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| Study Programme : BSc in Ecology | | | |
| Degree level: Bachelor degree | | | |
| Course Title: BIOACTIVE AGENTS OF MICROORGANISMS | | | |
| Professor: Dr. Milan Matavulj, Dr. Maja Karaman | | | |
| Elective Course | | | |
| Number of ECTS: 5 | | | |
| Prerequisites: Credit points of Chemistry, Cell Biology, Microbiology and Systematics of Algae and Fungi. | | | |
| Course Objective: A course designed to acquaint students with the principles of microbial culture isolation, cultivation and identification. Emphasis will be placed on understanding of microbial primary and secondary metabolism, as well as in developing skills for conducting simple biotechnological processes of microbial production of biologically active compounds. | | | |
| Course Outcome: Enabling students for independent and individual experimental work in the field of microbial primary and secondary metabolism: experiment design, results obtaining and recording, analysis and interpretation of results, and elaboration and presentation, eventually use of new experience in conducting simple biotechnological processes of conversion of agriculture or industry products into high value bioactive products. | | | |
| Course Content: | | | |
| <p><i>Theoretical part:</i> Students get acquainted with biology of microorganisms as the basis for microbial bioactive compounds production; Bacterial, cyanobacterial and algal bioactive metabolites, their nomenclature and classification. Fungi and lichens and their bioactive metabolites; Microbial bioactive agents in medicine and pharmacy (antibiotics, antitumor agents, antiviral agents, nematocides), as biopesticides, biofertilizers, biosynthetic plastics etc. Microbial metabolites in treating insomnia, cholesterolemia, as coagulants and anticoagulants, as tonics, angiotensins, cardiacs and aphrodisiacs, as sexual attractants and in cosmetics, as immunomodulators (immunoactivators and immunosuppressors). Microbial biotransformations (production of hormones, organic acids, alcohol). Microorganisms as the sources of healthy and organic food (vitamins, minerals, essential aminoacids). Microbial toxins (bacterial, cyanobacterial, algal, and fungal toxins, alkaloids); Mycetismus. Emphasis will be placed on research of microbial bioactive compounds, what should enable students to understand contemporary tendencies of use of microorganisms in different biotechnology fields, as well as to understand the microbial role and problems related to biologically active substances in the environment.</p> <p><i>Practical part:</i> Developing competence in experimental work: inoculation on media and cultivation procedure. Developing skills in results recording. Methods of culture cultivation, conservation and procedures for culture maintenance. Through the practicals, students get acquainted with the culture and physiological properties of isolated cultures of microorganisms. Cultivation with the aim of optimization of microbial growth in different conditions of experimental conditions, shifting from primary to secondary microbial metabolism. Research in production of antibiotics and antibiogram experiments.</p> | | | |
| Reading List: 1. Antoni H Rouz: (1975): Chemical microbiology. ICS Belgrad. (In Serbian and in English). 2. Pejin D: Industrial microbiology (2003): University of Novi Sad, Faculty of Technology. (In Serbian). 3. Matavulj M, Gajin S, Petrović O, Radnović D, Svirčev Z, Simeunović J, et al.(1988): Biologically active compounds of higher plants, fungi, algae, and bacteria. Institute of Biology, Faculty of Sciences, University of Novi Sad. (In Serbian). 4. Duraković S. and Duraković L (2003): Mycology in Biotechnology. University of Zagreb, (In Croatian). 5. M. Muntañola – Cvetković: General Mycology. NIRO Književne novine, Belgrad. (In Serbian). 6. Svirčev Z (2005): Microalgae and Cyanobacteria in Biotechnology. Faculty of Sciences, University of N. Sad, (In Serbian). 7. Radnović D, Matavulj M, Karaman M (2007): Mycology. Faculty of Sciences, University of Novi Sad, WUS Austria ISBN 9787-86-7031-118-3. (In Serbian). 8. Vučetić J (1985): Microbial synthesis of antibiotics. KIZ“Centar“, Belgrad. (In Serbian). 9. Vučetić J, Vrvic M (1992): Microbial synthesis of vitamins. Nova prosveta, Belgrad. (In Serbian). 10. Vučetić J (1982): Microbial synthesis of aminoacids. Privredni pregled, Belgrad. (In Serbian). 11. Matavulj M (2010): Lecture outlines and power-point presentations (In Serbian) 12. Madigan MT, Martinko JM (2006): Brock Biology of Microorganisms. Prentice Hall, Pearson Education Internat. (In Engl.) | | | |
| Total hours: | | | |
| Lectures: 2 | Practicals: 2 | Other: | Student research work: |
| Methods of instruction: lectures, practicals, consultations, seminars, colloquia | | | |
| Assessment (maximum number of points 100) | | | |
| Requirements | points | Final exam | points |
| Active participation in lectures | 5 | Practical exam | 15 |
| Colloquia (Pre-exam testing) | 40 | Oral exam | 40 |
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| Remark: Students will develop a deeper understanding of experimental work in microbiological laboratory through independent study. Part of the learning material will be available on the internet. | | | |