FOREWORD

The Faculty of Chemical and Food Technology of the Slovak University of Technology is one of the six faculties, of the Slovak University of Technology in Bratislava. The history of the Faculty dates back to 1940/41 when the Branch of Chemical Engineering started with education. The Higher Education Act from 1950 changed this branch to the individual Faculty of Chemistry of the Slovak Technical High School in Bratislava.

The Slovak higher education has its rich history. Our Faculty follows in the footsteps of its famous predecessor in the education of technical chemistry, i.e., the famous Mining Academy in Banská Štiavnica constituted by empress Maria Theresa in 1762. The establishment of the Dr. M. R. Štefánik College of Technology in 1937 and subsequently, that of the Slovak College of Technology in 1939 succeded in keeping the high standard of technical education in Slovakia.

Within the time of its existence, the Faculty has educated more than 16 500 graduates (more than 3 600 graduates in food engineering). The Faculty has trained more than 1 100 graduates in postgraduate doctorate courses granting the title PhD in chemical and technical sciences. Thus, the Faculty has helped considerably to increase scientific knowledge in industry, education system, scientific and research institutes, and administrative services.

The Faculty occupies a very specific position within the Slovak Republic and relates to the whole spectrum of chemical, food, pharmaceutical and consumer industries, and ecology. At present, some 2.000 students study at the Faculty and they are trained by qualified pedagogical and research staff. Out of the total number of 273 teachers, there are 31 full professors, 106 associate professors, 139 assistant professors. Out of 85 research workers, 2 hold the title DSc, 45 hold the title PhD. Both the teaching process and research activities are centred within 24 Departments and Central Laboratories.

The Faculty currently offers study in BSc courses, MSc courses, and PhD. The undergraduate form of study is organized at two levels: Bachelor-of-Science and Master-of-Science programmes. The first level BSc course for all students lasts three years, and is run in two branches: Chemical Technology and Food Technology. This first level of the study ends by a state examination and a project granting the student the title Bachelor of Science (BSc). The nominal span of the study in the BSc course is 3 years. The second level MSc course is run in 9 majors with several possible specializations over two years. The MSc course ends by a state examination and by defending a diploma thesis. The graduate obtains the title Master of Science (MSc). In addition to the natural-science basis, students of all branches study basic engineering subjects, e.g. Chemical Engineering, Processes Control, Basics of Chemical and Food Processing Technology, as well as subjects on Economy, Law and Ecology.

The highest form of university education is currently the doctorate study, which in the past was run as a form of preparation for scientific work. In 1997 the Ministry of Education of the Slovak Republic approved the right of the Faculty to train and to administer examinations in PhD Courses. The Faculty has conferred the title PhD in 15 branches of the doctoral study. (Chemical Physics, Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, Macromolecular Chemistry, Biochemistry, Microbiology, Inorganic Technology and Materials, Organic Technology and Technology of Fuels, Technology of Macromolecular Materials, Chemical Engineering and Control of Processes, Chemistry and Technology of Environment, Chemistry and Food Technology, Biotechnology, and Applied Informatics).

The Faculty has a widely oriented programme, leading to the development of basic scientific fields in chemistry, chemical technology and food processing. This wide scientific orientation of Departments at the Faculty allows goal-oriented training of undergraduates and thereby their quicker transition to industry. There are several scientific schools at the Faculty which are successful at winning grants from domestic and international sources and at organising scientific meetings. The Faculty generally maintains an important international position. In addition to basic research, the Faculty participates in widely applied research for practice. The cooperation with many factories and companies allows for a swift application of research results in practice. At the same time the Faculty obtains considerable financial support.

The Faculty participates in issuing the specialized scientific journals: Chemical Papers, Fibres and Textile, Plastics and Rubber, Journal of Radioanalytical and Nuclear Chemistry, Biology, Folia Microbiologica, Vinohrad/Víno (Wineyard/Wine).

The scope and quality of the scientific activity keep the Faculty at a level, which is comparable with other top research and university centres in the world. This can be proved by the above mentioned number of grants, staff invitations to participate in conferences abroad, wide cooperation with foreign universities and institutions, and memberships in international organizations.

Any further details about the activities of the Faculty of Chemical Technology can be found in the Annual Report 2001.

February 2002

Prof. Vladimír Báleš, PhD, DSc
Dean

PRESIDIUM OF THE FACULTY

Dean: Prof. Vladimír Báleš, PhD, DSc

Vice-deans: Prof. Dušan Bakoš, PhD, DSc
Assoc. Prof. Pavel Kovařík, PhD
Prof. Ján Šajbidor, PhD, DSc
Assoc. Prof. Zdenek Židek, PhD

SCIENTIFIC COUNCIL

Chairman: Prof. Vladimír Báleš, PhD, DSc

Vice-chairman: Prof. Dušan Bakoš, PhD, DSc

Members: Prof. Stanislav Biskupič, PhD, DSc
Prof. Dušan Bustin, PhD, DSc
Assoc. Prof. Gabriel Čík, PhD
Prof. Pavel Fellner, PhD, DSc
Prof. Ľubor Fišera, PhD, DSc
Prof. Milan Hronec, PhD, DSc
Assoc. Prof. Pavel Kovařík, PhD
Prof. Fedor Malík, PhD, DSc
Prof. Milan Melník, PhD, DSc
Prof. Ján Mikleš, PhD, DSc
Assoc. Prof. Štefan Schmidt, PhD
Assoc. Prof. Zdenek Židek, PhD
Assoc. Prof. Tomáš Bleha, PhD, DSc
Miroslav Havlík
Assoc. Prof. Karel Kadlec, PhD
Milan Kováč, PhD
Ján Líška
Prof. Anton Osvald, PhD
Jozef Šimúth, PhD, DSc

Honorary Members: Milan Baláž
Tibor Doboly
Ondrej Gattnar, PhD
Jozef Kollár
Ján Maťaš
Prof. Stanislav Miertuš, PhD, DSc

ACADEMIC SENATE

Chairman: Assoc. Prof. Ján Dvoran, PhD.

Vice-chairmen: Assoc. Prof. Pavol Hudec, PhD
Andrea Baránková, student

Members:
Assoc. Prof. Ján Labuda, PhD, DSc
Assoc. Prof. Marián Koman, PhD, DSc
Assoc. Prof. Jana Gabčová, PhD
Assoc. Prof. Soňa Jantová, PhD
Assoc. Prof. Anton Gatial, PhD
Assoc. Prof. Ivan Hudec, PhD
Vladimír Lukeš, PhD
Milan Čertík, PhD
Assoc. Prof. Jozef Markoš, PhD
Prof. Eberhard Borsig, PhD, DSc
Miroslav Hutňan, PhD
Assoc. Prof. Jozef Augustín, PhD
Tibor Jakubík, PhD
Viliam Lendel, PhD
Assoc. Prof. Jozef Polonský, PhD
Pavel Kusý, PhD
Dr. Dušan Špirko, PhD
Assoc. Prof. Viktor Milata, PhD
Štefan Šutý, PhD
Zuzana Cvengrošová, PhD
Assoc. Prof. Mária Takácsová, PhD
Vladimír Kovár, PhD
Assoc. Prof. Anna Kolesárová, PhD
Viera Jančovičová, PhD
Ondrej Dolgoš, PhD-student
Rastislav Spišák, student
Karol Caltík, student
Peter Ditte, student
Pavol Lukáč, student
František Podzimek, student
Branislav Prosnan, student
Michal Tkáč, student

DEPARTMENT OF ANALYTICAL CHEMISTRY

Head of Department
Prof. Jozef Lehotay, PhD DSc

Telephone: ++421-2-52926043
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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, PhD, DSc, Drahomír Oktavec, PhD, Miroslav Rievaj, PhD, Jozef Polonský, PhD, Viktor Vrábel, PhD

Assistant Professors :
Eva Benická, PhD, Tatiana Buzinkaiová, PhD, Andrea Hercegová, PhD, Elena Korgová, PhD, Pavol Májek, PhD, Alena Manová PhD, Pavol Tarapčík, PhD, Mária Vaníčková, PhD

Research Fellows :
Miriam Bučková, PhD, Adriana Ferancová, PhD, Katarína Hroboňová, PhD, Jarmila Laštincová, Jana Sádecká, PhD, Ivan Skačáni, PhD, Ivan Špánik, PhD, Peter Tomčík, PhD, Magdaléna Valachovičová

PhD Students:
Branko Balla, Eva Blahová (till 1.10.2001), Jana Ďungelová, Peter Korytár, Petra Kotianová

Technical staff :
Marta Benešová, Zuzana Cifrová, Jana Otrubová, Juraj Žemlička

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of capillary gas chromatography
Laboratory of high performance liquid chromatography
Laboratory of electroanalytical methods
Laboratory of molecular spectrometry
Clean laboratory for trace analysis with atomic spectrometry (AAS, OES-ICP)
Laboratory of organic elemental analysis
Laboratory of organic synthesis
Laboratory of fluorescence analysis
Laboratory of capillary isotachophoresis
Laboratory of electrochemical pre-concentration for atomic spectroscopy
Laboratory of chemometry
Laboratory of bioanalytical chemistry

III. TEACHING

A. Undergraduate Study

4th sSemester		
Analytical Chemistry I.	(2-2h)	Beinrohr,Krupčík,Labuda,Polonský,Vrábel
Laboratory Practice AC I.	(0-4 h)	Valachovičová
5th semester		
Analytical Chemistry II.	(2-2 h)	Bustin, Čakrt, Lehotay, Polonský
Laboratory Practice AC II.	(0-4 h)	Korgová
Testing and Quality Control	(1-1 h)	Čakrt, Tarapčík
6th semester		
Semestral Project		
7th semester		
Atomic Spectrometry	(2-0 h)	Beinrohr, Manová
Anal.Chem.of Complex Inorg. Mixtures	(2-0 h)	Oktavec, Polonský
Anal.Chem. of Complex Org. and Biological Mixtures	(2-0 h)	Brandšteterová, Skačáni
Lab.Practice I.	(0-1 h)	Matisová
Biosensors	(2-1 h)	Labuda, Mocák
Computer evaluation of anal. measurement	(2-0 h)	Májek, Mocák
8th semester		
Electrochemistry and Electro-analytical Chemistry	(2-1 h)	Bustin, Mocák
Techniques of Mixtures Separation	(2-2 h)	Matisová, Valigura
Analytical Separation of Compounds	(2-1 h)	Krupčík, Matisová
Lab.Practice II	(0-6 h)	Matisová

Nuclear Analytical Chemistry	(2-0 h)	Tarapčík, Májek
Trace Analysis and Microanalysis Methods	(2-0 h)	Beinrohr, Čakrt
Environmental Analytical Chemistry	(2-0 h)	Benická, Buzinkaiová
Automatisation of Analytical Chemistry	(2-0 h)	Rievaj, Dzurov
9th semester		
Bioanalytical Chemistry	(2-1 h)	Labuda, Mocák
Identification of Chemical Substances	(2-1 h)	Lehotay, Liptaj
Lab.Practice V.	(0-1 h)	Matisová
10th semester		
Laboratory of Diploma Work	(0-30 h)	
Selected Subjects		

IV. CURRENT RESEARCH PROJECTS

A. Development and Application of Direct Injection Assays for HPLC Analysis of Some Drugs and Toxic Compounds in Biological Samples (Éva 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. New Electroanalytical and Spectroscopic Systems for Ultra-trace and Speciation Analysis with Special Emphasis to Environmental and Clinical Problems. Optimization of Analytical Procedures (Dušan Bustin)

The project was oriented to the developement of analytical methods for ultratrace analysis of some biologically and environmentally important analytes. Flow - through galvanostatic chronopotentiometry has proved to become a calibrationless method for the determination of electrochemically active species. The method enables the measurement of extremely low (below µg/l) as well as medium and high analyte concentrations, e.g. over g/l. The method provides reliable results and owing to its robustness it can also be applied for unattended monitoring of toxic species in waters. Porous electrodes facilitates the electrochemical generation of hydrides for their consecutive determination by atomic spectroscopy. Flow-through coulometry was successfully applied for the measurement of metal layer thickness. Using new chemometrical and statistical procedures, the original multidimensional analytical data were transformed into ulticomponents, which enable a detailed characterization of clinical, environmental or food samples. Thus, it was possible to find the way how the original chemical and physical parameters affect the main diagnostic features or desired properties of the analyzed subject or object. New chemometrical procedures were utilized for obtaining the resolution of the overlapped voltammetric signals as well as the modelling of the signal shape and height under different conditions of an electrochemical experiment. The IUPAC- recommended method for determining the limits of detection and quantification was reformulated in a new, more comprehensive way. This way applies easy calcultation, however, it is still statistically perfect.

C. Development of selective methods for analysis of biologically active compounds by seleceted chromatographic and electroanalytical methods (Ján Krupčík)

This project intends to contribute to development of methods for: (a) Computer assisted optimization of chromatographic separation of mixtures of biologically active compounds in several columns coupled in series under multicolumn and multidimensional separation conditions, (b) Modeling of gas-chromatographic separation and explanation of chiral recognition of enantiomers in gas chromatography on chiral columns using knowledge and data obtained by theoretical chemistry (semiempirical and ”ab initio” methods) and by structure -retention data correlations for enantiomers of analyzed compounds. (c) Computer assisted signal processing for deconvolution together with an increase of signal to noise ratio of weak signals which are not resolved experimentally. Elaborated algorithms shall be exploited for processing of signals in gas chromatography and electroanalytical methods. Procedures for the determination of uncertainties and evaluation of signal errors shall be implemented in elaborated algorithms, too. (d) Analytical characterization and application of new types of chemical modifiers for electrodes, based on DNA, proteins and substances with the chiral properties.

D. Trace analysis of selected analytes in complex organic systems by combination of preconcentration techniques and capillary gas chromatography. (Eva Matisová)

The project is oriented to the development of methods for the trace analysis of selected, particularly volatile and semivolatile compounds in complex organic systems - in environmental matrix utilising preconcentration techniques in combination with capillary GC. A part of the project is devoted to the miniaturisation in analytical chemistry
- to the development of microextraction methods for the sample preparation, large volume injection in capillary GC. A part of the project is connected with the development of high speed GC
- devoted to trace analysis.

E. The development of modern method for teaching analytical chemistry supported by PC (Pavel Tarapčík)

The main drawbacks of traditional teaching method of analytical chemistry are: low individual activity of students in classroom; unified work rhythm not considering individual abilities of students; low variability; high cost of modern laboratory method. There is a possibility to overcame this drawbacks applying relatively individual work in front of PC. The main goals of this project are:
- to provide simulating software for various analytical methods, mainly in the area of chemical equilibria in analytical chemistry,
- to provide teaching procedures supported by simulating software, combining work methods in whole group by traditional method and in small groups (two-three students) with PC.

The spreadsheet „EXCEL“ is widely used calculating product with high poverty of graphics, statistics..., the supporting software will be made on this basis as the EXCEL sheets, partly with macros in VBA language.

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
Faculty Hospital, Bratislava
Food Research Institute, Bratislava
Hospital for Tuberculosis and Respiratory Diseases, Department of Clinical Chemistry, Kvetnica, 058 87 Poprad
Hospital of the Ministry of Defence, Division of Clinical Laboratories, 833 31 Bratislava
National Institute of Oncology, Bratislava
Pharmaceutical Faculty, Comenius University, Bratislava
Slovak Institute of Metrology, Karloveská 63, 842 55 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 Environmental Chemistry and Ekoanalytics, Faculty of Chemistry
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
Faculty of Material Engineering and Ceramics, The University of Mining and Metallurgy, Al. Mickiewicza 30, 30-059 Cracow, Poland
Institut de Physique Nucléaire, 91406 Orsay Cedex, France
Institute of Pharmaceutical Chemistry, University of Muenster, Germany
Nicholas Copernicus University, Toruň, 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	(D. Bustin)
Membership in the Editorial Board of the Slovak scientific journal *L*aboratory Diagnosis	(J. Mocák).
Slovak Chemical Society at Academy of Science, Group of Analytical Chemistry	(J. Krupčík)
Slovak Chemical Society at Academy of Science, Group of Analytical Chemistry	(J. Lehotay)
Slovak Chemical Society	(D. Bustin)
Slovak Society of Clinical Biochemistry. ISSN 1335-2644	(J.Mocák)

D. Membership in International Organisations and Societies

American Chemical Society	(D. Bustin)
European Commision, Science, Research and Developments	(J. Lehotay)
Chemical Analysis Editorial Board	(J. Lehotay)
IUPAC	(D. Bustin)
UICC (International Union Against Cancer), Geneva, Switzerland	(Eva Brandšteterová)

F. International Scientific Programmes :

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.

