

## DEPARTMENT OF ANALYTICAL CHEMISTRY

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### I. STAFF

#### Full Professors:

Dušan Bustin, PhD, DSc; Ján Krupčík, PhD, DSc; Jozef Lehotay, PhD, DSc; Eva Matisová, PhD, DSc; Ján Mocák, PhD, DSc;

#### Associate Professors:

Ernest Beinrohr, PhD; Eva Brandšteterová, PhD; Miroslav Čakrt, PhD; Ján Labuda, DSc; Drahomír Oktavec, PhD; Miroslav Rievaj, PhD; Jozef Polonský, PhD; Viktor Vrábek, PhD;

#### Assistant Professors:

Eva Benická, PhD; Tatiana Buzinkaiová, PhD; Andrea Hercegová, PhD; Svetlana Hrouzková, PhD; Elena Korgová, PhD; Pavol Májek, PhD; Alena Manová, PhD; Pavol Tarapčík, PhD; Mária Vaničková, PhD;

#### Research Fellows:

Miriám Bučková, PhD; Adriana Ferancová, PhD; Katarína Hroboňová, PhD; Jarmila Laštincová, PhD; Jana Sádecká, PhD; Ivan Skačáni, PhD; Ivan Špánik, PhD; Peter Tomčík, PhD; Magdaléna Valachovičová;

#### PhD Students:

Branko Balla (in 31.9.2002); Eva Blahová; Jana Ďungelová; Peter Korytár; Petra Kotianová; Milena Dömötöröová (since 1.10.2002); Gabriela Karasová (since 1.10.2002);

#### Technical Staff:

Marta Benešová; Zuzana Cifrová (till 30.9.2002); Ľubica Zajacová (since 1.12.2002); Jana Otrubová; Juraj Žemlička

### II. TEACHING AND RESEARCH LABORATORIES

#### A. Teaching (research, too) Laboratories:

Laboratory of capillary gas chromatography

Laboratory of high performance liquid chromatography

Laboratory of capillary isotachopheresis

Laboratory of electroanalytical methods

Laboratory of molecular spectrometry

Clean laboratory for trace analysis with atomic spectrometry (AAS, OES-ICP)

Laboratory of electrochemical pre-concentration for atomic spectroscopy

Laboratory of organic elemental analysis

Laboratory of fluorescence analysis

Laboratory of chemometry

Laboratory of bioanalytical chemistry

#### B. Research Laboratories:

Laboratory of organic synthesis

### III. TEACHING

#### A. Undergraduate Study

##### 4th semester (spring)

Analytical Chemistry I. (2-2 h) Polonský, Vrábek

Laboratory Practice AC I. (0-4 h) Valachovičová

##### 5th semester (autumn)

Analytical Chemistry II. (2-2 h) Bustin, Čakrt, Polonský

Laboratory Practice AC II. (0-4 h) Korgová

Testing and Quality Control (1-1 h) Čakrt

##### 6th semester (spring)

Semestral Project (0-4 h) Rojkovičová

##### 7th semester (autumn)

Analytical Spectrometry (2-0 h) Beinrohr

Anal.Chem.of Complex Inorg. Mixtures (2-0 h) Oktavec

Anal.Chem. of Complex Org. and Biological Mixtures (2-0 h) Sádecká

Lab.Practice I. (0-10 h) Sádecká

Biosensors (2-1 h) Labuda

Computer evaluation of anal. measurement (2-0 h) Májek, Mocák

8th semester (spring)

Electrochemistry and Electroanalytical Chemistry	(2-1 h)	Bustin
Techniques of Mixtures Separation	(2-2 h)	Matisová, Valigura
Analytical Separation of Compounds	(2-1 h)	Krupčík
Lab.Practice II	(0-6 h)	Sádecká
Trace Analysis and Microanalysis Methods	(2-0 h)	Beinrohr

9th semester (autumn)

Bioanalytical Chemistry	(2-1 h)	Labuda
Identification of Chemical Substances	(2-1 h)	Lehotay, Liptaj
Lab.Practice of Specialisation	(0-10 h)	Sádecká
Automatisation of Analytical Chemistry	(2-0 h)	Rievaj
Nuclear Analytical Chemistry	(2-0 h)	Tarapčík

10th semester (spring)

