

ANALYTICAL CHEMISTRY

Development of novel miniaturized and automated analytical methods.

supervisor: prof. Mgr. Vasil' Andruch, DSc. (vasil.andruch@upjs.sk)

consultant: RNDr. Jana Šandrejová, PhD.

study form: full time

Annotation: The theme is focused on the design of new schemes, technical and technological solutions for miniaturization and automation of analytical procedures; design of new solutions to overcome disadvantages and limitations microextraction techniques; development of microextraction procedures using ultrasound and vortex, and the development of new optical / visual sensors.

Use of current green techniques in luminescence analysis.

supervisor: prof. Dr. Yaroslav Bazel, DrSc. (yaroslav.bazel@upjs.sk)

study form: full time

Annotation: Development of current green techniques, including environmentally friendly solvents compatible with fluorescence and UV-Vis spectrometry as a suitable alternative in the determination of selected analytes in model and real samples.

Analytical study of contaminants during the remediation of polluted areas.

supervisor: doc. Ing. Viera Vojteková, PhD. (viera.vojtekova@upjs.sk)

consultant: MVDr. Daniel Kupka, PhD.

study form: full time

Annotation: Development of the methods for treatment and determination of contaminants and their degradation products for the samples from contaminated areas using analytical techniques such as mass spectrometry, inductively coupled plasma mass spectrometry, atomic absorption spectrometry, ion chromatography, and on-line coupling of spectroanalytical technique with chromatographic separation. Validation of the new-developed methods for analysis.

Application of enantioselective selectors in chromatographic separation techniques.

supervisor: doc. RNDr. Taťána Gondová, CSc. (tatana.gondova@upjs.sk)

study form: full time

Annotation: The development a new enantioselective chromatographic methods for separation and determination of selected chiral and biologically interesting analytes in various matrices. Validation of methods and their use in the analysis of real samples.

Development of new GC-FID fingerprint analytical procedures with forensic focus.

supervisor: doc. RNDr. Taťána Gondová, CSc. (tatana.gondova@upjs.sk)

consultant: RNDr. Rastislav Serbin, PhD.

study form: full time

Annotation: Development of simple fingerprint analytical procedures applicable in forensic analytical chemistry. Assessment of GC-FID application possibilities in already existing fingerprint and non-fingerprint techniques with high operating costs.

Optimization of conditions for selected analytical procedures (sampling, preparation, processing of samples, setting of GC-FID parameters. Data collection for a number of model and real samples, creating our own fingerprint libraries resp. use of existing ones, if possible. Design of a method of identification, proof and evaluation of data for given methods. Validation of developed procedures. Application of developed procedures on real samples.

Microextraction techniques and high performance liquid chromatography (HPLC) in the analysis of selected bioactive substances.

supervisor: doc. RNDr. Katarína Reiffová, PhD. (katarina.reiffova@upjs.sk)

study form: full time

Annotation: The current trend in analytical chemistry in the field of pre-treatment of complex samples is focused on the development of new micro-extraction methods using analytical systems with a small volume of analytical reagents. The main goal of the proposed topic will be the development of a new two-step analytical method suitable for effective preconcentration and subsequent determination of a selected group of bioactive substances by HPLC.