G. Visitors from Abroad

Prof. D.W.Armstrong	Department of Chemistry, Gilman Hall, Iowa State University, Ames, Iowa, USA, August 2001 (5 days)
Prof. Andrzej Bobrowski, DSc.	The University of Mining and Metallurgy, Cracow, Poland, March 2001 (10 days)
Prof.A.Manschreck	Department of Organic Chemistry, University of Regensburg, Germany
Prof.P.Sandra	Department of Organic Chemistry, University of Gent, Gent, Belgium, August 2001 (5 days)
Dr. Matija Strlič	The University of Ljubljana, Ljubljana, Slovenia, January-February 2001 (44 days)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

B. Balla	Prag, Czech Republic, May 31 2001 (1 day)
B. Balla	Austria, June 10-30 2001 (21 days)
E. Beinrohr	Gent, Belgium, February 10-13 2001 (4 days)
E. Beinrohr	Budapest, Hungary, February 271 2001 (1 day)
E. Beinrohr	Fridek – Mistek, Czech Republic, June 12 2001 (1day)
E. Beinrohr	Czech Republic, conference, November 13-14 2001 (2 days)
M. Bučková	Dortmund, Germany, February 15 – May 14 2001 (1 month)
M. Bučková	Dortmund, Germany, September 3 – November 2 2001 (2 months)
M. Čakrt	Fridek-Mistek,Czech republic, June 12 2001 (1day)
J. Ďungelová	Czech Republic, November 19 – December 19 2001 (1 month)
A. Ferancová	Czech Republic, January 5 – January 31 2001 (1 month)
A. Ferancová	Czech Republic, conference, June 19–23 2001 (5 days)
A. Ferancová	Prag, Czech Republic, July23 – August 18 2001 (1month)
S. Hrouzková	Sophia, Bulgary, June 6-10 2001 (5 days)
P. Korytár	Deutchland, January 1 December 31 2001 (12 months)
P. Kotianová	Wien, Austria, January 29 2001 (1 day)
P. Kotianová	Wien, Austria, January 31 2001 (1 day)
P. Kotianová	Wien, Austria, March 1 2001 (1 day)
P. Kotianová	Las Vegas, USA, conference, May 18-28 2001 (11 days)
P. Kotianová	Wien, Austria, May 4 2001 (1 day)
P. Kotianová	Wien, Austria, June 29 2001 (1 day)
P. Kotianová	Wien, Austria, July 31 2001 (1 day)
J. Krupčík	Wien, Austria, conference, January 23-24 2001 (2 days)
J. Krupčík	Belgium, coneference, May 27 – June 2 2001 (7 days)
J. Krupčík	USA, conference, July 10–23 2001 (14 days)
J. Krupčík	Bruxelless, Belgium, conference, September 17–22 2001 (7 days)
J. Krupčík	Deutchland, conference, October 7–10 2001 (4 days)
J. Krupčík	Bruxelless, Belgium, November 14–16 2001 (3 days)
J. Krupčík	Paris, France, conference, December 3–6 2001 (4 days)
J. Labuda	Czech Republic, June 19–23 2001 (5 days)
J. Labuda	Deutchland, September 29 – October 5 2001 (8 days)
J. Labuda	Czech Republic, November 1–2 2001 (2 days)
J. Labuda	Czech Republic, November 14–16 2001 (3 days)
J. Labuda	Czech Republic, November 27–December 1 2001 (5 days)
J. Lehotay	Wien, Austria, conference, January 23-24 2001 (2 days)
J. Lehotay	Czech Republic, conference, May 22–25 2001 (4 days)
J. Lehotay,	Danmark, conference, June 4–7 2001 (4 days)
J. Lehotay	Czech Republic, conference, June 12–14 2001 (3 days)
J. Lehotay	USA, conference, July 10–23 2001 (14 days)
J. Lehotay	Siofok, Hungary, September 1–5 2001 (5 days)
J. Lehotay	Poland, September 19–21 2001 (3 days)
J. Lehotay	Deutchland, conference, October 7–10 2001 (4 days)
J. Lehotay	Czech Republic, October 30 2001 (1 day)
J. Lehotay	Belgium, November 14–16 2001 (3 days)
E. Matisová	Spain, conference, May 9-18 2001 (10 days)
E. Matisová	Wien, Austria, June 29 2001 (1 day)
E. Matisová	Deutchland, conference, October 7-10 2001 (4 days)
J. Mocák	Brno, Czech Republic, May 23-24 2001 (2 days)
J. Mocák	Graz, Austria, June 15–30 2001 (15 days)
J. Mocák	Poland, September 14–21 2001 (8 days)
P. Oswald	Gent, Belgium, February 6 - July 5 2001 (5 months)
I. Špánik	USA, August 1 – December 31 2001 (5 months)
A. Žiaková	Pardubice, Czech Republic, June 18-19 2001 (2days)

VI. THESES AND DISSERTATIONS

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

Adamcová Z.:	HPLC ultratrace analysis of some nitroaromatics compounds in soil samples (K. Hroboňová)
Baranová V.:	Analysis using DNA biosensor (J. Labuda)
Blahová. E.:	The study of sorbents of new generation in sample-handling before HPLC analysis of morphine and its metabolites (E. Brandšteterová)
Čonka K.:	Extraction of persistent organic compounds from biological samples using the methods of SPE (A.Kočan)
Gašpieriková K.:	Study of the sorption of some cations on the teflon surface (P. Tarapčík)
Heldiová E.:	In – electrode coulometric titrations: determination of some metals (E. Beinrohr)

Hrašková L.:	Preparation and application of DNA modified electrode. (M. Vaníčková)
Krascsenits Z.:	Determination of fluorides in waters (M. Čakrt)
Krištof J:	Detailed twodimensional and multidimensional data analysis (J.Mocák)
Malychová Z.:	Isotachophoretic determination of citric and isocitric acid (J. Sádecká)
Martinkovičová K.:	In – electrode coulometric titrations: determination of acids and bases (E.Beinrohr)
Rexová D.:	Application of microelectrodes in voltammetric analysis (M. Rievaj)
Rojkovičová T.:	The HPLC separation of some enantiomers using macromolecules of antibiotics as stationary phase (J. Lehotay)
Senková Z.:	Determination of antidepresive drugs and polutants using electrochemical biosensors (E. Korgová)
Skaličanová A.:	Electroanalytical application of interdigitated microelectrodes arrays (D. Bustin)
Slaná I.:	Determination of phosphates in waters by flow –trough coulometry (A. Manová)
Šimeková M.:	Fast gas chromatography and its utilisation in the analysis of organic compounds (E. Matisová)
Škrabáková Z.:	Optimalization of the Determination of High Boiling Petroleum Hydrocarbons by UV and IR Spectrometry (D. Oktavec)
Štorcel M.:	Possibility of determination some chosen drugs by capillary isotachophoresis (T. Buzinkaiová)
Tóthová A.:	Crystal structure and biological activity of 1,4 dihydropyridine derivates (V.Vrábel)
Verčík T.:	The analysis of persistent organic contaminants in food products (E. Benická)
Žabka M.:	Optimization of separation of enantiomers by dual column capillary gas chromatography in chiral columns (J. Krupčík)

B. Dissertations (PhD)

Ferancová A.:	Development and utilization of sensors based on β - cyclodextrin modified electrodes (J. Labuda)
Hercegová A.:	Utilization of some electromigrating methods in pharmacy ITP determination of some selected nonsteroidal antirheumatics in body fluids and pharmaceutical preparations (J. Polonský)

VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

[1]* Balla B., Mocák J., Pivovarníková H., Balla, J., Kavková D., Varmusová E.: Application of Multivariate Analysis in Laboratory Medicine. Clin. Chem. Lab. Sci. 39, 285 (2001)

[2]* Beinrohr E.: Flow-through coulometry as a calibrationless method in inorganic trace analysis. Accred. Qual. Assur., 6, 321-324 (2001)

[3]* Blahová E., Bovanová Ľ.,Brandšteterová E.:Direct HPLC analysis of trimethoprim in milk. J. Liq. Chrom. & Rel. Technol., 24 19, 3027-3035 (2001)

[4]* Borošová D., Mocák J., Beinrohr E., Bobrowski A.: Determination of arsenic in water quality assurance and calculation of metrological characteristics. Centr. Europ. J. Public Health 8, 196-198 (2001)

[5]* Brandšteterová E., Endresz E., Blaschke G.: Chiral separation of verapamil and some of its metabolites by HPLC and CE. Pharmazie 56, 7, 536-541 (2001)

[6] Buzinkaiová T.: Úlohy z chemickej praxe. Chemické rozhľady 4, ISSN 1335-8391 (2001)

[7]* Buzinkaiová T., Polonský J., Skačáni I.: Determination of fendiline and gallopamil by capillary isotachophoresis. J. Chromatography B 757, 215 (2001)

[8] Čakrt M.: Entries in: Encyclopaedia Beliana. 2. zväzok, Bell – Czy, EÚ SAV & Veda, Bratislava, ISBN 80–224–0671–6 (2001)

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C. Books and Textbooks

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D. Patents

E. PC Programmes

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DEPARTMENT OF BIOCHEMICAL TECHNOLOGY

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I. STAFF

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Technical Staff:
Vlasta Sládková, Jaroslava Telgárska

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory for the design of bioactive compounds
Laboratory for biotechnological production of organic acids and fine chemicals
Laboratory for study, isolation and transformation of microbial lipids
Laboratory of secondary metabolites
Laboratory of wine microbiology and oenology
Laboratory of bioengineering
Laboratory for solid-state fermentations
Laboratory of yeast biotechnology
Laboratory for microbial degradation of xenobiotics
Laboratory of brewery technology

III. TEACHING

A. Undergraduate Study

3rd semester (autumn)		
Biochemistry and Microbiology	(2-1-0 h)	Šturdík
5th semester (autumn)		
Principles in Biotechnology	(2-0-0 h)	Malík
Xenobiochemistry	(2-0-0 h)	Dercová
6th semester (spring)		
Biophysical Chemistry	(2-2-0 h)	Valko, Voštiar
Semestral Work	(0-0-4 h)	Dömény, Čertík, Hronská, Navrátil, Šmogrovičová, Šturdík, Šturdíková
7th semester (autumn)		
Enzymology and Enzyme Engineering	(2-2-0 h)	Augustín, Hronská
Biochemical and Biotechnological Informations	(1-2-0 h)	Šmogrovičová, Dömény, Navrátil
Technical Microbiology	(2-0-0 h)	Šturdík
Biosynthesis and Transformation of Metabolites	(2-0-0 h)	Rosenberg
Special Laboratory	(0-0-3-4 h)	Čertík, Dömény, Hronská, Rosenberg, Šmogrovičová, Šturdík, Šturdíková
8th semester (spring)		
Bioanalytical Methods	(2-1-0 h)	Šajbidor
Laboratory of Bioanalytical Methods	(0-0-2 h)	Hronská, Sláviková, Navrátil, Tkáč, Zigová
Bioengineering	(2-2-0 h)	Polakovič, Slugeň
Pharmaceutical Biotechnologies	(2-0-1 h)	Šturdíková

Ecochemical Biotechnologies	(2-0-1 h)	Rosenberg, Dercová
Special Laboratory	(0-0-6 h)	Čertík, Dercová, Dömény, Hronská, Navrátil, Rosenberg, Šmogrovičová, Šturdík, Šturdíková

9th semester (autumn)

Food Biotechnology	(2-0-1 h)	Malík, Slugeň
Malting and Brewing	(2-0-1 h)	Šmogrovičová, Dömény
Chemistry and Microbiology of Wine	(2-0-1 h)	Malík, Volleková
Microbial Biomass and Distillery	(2-0-1 h)	Šmogrovičová, Augustín
Biochemical and Genetical Regulations	(2-0-1 h)	Šturdík, Dömény
Special Laboratory	(0-0-6 h)	Čertík, Dercová, Dömény, Krištofíková, Malík, Navrátil, Rosenberg, Slugeň, Šmogrovičová, Šturdík, Šturdíková

10th semester (spring)
Diploma Work

B. PhD Study

Biochemical Technology	(3 h)	Augustín

IV. CURRENT RESEARCH PROJECTS

A. Application of microorganisms in food industry and agriculture – biotechnological aspects. (Ján Šajbidor)

Yeasts (Saccharomyces cerevisiae) important for the production of Tokay type wines were isolated. We have isolated ethanol and osmo- tolerant strain Saccharomyces cerevisiae suitable for very high gravity wort fermentation, too. The strain was immobilised on a new type of hydrogele and it was successfully tested in large-scale pilot experiments. Patented process of non-alcoholic beer production based on wort fermentation by mutant strains with defective enzymes in Krebs cycle can be assumed as an original result of our research. Contaminated soil near former operation for polychlorinated biphenyl production - Chemko Strážske - was a source for isolation of Alcaligenes xylosoxid and Pseudomonas stutzeri bacteria strains useful for bioremediation technologies. Valuable results were presented in papers deals with relationship between structure of xenobiotics and their biodegradability. A new isolate identified as Nocardia species with high activity of cis-epoxysuccinat dehydrogenase was developed for food industry. This patented strain is deposit in the Czech Collecion of Microorganisms (CCM). We suppose its application in tartaric acid production by fermentation process. This problem was solved in cooperationin with BCS Engineering Ltd. Activity of fumarase in our producer Dipodascus magnusii - enzyme for malic acid production by fermentation of sugar medium - have been approximately ten times higher in comparison with earlier published data. We suppose application of this solution in industrial production of malic acid similary as former mentioned result. Monitoring of biotechnology processe via application of biosensors was in the focus of our interest, too. New types of biosensors based on electrochemistry or microcalorimetry principles for monitoring of ethanol production from sucrose, glucose, lactose or biotransformation of glycerol to dihydroxyacetone was published in scientific journals. Individual part of our research is overproduction of secondary metabolites for food industry and pharmacy. We have isolated new metabolite of Penicillium funiculosum called OR-1 having inhibition effect against proteinase trypsin. This fact can be used in pharmacy and medicine. New trends in fortification of cereals with essential fatty acids via solid-state fermentations (for human nutrition or animal feed) were published. Very interesting result were obtained during the study of lipogenesis regulation in filamentous fungi.

B. Immobilized technologies: Implementation of new immobilization techniques/technologies into microbial and plant fermentations and biotransformations and their industrial applications (Ernest Šturdík)

The project aims to integrate up-to-date knowledge of material engineering of supports (new hydrogels and composite materials for capsule cell immobilization, new methods of exact measuring of mechanical properties of hydrogel supports), immobilization methods (new gelation techniques), methods of preparation of immobilized cells with uniform size and shape in volumes needed for industrial application, knowledge of effect of immobilization process to physiological state and metabolism of cells and microbial and plant fermentation biotechnologies, biotransformations and xenobiotics biodegradations. The most perspective are: fermentation of starch hydrolysates to ethanol, primary and secondary beer fermentation, tensid-like xenobiotics degradation.

One of the main aims of the project has been to test the selected variety of hydrogels and other composite materials for cell immobilization by techniques of entrapment and encapsulation. These should be applied in fermentation technologies applicable in industrial praxis. Yeast cells were used when immobilized in hydrogels (alginate, pectate, carrageenan) and other synthetic polymers (polyvinyl alcohol) and tested in fermentation processes under batch, semi-continuous and continuous conditions. Electrochemical and microcalorimetric biosensors have been constructed and successfully applied to monitor the processes.

V. COOPERATION

A. Cooperation in Slovakia:

VÚL Modra
Institute of Drug Research, Modra
Soil Science and Conservation Research Institute, Bratislava
Institute of Preventive and Clinical Medicine, Bratislava
Faculty of Pharmacy, Comenius University, Bratislava
Institute of Experimental Pharmacology, Slovak Academy of Science, Bratislava
Institute of Ecobiology, Slovak Academy of Science, Bratislava

Institute of Chemistry, Slovak Academy of Science, Bratislava
Institute of Experimental Endocrinology, Slovak Academy of Science, Bratislava
University Cyril and Metods, Trnava
Likospol, Bratislava
Allcop, Bratislava
Research Institute of Viticulture and Oenology, Bratislava
Brewery, S.t.e.i.n., a.s., Bratislava
Brewery, Codecon, Svätý Jur
Wine Establishments in Bratislava-Rača, Pezinok, Sereď, Nitra, Tibava
Slovakofarma, Hlohovec
Biotika, Slovenská Ľupča
Topvar Brewery, Topoľčany
Codecon, Sv.Jur
Biopo, Leopoldov
Research Institute of Rheumatic Diseases, Piešťany
Piešťany spa
Alfa Bio, Banská Bystrica
VÚPOP Bratislava
Department of Biochemistry, University of Veterinary Medicine, Košice

B. International Cooperation:

North Dakota State University, College of Pharmacy, Department of Pharmaceutical Sciences, Fargo, North Dakota, USA
- Subcellular pharmacokinetics; Prediction of the fate of xenobiotics in the environment

UFZ Centre for Environmental Research, Department of Chemical Ecotoxicology, Leipzig, Germany
- Degradation of pollutants in sediments

BCS Engineering, Brno, Czech Republic
–Bioconversion of maleinanhydride to organic acids

Mega a.s., Stráž pod Rálskem, Czech Republic
- Encapsulation of microorganisms to PVA Gel

Office International de la Vigne et du Vin, Paris, France
–Evaluation of wine

Agricultural University, Brno, Czech Republic
–Microbiology of wine fermentation

Wine Establishment, Znojmo - Šatov, Czech Republic
–Chemistry of red wine

Kyoto University, Department of Agricultural Chemistry, Kyoto, Japan
–Overproduction and regulation of microbial polyunsaturated fatty acids

National Institute of Advanced Science and Technology, Tsukuba, Japan
-Biochemistry and overproduction of microbial polyunsaturated fatty acids

Office International de la Vigne et du Vin, Paris, France
–In Wine Tasting Commission

Pure and Applied Biochemistry, University of Lund, Sweden
–Enzyme thermistor applications in analysis

Division of Biotechnology IFM, Linköpings Universitet Linköping, Sweden
-Development and application of biosensors

C. Membership in Domestic Organizations and Societies:

Slovak Society of Biotechnology, Bratislava (J.Augustín, K.Dercová, D.Slugeň)
Slovak Society for Biochemistry and Molecular Biology, Bratislava (J.Augustín)
Slovak Society for Agriculture, Forestry, Food and Veterinary Sciences, Bratislava (J.Šajbidor, D.Slugeň)

D. Membership in International Organizations and Societies:

Editorial boards of the journal Kvasný průmysl, Prague, Czech Republic (F.Malík, D.Šmogrovičová)
ECE Governments on Science and Technology of The United Nations, Geneva, Switzerland (J.Augustín)
Member of the EBC Brewing Science Group, Zoeterwoude, The Netherlands (D.Šmogrovičová)
Czecho-Slovak Society of Microbiology, Bratislava (J.Augustín, K.Dercová, D.Haľama, D.Šmogrovičová, M.Šturdíková)
SETAC-Society for environmental Toxicology and Chemistry (R.Tandlich)

E. CEEPUS PROGRAMME

Number H-0115, Green Network in Central Europe (Šmogrovičová D., Dömény Z.) Coordinator: Szent Istvan University, Buda Campus (University of Horticulture and Food Industry)
University of Agriculture, Foresty and Renewable Natural Resources, Vienna
Mendel University of Agriculture and Foresty, Brno
University of Agriculture in Wroczlaw
University of Agriculture in Nitra
Josip Juraj Strossmayer University of Osijek
Slovak University of Technology in Bratislava
University of Ljubljana

G. Visitors from Abroad:

Assoc.Prof.J.Čepička University of Chemical Technology, Prague, Czech Republic, December 2000 (2 days)

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

M. Čertík	Tomáškovy dny, Brno, Czech Republik, June 6-8, 2001 3 days
K. Dercová	Biodegradation, Seč u Chrudimi, Czech Republic, March 7-8, 2001 2 days
K. Dercová	ECB, 10th European Congress on Biotechnology, Madrid, Spain, July 7-11, 2001 5 days
Z. Dömény	CEEPUS, Intensive Course Wine Technology and Biotechnology, Budapest, Hungary, April 22-29, 2001 7 days
Z. Dömény	19th Malting and Brewing Days, October 24-26, 2001, Brno, Czech Republic 3 days
F. Malík	CEEPUS, Intensive Course Wine Technology and Biotechnology, Budapest, Hungary, April 22-29, 2001 7 days
F. Malík	Vinalies Paris, France, February 21-26, 2001, 6 days
F. Malík	II. Int. Winw Competition Thessaloniki, Greece, February-March 27-3, 2001, 5 days
F. Malík	47. Vino Ljubljana, Slovenia, March 22-27, 2001, 6 days
F. Malík	Selection Mondiales Brussel, Belgium, April 7-11, 2001, 5 days
F. Malík	Prix Zarcillo, Valladolid, Spain, June 4-8, 2001, 5 days
F. Malík	10th Vinoforum Prag, Czech Republic, July 11-14, 2001, 4 days
F. Malík	Mundus Vini, Neustadt, Germany, September 7-9, 2001, 4 days
F. Malík	26th World Congress of Wine, Adelaide, Australia, October 9-18, 2001, 10 days
M. Navrátil	19th Malting and Brewing Days, Brno, Czech Republic, October 24-26, 2001, 3 days
M. Navrátil	Linköping University, Sweden, August 13-15, 2001, 3 days
H. Hronská	Tomáškovy dny, Brno, Czech Republik, June 6-8, 2001,3 days
M. Rosenberg	CPH 2000, Milano, Italia, November 7-11, 2001, 4 days,
M. Rosenberg	Vitafood, Geneva, Switzerland, April 24-27, 2001, 4 days
D. Slugeň	CEEPUS, Intensive Course Wine Technology and Biotechnology, Budapest, April 22-29, 2001, 7 days
D. Šmogrovičová	EBC Congress, Budapest, Hungary, May 12-18, 2001, 7 days,
D. Šmogrovičová	CEEPUS, J.J. Strossmayer University in Osijek, Osijek Croatia, June 12-22, 2001, 10 days
D. Šmogrovičová	19th Malting and Brewing Days, Brno, Czech Republic, October 24-26, 2001, 3 days
J. Zigová	Lausanne EPFL, Technical University, Switzerland, 2001, 1 year
I. Voštiar	Study state, Linköping University, Sweden, 1.10. 2001- 1.10.2002- 1 year
I. Voštiar	Tomáškovy dny, Brno, Czech Republik, June 6-8, 2001, 3 days
L. Sláviková	Tomáškovy dny, Brno, Czech Republik, June 6-8, 2001, 3 days
R. Tandlich	Study state, North Dakota State University, North Dakota, USA, 2001, 1 year
M. Hazlingerová	King Technical Institute, Stokholm, Sweden 2000-2001 Sept.-Jan. 5 month
D. Kóňová	Dánsko ECCO SkoA/5, Bredebro – International Shoe Company, Jan.-Feb.2001 (Chemical Engineering Trainee, ECCO´s Group Quality Department)
M. Rebroš	University of Luton, Great Britain, 2001
M. Pavlíková	(CEEPUS, J.J. Strossmayer University in Osijek, Marz 2001
K. Volleková	(Szent István University, Faculty of Food Sciences, Budapest)CEEPUS, Marec 2001
B. Raczová	(Szent István University, Faculty of Food Sciences, Budapest, CEEPUS, Marec 2001

