Level: PhD

Course title: Natural products isolation and characterization (DSB614)

Status: elective

ECTS: 15

Requirements: none

Learning objectives

To provide students with advanced knowledge of techniques for extraction and purification of natural products from biological materials, techniques for structural elucidation, and methods for bioactivity evaluation. To enable students to choose optimal isolation technique for selected natural products.

Learning outcomes

After completing the course, student is able to: (1) describe experimental techniques used for natural products isolation from biological materials, their advantages and shortcomings, (2) describe peculiarities of isolation of different natural products classes, (3) describe and apply techniques for characterization of raw fractions and isolated compounds.

Syllabus

Theoretical instruction

Biological material processing – drying, size reduction, enzymes inhibition. Initial extraction and separation techniques – phase separation, solvent extraction, solid-phase extraction (SPE), supercritical fluid extraction (SFE), microwave extraction (MWE). Volatile compounds isolation. Chemical methods in isolation – enzymatic and chemical hydrolysis, derivatization. Raw extract purification. Liquid-liquid extraction. Chromatographic techniques in purification and isolation – chromatography modes, open-column chromatography, preparative HPLC, thin-layer chromatography (TLC), centrifugal partition chromatography (CPC). Isolation monitoring – chemical tests, bioactivity assays, activity-guided and chemical analysis-guided fractionation, dereplication. Final purification – desalting, drying, crystallization. Spectrometric methods for isolated product characterization –UV/VIS, MS, NMR, IR, XRD.

Weekly teaching load				Other:
Lectures: 5	Exercises:	Other forms of teaching:	Student research: 5	