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| <b>Study Programme:</b> Master Academic Studies in Biochemistry   |
| <b>Course Unit Title:</b> Natural Antioxidants  |
| <b>Course Unit Code:</b> IB-522   |
| <b>Name of Lecturer(s):</b> Full professor Neda Mimica-Dukić  |
| <b>Type and Level of Studies:</b> Master of Science Degree  |
| <b>Course Status (compulsory/elective):</b> elective  |
| <b>Semester (winter/summer):</b> summer   |
| <b>Language of instruction:</b> English   |
| <b>Mode of course unit delivery (face-to-face/distance learning):</b> Face-to-face  |
| <b>Number of ECTS Allocated:</b> 5  |
| <b>Prerequisites:</b> None  |
| <p><b>Course Aims:</b></p> <p>(1) to provide students with advance knowledge of free radicals as chemical particles with significant roles in metabolism and development of diseases in humans, (2) expanding students knowledge about the most important classes of natural antioxidants, their occurrence in nature and chemical structure, (3) developing a critical attitude among students about the application and role of natural products in nutrition, prevention and therapy of various diseases (4) further improvement of students skills for experimental and laboratory work in evaluation of antioxidant activities of natural antioxidants</p>   |
| <p><b>Learning Outcomes:</b></p> <p>Upon successful completion of this course, the student is able to: (1) list the most reactive radical species in the body and the ways of their formation; (2) define and describe the causes of oxidative stress and list the effects of oxidative stress on living organisms; (3) list the most important mechanisms of antioxidant protection; (4 ) list the most important classes of natural antioxidants, their sources and applications; (5) specify basic antioxidant defence mechanisms (6) select experimental methods for determination of antioxidant potential of selected natural products, correctly interprets the results and compare with literature data.</p>  |
| <p><b>Syllabus:</b></p> <p><i>Theory</i></p> <p>The formation and properties of toxic forms of oxygen and nitrogen. Cellular sources of free radicals and oxidative stress concept. Toxic effects of free radicals in the body. Types of antioxidant protection: endogenous and exogenous antioxidants. Main classes of natural antioxidants and their sources in nature. Mechanism of antioxidant activities (AO) of natural antioxidants. Natural antioxidants as dietary supplements and additives. Direct and indirect methods for determination of antioxidant activity (AO).</p> <p><i>Practice</i></p> <p>Preparation and selection of the samples for experimental works. Qualitative analysis of selected samples. Determination of AO using various tests: DPPH, FRAP, ABTS, beta carotene etc. Determination of total antioxidant capacity. Identification of the compounds responsible for AO by TLC-DPPH test.</p> |
| <p><b>Required Reading:</b></p> <ol style="list-style-type: none"> <li>Halliwell, B., Gutteridge, J.M.C.: <i>Free radicals in biology and medicine</i>, Oxford University Press Inc., New York, 2007</li> <li>Larson, R.A. <i>Naturally Occuring Antioxidants</i>. Lewis Publishers, Boca Raton, New York, 1997</li> </ol>  |

3. Shahidi, F. (ed): *Natural Antioxidants: Chemistry, Health Effects, and Applications*, AOCS Press, 1997
4. Cadenas, E., Packer, L. (eds.): *Handbook of Antioxidants*, Marcel Dekker, Inc., New York, USA, 2002

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| <b>Weekly Contact Hours:</b> 4 (60) | <b>Lectures:</b> 2 (30) | <b>Practical work:</b> 2 (30) |
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**Teaching Methods:** Lectures, laboratory work, seminar(s)

**Knowledge Assessment (maximum of 100 points):** 100

| <b>Pre-exam obligations</b> | points | <b>Final exam</b> | points |
|-----------------------------|--------|-------------------|--------|
| Active class participation  | 5      | written exam      | 60     |
| Practical work              | 20     | oral exam         |        |
| Preliminary exam(s)         |        | .....             |        |
| Seminar(s)                  | 15     |                   |        |

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