VI. THESES AND DISSERTATIONS

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

Baráthová Z.:	Optimisation of ethanol fermentation with immobilised yeasts. (E. Šturdík)
Brnáková Z.:	Azaphilone pigment production and isolation by the Monascus strains. (D. Slugeň)
Bugárová L.:	Relationship between polyols formation and lipid biosynthesis in osmotolerant yeasts.(M. Čertík)
Gajdošíková E.:	Enzymatic hydrolysis of starch substrates for ethanol fermentation.(E. Šturdík)
Hazlingerová M.:	Screening of compounds of natural origin with antiprotease activity. (T. Maliar)
Hranická S.:	Xenobiotics degradation by microorganisms. (J. Augustín)

Jurčíková Z.:	Microbial production of erythritol by the yeasts of the genus Aureobasidium and Trichosporonoides. (M. Rosenberg)
Juršíková P.:	Protective role of polysaccharides in yeast cells for toxic effect of Cd^{2+} and Ni^{2+} ions. (M. Čertík)
Klimko J.:	Biotechnological aspects of secondary wine fermentation. (F. Malík)
Kóňová D.:	Production of yeast's beer with the microelements. (Z. Dömény)
Matušíková M.:	Preparation of tartaric acid by the immobilised cells Nocardia sp. CCM 4837/A. (H. Hronská)
Michalisková L.:	Primary biodegradation of xenobiotics. (J. Augustín)
Mikušová L.:	Analysis of volatile products of Italian Riesling. (J. Krupčík)
Monošíková M.:	Continuous production of beverages based on honey by immobilised yeast. (M. Navrátil)
Mrňák R.:	Biosensors for determination of glucose with immobilised glucose oxidase. (J. Tkáč)
Pavlíková M.:	Characterization of beer produced from very high gravity substrates using immobilised yeasts. (D. Šmogrovičová)
Pekarová T.:	The influence of the immobilisation on yeast metabolism and fermentation in stress conditions.(D. Šmogrovičová)
Pigoš M.:	Fungal inhibitors of the patho-physiological proteinases. (M. Šturdíková)
Ráczová B.:	Production of beverages with the help promoting effect. (Z. Dömény)
Salugová D.:	Microbial degradation of chlorinated phenols. (K. Dercová)
Špániková S.:	Effect of detergents on growth and lipid composition in Trichoderman viride. (M. Čertík)
Tybitanclová K.:	Production of the cytotoxic metabolites by endophytic micromycetes. (M. Šturdíková)
Valach M.:	Biosensors for determination of ethanol with use of alcohol dehydrogenase. (J. Tkáč)
Vargová K.:	Development of fermented juices by yeast with defect in TCA cycle. (M. Navrátil)
Volleková K.:	Yeast strains of Slovak vine region Tokay. (F. Malík)

B. Dissertations (PhD):

Navrátil M.:	Innovations of fermentation processes using microorganisms immobilized in hydrogels.

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Bugan S.G., Šmogrovičová D., Dömény Z., Stopka J., Schlosser Š.: Využitie „crossflow" mikrofiltrácie v pivovarníctve. Application of the crossflow microfiltration in the brewing industry (in Slovak). Kvasny Prum. 47 (4), 97-101, (2001)

[2] Čertík M.: Nihonshu - Japonské saké. 1. časť: História. Vinohrad a Víno, 1, 2001, 13-15. (Nihonshu – Japanese sake. 1. part: History (in Slovak). Vinohrad a Víno, 1, 13-15 , 2001

[3] Čertík M.: Nihonshu - Japonské saké. 2. časť: Tajomstvo premeny ryže a vody na saké. Nihonshu – Japanese sake. 2. part: Mystery of rice and water changing to sake (in Slovak). Vinič a Víno, 1(3), 61-63 , 2001

[4] Furdíková K., Vollek V., Malík F.: Kvasinky slovenskej tokajskej vinohradníckej oblasti. 1. časť: Izolácia a charakterizácia potenciálnych kmeňov. Yeasts of Slovak Tokay Wine Region. Part I. Isolation and characterisation of potencial strains (in Slovak). Vinič a víno 1, No 6, 2,3,6 (2001)

[5]* Horváthová V., Janeček Š., Šturdík E.: Amylolytic enzymes: Molecular aspects of their properties. General Physiology and Biophysics 20, 7-32 (2001)

[6] Horváthová V., Janeček Š., Šturdík E.: Štruktúra, stabilizácia a využitie amyláz. Nova Biotechnologica 1, 97-125 (2001)

[7] Horváthová V., Šturdík E., Janeček Š.: Stabilita, stabilizácia a aplikácia amyláz. Stability, stabilization and application of amylases (in Slovak). Bullettin of Food Research 40, 1-20 (2001)

[8] Kováčová S., Šturdík E.: Bioremediácia rádionuklidmi znečistených oblastí. Nova Biotechnologica 1, 51-65 (2001)

[9]* Lešová K., Šturdíková M., Proksa B., Pigoš M., Liptaj T.: OR-1-a mixture of esters of glyceric acid produced by Penicillium funiculosum and its antitrypsin activity. Folia Microbiol. 46 (1), 21-23 (2001)

[10] Malík F.: Imobilizované vínne kvasinky. Immobilized wine yeasts (in Slovak). Kvasny Prum. 47,(9), 242 – 243, (2001)

[11]* Miková H., Rosenberg M., Krištofíková Ľ: Production of dicarboxylic acids important for technology. Chemical papers 95, 28-33, (2001)

[12]* Navrátil M., Šturdík E.: Batch and continuous mead production with pectate immobilized, ethanol-tolerant yeast. Biotechnology Letters 23, 977-982 (2001)

[13]* Navrátil M., Švitel J., Tkáč J., Danielsson B., Šturdík E.: Monitoring of the bioconversion of glycerol to dihydroxyacetone with immobilized Gluconobacter oxydans cells using thermometric flow injection analysis. Process Biochemistry 11, 7-14 (2001)

[14] Oravcová K., Kaclíková E., Šturdík E.: Metódy na rýchle odlíšenie Listeria monocytogenes od ostatných baktérií. Nova Biotechnologica 1, 126-135 (2001)

[15] Pátková J., Šmogrovičová D., Dömény Z., Bafrncová P.: Adaptácia voľných a imobilizovaných pivovarských kvasiniek pri skvasovaní vysoko koncentrovaných mladín. Adaptation of free and immobilized brewery yeast during attenuation of highly concentrated hopped worts (in Slovak). Kvasny Prum. 47 (1), 7-10, (2001)

[16] Slugeň D.: Slovenské vína 2001 - bol to dobrý rok. Slovak wines 2001 - it was a good year (in Slovak). Vinič a víno 1, 6, 121 – 122 (2001)

[17] Slugeň D.: Technológia a biotechnológia vína v strednej Európe. Wine technology and biotechnology in the Middle Europe (in Slovak). Vinič a víno 1, 3, add. 6 (2001)
[18] Slugeň D.: Tisícročné víno. Thousand years wine (in Slovak). Kvasny Prum. 42, 9, 270 (2001)
[19] Slugeň D.: Tokajské zlaté inžinierstvo. Tokay gold engineering (in Slovak). Vinič a víno 1, 5, add. 2,3,6 (2001)
[20] Slugeň D.: V kraji červených vín najviac chutilo biele. In the landscape of red wines best tastes the white one (in Slovak). Vinič a víno, 1,4, add. 3,6,7 (2001)
[21] Slugeň D.: Vi(n)zážisti. Wine imagemakers (in Slovak). Vinič a víno 1, 2, 25 – 26 (2001)
[22]* Šmogrovičová D., Dömény Z., Švitel J.: Modelling of saccharide utilization in primary beer fermentation with yeast immobilized in calcium alginate. Applied Biochemistry and Biotechnology. 94 (1) 147-158, (2001)
[23]* Tandlich R., Brežná B., Dercová K.: The effect of terpenes on the biodegradation of polychlorinated biphenyls by Pseudomonas stutzeri. Chemosphere 44, 1547-1555 (2001)
[24]* Tkáč J., Navrátil M., Šturdík E., Gemeiner P.: Monitoring of dihydroxyacetone production during oxidation of glycerol by immobilized Gluconobacter oxydans cells with an enzyme thermistor. Enzyme and Microbial Technology 28, 383-388 (2001)
[25]* Tkáč J., Voštiar I., Šturdík E., Gemeiner P., Mastihuba V. and Annus J.:: Fructose biosensor based on D-fructose dehydrogenase immobilised on ferrocene embedded cellulose acetate membrane. Analytica Chimica Acta 439, 39-46 (2001)

B. Conferences (*international conferences)

[1]* Čertík M., Breierová E., Juršíková P., Šajbidor J.: Lipid structural changes of yeasts grown under heavy metal presence. Proceedings of XXIX. International Conference of Yeasts, Smolenice, 2001, p. 68
[2]* Čertík M., Breierová E., Šimončíková P., Šajbidor J.: Characterization of yeast lipids affected by salt stress. Proceedings of XXIX. International Conference of Yeasts, Smolenice, 2001, p. 67
[3]* Čertík M., Bugárová L., Krištofíková Ľ., Rosenberg M.: Štruktúrne zmeny lipidov u kvasiniek tvoriacich polyoly. Structural changes of lipids from yeasts producing polyols (in Slovak). Proceedings of 22. International Congress of the Czechoslovak Society for Microbiology "Health and Microorganisms", Košice, 2001, p. 135
[4]* Čertík M.: Využitie chromatografických metód pri sledovaní mikrobiálnej syntézy mastných kyselín. The use of chromatographic methods for determination of microbial fatty acids synthesis (In Slovak). Proceedings of XIII. International Conference LABORALIM, Banská Bystrica, 2001, p. 87-90 (ISBN 80-227-1524-7)
[5]* Čertík M.: Extrakcie mikrobiálnych lipidov klasickými metódami a superkritickým CO_2. Extraction of microbial lipids by clasical methods and supercritical CO_2 (In Slovak). Proceedings of XIII. International Conference LABORALIM, Banská Bystrica, 2001, p. 268-276) (ISBN 80-227-1524-7)
[6]* Čertík M.: Physiological regulation of lipid biosynthesis in yeasts. Proceedings of XXIX. International Conference of Yeasts, Smolenice, 2001, p. 22
[7]* Dercová K.: Biodegradácia PCB a možnosti zvyšovania jej účinnosti. Biodegradation of PCBs and some possibilities of its enhancement (in Slovak). In:Book of Abstracts Biodegradation conference V. (O. Halousková, ed.), Seč, Czech.Republic, March 7.-8. 2001 p. 37-43.
[8]* Dercová K.: Biodegradation of PCBs and induction of their cometabolism. 10th European Congress on Biotechnology. In: Abstract Book, ENV 21, Madrid (Spain), July 8-11, 2001, p. 126
[9]* Dercová K., Kyseľová Z., Salugová D., Barančíková G.: Biodegradácia pentachlórfenolu (PCP). Biodegradation of pentachlorophenol (PCP) (in Slovak). 22nd International Congress of the Czechoslovak Society for Microbiology Health and Microorganisms. In: Book of Abstracts, Košice 2001, p. 141
[10]* Dercová K., Tandlich R., Brežná B.: Vplyv terpénov na biodegradáciu polychlórovaných bifenylov (PCB). The effect of terpenes on biodegradation of PCBs (in Slovak). 22nd International Congress of the Czechoslovak Society for Microbiology Health and Microorganisms. In: Book of Abstracts, Košice 2001, p.39
[11]* Dömény Z., Ráczová B., Navrátil M., Šmogrovičová D., Šturdík E.: Vplyv teploty fermentácie na tvorbu senzoricky aktívnych látok pri výrobe medoviny pomocou imobilizovaných buniek. The influence of fermentation temperature on sensoric products formation during fermented honey production using immobilized cells (in Slovak). XIII. International Conference LABORALIM. In: Abstracts book Laboralim 2001, Banská Bystrica, February 7-8, 2001 p. 95-98
[12]* Dömény Z., Šmogrovičová D.: Degradácia α-acetolaktátu imobilizovanou α-acetolaktátdekarboxylázou. α-Acetolactate degradation using immobilised α-acetolactate decarboxylase (in Slovak). 19th Day of brewing and malting. In: Abstracts of lectures and posters Brno, October 25-26, 2001, p. 13.
[13]* Horváthová V., Šturdík E.: Utilisation of amylolytic enzymes for preparation of starch hydrolyzates for ethanol fermentation, Structure and Stability of Biomacromolecules SSB 2001. In: Book of Abstracts, Košice, September 12-14. 2001, p. 95-96
[14]* Horváthová V., Navrátil M., Šturdík E.: Hydrolysis of starch substrates by amylases before fermentation. The First Symposium on the Alpha-Amylase Family. In: Book of Abstracts, Smolenice, September 30. - October 4. 2001, p. 116
[15]* Hronská H., Rosenberg M., Krištofíková Ľ.: Maleic acid anhydride as biotechnological material. XIII. International conference about analytical methods in food industry LABORALIM 2001. In: Book of Abstracts Laboralim 2001, Banská Bystrica , February 7.-8. 2001, p. 114-116.
[16]* Hronská H., Rosenberg M., Krištofíková Ľ.: The use of yeasts for malic acid production. 22nd Congress of Czechoslovak Society for Microbiology with international participation on the topic of "Health and Microorganisms". In: Book of Abstracts Košice, Slovak republic, September 5.-9. 2001, p. 176.
[17]* Hronská H., Rosenberg M., Krištofíková Ľ: Microbial production of tartaric acid. Conference of the Young Microbiologists, Tomáškovy dny 2001. In: Book of Abstracts Brno, Czech Republic, June 6.-8. 2001, p. 13.
[18] Koreňová A., Uher M., Milovník P., Šturdíková M.: Inactivation of the etastase activity by some derivatives of kojic acid. Abstract Book of the 53th Congress of Chemical Societes, Banská Bystrica 2001, p. 196-197 (ISBN 80-89029-24-8)
[19]* Kováčová S., Lesný J., Šturdík E.: Biotechnologies in nuclear waste management, Proceedings of II. Conference of Environmental Science, Széchenyi István University. In: Book of Abstracts, Györ, Hungary, p. 95-104

[20]* Krištofíková Ľ., Rosenberg M., Hronská H.: Production of erythritol by various species of osmophilic yeasts. 22nd Congress of Czechoslovak Society for Microbiology with international participation on the topic of "Health and Microorganisms". In: Book of Abstracts Košice, Slovak republic, September 5.-9. 2001, p. 219.

[21]* Krištofíková Ľ., Rosenberg M., Hronská H.: Formation of polyunsaturated fatty acids during lactic acid production by Rhizopus sp. XIII. International conference about analytical methods in food industry LABORALIM 2001. In: Book of Abstracts Laboralim 2001, Banská Bystrica , February 7.- 8. 2001, p. 152-155.
[22] Malík F., Slugeň D.: Víno – naša hrdosť? Wine – our pride? (in Slovak). Special wine seminar Pezinok April 20, 2001
[23] Malík D., Slugeň D.: Víno - naša hrdosť? Wine - our pride? (in Slovak) Poceedings Common seminary slovak and autrian experts to visual marking of Small Carpatian wine pathway association, Pezinok, April 20. 2001, p. 4 - 6.
[24] Malík F., 2001: Kam kráčaš víno tretieho tisícročia. Quo vadis wine of 3rd millenium? (in Slovak). Conference BASF, Slovensko, Modra, February 13, 2001
[25] Malík F.: Kam kráčaš víno 3. tisíciletí. Quo vadis wine of 3rd millenium? (in Slovak) Wine seminar, Moravín, Valtice, January 1, 2001
[26] Malík F.: Kategorizácia vín a systém ich hodnotenia na svetových konkurzoch vín. Categories of wine and system of evaluation on world contest of wine (in Slovak). Valtice, Czech.Republic, November 7, 2001
[27] Malík F.: Slovenské vína. Večer slovenských vín. Slovak wines. Evening of slovak wines (in Slovak). Brno, Czech Republic, October 30, 2001
[28] Malík F.: Špeciálne vína a krajové špeciality. Special wines and regional products (in Slovak). Course „Sommelier 2000/2001. Wine Academy, Valtice. February 19, 2001
[29] Malík F.: Technologie výroby vína v stredoeurópskom regióne. Wine technology in middle Europe (in Slovak). Course Sommelier 2001/2002.Wine Academy Valtice, November 15, 2001
[30] Malík F.: Víno (magického) roku 2001. Wine of (magic) year 2001 (in Slovak). Seminar „Viticulture and enology in Slovakia!" In: Book of Abstracts, Nitra, November 20, 2001, p. 69
[31] Malík F.: Víno a jeho poslanie v spoločnosti. Wine and its mission in community (in Slovak). University of 3rd era. Food and health of person.I. STU Bratislava March 30, 2001
[32] Malík F.: Vplyv jablčnej-mliečnej fermentácie na budúcu kvalitu a stabilitu vína. Malo-lactic fermentation and its influence of quality and stability of wine (in Slovak). Révovin Velké Bílovice s.r.o., September 4, 2001
[33] Malík F.: Význam senzorického hodnotenia vína. Importance of sensorial evaluation of wine (in Slovak). Course „Sensorial evaluation of drinks. CHTF STU Bratislava, January 31, 2001
[34]* Malík F.: Pure wine yeast cultures in strategies of enological moderna. In: Abstracts XXIX th Annual Conference on yeasts. SAV Congress Centre Smolenice, May 23-25, 2001, p. 33
[35]* Navrátil M., Šturdík E., Gemeiner P.: Ionotropic hydrogels as carriers for immobilization biotechnologies. Structure and Stability of Biomacromolecules SSB 2001. In: Book of Abstracts, Košice, September 12-14. 2001, p. 39-40
[36]* Navrátil M.: Natural enrichment of fruit & vegetable juices by organic acids via fermentation with selected strains of yeast, Fruit Juice Processing. Terchová-Vrátna, May 23-26. 2001
[37] Navrátil M., Dömény Z., Šmogrovičová D., Šturdík E., Gemeiner P.: Detekcia aktívnej biomasy imobilizovanej v géloch polysacharidovej povahy metódou bioluminometrie. Determination of the active biomass immobilized in hydrogels of polysaccharide nature by bioluminometric method (in Slovak). In: Abstracts book Laboralim 2001, Banská Bystrica, February 7-8, 2001 p. 177-180
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[39] Navrátil M., Tkáč J., Švitel J., Danielsson B., Šturdík E.: Stanovenie glycerolu metódou prietokovej mikrokalorimetrie s využitím imobilizovanej glycerolkinázy. Determination of glycerol by flow microcalorimetry method with immobilized glycerokinase.In: Book of Abstracts Laboralim 2001, Banská Bystrica, February 7-8. 2001, p. 181-184
[40] Navrátil M.: Biochemické, mikrobiologické a bioinžinierske aspekty aplikácie imobilizovaných systémov do fermentačných procesov. Biochemical, microbiological and bioengineering aspects of application of immobilized systems in fermentation processes (in Slovak). Drobnicov Memoriál 2001. In: Book of Abstracts, Smolenice, November 8-9. 2001, p. 82-83
[41]* Navrátil M., Gemeiner P., Šturdík E.: Entrapment of yeast cells into calcium pectate gels: continuous alcohol fermentation. IXth International Workshop on Bioencapsulation. Warsaw, Poland, May 11-13. 2001
[42]* Navrátil M.: Estimation of anthocyanins and polyphenols in fruit juices. Fruit Juice Processing, Terchová-Vrátna, May 23-26. 2001 p. 37-43 (ISBN 80-7080-419-X.)
[43] Ráczová B., Dömény Z., Šturdík E.: Výskum fermentovaných nápojov na báze sladiny a medu s priaznivými účinkami na zdravie človeka. Research of fermented beverages based on wort and honey with possitive effect on human health. VIII. Fyto-terapeutické dni. In: Book of Abstracts, Košice, September 15-16. 2001, p. 17
[44]* Rosenberg M., Krištofíková Ľ. Hronská H.: Preparation of L(+)-lactic acid by fungi Rhizopus sp. XIII. International conference about analytical methods in food industry LABORALIM 2001. In: Book of Abstracts Laboralim 2001, Banská Bystrica , February 7.-8. 2001, p. 291-294
[45]* Sláviková L., Čertík M., Slugeň D., Šajbidor J.: Štrukturálne premeny lipidov prírodných materiálov v režime polosuchých kultivácií. Structural changes of natural materials by solid state fermentations (In Slovak). Proceedings of XIII. International Conference LABORALIM, Banská Bystrica, 2001, p. 210-213)
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E.