Laboratory of Diploma Work	(0-30 h)	Rojkovičová
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#### IV. CURRENT RESEARCH PROJECTS

A. VEGA Projekt No 1/9128/02 Development and Application of Direct Injection Assays for HPLC Analysis of Some Drugs and Toxic Compounds in Biological Samples (Eva Brandšteterová). The aim of the project was the development and the application of new assays with the possibility of direct injection of biological samples into the HPLC system. SPE (Solid Phase Extraction) precolumn was integrated directly into the HPLC system what improves validation parameter values and minimizes the personal contact with biofluids. Automated HPLC procedures for the analysis of chosen drugs, natural and toxic compounds were compared with applied electromigration methods.

B. VEGA Projekt No 1/9129/02 Elektroanalysis by means of in-elektrode coulometric titration and interdigitated array of microelectrodes. Optimization of stages of trace analysis (Dušan Bustin). The project is oriented to the investigation of in-electrode coulometric titration in porous electrodes for calibrationless determination of trace concentrations of metals and some non-metals and to the application of elaborated procedures for automated process analysis. It also intends to contribute to employment of chronoamperometry with the segments of inter-digitated microelectrode arrays for the calibrationless analysis of electroactive species. Chronoamperograms are to be obtained under redox-cycling or isolated segment conditions. The multivariate statistical data analysis are to be used for authentication and classification of food products, environmental samples as well as for the software aided clinical diagnosis.

C. Grant GAV 1/9127/02 Development of optimum methods for analyses of enantiomers of biologically active chiral substances by high performance liquid, supercritical fluid and gas chromatography (Ján Krupčík). This project intends to contribute to development of methods for the direct analysis of enantiomers of selected biologically active chiral compounds by high performance liquid (HPLC), supercritical fluid (SFC) and gas (HRGC) chromatography. Following subparts shall be studied in this project: (i) Computer assisted optimum methods shall be developed for direct separations of enantiomers of selected biologically active chiral compounds by HPLC, SFC and GC methods using commercially available modified cyclodextrins (GC) and macrocyclic antibiotics (SFC and HPLC). (ii) Two columns in series and two dimensional HRGC and or HPLC shall be applied for the separation of enantiomers in complex mixtures. (iii) Computer assisted deconvolution of the peak clusters obtained separating the racemic mixtures shall be applied to determine the enantiomerization barrier of the thermally labile enantiomers by dynamic HPLC, SFC and GC. (iv) Principal component analysis and cluster analysis shall be used to classify the enantioselectivity of modified  $\alpha$ -,  $\beta$ - and  $\gamma$ -cyclodextrin used in HRGC.

D. VEGA Project No 1/9126/02 Large Volume Injection in Conventional and Fast Capillary Gas Chromatography (Eva Matisová). The aim of the project is the development of the large volume sample injection methods in combination with conventional, fast capillary gas chromatography and GC-MS for trace analysis of volatile and semi-volatile organic compounds in multicomponent model and real environmental samples. A part of the project is connected with the development of comprehensive gas chromatography (GCxGC) and its combination with the large volume sample injection for the analysis of multicomponent samples of trace analytes. A part of the project is devoted to the application of the gained knowledge to the trace and ultra-trace analysis of multicomponent mixtures of organic compounds in environmental matrices including the sample pre-treatment for the large volume sample injection.

E. NATO Project No SFP 977983 Minimisation of Pesticide Residues in Processed Products and the Environment (Eva Matisová). The project refers to pesticide science and more specifically to pesticide chemistry, and analytical methodology of residues. Pesticide residues undergo significant changes in chemical structure and concentration during food processing. The research work in the project is planned to contribute to better understanding of the effects of food processing on pesticide residues. Perfection of the analytical methodologies for detection and determination of pesticide residues at extremely low concentrations allowed in baby foods will be one of the scientific contributions of the project. Existing methods will be modified or new

methods will be developed, distinguished by sufficient precision and reliability of determination of residues at or below the concentration level of 0.01 mg/kg, required by the EU directives on baby food. The identification and assessment of the critical points in the food technology processes will be a contribution to food technology.

