., Stošić, D., Mimica-Dukić, N., Lakušić, B.: <i>Aromatične biljke Srbije</i>, Dečije Novine, Gornji Milanovac, 1995. 3. Neda Mimica-Dukić et al.: Aromatic Plants and Essential Oils in the Treatment and Prevention of Infectious Diseases.

In Aromatherapy: Basic Mechanisms and Evidence Based Clinical Use. Ed. G. Bagetta et. al. CRC Press Taylor&Francis Group.Inc. London UK. 2015

4. Max Wichtl: Herbal Drugs and Phytopharmaceuticals. Medpham, Scientific Publisher, Stuttgart, 1994.

5. Lawless J. The illustrated Encyclopedia of Essential Oils. Element Books Limited, 1996.

Weekly Contact Hours: 10
(150)

Lectures: 5 (75)

Practical work: 5 (75)

Teaching Methods: consultative teaching, research project, seminars, journal club

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	Final exam	points
Active class participation		written exam	
Research project	50	oral exam	50
Preliminary exam(s)		
Seminar(s)			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.