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DEPARTMENT OF BIOCHEMISTRY AND MICROBIOLOGY

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I. STAFF

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Assistant Professors:
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PhD Students:
Richard Pokorný, Roman Hudec, Michal Kaliňák, Martina Poturnajová

Technical Staff:
Oľga Willantová-Secretary, Dagmar Adamíková, Gabriela Chytilová, Anna Kučinská, Margita Kosárová, Ján Škvara, Eva Sameková

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Animal Cell Cultures
Laboratory of Biochemistry of Cancer Cells
Laboratory of Fungal Biochemistry and Physiology
Laboratory of Immunochemistry
Laboratory of Microbiology

III. TEACHING

A. Undergraduate Study

1st semester (autumn)		
Biology	(2-0 h)	Jantová, Horáková, Mikulášová
Laboratory Practices in Biology	(0-1 h)	Jantová, Dudová, Šovčíková, Poturnajová, Kaiserová
3rd semester (autumn)		
Microbiology I	(2-0 h)	Hudecová
Laboratory Practices in Microbiology I	(0-2 h)	Hudecová, Majtán*, Mikulášová, Dudová, Pokorný
4th semester (spring)		
Biochemistry I	(2-0 h)	Varečka
Laboratory Practices in Biochemistry I	(0-2 h)	Varečka, Paulíková, Chovanec, Lakatoš, Kaiserová, Pokorný
5th semester (autumn)		
Principles of Human Nutrition	(2-0 h)	Miko
6th semester (spring)		
Laboratory Project	(0-4 h)	Miko, Horáková, Varečka, Hudecová, Jantová, Mikulášová, Majtán*, Dudová, Pokorný
7th semester (autumn)		
Biochemistry II	(2-0 h)	Varečka
Laboratory Practices in Biochemistry II	(0-2 h)	Paulíková, Chovanec, Lakatoš, Hudec
Microbiology II	(2-0 h)	Mikulášová, Hudecová
Laboratory Practices in Microbiology II	(0-2 h)	Hudecová, Majtán*, Mikulášová, Dudová
Immunochemistry	(2-0 h)	Ferenčík*
Seminar in Immunochemistry	(0-1 h)	Ferenčík*
Laboratory Practice in Immunochemistry	(0-2 h)	Daussant*, Kaiserová, Hudec, Kaliňák
Biosensors	(2-0 h)	Labuda*
Biosensor Seminar	(0-1 h)	Labuda*
Biosensors Laboratory Practices	(0-2 h)	Labuda*

8th semester (spring)		
Molecular Biology and Genetics	(2-0 h)	Mikulášová, Paulíková
Applied Microbiology	(2-0 h)	Hudecová, Majtán*
Bioenergetics	(2-0 h)	Miko
Laboratory Practices in Bioenergetics	(0-2 h)	Miko
Mechanisms of Action of Natural Compounds	(2-0 h)	Varečka
Mechanisms of Action of Natural Compounds -Laboratory Practices	(0-2 h)	Dudová, Pokorný
Laboratory Practices of the branch Biomedical Engineering, Biochemistry and Microbiology	(0-4 h)	Miko, Horáková, Varečka, Hudecová, Jantová, Mikulášová, Majtán*
9th semester (autumn)		
Genetic Manipulations	(2-0-2 h)	Čertík*
Clinical Biochemistry	(2-0 h)	Chandoga*
Clinical Biochemistry-Laboratory Practices	(0-2 h)	Chandoga*
Cell cultures	(2-0 h)	Jantová, Horáková
Laboratory Practices of the branch Biomedical Engineering, Biochemistry and Microbiology	(0-6 h)	Horáková, Hudecová, Jantová, Miko, Mikulášová, Varečka, Majtán*
10th semester(spring)		
Master`s Thesis Seminar	(3-0 h)	Miko, Horáková, Varečka, Hudecová, Majtán*
Master`s Thesis	(0-27 h)	Miko, Horáková, Varečka, Hudecová, Majtán*

B.PhD Study

Biochemistry	Miko, Varečka
Microbiology	Horáková, Hudecová

*-external teacher

VI. CURRENT RESEARCH PROJECTS

A. Cytotoxicity of novel xenobiotics and their mode of action (Milan Miko)

The primary aim of our group is the identification and evaluation of potential anti-cancer agents. The main results are as follows:

1. Fourteen substituted 4-anilinoquinazolines, seventeen plant extracts and four preservative compounds for cosmetics were tested for cytostatic, genotoxic, anticancer and antibacterial effects. The most active 4-anilinoquinazolines were substituted by chlorine or bromine group in the aromatic ring, in the pyrimidine ring by morpholine group and in the aniline skeleton by nitro group in position 4 or 2. Four anilinoquinazolines inhibited growth of tumor cell lines HeLa, B16 and L1210 and exhibited antiprotease effect on plasmine. Concentration 5.2 μmol/L of 6-bromo-2-(morpholin-1-yl)-4-anilinoquinazoline induced a significant increase of filamentous actin in the transformed HepG2 cells.A 35 % degradation of HeLa cells was found after 72 h treatment with 62.5 μg/mL of the extract isolated from *Stephanandra tanakae*. The 100 % lysis of HeLa cells was observed after 72 h treatment by 125 μg/mL concentration of the extract prepared from *Gymnocladus dioicus*. The extracts from *Ligustrum devayanum* and *Ligustrum vulgare* are specifically effective only with HeLa cells. On the other hand, the extract prepared from *Gymnocladus dioicus* is effective on the bacteria and on the HeLa cells too. Preservative Bronopol demonstrated the highest cytotoxic effect on the proliferation of V79 and VH10 fibroblast cell lines.

2. In the frame of mode of action of 8 novel isotiocyanate derivatives (ITCs) was found out, that two carcinoma cell lines (A2780, A431) appeared extremely sensitive to the majority of the tested ITCs (ID_{50} = 2.2-8.0 μmol/l). The tested ITCs modified the cell cycle of carcinoma cell lines (A2780, A2780/ADR, A431) and sarcoma cell lines (B-5GT, BP6-TU2), as well as leukemic cell line (JURKAT), mainly at 10 μmol/l and 5 μmol/l. The gradual inhibition of cell proliferation was observed, characterised by decreasing of percentage of cells in G_0/G_1 phase and accumulation of cells in S and G_2/M phases of the cell cycle. Four from the five tested ITC derivatives showed the ability of strong induction of apoptosis (34-27%) in A2780 carcinoma cells.

3. Four trisubstituted quinazoline derivatives exerted a significant effect on *E. coli, P. aeruginosa*, *S. aureus* and *B. subtilis* ($IC_{50} < 100$ mg/l) and influenced the specific growth rate. The results of primary screening for cytotoxicity of eighteen plant extracts showed that the extracts which have manifested 100% toxicity on HeLa cells come from the family Fabaceae, Rosaceae, Oleaceae and Staphyleaceae. The cytotoxically effective extracts represent three different types of cytotoxic effect – acute, delayed and combined effect. The effect of Cu tetraaza macrocyclic complex on the glutathione status was examined and the possible mechanism of this anticancer-membrane targeting drug was studied. In the frame of genotoxic effects of Cu(II) complexes of mephenamate, flufenamate, acetylsalicylate was found that these compounds statistically significantly decreased the number of revertants induced by 2-aminoanthracene and 2-aminofluorene. This antimutagenic activity is associated with the copper properties to participate in a number of different biological processes and its interaction with DNA. The genotoxic effects of lignin and selected degradation products of lignin were studied.

B. Biochemical processes underlying fungal differentiation and secondary metabolism (Ľudovít Varečka)

In the project devoted to study the transport processes in filamentous fungi several aspects of transport and physiology were studied.

In *Trichoderma viride* the process of chloride transport was studied by means of ^{36}Cl radionuclide. It was found that chloride anions enter the vegetative mycelia in a saturatable, pH- and temperature-dependent manner with selectivity for chlorides and bromides. Further properties of transport suggest that chloride anions are transported by a specific and electrically silent transport

protein. In *Penicillium simplicissimum* the process of citrate transport into the vegetative mycelia has been described and the conditions were found which led to the induction of novel citrate uptake system driven by protonmotive force. Its role in the citrate metabolism is being currently analysed.

In the project devoted to study the conidiation and physiology of filamentous fungi, the physiology of development and conidiation has been studied. It was found that the conidiation of *Trichoderma* observed in the dark is induced neither by starvation nor steric constraints and probably could be related to the genetical program of the organism. This notion could be supported by the isolation of mutants with delayed conidiation but normal growth characteristics. Further, the changes of the energy metabolism were studied in the submerged mycelia which revealed a strong dependence of various parameters (respiration, citrate production, etc.) on the developmental status which complement our previous data concerning the Ca^{2+} uptake or glutamate decarboxylase activity and suggest that there rate of metabolism is a function of developmental stage of mycelia.

V. COOPERATION

A. Cooperation in Slovakia

Institute of Chemistry, Slovak Academy of Sciences, Bratislava
Institute of Animal Physiology and Biochemistry, Slovak Academy of Sciences, Bratislava
Institute of Molecular Physiology, Slovak Academy of Sciences, Bratislava
Institute of Animal Biochemistry and Genetics, Slovak Academy of Sciences, Ivánka pri Dunaji
Cancer Research Institute, Slovak Academy of Sciences, Bratislava
Faculty of Pharmacy, Comenius University, Bratislava
Faculty of Natural Sciences, Comenius University, Bratislava
Institute of Preventive and Clinical Medicine, Bratislava
Institute of Virology, Slovak Academy of Sciences, Bratislava
Dairy Research Institute, Žilina
Department of Chemistry, Paedagogical Faculty, University, Trnava
Department of Medical Chemistry, Biochemistry and Clinical Biochemistry, Faculty of Medicine, Comenius University, Bratislava
Department of Molecular Biology, Faculty of Natural Sciences, Comenius University, Bratislava
Institute of Immunology, Faculty of Medicine, Comenius University, Bratislava

B. International Cooperation:

Laboratoire du Biomembranes et Messagers Cellulaires, Université Paris XI, Orsay, France (Dr. Francoise Giraud)
Laboratory of Cell Signalling, Nagoya University Bioscience Center, Nagoya, Japan (Prof. Dr. Shoshi Toriyama)
Institut für Mikrobiologie, Universität zu Innsbruck, Innsbruck, Austria (Prof. Dr. Wolfgang Burgstaller)
Botanisches Institut, Friedrich Wilhelms Universität, Bonn, Germany (Dr. Udo Hoelker)
ReaD VUFB, a.s. Prague, Czech Republic
Liverpool John Moores University, Liverpool, UK
- Electron microscopy of photo-induced conidiation and dimorphism in Fungi.
Université de Genéve, Genéve, Suisse
- Biochemistry and molecular biology of photo-induced conidiation in Fungi.
European Organisation on Research and Treatment of Cancer, Screening and Pharmacology Group, University of Tokushima, Japan
- Uncouplers of oxidative phosphorylation.
Institute of Food Research, Norwich, UK
- Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.
Institute of Chemical Technology, Prague, Czech Republic
- Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.
MILCOM a.s., Dairy Research Institute, Prague, Czech Republic
- Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.
Dublin City University, Dublin, Ireland
- Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.

C. Membership in Domestic Organizations and Societes:

Slovak Society for Biochemistry and Molecular Biology, Bratislava	(M. Miko, Ľ. Varečka)
Slovak Medical Society, Bratislava	(S. Jantová)
Czecho-Slovak Society for Biochemistry, Bratislava	(S. Jantová)
Czecho-Slovak Society for Microbiology, Bratislava	(K. Horáková, D. Hudecová, M. Mikulášová)
Czecho-Slovak Society for Biology, Brno	(K. Horáková, S. Jantová, M. Mikulášová)
Oncological Society of the Slovak Medical Society, Bratislava	(K. Horáková)

D. Membership in International Organizations and Societes:

International Society for the Study of Xenobiotics, Bethesda, MD, U.S.A.	(M. Miko)
European Association for Cancer Research, Nottingham, U.K.	(M. Miko)
European Organisation on Research and Treatment of Cancer, Moerkapelle, Netherland.	(M. Miko)
European Tissue Culture Society	(K. Horáková)
EUROTOX-European Societies of Toxicology, Turku, Finland	(K. Horáková, S. Jantová, M. Mikulášová, A. Šovčíková)

F. International Scientific Programmes:

1. INCO COPERNICUS
a) project PL 979012, „Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor

technology.„ (K. Horáková)
contract No. ERB IC15-CT98-0902 (1999-2001)
Participating organizations:

Institute of Chemical Technology, Prague (CZ)
Institute of Food Research, Norwich (UK)
Slovak Univerzity of Technology, Bratislava (SK)
Dublin City University, Dublin (I)
MILCOM a.s., Dairy Research Institute, Prague (CZ)
Dairy Research Institute, Žilina (SK)

G. Visitors from Abroad:

Prof. Dr. Jean Daussant	C.N.R.S., Meudon, France, November 2001 (10 days)

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

M. Kaliňák	Universität Innsbruck, Innsbruck, Austria (90 days)
R. Pokorný	Friedrich Wilhelms Universität, Bonn, Germany (90 days)
B. Dudová	XXIst Xenobiochemical symposium. Dolní Věstonice (Czech Republic), May-June 2001 (2 days)
M. Miko	XXIst Xenobiochemical symposium. Dolní Věstonice (Czech Republic), May-June 2001 (2 days)

VI THESES AND DISSERTATIONS

A. Graduate These (MS Degree) for state examinations after five years of study (supervisors are written in brackets external supervisers):

Cariková S.:	Screening and mode of cytotoxic action of chosen xenobiotics**.** (M. Miko)
Čavojcová M.:	Cytotoxicity and apoptotic potential of selected isothiocyanate derivatives. (K. Horáková)
Dudíková J.:	Bioactive polypropylene fibres on the basis of Irgasan. (D. Hudecová)
Furjészová K.:	Identification of virulence markers of *Salmonella enteritidis* strains isolated from food andclinical samples. (V. Majtán*)
Horváth V.:	Biological effects of some quinazoline derivatives. (S. Jantová)
Hudec R.:	Using immunochemical and chromatography methods in calcium transport study in human red blood cells. (Ľ. Varečka)
Kaliňák M.:	Transport of the citric acid into the mycelia of *Penicillium simplicissimum*. (Ľ. Varečka)
Kamenistá A.:	Characterization of chlorpromazine-resistant *Trichoderma viride* mutants. (D. Hudecová)
Kamodyová M.:	Optimalization of two-plasmid system for identification of promoters controlled by RNA-polymerase containing stress factor δ^E . (J. Kormanec*)
Krabáč B.:	The influence of mineral fibrous dust on mammalian immune system. (J. Tulinská*)
Lábaj J.:	The role of lignin in reduction of genotoxic damage of mammalian cells. (D. Slameňová*)
Luptáková I.:	Aging of *Trichoderma viride* grown up in the submerged and surface cultivation. (Ľ. Varečka)
Ľuptovcová M.:	Modulation of glutathione metabolism and chemotherapy. (H. Paulíková)
Mellenová H.:	Effect of new bisquaternary ammonium salts on *Stenotrophomonas maltophilia*. (V. Majtán*)
Roľková G.:	Genotoxic and antimicrobial activity of selected derivatives of quinazolines. (M. Mikulášová)
Teplická J.:	The study of different types of lignin considering to their antimicrobial and genotoxic effects. (M. Mikulášová)
Trutzová R.:	Imunochemical detection of the patological forms of tau protein in the brain of the patient with Alzheimer disease. (E. Kontseková*)

-*external teacher

B. Dissertations (PhD):

Chovanec P.:	Metabolic aspect of vegetative growth and conidiation of *Trichoderma viride*. (Ľ. Varečka)
Strigáčová J.:	Antimicrobial (biological) activity of selected synthetic or natural compounds. (D. Hudecová)
Šovčíková A.:	Antimicrobial activity and the mode of action of isothiocyanate derivatives. (K. Horáková)

D. Habillitation Theses:

Jantová S.:	Cytotoxicity, antimicrobial activity and the mechanism of effect of the

natural and synthetic compounds.

VII PUBLICATIONS

A. Journals (*registered in Current Contents)

[1] Brtko J., Hudecová D., Bransová-Bobálová J., Novotný L., Eybl V., Melník M., Uher M.: Kojic acid: a superior source for preparation of biologically active compounds (current experience). Biomarkers Environment 4, 26-30, (2001).