F. CEEPUS PL-110 02/03: "Development and improvement of modern analytical methods for monitoring the environmental pollution and introduction of the quality systems and accreditation to routine analytical laboratories" (Ján Mocák). Educational project enabling the exchange of students and teachers among the following partner universities: (a) The University of Mining and Metallurgy, Cracow, Poland, (b) Karl-Frenzens-University, Graz, Austria, (c) The University of Maribor, Maribor, Slovenia, (d) The University of Pardubice, Pardubice, Czech Republic, (e) Slovak University of Technology, Bratislava, Slovakia (national coordinator: Jan Mocak). Project duration: academic year 2002/2003.

G. Aktion Oesterreich-Slowakei: "Chemometrical Classification of Food and Biologically Important Samples". Bilateral scientific project between (a) Technische Universitaet Graz, Austria, and (b) Slovak University of Technology, Bratislava, Slovakia (national coordinator: Jan Mocak.). Project duration: 2 years, 2002-2003.

H. VEGA project 1/9253/02: Electrochemical DNA biosensors for the characterization of chemical interactions of the bound DNA, the determination of traces of compounds binding to DNA as well as activators and inhibitors of damage to DNA (Ján Labuda). New biosensors with a DNA layer of controlled properties attached to screen-printed carbon electrodes have been prepared. Host-guest interactions for dsDNA and small molecules of selected chiral drugs and risk chemicals have been characterized using several voltammetric techniques. DNA structural changes and deep degradation as a consequence of chemical reactions of reactive oxygen radical species as well as DNA protection by selected antioxidants such as flavonoids were investigated. New analytical procedures for the simple and fast determination of trace amounts of chiral drugs were developed. The DNA biosensors were tested as simple and single-use sensors for the determination of DNA damage as well as the evaluation of antioxidative capacity of plant extracts of food industry interest.

I. Project 035/2001 (USA – SK) The HPLC Study of Enantioselective Separations Using Molecular Modelling and Artificial Neural Networks on Macrocyclic Antibiotic Chiral Selectors (Jozef Lehotay). The objective of this research project is to create a comprehensive method capable of the prediction and optimization of enantioselective separations achieved by the vancomycin chiral selector, VM-CS, in HPLC, CEC and CE. This will be accomplished by: 1) development of QSERRs to describe the retention and enantioselective separations achieved in each chromatographic mode; 2) training ANN to select optimum format and conditions, i.e. to minimize  $k_1'$  and  $k_2'$  while optimizing  $k_2'/k_1'$ , using the independent variables identified by the QSERR studies. A key element in the optimal use of CSs is an understanding of the chiral recognition mechanisms responsible for the observed enantioselective separations. Thus, a second objective is the use of the QSERRs and stopped-flow kinetic studies to construct descriptions of the chiral recognition mechanisms operating in each mode and to correlate these results with molecular modelling studies. The aim of these studies is a better understanding of the fundamental processes involved in chiral recognition.

## V. COOPERATION

### A. Cooperation in Slovakia

Department of Microelectronics Faculty of Electrical Engineering and Information Technology, Slovak University of Technology Bratislava

Department of Petroleum Technology, Department of Biotechnology and Environment, VURUP, Slovnaft a.s. Bratislava

Department of Plant Physiology, Faculty of Natural Sciences, Comenius University, Bratislava  
Food Research Institute, Bratislava

Hospital for Tuberculosis and Respiratory Diseases, Department of Clinical Chemistry, Poprad

Hospital of the Ministry of Defence, Division of Clinical Laboratories, Bratislava

National Institute of Oncology, Bratislava

Pharmaceutical Faculty, Comenius University, Bratislava

Slovak Institute of Metrology, Bratislava

### B. International Cooperation:

Department of Analytical Chemistry, Chemical Technological Faculty, University, Pardubice, Czech Republic

Department of Analytical Chemistry, Palacky University, Olomouc, Czech Republic

Department of Chemistry, Gilman Hall, Iowa State University, Ames, Iowa, USA

-Chiral separation of optical active compounds by HPLC and HRGC

Department of Organic Chemistry, University of Gent, Gent, Belgium

-Chiral separations by HRGC

School of Chemistry, Monash University, Clayton, Victoria, Australia

Faculty of Material Engineering and Ceramics, The University of Mining and Metallurgy, Cracow, Poland

Nicholas Copernicus University, Toruń, Poland

Prof. Hans Puxbaum; Technical University Vienna, Institute of Analytical Chemistry, Vienna, Austria  
-Utilisation of Capillary GC in Combination with Preconcentration Techniques for the Analysis of Organic Compounds in Aerosols

C. Membership in Domestic Organizations and Societies:

Chairman of Scientific Group "Chromatography and Electrophoresis", Slovak Chemical Society, Slovak Academy of Sciences, Bratislava (E. Brandšteterová)  
Chemical Papers Editorial Board, Bratislava (D. Bustin)  
Membership in the Editorial Board of the Slovak scientific journal *Laboratory Diagnosis*, Bratislava (J. Mocák)  
Chairman of Analytical Chemistry Group (J. Lehotay)  
Vice-Chairman of Chemical Society (J. Krupčík)  
Member honoris causa of the Slovak Medical Society, Bratislava (J. Mocák)

D. Membership in International Organisations and Societies:

American Chemical Society, USA (D. Bustin)  
European Commission, Science, Research and Developments, Brussel, Belgium (J. Lehotay)  
Chemical Analysis Editorial Board, Warszawa, Poland (J. Lehotay)  
Sensors Editorial Board, Basel, Switzerland (J. Labuda)  
Delegate of Slovak Chemical Society at the Division of Analytical Chemistry of the Federation of European Chemical Societies (J. Labuda)  
IUPAC Fellow, Switzerland (D. Bustin)  
UICC (International Union Against Cancer), Geneva, Switzerland (E. Brandšteterová)

E. Tempus Programme:

F. International Scientific Programmes:

1. Grant No. 002-98, Slovak – US Universities Co-operation. Mechanistic study of chiral recognition in HPLC and HRGC (J. Krupčík). The main objective of the project is to study mechanistic aspects of chiral recognition in the direct separation of enantiomers by HPLC and HRGC. The influence of structure and polarity differences in substituents bonded to the asymmetric carbon atom in enantiomers, and selectivity of a chiral selector in HPLC and HRGC shall be studied in detail. Elaborated optimum separation system shall be used for two dimensional separation of optically active compounds in natural samples.

2. Project 035/2001 (USA – SK) The HPLC Study of Enantioselective Separations Using Molecular Modelling and Artificial Neural Networks on Macrocyclic Antibiotic Chiral Selectors (Jozef Lehotay). The objective of this research project is to create a comprehensive method capable of the prediction and optimization of enantioselective separations achieved by the vancomycin chiral selector, VM-CS, in HPLC, CEC and CE. This will be accomplished by: 1) development of QSERRs to describe the retention and enantioselective separations achieved in each chromatographic mode; 2) training ANN to select optimum format and conditions, i.e. to minimize  $k_1'$  and  $k_2'$  while optimizing  $k_2'/k_1'$ , using the independent variables identified by the QSERR studies. A key element in the optimal use of CSs is an understanding of the chiral recognition mechanisms responsible for the observed enantioselective separations. Thus, a second objective is the use of the QSERRs and stopped-flow kinetic studies to construct descriptions of the chiral recognition mechanisms operating in each mode and to correlate these results with molecular modelling studies. The aim of these studies is a better understanding of the fundamental processes involved in chiral recognition.

3. CEEPUS PL-110 02/03: "Development and improvement of modern analytical methods for monitoring the environmental pollution and introduction of the quality systems and accreditation to routine analytical laboratories" (Ján Mocák). Educational project enabling the exchange of students and teachers among the following partner universities: (a) The University of Mining and Metallurgy, Cracow, Poland, (b) Karl-Frenzens-University, Graz, Austria, (c) The University of Maribor, Maribor, Slovenia, (d) The University of Pardubice, Pardubice, Czech Republic, (e) Slovak University of Technology, Bratislava, Slovakia (national coordinator: Jan Mocak). Project duration: academic year 2002/2003.

4. Aktion Oesterreich-Slowakei: "Chemometrical Classification of Food and Biologically Important Samples". Bilateral scientific project between (a) Technische Universitaet Graz, Austria, and (b) Slovak University of Technology, Bratislava, Slovakia (national coordinator: Jan Mocak.). Project duration: 2 years, 2002-2003.