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DEPARTMENT OF CERAMICS, GLASS AND CEMENT

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I. STAFF

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Assoc. Prof. Jozef Laček, PhD, Zdenek Hrabě, PhD

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Teaching laboratory I
Teaching laboratory II

B. Research Laboratories:

Laboratory of ceramics
Laboratory of glass
Laboratory of inorganic binders
Laboratory of sol/gel
Laboratory of inorganic powders synthesis
Laboratory of thermal analysis
Laboratory of calorimetry
Scanning electron microscopy laboratory
X-ray diffractometer laboratory

III. TEACHING

A. Undergraduate Study

1. Introductory Courses

6th semester (spring)		
Materials technology	(2-0 h)	Majling
Bachelor's thesis	(0-4 h)	Holková, Jamnický, Kákoš, Kovár, Kozánková, Majling, Rebroš, Sedláček, Smrčková, Svetík

2. Advanced Courses

7th semester (autumn)		
Inorganic chemistry III	(2-2 h)	Jamnický
Solid state physics	(2-0 h)	Lokaj, Smrčková
Technical mineralogy	(1-1 h)	Svetík
Applied thermodynamics	(2-2 h)	Fellner, Pach
Raw materials and mechanical operations	(3-0 h)	Kovár, Svetík
Specialised laboratory practices I	(8 h)	Kákoš, Kovár, Kozánková, Palou, Rebroš, Smrčková, Svetík
8th semester (spring)		
High temperature processes	(2-1 h)	Kovár
Applied heat technique	(2-1 h)	Kovár, Kákoš
Specialised laboratory practices II	(8 h)	Holková, Jamnický, Kákoš, Kozánková, Lokaj, Manová, Smrčková
Factory praxis		Jamnický, Smrčková

9th semester (autumn)		
Technology of spec. inorg. materials	(2-0 h)	Majling, Kákoš
Inorganic binders technology	(2-0 h)	Palou
Technology of ceramics	(2-0 h)	Majling, Smrčková
Technology of glass	(2-0 h)	Jamnický, Pach
Specialised laboratory practices III	(10 h)	Holková, Jamnický, Majling, Palou, Rebroš, Smrčková
10th semester (spring)		
Master's thesis laboratory	(30 h)	Galusek, Holková, Jamnický, Kákoš, Kovár, Majling, Pach, Palou, Rebroš, Smrčková, Šimurka

IV. CURRENT RESEARCH PROJECTS

A. Chemical and structural assumption for immobilization of toxic materials by cementing, vitrification and ionic-exchange methods (Ján Majling)

An appriciable high amount of Cr was accomplished into borosilicate glass by in situ reduction of Cr(VI) by graphite in the first processing step and by subsequent melting and vitrification of the relevant batch.

The toxic Cr(VI) was also immobilized into in situ created ettringite. The laboratory sulfoaluminate cement was used to form ettringite by the hydration process.

The Pb^{2+} ions can be incorporated into hydroxyapatite by ionic exchange from solution with respect to the specific surface of hydroxyapatite particles. The substantial exchange can be accomplished only by in situ precipitation of hydroxyapatite from Pb^{2+} containing water solutions.

B. Electrically conductive oxide glasses containing copper cations. Preparation, structure and physical properties (Miroslav Jamnický)

The possibility to achieve the high ionic conductivity in a new Cu^{+} glass system was studied. The main scientific results were obtained as follows:

1. Determination of the optimum procedures for the preparation of electrically conductive oxide glasses containing copper cations in the systems of the general composition CuI – CuBr – Cu_2O – M_mO_n (where M = Mo and W; m = 1 and n = 3).

2. Determination of the arrangement of main structural units in these glasses and characterization of their thermal and electrical properties.

3. Determination of new relationships among the composition, the structure and the electrical conductivity of phosphate, phosphate – molybdate and phosphate – tungstate glasses containing copper ions.

C. Design microstructure and properties of sol-gel materials by means of seeding and polymer additives (Ladislav Pach)

The research in the field of sol-gel process synthesis of materials is oriented in the latest time to explanation of α-Al_2O_3 crystallisation in boehmite derived alumina gels seeded with $Fe(NO_3)_3$. Our new results, published in three papers, proved, that seeding effect $Fe(NO_3)_3$ (system AlOOH - $Fe(NO_3)_3$ is qualitatively different of seeding effect of α-Al_2O_3 or α-Fe_2O_3 crystals in the same boehmite gels. Mechanisms is not crystallographic as in the case of α-Al_2O_3 or α-Fe_2O_3 crystals, bat it is a solution effect of dispersed Fe^{3+} ions on crystallisation of corundum phase. Ferric oxide originating from $Fe(NO_3)_3$ enters into γ-Al_2O_3 structure resulting in solid solution of γ-$(Al, Fe)_2O_3$ and the subsequent process (γ-$(Al, Fe)_2O_3 \rightarrow$ α-$(Al, Fe)_2O_3$) are influenced by Fe^{3+} ions, because pure α-Fe_2O_3 phase is not present. Obtained results enabled us to prepare transparent alumina ceramics at relatively low temperatures about 1300^{o}C

V. COOPERATION

A. Cooperation in Slovakia:

Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava
Faculty of Mechanical Engineering, Slovak University of Technology, Trnava
Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava
Research Institute of Building Materials, Slovak Academy of Sciences, Bratislava
Research Institute of Refractory Materials, Bratislava
Cementáreň Turňa, a.s., Turňa nad Bodvou (Cement producer)
Považská cementáreň, a.s., Ladce (Cement producer)
Hirocem, a.s., Rohožník (Cement producer)
Eurodom, s.r.o., Lučenec (Constructional system)
Novoker, a.s., Lučenec (Wall tiles producer)
CERAM Čáb, a.s., Nové Sady (Electroceramics producer)
TS, a.s., Bratislava (Technical glass work)
SMZ, a.s., závod Jelšava (Magnesite clinker plant)
Izomat, a.s., Nová Baňa (Mineral fibre insulation materials producer)
Slovenské elektrárne, Výskumný ústav jadrových elektrární Trnava a.s. (Research institute of electric power stations)

B. International Cooperation:

Intercollege Materials Research Laboratory, The Pennsylvania State University, University Park, PA, USA
- Synthesis of Inorganic Materials
Department of Engineering Materials, The University of Sheffield, U. K.

- Novel Low Energy Cements Based on Belite

C. Membership in Domestic Organisations and Societies:

Slovak Silicate Society, Bratislava
Union of Glass Industry, Bratislava
Slovak Glass Society, Lednické Rovne
Crystallographic Society, Bratislava
Association of Science Technical Societies, Bratislava

D. Membership in International Organisations and Societies:

Silicate Society, Prague, Czech Republic (Z. Hrabě)
American Ceramic Society, USA (L. Pach)
The International Society for the Environmental and Technical Implications of Construction with Alternative Materials (ISCOWA), Nederland (J. Majling)
Institute of Materials, U.K. (J. Majling)

G. Visitors from Abroad:

N. Lyschkow	Hamamatsu, Chicago, IL, USA, February 2001 (1 day)
Prof. Dr. H. Altenburg	Fachhochschule Münster, Steinfurt, Germany, November 2001 (3 days)
Dipl. Ing. I. Eusch	Österreichische Heraklith GmbH, Fürnitz, Austria, November 2001 (1 day)
Doc. Ing. J. Havlica, DrSc.	FCH VUT, Brno, Czech Republic, December 2001 (2 days)

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

M. Rebroš, J. Sedláček	seminar, VŠChT Praha, Czech Republic, February 7-8
P. Krutý	sample measuring, VŠChT Praha, Czech Republic, May 15
J. Majling	7^{th} Conference and Exhibition of the European Ceramic Society, Brugge, Belgium, September 8-13
J. Sedláček	sample measuring, VŠChT Praha, Czech Republic, September 17
M. Palou, E. Smrčková	5^{th} conf. Nové stavební hmoty a výrobky, VÚSH Brno, Czech Republic, November 22-23

VI. THESES AND DISSERTATIONS

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

Bodorová P.:	Influence of organic additives on porosity of inorganic gels (L. Pach)
Dominová Ľ.:	Determination of pc-clinker mineralogical composition by the chemical phase separation (E. Smrčková)
Goliašová-Surgentová A.:	Study of ionic exchange reactions of hydroxyapatite ((E. Smrčková)
Jurenová M.:	Kinetic evaluation of optical transparency – temperature dependence (V. Kovár)
Kido L.:	Fracture properties of polycrystaline corundum (D. Galusek)
Kozloková M.:	Preparation of the opal-like ordered glassy structure (J. Kákoš)
Michalková E.:	Study of the mixed anions effect in Cu^+ ionic conductive glasses (M. Jamnický)
Panáček M.:	Chemical resistance of household glassware in kitchen washers (P. Šimurka)
Radošovská Z.:	Study of the chemical compositions of solid solutions in the system C-C_2S-C_3A-C_4AF-C_4A_3S" (J. Majling)
Rejman J.:	Identification and verefication of singular points relevant for the mixture of raw meal – fly ash – gypsum (M. Palou)
Szatmáry L.:	Crystallization kinetics of Al_2O_3-Fe_2O_3 gels (L. Pach)
Škorvanová A.:	Preparation and characterization of products in the system CaO-Al_2O_3-SO_3(CrO_3)-H_2O with respect to immobilization of Cr(VI) (M. Palou)
Tóth R.:	Biocompatible nanocomposites on the base of hydroxyapatite (J. Majling)

B. Dissertations (PhD):

Bača Ľ.:	Crystallization of alpha-Al_2O_3 from boehmite gels (L. Pach)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1] Alexy P., Košíková B., Crkoňová G., Kozánková J., Martiš P., Precnerová L.: Vplyv EVA kopolymérov na morfológiu a mechanické vlastnosti zmesí polyetylén – lignín. Influence of EVA copolymers on morphology and mechanical properties of polyethylene-lignine mixtures (in Slovak). Ropa, uhlie a petrochémia 43 (1) 42-45 (2001)

[2]* Bača Ľ., Lipka J., Tóth I., Pach L.: Study of crystallization of Al2O3-Fe2O3 gels by Mössbauer spectroscopy. Ceramics –

Silikáty 45 (1) 9-14 (2001)
[3]* Bača Ľ., Plewa J., Pach L., Opfermann J.: Konetic analysis crystallization of alpha-Al2O3 by dynamic DTA technique. J. Thermal Analysis and Calorimetry 66 () 803-813 (2001)
[4]* Kákoš J., Bača Ľ., Veis P., Pach L.: Photoluminiscence spectra and crystallization of theta-Al_2O_3 and alpha-Al_2O_3 from AlOOH-$Fe(NO_3)_3$ gels. J. Sol-Gel Sci. Technology 21 () 167-172 (2001)
[5]* Majling J., Kremničan V., Pach L., Chocholoušek J.: Thermo-optical investigation in transmitted light. High Temperature – High Pressure 33 () 43-50 (2001)
[6] Volfová P., Chrástová V., Černáková Ľ., Mrenica J., Kozánková J.: Properties of polystyrene/poly(butyl acrylate) core/shell polymers modiefied with N-methylo acrylamide. Macromol. Symp. 170 () 283-290 (2001)

B. Conferences (*international conferences)

[1] Bača Ľ., Holková Z., Pach L., Valko M.: Mechanizmy fázovej transformácie böhmitového gélu na korund. Phase transformation mechanisms of boehmite gel to corundum (in Slovak). In: Zb. IV. seminár Príprava keramických materiálov, Herľany, June 26 – 28, 2001, Ed. HF TU Košice, pp. 95-98 (2001), ISBN 80-7099-660-9
[2]* Bača Ľ., Plewa J., Wojcik M., Pach L.: Kinetic study of alpha-Al_2O_3 crystallization in originally AlOOH/$Fe(NO_3)_3$ gels. In: Abstracts, 8th Conf. on Calorimetry and Thermal Analysis, Sept. 3-8, 2000, Zakopane (Poland), Ed. AGH Krakow, pp. 235-236 (2000)
[3]* Bury P., Jamnický I., Jamnický M.: Acoustic investigation of ion conductive glasses. In: Book of Abstr., 17th Int. Congress on Acoustics, Rome (Ital.), Sept. 2-7, 2001, Ed. AIA Roma, p. 121 (2001)
[4]* Hockicko P., Bury P., Jamnický I., Jamnický M.: Akustické vlastnosti iónovo vodivých skiel. Acoustic properties of ionic conductive glasses (in Slovak). In: Proc. 6th Int. Colloquium Acoustics ICA'01, Zvolen – B. Štiavnica, Sept. 19-21, 2001, Ed. TU Zvolen, pp. 17-19 (2001), ISBN 80-228-1048-7
[5] Holková Z., Pach L.: Nosiče keramických membrán. Ceramic membranes supports (in Slovak). In: Zb. IV. seminár Príprava keramických materiálov, Herľany, June 26 – 28, 2001, Ed. HF TU Košice, pp. 69-72 (2001), ISBN 80-7099-660-9
[6]* Holková Z., Pach L.: Príprava keramických membrán. Ceramic membranes preparation (in Slovak). In: Zb. predn. 7. medzinár. konf. Technológia 2001, Bratislava, Sept. 11 – 12, 2001, Ed. STU Bratislava, pp. 57-60 (2001), ISBN 80-227-1567-0
[7]* Holková Z., Pach L., Bača Ľ.: Influence of $Fe(NO_3)_3$ addition on the porosity of boehmite-derived Al_2O_3 ceramics. In: Book of abstrakts, 6th int. conf. on Theoretical and experimental problems of materials engineering, Sept. 5-7, 2001, Ed. Matador Púchov, p. 69 (2001), ISBN 80-968099-5-4
[8]* Jamnický I., Bury P., Jamnický M.: Electrical properties of ion conducting glasses. In: Proc. 4th Int. Sci. Conf. ELEKTRO 2001, Žilina, May 22-23, 2001, Ed. EF ŽU Žilina, pp. 68-71 (2001), ISBN 80-7100-838-9
[9]* Jamnický I., Bury P., Jamnický M., Hockicko P.: Correlation between electrical and acoustical properties of ion conductive glasses. In: Proc. 7th Int. Workshop on Applied Physics of Condensed Matter APCOM 2001, Lipt. Mikuláš, Sept. 17-19, 2001, Ed. HONORS Lipt. Mikuláš, pp. 89-92 (2001), ISBN 80-8040-160-8
[10] Majling J., Kremničan V., Svetík Š., Pach L.: Optická priepustnosť mulitových gélov pri ich ohreve. Optical transmittance of mullite gels at their heat treatment (in Slovak). In: Zb. IV. seminár Príprava keramických materiálov, Herľany, June 26 – 28, 2001, Ed. HF TU Košice, pp. 99-102 (2001), ISBN 80-7099-660-9
[11]* Palou M., Majling J.: Application of conduction calorimeter in the study of hydration kinetics of C_2S-C_4A_3S'-CS' system relevant to sulfoaluminate belite cement. In: Sb. přísp. Mezinárodní slovenský a český kalorimetrický seminář 2001, Pribylina, May 28 – June 1, 2001, Ed. B. Taraba, Ostravská univerzita, pp. 103-106 (2001), ISBN 80-7042-803-1
[12]* Palou M. T., Smrčková E., Majling J., Pagáčová J.: Vlastnosti cementov s vápencovou prísadou. Properties of cements containing limestone additives (in Slovak). In: Zb. predn. V. konf. Nové stavební hmoty a výroby, Nov. 22-23, 2001, VÚSH Brno, pp. 50-54 (2001)
[13] Palou M. T., Škorvanová A., Majling J., Smrčková E.: Príprava a charakterizácia produktov v systéme CaO-Al_2O_3-SO_3(CrO_3)-H_2O z hľadiska imobilizácie Cr(VI). Preparation and characterization of products in CaO-Al_2O_3-SO_3(CrO_3)-H_2O system with respect to immobilization of Cr(VI) (in Slovak). In: Zb. konf. O ochrane životného prostredia vo výrobe nekovových minerálnych produktov a iných priemyselných odvetviach OŽP 2001, Oct. 3-5, 2001, Stará Lesná, ZVCV SR, pp. Q1 – Q11 (2001)
[14] Petrušková V., Vrábel P., Šimurka P., Maryška M., Rebroš M.: Proces zvetrávania úžitkového skla pri skladovaní. Weathering of household glassware at storing (in Slovak). In: Zb. IV. seminár Príprava keramických materiálov, Herľany, June 26 – 28, 2001, Ed. HF TU Košice, pp. 121-125 (2001), ISBN 80-7099-660-9
[15] Rebroš M., Petrušková V., Pach L., Šimurka P.: Pôsobenie umývačiek riadu na povrch úžitkového skla. Influence of dish washers on household glassware surface (in Slovak). In: Zb. IV. seminár Príprava keramických materiálov, Herľany, June 26 – 28, 2001, Ed. HF TU Košice, pp. 126-130 (2001), ISBN 80-7099-660-9
[16] Sedláček J., Jamnický M.: Štúdium zmien mikroštruktúry a zloženia AZS žiaruvzdorných materiálov pri tepelnom zaťažení. Thermal load influence on microstructure and composition of AZS refractory materials (in Slovak). In: Zb. IV. seminár Príprava keramických materiálov, Herľany, June 26 – 28, 2001, Ed. HF TU Košice, pp. 48-52 (2001), ISBN 80-7099-660-9
[17] Smrčková E., Majling J., Palou M. T.: Imobilizácia toxických odpadov do silikátových matríc. Príprava a charakterizácia produktov v systéme CaO-Al_2O_3-SO_3(CrO_3)-H_2O z hľadiska imobilizácie Cr(VI). Immobilization of toxic wastes into silicate matrices. Preparation and characterization of products in CaO-Al_2O_3-SO_3(CrO_3)-H_2O system with respect to immobilization of Cr(VI) (in Slovak). In: Zb. konf. O ochrane životného prostredia vo výrobe nekovových minerálnych produktov a iných priemyselných odvetviach OŽP 2001, Oct. 3-5, 2001, Stará Lesná, ZVCV SR, pp. Y1 – Y4 (2001)
[18]* Smrčková E., Pach L.: Biodegradovateľnosť minerálnych vlákien. Biodegradability of mineral fibres (in Slovak). In: Zb. predn. V. konf. Nové stavební hmoty a výroby, Nov. 22-23, 2001, Ed. VÚSH Brno, pp. 110-113 (2001)
[19]* Smrčková E., Palou M. T., Majling J.: Eliminácia toxických účinkov Cr(VI) obsiahnutého v cemente. Elimination of toxic effects of cement containing Cr(VI) (in Slovak). In: Zb. predn. V. konf. Nové stavební hmoty a výroby, Nov. 22-23, 2001, Ed. VÚSH Brno, pp. 46-49 (2001)
[20]* Volfová P., Chrástová V., Černáková Ľ., Kozánková J.: Štúdium polystyrén/poly(butyl akrylátových) N-metylol akrylamidom N-MA funkcionalizovaných disperzií. Study of dispersions functionalised by polystyrene/poly(butyl acrylate) N-metylol acrylamid N-MA (in Slovak). In: Zb. príspevkov, 55. Zjazd chemických spoločností, B. Bystrica, Sept. 3-6, 2001, Ed. SCHS Bratislava,

pp. 52-53 (2001)
[21]* Vitková M., Kozánková J., Chalabala M., Rak J.: Pentoxyphylline retard based on ethylcellulose microcapsules. In: Abstracts, Pharmacy world congr. 2000, Vienna (Austria), Aug. 26-31, 2000, Ed. xx, p. 102 (2000)

C. Books and textbooks

[1] Collective authors (among them also Majling J., Kovár V., Laček J., Znášik P.): Encyklopaedia Beliana, Slovenská všeobecná encyklopédia v dvanástich zväzkoch. Druhý zväzok Bell-Czy. Encyklopaedia Beliana, Slovak encyclopedia in twelve volumes. Second volume Bell-Czy (in Slovak). EU SAV Bratislava, 2001.
[2] Koman M., Jamnický M., Majling J.: Anorganické materiály. Inorganic materials (in Slovak). Ed. STU Bratislava, 2001, 165 pp.
[3] Šimon P., Svetík Š., Smrčková E., Palou M. T.: 1. letná škola termickej analýzy a kalorimetrie, študijné materiály. The first summer school of thermal analysis and calorimetry, textbooks (in Slovak). Ed. FCHPT STU Bratislava, 2001, 62 pp.