5. NATO Project No SFP 977983 Minimisation of Pesticide Residues in Processed Products and the Environment (Eva Matisová). The project refers to pesticide science and more specifically to pesticide chemistry, and analytical methodology of residues. Pesticide residues undergo significant changes in chemical structure and concentration during food processing. The research work in the project is planned to contribute to better understanding of the effects of food processing on pesticide residues. Perfection of the analytical

methodologies for detection and determination of pesticide residues at extremely low concentrations allowed in baby foods will be one of the scientific contributions of the project. Existing methods will be modified or new methods will be developed, distinguished by sufficient precision and reliability of determination of residues at or below the concentration level of 0.01 mg/kg, required by the EU directives on baby food. The identification and assessment of the critical points in the food technology processes will be a contribution to food technology.

#### G. Visitors from Abroad:

Prof. A. Manschreck Department of Organic Chemistry, University of Regensburg, Germany, November 2002(1 day)  
Mgr. R. Štěpán Faculty of Natural Science, Charles University, Prague, Czech Republic, Oktober 2002 (1 month)  
Prof. A. Bobrowski University of Mining and Metallurgy, Cracow, Poland, 22.2.-3.3.2002 (10 days)  
Dipl. Ing. A. Krolicka University of Mining and Metallurgy, Cracow, Poland, 18.2.-11.3.2002 (22 days)  
Dr. M. Bartoš University of Pardubice, Pardubice, Czech Republic, June 2002 (16 days)  
Prof. V. Kriváň University Ulm, Germany, Dezember 2002 (3 days)  
Prof. J. Ševčík Charles University, Prague, Czech Republik, September 2002 (2 days)  
Mgr. O. Korbut Fakulty of Mathematics and Natural Science University, Rostock, Germany, February 2002 (1 month)

#### H. Visits of Staff Members and PhD Students to Foreign Institutions:

B. Balla University of Pardubice (CEEPUS), Pardubice, Czech Republic, April 8-28, 2002 (21 days)  
B. Balla ICCC 2002, Kyoto, Japan, October 17-29, 2002 (13 days)  
B. Balla University of Graz, Graz, Austria, November 18-22, 2002 (5 days)  
E. Beinrohr Charles University, Heyrovsky Memorial, Prag, Czech Republic, February 12, 2002 (1 day)  
E. Beinrohr International Conference in Organic Analysis, Luhačovice, Czech Republic, April 16-17, 2002 (2 days)  
E. Beinrohr Working Seminar, Brno, Czech Republic, May 28, 2002 (1day)  
E. Benická 25<sup>th</sup> International Symposium on Capillary Chromatography, Riva del Garda, Italia, May 13-17, 2002 (5 days)  
E. Blahová 54<sup>th</sup> Meeting of Chemical Societies, Brno, Czech Republic, June 30-July 4, 2002 (5 days)  
E. Blahová 8<sup>th</sup> International Symposium on Separation Sciences, Toruń, Poland, September 8-12, 2002 (5 days)  
E. Blahová 24<sup>th</sup> International Symposium on Chromatography, Leipzig, Germany, September 13-20, 2002 (8 days)  
E. Blahová Vitamins 2002, Pardubice, Czech Republic, September 3-5, 2002 (3days)  
M. Bučková Charles University, Prag, Czech Republic, February 11-12, 2002 (2 days)  
M. Bučková University of Rostock, Rostock, Germany, June 3 – December 31, 2002 (7 months)  
T. Buzinkaiová Advances in Chromatography and Electrophoresis, Olomouc, Czech Republic, June 24-27, 2002 (4 days)  
J. Ďungelová 25<sup>th</sup> International Symposium on Capillary Chromatography, Riva del Garda, Italia, May 13-17, 2002 (5 days)  
J. Ďungelová 8<sup>th</sup> International Symposium on Separation Sciences, Toruń, Poland, September 8-12, 2002 (5 days)  
J. Ďungelová 24<sup>th</sup> International Symposium on Chromatography, Leipzig, Germany, September 13-20, 2002 (8 days)  
A. Ferancová Charles University, Prag, Czech Republic, February 11-12, 2002 (2 days)  
P. Korytár Netherlands Institute for Fisheries Research, IJmuiden, The Netherlands, January 1–December 31, 2002 (12 months)  
P. Kotianová Free University (Erasmus Programue), Amsterdam, Holand, March 4 – June 30, 2002 (4 months)  
P. Kotianová Technical University, Wien, Austria, September 11, 2002 (1 day)  
P. Kotianová 24<sup>th</sup> International Symposium on Chromatography, Leipzig, Germany, September 13-20, 2002 (8 days)  
P. Kotianová Technical University, Wien, Austria, September 20, 2002 (1 day)  
J. Krupčík University of Gent, Gent, Belgium, April 3-5, 2002 (3 days)  
J. Krupčík European Comunity, Brusels, Belgium, May 14-18, 2002 (5 days)  
J. Krupčík 4<sup>th</sup> Slovenian Symposium on Separation Techniques, Novo Mesto, Slovenia, October 2-4, 2002 (3 days)  
J. Krupčík International Symposium on Analytical Science, Stellenbosch, South Africa, December 2-12, 2002 (11 days)