DEPARTMENT OF CHEMICAL AND BIOCHEMICAL ENGINEERING

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TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories

Laboratory of Chemical Engineering
Laboratory of Unit Operations
Laboratory of Reaction Engineering
Laboratory of Membrane Processes
Laboratory of Chemical Engineering Thermodynamics

B. Research Laboratories

Laboratory of Chemical Reaction Kinetics and Reaction Engineering
Laboratory of Heat Transfer
Laboratory of Hydrodynamics and LDA
Laboratory of Fluid - Particle Dynamics
Laboratory of Membrane Processes and Membrane Reactors
Laboratory of Adsorption
Laboratory of Bioreaction Engineering
Laboratory of Enzyme Engineering
Laboratory of Phase Equilibria

III. TEACHING

A. Undergraduate Study (Bachelor of Chemical Technology)

1. Introductory Courses

1st semester

Material Balances of Technological Processes	(2 h)	M.Šefčíková, P.Ačai, S.Bafrncová, E.Besedová, O.Dolgoš, V.Ileová, M.Kiša, F.Malík, B.Remiarová, P.Steltenpohl, M.Polakovič, J.Šefčík, Š.Sclosser, V.Štefuca, P.Timár, M.Vajda

5th semester

Chemical Engineering I		
Lectures	(2 h)	V. Báleš, Ľ.Jelemenský
Exercises	(3 h)	P.Ačai, M.Antošová, S.Bafrncová, D.Bobok, E.Graczová, I.Havalda, O.Mierka, J.Stopka, J.Šefčík, M.Šefčíková, P.Timár, M.Vajda

Chemical Engineering Laboratory I	(1 h)	P.Ačai, M.Antošová, S.Bafrncová, D.Bobok, E.Graczová, G.Grznárová, I.Havalda,M.Juma,R.Kertesz,O.Mierka,. J.Longauer, J.Šefčík, M.Šefčíková, P.Timár, M.Vajda

6th semester

Chemical Engineering II		
Lectures	(2 h)	J.Dojčanský, V.Štefuca, M.Polakovič,
Exercises	(3 h)	P.Ačai, S.Bafrncová, F.Besedová, D.Bobok, J.Dojčanský, E.Graczová, I.Havalda, O.Mierka, J.Stopka, V.Štefuca, Š.Schlosser, J.Šefčík
Chemical Engineering Laboratory II.	(3 h)	P.Timár, P.Ačai, M.Antošová, M.Bafrnec, M.Blažej, E.Graczová, G.Grznárová, I.Havalda, V.Ileová, R.Kertesz, J.Longauer, M.Juma, B.Remiarová, E.Sabolová, P.Steltenpohl, J.Stopka, J.Šefčík, R.Žajdlík
Engineering Thermodynamics		
Lectures	(2 h)	M.Šefčíková, P.Timár
Exercises	(2 h)	M.Šefčíková, P.Timár, O.Mierka
Technological Projects	(4 h)	M.Bafrnec, J. Ľ.Jelemenský, O.Mierka, A. Molnár, M.Polakovič, Š.Schlosser, M.Polakovič, P.Timár, M.Vajda
Equipment of Chemical and Food Technology	(2-2 h)	J.Longauer

B. Graduate Study (Master of Chemical Technology)

1. Advanced Courses

7th semester

Chemical engineering Thermodynamics		
Lectures	(2 h)	E.Graczová
Exercises	(2 h)	E.Grazcová,
Diffusional Separation Processes	(2-2 h)	J.Dojčanský
Hydrodynamics and Heat Transfer		
Lectures	(2 h)	J.Stopka
Exercises	(2 h)	I.Havalda
Laboratory	(1 h)	J.Stopka
Mass Transfer Theorie	(2-1 h)	D.Bobok
Computer Cemical Egineering Calculations	(3 h)	M.Juma, A.Molnár, S.Bafrncová
Mathematical Methods in Chemical engineering	(4 h)	I.Havalda

Safety engineering

Chemical engineering Thermodynamics		
Lectures	(2 h)	E.Graczová
Exercises	(2 h)	P. Steltenpohl
Hydrodynamics and Heat Transfer		
Lectures	(3 h)	J.Stopka
Exercises	(2 h)	I. Havalda
Laboratory	(1 h)	J.Stopka
Mass Transfer Theorie	(2-1 h)	D.Bobok
Fire Engineering	(2 -2 h)	K.Balogh
Computer Chemical Egineering Calculations	(3 h)	M.Juma, A.Molnár, S.Bafrncová
Mathematical Methods in Chemical Engineering	(4 h)	I.Havalda

8th semester

Chemical Engineering

Chemical Reaction Engineering I		
Lectures	(2 h)	J. Markoš
Exercises	(2 h)	M. Vajda
Laboratory of Chemical Reaction Engineering	(2 h)	J.Markoš
Safety Engineering	(2-2 h)	L.Jelemenský
Bioprocess Engineering I		
Lectures	(2 h)	V.Báleš
Exercises	(1 h)	M.Polakovič
Selected Unit Operation	(2 h)	D.Bobok, Š.Schlosser
Project of Equipment of Chemical and Food Technology	(3 h)	M.Bafrnec, J.Dojčanský, J.Longauer, M.Vajda
Advanced Laboratory of Chemical Engineering I	(3 h)	J.Šefčík, D.Bobok, E.Graczová, M.Juma, J.Markoš, O.Mierka, B.Remiarová J.Stopka,

		V.Štefuca, Š.Schlosser, P.Timár
Safety engineering		
Chemical Reaction Engineering I		
Lectures	(2 h)	J. Markoš
Exercises	(2 h)	M. Vajda
Safety Engineering	(2-2 h)	L.Jelemenský
Explosion Prevention	(2-2 h)	D.Skarba
Process Systems Engineering	(2 h)	P.Rajniak
Laboratory of Process Systems Engineering	(2 h)	M.Šoóš
Project of Equipment of Chemical and Food Technology	(3 h)	M.Vajda, J.Longauer

9th semester

Chemical Engineering		
Chemical Reaction Engineering II	(2-1 h)	J.Markoš
Process Systems Engineering	(1-2 h)	P.Rajniak
Bioprocess Engineering ll	(1-1 h)	V.Báleš
Design Projekt	(1-1 h)	O.Mierka
Solid Particles in Technology and Environment	(2 h)	P.Timár
Cost Engineering of Industrial Enterprise	(2 h)	M.Bafrnec
Advanced Laboratory of Chemical Engineering II	(6 h)	D.Bobok, O.Dolgoš, E.Graczová, L.Jelemenský, I.Langfelder, J.Markoš, O.Mierka, M.Polakovič, B.Remiarová, J.Stopka, V.Štefuca, P.Timár
Safety engineering		
Safety Engineering ll	(2-2 h)	L.Jelemenský
Laboratory of Process Plant Safety	(3 h)	L.Jelemenský, .Remiarová,
Laboratory of Safety Engineering	(3 h)	L.Jelemenský, J.Markoš, J.Stopka,
Electrical Saafety for Chemical Process Plants	(1-1 h)	D.Perniš
Solid Particles in Technology and Environment	(2 h)	P.Timár
Cost Engineering of Industrial Projects	(2 h)	M.Bafrnec

7th semester

OrganicTechnology		
Chemical Engineering Thermodynamics		
Lectures	(2 h)	E.Graczová

8th semester

Biochemical Engineering		
Lectures	(2 h)	M.Polakovič

9th semester

Safety Engineering	(2 h)	Ľ.Jelemenský
Biochemical Technology		

C. Postgraduate study

Chemical Engineering	
1st year:	3 students
2nd year:	3 students
3rd year:	1 student
Obligatory	
English	
Mathematics I.,II.	
Chemical Reactors Engineering	
Theory of Mass Transfer	
Hydrodynamics and Heat Transfer	
Optional	
Engineering Bioreactor	
System Engineering	

IV. CURRENT RESEARCH PROJECT

A. Engineering approaches to the investigation of properties of ligand-enzyme-carrier systems in biocatalysis and bioseparations (Milan Polakovič)

The project incorporates several different problems related to the heterogeneous liquid-solid systems employed in biotechnology. The main areas covered by the project include the optimization of flow microcalorimetry using mathematical modelling for the analytical applications of the biocatalytic systems under study, investigation of enzyme systems with complex kinetics and characterisation of morphological and diffusional properties of carriers used in biocatalysis and biotransformation. The particular goals include the development of methodologies for the identification of mechanisms of enzyme inactivation using the integration of experimental techniques at the quantitative level; the development of chemical

engineering data for the optimization of the design of the fructooligosaccharide production process and for the improvement of biocatalyst properties; the formation of the kinetic equation of triacylglycerols hydrolysis by yeast lipase and its implementation for the description of fermentation production of lipase; modelling of kinetics of potato starch hydrolysis by glucoamylase; the determination of the degree of instability of casein micelles in relation to the degree of hydrolysis of kappa-casein using an experimental procedure of the separation of unstable aggregated micelles and investigation of kinetics of destabilisation of micelles via mathematical modelling of sequential processes; study of the kinetics of glycoprotein sorption at lectin ligands.

B. Immobilized biotechnologies: Implementation of new immobilization methods into microbial and plant fermentations and biotransformations, and their industrial applications (Vladimír Štefuca)

The aim of the project is a systematic development of immobilized biotechnologies. This can be achieved most probably in case of biotechnological processes where the state of the knowledge or the process optimization has reached maximum level and the further increase of the process effectiveness requires the development of new unconventional ways. This evolution should bring more extensive use of continuous processes. The increase of the processes in biotechnology will accelerate their introduction in the industrial use. The project outputs will be information about biochemistry, bioengineering and process parameters that will be used in practical application of investigated processes. The study is oriented toward implementation of immobilization techniques into following processes:

i) ethanol production by fermentation of starch hydrolysates,
ii) primary and secondary wort fermentation,
iii) butyric acid production by transformation of butanol,
iv) biotransformation/biodegradation of xenobiotics,
v) secondary metabolite production by plant fermentation.
vi) dextrose sirup production by maltodextrin hydrolysis.

C. Thermal diffusivities of orthogonal anisotropic materials (Milan Bafrnec)

Elaboration of a model of heat transfer in orthogonal anisotropic composite materials with a course oriented structure. This model will be used for the proposal of a method for measuring thermal diffusivities of such materials. In addition, this method will enable the measurement of the difference in thermal diffusivities in particular directions.
In this year, a suitable mathematical model describing the nonstationary heat transfer in composite materials with a course fiber structure has been proposed. In the choice of parameters and the model of material structure the feasibility solution of the mathematical model was taken into account. Various samples of such composite materials were prepared and their measurement confirmed that there is a great difference between the thermal diffusivity in the direction perpendicular to the fiber layer and in the direction along the composite material fibers.
Models of industrial processes of tire vulcanisation were derived and solved.

D. Mathematical and experimental modelling of coal combustion(Jozef Markoš)

Mathematical and experimental modelling of coal combustion with the aim of its maximal energetic utilization and decreasing of sulphur dioxide emissions.

E. Modelling of mass-transfer through membranes and immobilized interfaces directed to formation and modelling of hybrid systems with biochemical or chemical reactions and membrane separation (Štefan Schlosser)

The possibility of permeate flux enhancement based on the surface modification of a ceramic membrane was investigated in crossflow microfiltration of pure beer yeast suspensions. The stamped membrane had a helical reversed thread to increase turbulence in the feed flow. A stamped membrane has several advantages comparing with a smooth one: flux, as well as limiting flux are higher at the same velocity of the feed, power consumption per unit volume of permeate is lower for the stamped membrane and increases with increasing crossflow velocity of the feed. Modelling of the flux decline indicates different mechanisms of fouling for smooth and stamped membranes.
The mechanism of transport of Ag, phenylalanine (Phe) and other acids through liquid membranes has been studied in a two compartment cell. As carriers for Ag octylphenylmethanesulfide (MF18, novel carrier) and triisobutyl-phosphinesulfide (Cyanex 471X) were used. The advantage of the carrier MF18 is better kinetics of stripping resulting in the same rate of transport or higher in comparison with Cyanex 471X, despite the much lower distribution coefficient of Ag with MF18. The dependence of the transport rate of Phe vs. carrier (DEHPA) concentration goes through a maximum indicating probably aggregation in the membrane phase at higher concentrations of carrier and/or complex. In all systems studied it has been found that the initial flux of permeant through extraction interface is higher than the maximum flux through the strip interface. In some systems this fact leads to a conclusion about the decisive role of kinetics of the processes on stripping interface for the overall transfer rate.
Equilibrium data for butyric acid and dimethylcyclopropanecarboxylic acid with tri-n-octylamine as an extractant have been completed and modelled. These data were interpreted by a chemical reaction mechanism, a related model was tested and the equilibrium constants were estimated. New equilibrium data have been estimated for Phe, silver and HCA.

V. COOPERATION

A. Cooperation in Slovakia

Institute of Chemistry, Slovak Academy of Sciences, Bratislava
Institute of Experimental Physics, Slovak Academy of Sciences, Košice
Slovak Agricultural University, Nitra
LikoSpol, Bratislava
Fermas, Slovenská Ľupča
SKY Life, s.r.o., Malacky
KINEX, a. s.
SCP, a.s. Ružomberok

PETROCHEMA, a. s. Dubová
RHODIA Industrial Yarns Slovakia, a. s. Humenné
Chemical Enterprise Nováky
Lhodol, lim. Rajec
Combin, lim. Tisovec
Research Institute for Milk Products, Žilina
Slovakofarma, a.s. Hlohovec

B. International Cooperation:

CIBA, Swiss
- synthesis of IRGANOX L67

Wroclaw Institute of Technology, Wroclaw, Poland
- starch hydrolysis and starch enzyme inactivation

Laboratoire Environnement et Minéralurgie, UMR INPL et CNRS N° 7569, Nancy, France
- organic pollutants removal from drinking water by activated coal adsorption

University of Lund, Lund, Sweden
- flow microcalorimetry

Oakland University, Rochester, USA
- amperometric sensors for the determination of NO
- monitoring of new anticancer drugs by HPLC

University of Perugia, Perugia, Italy
- study of cyanocomplexes of Cr
- development of thermometric sensors for investigation of enzyme properties

Institute für Technische Chemie der Universtität Hannover, Hannover, Germany
- immobilized enzymes applications

Bundesforschungsanstalt f. Landwirtschaft (FAL), Braunschweig, Germany
- immobilized enzymes applications

Consejo superior de investigaciones cientificas, Madrid, Spain
- investigation of immobilized enzyme stability and inactivation

Academy of Sciences of Czech Republic, Prague, Czech Republic
- study of properties of immobilized lipases

Lab. Membrane Mater. Proc. ENSCM, Montpellier, France
- joint project INCO Copernicus

ICMAB, Barcelona, Spain
- joint project INCO Copernicus

Amino GmbH, Hannover , Germany
- joint project INCO Copernicus

BCS Engineering, Brno Czech Republic
- joint project INCO Copernicus

Technical University of Bucharest, Romania
- joint project INCO Copernicus

Res. Centre Macromolecular Materials and Membranes, Bucharest, Romania
- joint project INCO Copernicus

Technical University of Warsaw, Poland
- joint project INCO Copernicus

Aston University, Birmingham, UK
- joint project INCO Copernicus

Universidade do Minho, Braga, Portugal
- joint project INCO Copernicus

University College London, United Kingdom
- Grant British Council/STU Bratislava

Acetec, Vienna, Austria
- EUREKA

Scheidl Umweltanalytic, Vienna, Austria
- EUREKA

VUOS Pardubice, Czech Republic
- research cooperation in the EURECA programme

C. Membership in Domestic Organisations and Societies:

Slovak Society of Chemical Engineering	(chairman: V. Báleš, member of the general committee: Š. Schlosser)
Slovak Society of Biotechnology	(chairman: V. Báleš)

D. Membership in International Organisations and Societies:

European Membrane Society, Toulouse, France	(Š. Schlosser, member of the Council)
European Federation of Chemical Engineering	(Š. Schlosser, Slovak delegate of the Working Party for Membranes)
European Federation of Chemical Engineering	(V. Báleš, member of the Executive Board)
European Federation for Biotechnology	(M. Polakovič, member of the Working Party for Applied Biocatalysis)
European Federation for Biotechnology	(V. Báleš, member of the Working Party for Bioreactor Performance and Slovak delegate in the General Assembly)
American Chemical Society	(V. Báleš, member)

E. International Scientific Programs:

1. COPERNICUS

a/ Inco-Copernicus ERBIC15 CT98 0809." Novel techniques for implementation of immobilized biocatalysts in industrial processes"
Scientific partner at STU: Dr. Vladimír Štefuca
Coordinator: Dr. Bengt Danielsson (Lund University, Sweden)
Other partner institutions: FAL Braunschweig (D), Technical University of Hannover (D), Amino GmbH, Hannover (D), CSIC, Madrid (E), SAS, Bratislava (SK), AS CR, Prague (CR), BCS Engineering, Brno (CR).
The project started: 1.9.1998
Duration of the project: 3 years
A research project of 7 partners from EU countries, 2 from the Czech Republic, and 2 from Bratislava. It is a Concerted Action project aimed at creating links among partners, research coordination and preparing possible future actions. No money for the research support is available if not the financial support provided by the EU for this project. The main objective of the project is to facilitate the implementation of new materials and techniques into industrial biocatalytic processes. The project involves interdisciplinary trans-national teams to integrate expertise on immobilized biocatalysts. Expertise of partners covers, in particular, the development of the carriers for immobilization, immobilization techniques, methods of characterisation of immobilized biocatalysts, novel approaches for biotransformations, development of bioreactors with immobilized biocatalysts, process monitoring and control, and scaling up processes.

b/ Inco-Copernicus IC15-CT98-0904: "Modelling and design of multiphase bubble bed reactors for advanced food industries"
Responsibleat STU: Jozef Markoš
Coordination institution: Aston University, Birmingham, UK
Other partner institutions: Universidade do Minho, Braga, P, Institute of Chemical Processes, Czech Academy of Sciences, Prague CZ.
Duration of the project: November 1998 - October 2001

2. Grant STU/British Council: "Process simulation for environmental and safety assessment"
Responsible at STU: Ľudovít Jelemenský
Coordination institution: University College London.
Duration of the project: 1999 - 2001

3. EUREKA
EUREKA EU 1574: "Lowering Occurence and Diminishing Effluents/ Pollution at Source - Treatment and Recovery" (acronym: LODE (P) STAR)
Responsible at STU: Štefan Schlosser
Coordinated by VÚOS, Pardubice, Ing. Josef Kotlán
Other partners: Acetec, Vienna (A), Scheidl Umweltanalytic, Vienna (A).
Duration of the project: 1998-2000.