- J. Labuda Charles University, Prag, Czech Republic, February 11-13, 2002 (3 days)
- J. Labuda Charles University, Prag, Czech Republic, March 18-22, 2002 (5 days)
- J. Labuda 54<sup>th</sup> Meeting of Chemical Societies, Brno, Czech Republic, June 30–July 4, 2002 (5 days)
- J. Labuda Euroanalysis 12 Conference, Dortmund, Germany, September 6-14, 2002 (9 days)
- J. Labuda Elektrochemical Sensors, Matrafüred, Hungary, October 13-18, 2002 (6 days)
- J. Labuda Charles University, Prag, Czech Republic, November 3-6, 2002 (4 days)
- J. Laštincová 54<sup>th</sup> Meeting of Chemical Societies, Brno, Czech Republic, June 30 – July 4, 2002 (5 days)
- J. Laštincová 20<sup>th</sup> Conference of the International Humic Substances Society, Northeastern University, Boston, USA, July 22-26, 2002 (5 days)
- J. Lehotay Ministry of Environment Prague, Prag, Czech Republic, February 7-8, 2002 (2 days)
- J. Lehotay Ministry of Environment Prague, Prag, Czech Republic, February 13-16, 2002 (4 days)
- J. Lehotay University of Gent, Gent, Belgium, April 3-5, 2002 (3 days)
- J. Lehotay 25<sup>th</sup> International Symposium on Capillary Chromatography, Riva del Garda, Italia, May 13-17, 2002 (5 days)
- J. Lehotay European Centre on Waste and Material Flow, Tallinn, Latvia, June 17-20, 2002 (4 days)
- J. Lehotay Pharmaceutical Faculty, Charles University, Hradec Králové, Czech Republic, June 23-27, 2002 (5 days)
- J. Lehotay 8<sup>th</sup> International Symposium on Separation Sciences, Toruń, Poland, September 8-13, 2002 (6 days)
- J. Lehotay International Symposium on Analytical Science, Stellenbosch, South Africa, December 2-12, 2002 (11 days)
- P. Májek 25<sup>th</sup> International Symposium on Capillary Chromatography, Riva del Garda, Italia, May 13-17, 2002 (5 days)
- E. Matisová 25<sup>th</sup> International Symposium on Capillary Chromatography, Riva del Garda, Italia, May 13-17, 2002 (5 days)
- E. Matisová 4<sup>th</sup> European Pesticide Residues Workshop, Rome, Italia, May 23–June 1, 2002 (10 days)
- E. Matisová 2<sup>nd</sup> European Conference on Pesticides and Related Organic Micropollutants in the Environment, Corfu, Greece, September 24–October 1, 2002 (8 days)
- J. Mocák University of Pardubice (CEEPUS), Pardubice, Czech Republic, April 11-20, 2002 (10 days)
- J. Mocák ESEAC Conference, Krakow, Poland, June 9-15, 2002 (7 days)
- J. Mocák 5<sup>th</sup> Chemometric, Brno, Czech Republic, September 1-5, 2002 (5 days)
- T. Rojkovičová 25<sup>th</sup> International Symposium on Capillary Chromatography, Riva del Garda, Italia, May 13-17 2002 (5 days)
- T. Rojkovičová 8<sup>th</sup> International Symposium on Separation Sciences, Toruń, Poland, September 8-12, 2002 (5 days)
- T. Rojkovičová 24<sup>th</sup> International Symposium on Chromatography, Leipzig, Germany, September 13-20, 2002 (8 days)
- I. Špánik Department of Chemistry, Texas A&M University, College Station, USA, January 1 – December 31, 2002 (12 months)
- P. Tomčík Physical and Theoretical Chemistry Laboratory, Oxford University, England, September 17 – December 31, 2002 (3,5 months)

## VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree in Analytical Chemistry) for state examinations after five years of study (supervisors are written in brackets):

- Antolíkova A.: Kinetic Study of Decomposition of Some Phenylcarbamic Derivatives in Biological Environment by HPLC. (J. Lehotay)
- Bednářiková A.: Isotachophoretic determination of morphine in biological samples. (J. Sádecká)
- Birasová H.: Capillary gas chromatographic separation of enantiomers of lower boiling optical active organic compounds on cyclodextrin stationary phases. (J. Krupčík)
- Büiová K.: Possibilities of determination of As (III) by flow coulometry in environmental samples (J. Laštincová)
- Číef E.: Chemometrical calculation and processing of analytical signals. (J. Mocák)
- Deáková E.: Preparation of plant samples before HPLC analysis of biological active compounds. (E. Brandšteterová)
- Dömötörövá M.: Fast Capillary Gas Chromatography and Its Utilisation in Pesticide Analysis. (E. Matisová)
- Jakubková E.: Determination of Drugs by DNA biosensor. (M. Vaničková)
- Karasová G.: Isotachophoretic determination of pantothenic acid in foods. (J. Sádecká)
- Kálnaiová Z.: Optimization of gas chromatographic dual-column system for the analysis of natural compounds. (E. Benická)

Klottonová M.: Electrochemical sensors using screen-printed carbon electrode assemblies modified with the beta-cyclodextrin for the determination of pollutants. (E. Korgová)  
Krajčíková M.: Developement of the voltammetric methods applying microelectronic structures. (P. Tomčík)  
Lokša J.: Potentiometric determination of sulfides and thiols. (M. Čakrt)  
Marcinová-Humeníková S.: In-Elektrode Coulometric Titration for determination of trace metals in the waters and in the samples of the ecological sphere of life. (A. Manová)  
Marková M.: Analysis of betaxolol hydrochloride in drugs and human fluids. (T. Buzinkaiová)  
Nemcová R.: Study of DNA damage and its inhibition. (M. Bučková)  
Polková M.: Spectral Study of the Dithiocarbamate Chelates of Co(III), Ni(II), Cu(II).(D. Oktavec)  
Siváková Z.: Determination of antioxidants using DNA biosensor. (J. Labuda)  
Szokolová-Horváthová M.: Separation of Some Enantiomers of Phenylcarbamic Derivatives by HPLC – Interation Study. (J. Lehotay)  
Tóthová-Matúsová A.: Crystal structure and biological activity of 1,4 – dihydropyridine derivative. (V. Vrábel)  
Tóthová Z.: Possibility of microelectrodes application in voltammetric analysis (M.Rievaj)  
Varga P.: In-electrode coulometric titrations. Determination of bases. (E. Beinrohr)

#### B. Dissertations (PhD.):

Laštincová J.: Trace analysis of biologicaly relevant elements in soil by atomic absorption methods, ICP-AES and flow coulometry. (E.Beinrohr)  
Jurica L.: Determination of trace amounts of As by flow coulometry and electrochemical generation of hydrides coupled by the atomic absorption spectrometry. (E. Beinrohr)

#### C. Dissertations (DSc.):

#### D. Habilitation Theses:

Benická E.: Dual-column and enantioselective systems in capillary gas chromatography and their application in the analysis of environmental pollution.

## VII. Publications

### A. Journals (\*registered in Current Contents)

- [1]\* Beinrohr E., Labhart W., Maugham E.V.: Heavy metal discharge from coal-fired power plants - How does this affect the environment and cost-effective production of electric power? *Power Plant Chemistry* 4, 693-696 (2002)
- [2]\* Blahová E., Brandšteterová E., Netriová J.: Symmetry Shield and XTerra reversed phase columns in HPLC determination of morphine and its metabolites. *Microchim. Acta* 140, p. 247 (2002)
- [3]\* Borošová D., Mocák J., Beinrohr E., Miškovič P.: Validation and Quality Assurance of Arsenic Determination in Urine by GFAAS after Toluene Extraction. *Polish J. Environ. Stud.* 11, 617-623 (2002)
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#### C. Books and Textbooks

#### D. Patents