4. INCO Copernicus Programme
IC15-CT98-0147: "Recycling heavy metal ions and organics of biological interest by innovative separation membranes"
Responsible at: STU Štefan Schlosser
Coordinated by Lab. Membrane Mater. Proc. ENSCM, Montpellier (F)
Other partners Technical University of Bucharest (RO), Res. Centre Macromol. Materials Membranes, Bucharest (RO), Warsaw University of Technology (PL), Inst. of Material Science of Barcelona (E).
Duration of the project: January 1999 – 2001

F Visitors from Abroad:

Dr. J. Bryjak	Wroclaw Institute of Technology, P, August 2000, 5 days
Dr. B. Danielsson	Lund University, S, October 2000, 3 days
Prof. David Bogle	UCL London, UK, January 2000 (4 days)
Prof. Eric Fraga	UCL London, UK, January 2000 (4 days)
Prof. Jose Luis Rico Cerda	Universidad Michoacana, Morelia, Mexico, July 2000, (2 days)
Ing. Quido Smejkal, PhD	VŠCHT Praha, CZ, November 2000 (2 days)
J. Kotlán, M. Havlík	VÚOS, a.s., Pardubice, CZ, January, May and December 2000 (3 days)
G. and A. Vladisavljevič	Inst. Food Technol. Biochem., Univ. Belgrade, YU, June 2000 (3 days)
J-A. Jonsson, Dept. Analyt. Chem.	Lund Univ., Lund, S, September 2000, (2 days)
P. Uchytil	Inst. Chem. Proc. ASCR, Praha, CZ, November 2000 (3 days)

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

D. Bobok	Technische Universität, Munich, Germany, January 2000 (3 days)
M. Polakovič	2nd International Conference on Protein Stabilisation/Biomolecule Stabilisation, Lisbon, Portugal, April 9-12, 2000.
V. Štefuca	2nd International Conference on Protein Stabilisation/Biomolecule Stabilisation, Lisbon, Portugal, April 9-12, 2000.
M. Polakovič	ISCRE 16 – 16th International Symposium on Chemical Reaction Engineering, Cracow, Poland, September 10-13, 2000.
Ľ. Jelemenský	Ljubľana, Slovenia, September 2000, (3 days)
D. Bobok	14th International Congress CHISA, Prague, CZ, August 2000, (4

	days)
Ľ. Jelemenský	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
J. Markoš	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
B. Remiarová	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
M. Šoóš	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
O. Dolgoš	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
J. Klein	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
Š. Schlosser, E. Sabolová	14th International Congress CHISA, Prague, CZ, August 2000, (4 days)
Ľ. Jelemenský	International Symposium on Chemical Reactor Engineering, Krakow, PL, September 2000, (3 days)
J.Markoš	International Symposium on Chemical Reactor Engineering, Krakow, PL, September 2000, (3 days)
J. Markoš	UCL London, UK, October 2000, (1 week)
M.Šoóš	UCL London, UK, October 2000, (1 week)
J. Markoš	Universidade do Minho, Braga, P, April 2000, (4 days)
J. Markoš	ETH Zurich, Zurich, Switzerland, April 2000, (1 day)
Š. Schlosser	Meeting of the EMS Council at CNRS Paris, January 2000 (4 days)
Š. Schlosser	EIDOS, a.s., Zlín, CZ, April 2000, (1 day)
Š. Schlosser	meeting of the INCO Copernicus project, Bucharest, RO, June 2000 (3 days)
R. Kertész	Young Membrains, Aachen, D, June 2000, (4 days)
J. Stopka, Š. Schlosser	ICIM2000, Montpellier, F, June 2000 1999 (8 days)
Š. Schlosser	Euromembrane 2000, Maale Hachamisha, Israel, September 2000 (7 days)
M. Bafrnec	Conference New Trends in Rubber Industry, Zlín, CZ, November 2000

VI. THESES AND DISSERTATIONS

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

Báleš, J.:	Complex design of a tube heat exchanger considering possible phase transfers in both media (I. Langfelder)
Baláž, P.:	Evaluation of the influence of rheological properties and conditions of the application of a starch solution on final paper drying (P. Timár)
Blažej, M.:	Fermentation in an airlift reactor (J. Markoš)
Boťanský, B.:	Investigation of structural properties of a single coal particle in the combustion process. (B.Remiarová)
Hubinová, M.:	Safety analysis by the aid of the HYSYS program (M. Šoóš)
Hudecová, M.:	Kinetics of coal combustion (Ľ. Jelemenský)
Józsa, K.:	Energy audit at real conditions of a production plant (O. Mierka)
Kertesz, R.:	Pertraction of organic acids from model and fermentation solution in a fiber contactor (Š. Schlosser)
Kováčová, K.:	Pertraction of metals – mass transfer. (M. Vajda)
Krošlák, M.:	Fermentation in an airlift reactor (J. Markoš)
Kvinta, F.:	Safety assessment of the reactive distillation by the aid of the HYSYS program. (Ľ. Jelemenský)
Laurinc, T:	Safety analysis of chemical reactors. (J. Markoš)
Mikulová, E.:	Mass transfer in a fiber contactor. (M. Vajda)
Petergáčová, Z.:	The influence of model substances on the decrease of flux of permeate in microfiltration through ceramic membranes. (J. Stopka)
Porubská, I. :	Modelling of chromatographic processes of removal of organic impurities from potable water. (M. Polakovič)
Pristyákková, Z.:	Design of a high temperature heat pump operating with a solution LiBr-H2O (I. Langfelder)
Pšenák, M.:	Experimental investigation of diffusion of water in silicagel particles (D. Bobok)
Račko, D. :	Mathematical modelling of controlled drug release (M. Polakovič)
Sirková, Ž.:	Removal of heavy metals from waste waters by sorption on microbial biomass (M. Polakovič)
Skokan, S.:	Spread of pollutants in the air (J. Stopka)
Zavadil, V.:	Kinetics of coal combustion in the atmosphere of carbon dioxide (Ľ. Jelemenský)

Zuber, J.:	Possibilities of utilisation of the software CAMEO for the creation and assessment of realistic scenarios of accidents (V. Fecková)

B. Dissertations (PhD):

Klein, J.:	Study of transport processes in airlift reactors with model and fermentation processes
Juma, M.:	Nonstationary heat transfer and thermal diffusivity of composite materials.

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1] Bobok D., Besedová E.: Error in the Estimation of Effective Diffusion Coefficients from Sorption Measurement. Chem. Papers 54 (6b), 482-488 (2000)

[2] Bugan, G. S., Dömény, Z., Šmogrovičová, Stopka, J., Schlosser, Š.: Aplikácia mikrofiltrácie pri odhorčovaní odpadových pivovarských kvasiniek pre potravinárske účely. Bulletin potravinárskeho výskumu (Application of microfiltration in debittering of waste beer yeast for foostaff parposes (in Slovak)) 39 203-211 (2000)

[3] Bugan, G. S., Dömény, Z., Šmogrovičová, D., Švitel, J., Šturdík, E., Stopka, J., Schlosser, Š.: Ceramic membrane cross-flow microfiltration for beer recovery from tank bottoms. Monatsschrift fur Brauwissenchaft 53, 229-233 (2000)

[4] Jelemenský Ľ., Markoš J., Žajdlík R., Remiarová B.: Modelling of non-linear behaviour during combustion of single coal particle. Chem. Papers 54, (6b) 473-481 (2000)

[5] Juma M., Bafrnec M.: Method of Measuring Thermal Diffusivity of Composites with Thick Fillers and Reinforced Rubbers. Journal of Reinforced Plastics and Composites 19, 1024-1031(2000)

[6] González-Velasco, J.R., López-Fonseca, R., Aranzabal, A., Gutiérrez-Ortiz, J.I., Steltenpohl, P.: Evaluation of H-Y type Zeolites in the Destructive Oxidation of Chlorinated Volatile Organic Compounds. Appl. Catal. B: Environmental 24, 233-242 (2000)

[7] Klein, J., Dolgoš, O., Blažej, M., Markoš, J., Godó, Š.: Application of a magnetic tracer method for the characterisation of hydrodynamics in internal – loop airlift bioreactors. Chemical Papers 54, (6b) 456-466 (2000)

[8] López-Fonseca, R., Aranzabal, A., Steltenpohl, P., Gutiérrez-Ortiz, J.I., González-Velasco, J.R.: Performance of Zeolites and Product Selectivity in the Gas-Phase Oxidation of 1,2-Dichloroethane. Catal. Today 62, 367-377 (2000)

[9] Madlová, A., Antošová, M., Polakovič, M., Báleš, V. Thermal stability of fructosyltransferase from Aureobasidium pullulans. Chemical Papers 54 (6a), 339-344 (2000)

[10] Madlová, A., Antošová, M., Baráthová, M., Polakovič, M., Štefuca, V., Báleš, V. Biotransformation of sucrose to fructooligosaccharides: the choice of microorganisms and optimization of process conditions. Food Biotechnology (Bielecki, S., Tramper, J., Polak, J. eds). Progress in Biotechnology, Vol. 17, Elsevier, Amsterdam, 151-155 (2000)

[11] Markoš, J., Jelemenský, Ľ.: Bezpečnostné inžinierstvo na Katedre chemického a biochemického i nžinierstva STU v Bratislave. Safety engineering at the Department of Chemical and Biochemical Engineering of the STU in Bratislava (in Slovak). Ropa, uhlie, plyn a petrochémia (42) 17-20 (2000)

[12] Marták, J., Schlosser, Š.: L/L Equilibria of Dimethylcyclopropanecarboxylic Acid in Water - Solvent Systems with Trioctylamine as an Extractant. Chem. Papers 54, 413-422 (2000)

[13] Mierka O., Timár P.: Criterial Equation of Pressure Losses by Vertical Pneumatic Transport. Powder Handling and Processing 4 (2000)

[14] Sokolovská, I., Polakovič, M., Báleš, V.: Kinetics of olive oil hydrolysis by Candida cylindracea lipase. Food Biotechnology (Bielecki, S., Tramper, J., Polak, J. eds) Progress in Biotechnology, Vol. 17, Elsevier, Amsterdam, 209-214 (2000)

[15] Stopka, J., Schlosser, Š., Dömény, Z., Šmogrovičová, D.: Flux Decline in Microfiltration of Beer and Related Solutions of Model Foulants through Ceramic Membranes. Polish Journal of Environmental Studies 9, 65-69 (2000)

[16] Šefčíková M., Šefčík J., Báleš V.: Kinetic parameters of casein protein coagulation. Chemical Papers 53, 370-373 (1999)

[17] Šefčíková M., Šefčík J., Šefčík J., Báleš V.: Kinetics of casein micelle destabilization. Chemical Papers 54, 345-350 (2000)

[18] Šoóš, M., Rajniak, P.: Mathematical and experimental modelling of sorption processes in a fixed bed adsorber. Chem. Papers 54, (6b) 489-495 (2000)

[19] Štefuca, V., Polakovič, M.: The use of enzyme flow microcalorimetry for determination of soluble enzyme activity. Food Biotechnology (Bielecki, S., Tramper, J., Polak, J. eds) Progress in Biotechnology, Vol. 17, Elsevier, Amsterdam, 353-358 (2000).

[20] Štepánek, F., Kubicek, M., Marek , M., , Rajniak, P., Soos, P., Yang, R.T.: On the modelling of PSA cycles with hysteresis-dependent isotherms. Chemical Engineering Science 55, 431-440 (2000)

[21] Vajda, M., Schlosser, Š., Kováčová, K.: Pertraction of Silver through Bulk Liquid Membranes. Chem. Papers 54, 423-429 (2000)

[22] Žajdlík, R., Markoš, J., Jelemenský, Ľ., Remiarová, B.: Single Coal particle Combustion in Different Oxygen Atmosphere. Chem. Papers 54, (6b) 467-472 (2000)

(23] Žajdlík, R., Markoš, J., Remiarová, B., Jelemenský, Ľ.: Mathematical and Experimental Modelling of Coal Combustion (Review). Petroleum and Coal 42, 71 - 87 (2000)

B. Conferences (*international conferences)

[1] Ačai, P., Michálková E., Báleš, V.: Mathematical modelling of a packed bed bioreactor with immobilized permeabilized cells of Trigonopsis variabilis. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, B5 (CD ROM), 19 pp.

[2] Ačai, P., Michálková E., Báleš, V. : Mathematical analysis of the performance of a packed bed bioreactor with immobilized permeabilized cells. In: Proceedings of the 14th International Congress CHISA, Praha, Czech Republic, August 27.-31. 2000, P5.79 (CD ROM), 18 pp.

[3] Bafrncová S., Havalda I., Graczová E: Calculation of VOC Emission from Industrial Wastewater Treatment. In: Proceedings

of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, B5, p.74
[4] Bafrnec M., Juma M. : Chemical engineering aspects of tyre vulcanisation. In: Proceedings of the Slovak Rubber Conference 2000, Púchov, Slovakia, 23.-24. May 2000
[5] Bafrnec M., Juma M.: Analysis of the Tyre Curing Process in a Press with Diaphragm Heated by Steam and Nitrogen. In. Proceedings of the 27th International Conference of Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-2. 2000, p. 70
[6] Bafrnec M.*, Juma M. : Tire Curing Engineering. In: Proceedings New Trends in Rubber Industry 2000, Zlín, Czech Republic , November 7.-8. 2000, p. 137
[7] Báleš, V. Ačai, P.: Strategy for the application of Immobilized biocatalyst. In: Proceedings of the 14th International Congress of Chemical and Process Engineering. Praha, Czech Republic, August 27.-31. 2000, A5,1(CD ROM), 4 pp.
[8] Bobok D., Besedová E.: Diffusional Mass Transfer in Porous Solids. In: Proceedings of the 27-th International Conference of the Slovak Society of Chemical Engineering. Tatranské Matliare, Slovakia, May 22.-26. 2000, 14pp. (CD ROM), ISBN 1 80-227-1350-3
[9] Bobok D., Besedová E.: Error in the Estimation of Effective Diffusion Coefficients from Sorption Measurements. ibid, 12pp.
[10] Bobok D., Bodnár Z., Besedová E.: Diffusion of Water in Particles of Silicagel. In: Book of Abstracts of the 14th International Congress CHISA 2000. Praha, Czech Republic, August 27.-31. 2000, D6.5
[11] Besedová E., Bobok D.: Evaluation of Isosteric Heats from Adsorption Equilibrium Measurements. In: Proceedings of the 27-th International Conference of the Slovak Society of Chemical Engineering. Tatranské Matliare, Slovakia, May 22.-26. 2000, (CD ROM), ISBN 1 80-227-1350-3, P 213, 6pp.
[12] Besedová E., Bobok D.: Isosteric Heat as a Part of Adsorption Equilibrium. In: Book of Abstracts of the 14th International Congress CHISA 2000, Praha, Czech Republic, August 27.-31. 2000, P3.140
[13] Bugan, G.S., Stopka, J., Broussous, L., Schlosser, Š., Larbot, A.: Vplyv tvarovaného povrchu keramickej membrány na tok permeátu. The influence of the stamped surface of a ceramic membrane on the flux of permeate (in Slovak). In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, full texts on CD ROM,Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, 4 pp.
[14] Dolgoš, O., Klein, J., Blažej, M., Polák, Š., Annus, J., Markoš., J.: Measurements of circulation velocity in internal-loop airlift bioreactors using a new magnetic – tracer method. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Eengineering, Tatranské Matliare, SK, May 22.– 26. 2000, p. 52
[15] Dolgoš, O., Klein, J., Krošlák, M., Markoš, J.: Study of transport phenomena during gluconic acid fermentation in an airlift bioreactor. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, SK, May 22. – 26. 2000, p. 176
[16] Graczová E., Bafrncová S.: Prediction of Extraction Behavior of Mixed Solvent NMP/ DEG. ibid., p. 122
[17] Grznárová, G., Polakovič, M.: Transport properties of chromatography beds used for separation of biological macromolecules. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering. Tatranské Matliare, Slovakia, May 22.-26. 2000, P303 (CD ROM), 5 pp.
[18] Hajdučíková, L., Koniarová, D., Polakovič, M., Rehák, Ľ, Bakoš, D.: The mechanism and kinetics of drug release from biodegradable membranes. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, P309 (CD ROM), 5 pp.
[19] Illeová, V., Štefuca, V., Polakovič, M.: On-line monitoring of enzyme inactivation by flow calorimetry. In: Proceedings of the 27th International Conference of Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, P307(CD ROM), 6 pp.
[20] Illeová, V., Štefuca, V., Polakovič, M.: Investigation of enzyme inactivation by flow calorimetry. In: Conference Application of Biotechnology in Agriculture and Food Production. Nitra, Slovakia, October 3.-5. 2000, S23 (poster)
[21] Jelemenský, Ľ., Markoš, J., Žajdlík, R., Remiarová, B.: Modelling of non-linear behaviour during combustion of single coal particle. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD), Tatranské Matliare, SK, May 22. – 26. 2000
[22] Jelemenský, Ľ., Markoš, J., Žajdlík, R., Remiarová, B.: Kinetic modelling of single coal particle combustion. In: Book of Abstracts of the 14th International Congress of ChISA. Praha, CZ, August 27. –31.2000
[23] Jelemenský, Ľ., Šoóš, M., Markoš, J.: Dynamical simulation of safe control of MTBE reactive distillation. In: Book of Abstracts of the 14th International Congress CHISA. Praha, CZ, August 27. –31. 2000
[24] Juma M., Bafrnec M. : Nonstationary heat transfer in reinforced rubber products. Proceedings of the Slovak Rubber Conference 2000, Púchov, Slovakia, 23.-24. May 2000
[25] Juma M., Bafrnec M.: Unsteady Heat Conduction in the Steel-cord Rubber Composites. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22-26. May 2000, p. 69
[26] Kertész, R.: Transport of Phenylalanine Through Bulk Liquid Membranes. In: Proceedings of the Network Young Membrane, Aachen, Germany, September 7.- 8. 2000, 1 pp.
[27] Klein, J., Dolgoš, O., Pollák, Š., Annus, J., Blažej, M:, Markoš, J.: Application of a magnetic tracer method for the characterisation of hydrodynamics in internal – loop airlift bioreactors. In: Proceedings of the 14th International Congress CHISA, (CD), Praha, CZ, August 27. –31. 2000
[28] Klein, J., Godó, Š., Báleš, V.: Pneumatically mixed bioreactors – alternatives of their application to fungal fermentation of citric acid. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, , Tatranské Matliare, Slovakia, May 22.-26. 2000, p.51
[29] Klein, J., Báleš, V., Godó, Š.: Comparative study of citric acid fermentation in various types of bioreactors. In: Proceedings of the 3rd European Symposium on Biochemical Engineering Science (ESBES III), Copenhagen, Denmark, September 10.-13. 2000, p.176
[30] Lisý J.M., Graczová E., Bafrncová S.: Least squares polynomial interpolation.. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, p. 125
[31] López-Fonseca, R.. , Aranzabal, A., Steltenpohl, P., Gutiérrez-Ortiz, J.I., and González-Velasco, J.R.: Catalytic behaviour of H-Y type zeolites in the decomposition of chlorinated VOCs. In: Proceedings of the 12th International Congress on Catalysis,

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C. Books and Textbooks

[1] Bafrncová S., Šefčíková M., Vajda M.: Chemické inžinierstvo, Tabuľky a grafy. Chemical Engineering. Tables and Graphs (in Slovak). STU Bratislava, 2000, ISBN 80-227-1304-X
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[3] Schlosser, Š.: Membrane Based Processes with Immobilized Interface. In: Integration of Membrane Processes into Bioconversions. Kluwer Academic, p. 55-72 (2000)
[4] Schlosser, Š.: Pertraction Through Liquid and Polymeric Membranes. In: Integration of MembraneProcesses into Bioconversions. Kluwer Academic, p. 73-100 (2000)
[5] Schlosser, Š.: Membránové procesy. Membrane processes (in Slovak). In: Chemické inžinierstvo II. (Chemical Engineering II (in Slovak). J. Dojčanský, J. Longauer, Malé centrum, Bratislava, p. 333-374 (2000)

D. Reports and Invited Lectures

[1] Bafrnec, M. : Course: „Engineering aspects of new rubber technologies“. Barum-Continental, April 27.-28. 2000, Luhačovice, CZ
[2] Bafrnec M, Havalda, i., Langfelder I., Mierka O., Timár P.: Course: „Management in the production of paper“. Course for SCP Ružomberok, January-March, 2000
[3] Bafrnec M.: Engineering of rubber productions. 9th semester 2000/2001 lectures 4h/week, Faculty of Industrial Technologies in Púchov, University of Trenčín
[4] Bafrnec M.: Method for estimation of the vulcanisation degree. Research report for Matador a. s. Púchov, Slovakia
[5] Bafrnec M. Juma M.: Reduction of the energy consumption in the rubber production. Research report for Matador a. s. Púchov, Slovakia
(6] Bobok D.: Diffusion of Water in Particles of Silicagel. Thermodynamikseminar, TU Műnchen, 28.1.2000, pp.11 (invited lecture)
[7] Hudec I. Alexy P. Bafrnec M. Juma M. aet al.: Dynamico-mechanical properties and thermal diffusivity of components used for the production of tires. Research report for Matador a. s. Púchov, Slovakia
[8] Jelemenský Ľ., Šoóš M., Markoš J.: Chemical-engineering calculations and modification of the rectification column for the mixture DFA, nonene and additives. Research report for CIBA, Swiss (2000)
[9] Jelemenský, Ľ., Markoš, J.: Safety engineering, lectures within the frame of the education of the staff in SCP, a.s., Ružomberok, November – December, 2000
[10] Markoš M., Jelemenský Ľ., Šoóš M: Chemical-engineering calculations of a reactor and absorber for the production of chloroethanol Research report for Novácke Chemické Závody, a.s., Nováky (2000)
[11] Markoš J., Jelemenský Ľ., Šoóš M.: Kinetics of synthesis of IRGANOX L67. Research report for CIBA, Swiss (2000)
[12] Markoš J., Jelemenský Ľ., Šoóš M.: Estimation of basic physical properties of porous materials (surface area, mean radius of pores, specific volume of pores distribution of poress according to size, porosity) by the apparatuses SORPTOMATIC 1900 a POROSIMETER 2000 for:
Lhodol, s.r.o, Rajec,
Combin, s.r.o., Tisovec,
SCP a.s. Ružomberok,
Novácke chemické závody, a.s. Nováky
[13] Markoš J., Klein J.: Rheological measurement of samples of milk products by VISKOTESTER VT 550. Research report for the Research Milk Institute, Žilina (2000)
[14] Markoš J.: Chemical substances and environment, invited lecture for the advanced education of managers in SLOVAKOFARMA, a.s., , Hlohovec, November 2000
[15] Markoš, J.: Experimental and mathematical modelling of single coal particle combustion. ETH Zurich, Switzerland, April 2000 (invited lecture)
[16] Mierka O., Timár P.: Material and energy balance of an evaporator for black liquor after its reconstruction. Research Report for SCP, a.s. Ružomberok
[17] Mierka O., Timár P, Langfelder I.: Elaboration of an energy audit for the regeneration of caprolactam. Research Report for

RHODIA Industrial Yarns Slovakia, a. s. Humenné
[18] Schlosser, Š.: Pertraction of organic acids and silver through liquid membranes, Technical University of Bucharest, Bucharest, RO, June 8, 2000. (invited lecture)
[19] Šoóš M.: Applicability of the software HYSYS for safety analysis. University College London, London, UK, October, 2000 (invited lecture)
[20] Timár P., Mierka O., Báleš V.: Decrease of energy, and consumption of heat and pressurised air. Research Report for SKY Life, lim., Malacky
[21] Timár P., Mierka O., Báleš V. : Decrease of energy in the production of pressurized air. Research report for KINEX, a. s.
[22] Timár P., Mierka O., Báleš V.: Analysis of the efficiency of heat consumption in Petrochema Dubová. Research Report for PETROCHEMA, a. s. Dubová
[23] Timár P., Mierka O. : Course aimed at special problems of energy in industrial enterprises, for FERMAS s. r. o. Slovenská Ľupča (2000)

DEPARTMENT OF CHEMICAL PHYSICS

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I. STAFF

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Assistant Professors:
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Technical Staff:
Anton Adamko, Marián Babnič, Zdenka Halaburková

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories :

Laboratory of Physics I. (Mechanics, Deformations, Fluids, Heat)
Laboratory of Physics II. (Electrical measurements, DC and AC circuits, Waves, Black body radiation)

B. Research Laboratories:

Laboratory of X-ray Diffraction
Laboratory of Electrical Properties of Conducting Polymers
Laboratory of Gamma Radiation Source

III. TEACHING

A. Undergraduate Study

1. Introductory Courses

1st semester (autumn)		
Seminar in Basic Physics	(0-2h)	Bušovský, Fedorko, Griačová, Holá, Halúsková, Laurinc, Lukáč, Lukeš, Macková, Obert, Tokarčík, Žilinská
Physics I.	(2-2h)	Lukáč, Lukeš, Szőcs
2nd semester (spring)		
Physics I.	(2-2h)	Bušovský, Holá, Laurinc, Lukáč, Lukeš, Macková, Szőcs, Tokarčík, Valach, Žilinská
Physics Laboratory I.	(0-2h)	Annus, Bušovský, Griačová, Griač, Halúsková, Lukeš, Macková, Tokarčík, Žilinská
3rd semester (autumn)		
Physics II.	(2-2h)	Bušovský, Fedorko, Holá, Laurinc, Macková, Tokarčík, Žilinská
Physics Laboratory II.	(0-2h)	Annus, Griač, Griačová, Halúsková, Lukeš, Macková, Pálszegi, Tokarčík, Žilinská

2. Advanced Courses

6st semester (spring)		
Semestral project	(0-4h)	Lukeš
8th semester (spring)		
Statistical Thermodynamics	(2-1h)	Laurinc, Lukeš

IV. CURRENT RESEARCH PROJECTS

A. Effect of gamma- and/or laser irradiation on the structure and critical temperature of copper-oxygen and fulleroid high-temperature superconductors as single crystals (Fedor Valach)

1. X-ray structure investigation of gamma- and/or laser irradiated single crystals of $La_xSr_{1-x}CuO_{2+\delta}$ and C_{60}
2. Evaluation of the correlations of structural parameters versus critical temperature for high-temperature superconductors
3. Bond-valence approach to the copper-copper and copper-oxygen bonding in binuclear copper(II) complexes

4. X-ray crystallographic investigation of the temperature induced copper-oxygen isomers as single crystals

B. Theoretical study of thermo- and photochromism of thiophene based polymers (Viliam Laurinc)

Common project with partners from the Dept. of Organic Chemistry, Slovak Academy of Sciences, and Institute of Chemistry at the Comenius University. The main goal of the project is the analysis of optical absorbtion and luminescence data obtained for variety of synthesised new thiophene oligomers and polymers. The quantitative trends of changes in optical properties are analysed by using the methods of quantum chemistry and theoretical simulations.

C. Optimalization of didactic methods in physics (Oľga Holá)

1. Formation of examination tests, use of microcomputer sets in the physical laboratory and introduction of interactive educational computer programmes
2. Pedagogico-psychologico-sociologic investigation of the motivation and social conditions of university students

V. COOPERATION

A. Cooperation in Slovakia:

Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava
Faculty of Mathematics and Physics, Commenius University, Bratislava
Faculty of Civil Engineering, Slovak University of Technology, Bratislava
Institute of Physics, Slovak Academy of Sciences, Bratislava
Institute of Polymers, Slovak Academy of Sciences, Bratislava
Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava
Faculty of Natural Science, Commenius University, Bratislava
VÚJE a.s., Trnava

B. International Cooperation:

Institut für Festkörperphysik, Universität Wien , Vienna, Austria
- Fullerene and conducting polymer research

Institut für Physikalische Chemie, Universität Wien, Vienna, Austria
- Electronic excitation transport in polymers

Department of Inorganic Chemistry, Charles University, Prague, Czech Republic
- Synthesis of Co complexes

Institute of Chemistry, University of Wroclaw, Wroclaw, Poland
- X-ray crystallographic research

Laboratorium für Chemische und Mineralogische Kristallographie, Universität Bern, Bern, Switzerland
- X-ray crystallographic research

Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK
- Electron diffraction research

Universitad de la Laguna, Tenerife, Spain
- Structural crystallophysics

Institut für Mineralogie, Technische Universität Wien, Vienna, Austria
- Crystallographic and structural chemistry

Chemical Crystallography Laboratory, Oxford University, Oxford, UK
- X-ray crystallographic research at low temperatures, crystallographic statistics

Nuclear Research Institut, Řež u Prahy, Czech Republic
- Emanation thermal analysis

Aristotle University, Thessaloniki, Greece
- Natural sorbents - zeolites

Departement de Recherche Fondamentale sur la Matiere Condensee, Commissariat a l'Energie Atomique, Grenoble, France
- Conducting polymers

C. Membership in Domestic Organizations and Societies

Union of Slovak Mathematicians and Physicists, Bratislava	(V. Bušovský, P. Fedorko, O. Holá, V. Laurinc, S. Macková, T. Obert)
Slovak Physical Society, Bratislava	(V. Bušovský, P. Fedorko, O. Holá, V. Laurinc, S. Macková, T.Obert, F. Valach)
Slovak Chemical Society, Bratislava	(F. Valach)

D. Membership in International Organizations and Societies

International Society for Theoretical Chemical Physics, Erlangen, Germany	(V. Laurinc)
European Synchrotron Radiation Society, Paris, France	(F. Valach)
European Physical Society, Budapest, Hungary	(P. Fedorko, O. Holá, T. Obert, F. Valach)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

P. Fedorko	Departement de Recherche Fondamentale sur la Matiere Condensee, Commissariat a l'Energie Atomique, Grenoble, France (since 3.12.2001)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Valach F., Tokarčík M., Saunders A., Cowley A., Watkin D.J.: Structural isomerism of propionato copper(II) complex: crystal and molecular structure of tetrakis(m-o-propionato)bis(methyl 3-pyridyl-N-carbamate)dicopper(II) at 190 K. Polyhedron 20, 1933-1937 (2001)

[2]* Valach F., Tokarčík M., Maris T., Watkin D.J., Prout C.K.: Bond-valence approach to the copper-copper and copper-nitrogen bonding in binuclear copper(II) complexes: Structure of tetrakis(2-iodobenzoato)bis(caffeine)dicopper(II) at 210 K. J. Organomet. Chem. 622, 166-171 (2001)

[3]* Lukeš V., Vrábel I., Laurinc V., Biskupič S.: Ab initio study of the Li-H2 van der Waals complex. Chem. Phys. 271, 1-8 (2001)

[4]* Lukeš V., Vrábel I., Laurinc V., Biskupič S.: Ab initio study of the HF-H van der Waals complex. J. Phys. Chem. A105, 7686-7692 (2001)

[5]* Lukeš V., Breza M., Pálszegi T., Laurinc V., Vrábel I.: On the relation between conformational changes and optical properties in oligothiophenes. 2. Linear and nonlinear optical properties. Macromol. Theory Simul. 10, 592-599 (2001)

[6]* Lukeš V., Breza M., Végh D., Hrdlovič P., Krajčovič J., Laurinc V.: Non-linear optical properties of new bridged bis-thienyls. I. Pyrazine-based bridges: theory, synthesis and spectra. Synthetic Metals 124, 279-286, (2001). Simul. 10, 592-599 (2001)

[7]* Breza M., Lukeš M., Vrábel I.: On the dependence of optical properties on conformational changes in oligothiophenes. I. Electron absorption spectra. J. Mol. Struct. (THEOCHEM) 572, 151-160 (2001)

[8]* Fedorko P., Fraysse J., Dufresne A., Planés J., Travers J. P., Olinga T., Kramer C., Rannou P., Pron A.: New counterion-plasticized polyaniline with improved mechanical and thermal properties: comparison with PANI-CSA. Synthetic Metals 119, 445-446 (2001)

[9]* Tkáč J., Voštiar I., Šturdík E., Gemeiner P., Mastihuba V., Annus J.: Fructose biosensor based on D-fructose dehydrogenase immobilised on a ferrocene-embedded cellulose acetate membrane. Anal. Chim. Acta 439, 39-46 (2001)

[10]* Dufour B., Rannou P., Fedorko P., Djurado D., Travers J.-P., Pron A.: Effect of plasticizing dopants on spectroscopic properties, supramolecular structure, and electrical transport in metallic polyaniline. Chem. Mater. 13, 4032-4040 (2001)

[11] Vial J.-C., Pépin-Donat B., Viallat A., Fedorko P.: Carrier dynamics in poly(octylthiophene) gels. Mat. Res. Soc. Symp. Proc. 660, JJ8.22.1-JJ8.22.6, (2001)

B. Conferences (*international conferences)

[1]* Holý K., Ridziková A., Polášková A., Stanys T., Bosá I., Holá O.: Temporal variability of some radon characteristics of the soil. In: Proc. XXIV. Days of Radiation Protection, Demänovská dolina, Slovakia, Nov. 26.-29. 2001, p.68-73

[2]* Holý K., Patschová E., Holá O., Bosá I., Polášková A.: Detection system for continuous 222Rn monitoring in waters. In: Proc. XXIV.Days of Radiation Protection, Demänovská dolina, Slovakia, Nov. 26.-29. 2001, p.65-67

[3]* Földešová M., Dillinger P., Lukáč P.: Studies of adsorption of zinc ions on zeolites by means of Zn-65. In: Proc.XXIV.Days of Radiation Protection, Demänovská dolina, Slovakia, Nov. 26.-29. 2001, p.27-31

[4]* Valach F., Tokarčík M., Maris T., Saunders A., Cowley A., Watkin D.J., Prout C.K.: Prediction of metal-ligand bond length in copper complexes using bond-valence model. In: Proc. 18.Int.Conf. on Coordination and Bioinorganic Chemistry, Smolenice, Slovakia, June 4.-8. 2001, p.68

[5]* Holý K., Matoš M., Stanys T., Holá O., Polášková A., Bosá I.: Testing of the 222Rn as a tool for determination of CO2 exhalation rates from the soil. In: Banskoštiavnické dni 2000, Banská Štiavnica, Slovakia, Oct. 6.-7. 2000, p.124-138

[6] Holá O., Laurinc V.: Systém kontroly vedomostí z fyziky. In: Zborník z 2.odb.seminára: Náplň a poslanie fyziky na I.stupni VŠ vzdelávania a nové vzdelávacie technológie na VŠ technických (in Slovak). Trnava, Slovakia, May 31. 2001, p. 54-61

[7] Laurinc V., Holá O.: Fyzika na CHTF STU-súčasnosť a budúcnosť. In: Zborník z 2.odb.seminára: Náplň a poslanie fyziky na I.stupni VŠ vzdelávania a nové vzdelávacie technológie na VŠ technických (in Slovak). Trnava, Slovakia, May 31. 2001, p. 49-53

[8]* Dufour B., Rannou P., Djurado D., Fedorko P., Pron A.: Polyaniline metallique aux proprietes mecaniques ameliorees: preparation, structure et proprietes de transoport. In: 9. Journées Polyméres Conducteurs, Angers, France, Sept.18.-21. 2001, p.C03-06

[9]* Fedorko P., Djurado D., Genoud F., Dufour B., Pron A., Rannou P., Travers J.P.: Vieillissement thermique vs viellissement sous irradiation: nouvelle évidence en faveur de l´hétérogénéité dans la polyaniline. 9. Journées Polyméres Conducteurs, Angers, France, Sept.18.-21. 2001, p.P3-15

[10]* Pépin-Donat B., Vial J.-C., Viallat A., Fedorko P.: Dynamique des porteurs de charges dans les gels de poly(octylthiophene) gonfles. 9. Journées Polyméres Conducteurs, Angers, France, Sept. 18.-21. 2001, p. P3-09.

[11]* Szőcs V, Pálszegi P., Lukeš V., Tortschanoff A. and Kauffmann H.F.: Excitonic coupling in bichromophoric molecules: structural information from 2D two-pulse photon echoes - a theoretical study. In: 5th Femtochemistry conference, Toledo, Spain, Sept. 2.-6. 2001, p. PI17-PI18

[12]* Lukeš V., Laurinc V., Biskupič S., Vrábel I.: Ab initio štúdium van der waalsovských komplexov. Plocha potenciálnej energie komplexu Li-H2. In: XII. Konferencia slovenských fyzikov, Smolenice, Slovakia, Sept. 3.-9. 2001, p.119-120

[13]* Valach F., Tokarčík M., Maris T., Saunders A., Cowley A., Watkin D.J., Prout C.K.: Application of bond-valence theory to structures of coordination compounds. In: Materials Structure in Chemistry, Biology, Physics and Technology. Bedřichov, Czech Republic, June 18.-22. 2001, p.19-20

C. Books and Textbooks

1] Holá O., Veselský J., Baník I., Machovič Ľ., Macáková M., Tomčík P., Valková M., Minárik S., Labaš V.: Príručka k prijímacím skúškam z fyziky na STU v Bratislave (in Slovak). STU Bratislava, 69 pp. (2001)

E. Others:

[1] Laurinc V., Holá O.: Mechanika tekutín. Kapitola v internetovej učebnici fyziky v rámci Internet Distance Education Program (in Slovak). Internet Program IDEP, (2001)

DEPARTMENT OF CHEMICAL TECHNOLOGY OF WOOD, PULP AND PAPER

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II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Wood Structure and Analysis
Laboratory of Chemical Treatment of Wood
Laboratory of Pulping Technology
Laboratory of Papermaking Fibres and Additives

B. Research Laboratories

Laboratory of Wood Chemistry
Laboratory of Structure and Properties of Paper
Laboratory of Natural Polymers
GC-MS Laboratory

III. TEACHING

A. Undergraduate Study

6th semester (spring)		
Semestral Project	(0-4 h)	members of department
Paper and Printing	(2-2 h)	P. Krkoška, J. Panák
7th semester (autumn)		
Physics of Polymers and Paper	(2-2 h)	M. Krištofič, Š. Šutý
Wood Chemistry and Analysis	(2-0 h)	S. Katuščák, K. Vizárová
Pulping Technology	(3-1 h)	M. Vrška, Š. Šutý
Laboratory	(0-8 h)	K. Vizárová
Natural Polymers	(2-1 h)	V. Lužáková, D. Bakoš
Environmental Management in Pulp and Paper Industry	(2-0 h)	K. Vizárová, S. Katuščák
8th semester (spring)		
Paper Technology I.	(3-0 h)	P. Krkoška, Š. Šutý
Paper Machines	(2-2 h)	A. Čerňanský
Engineering of Pulp Production	(1-1 h)	L. Šutý, M. Vrška
Chemical Treatment of Wood I.	(3-0 h)	I. Šurina, S. Katuščák
Laboratory	(0-8 h)	M. Vrška, I. Šurina, P. Mišovec
9th semester		
Chemical Treatment of Wood II.	(2-0 h)	I. Šurina, Š. Šutý
Paper Technology II.	(3-0 h)	P. Krkoška, P. Mišovec
Packaging Materials	(2-0 h)	P. Mišovec
Laboratory	(0-9 h)	M. Vrška, I. Šurina, P. Mišovec
Chemical Aids in Pulp and Paper Industry	(1-1 h)	V. Lužáková, K. Vizárová

10th semester (spring)		
Thesis	0-27 h	supervisors
PhD Study		
Technology of polymeric materials	12 months	P. Krkoška

IV. CURRENT RESEARCH PROJECTS

A. Papermaking fibres-new process of isolation, modification, recyclation and preparing of paper (Pavel Krkoška)

The project respects the request of Slovak industry of chemical treatment of wood, and chemical technology of pulp and paper. Definition and mathematical description of pulp fibres properties by new delignification and bleaching processes in laboratory and industrial conditions, definition of their permanence and durability was studied. The database of monitoring of emission from pulp and paper industry of Slovak Republic was verified. The analysis of wood raw materials with regard to the content of calcium was studied.

B. Thermal degradation of plant cell wall polysaccharides (Ivan Šimkovic, Igor Šurina)

Thermal degradation of wood cell wall polysaccharides and the possibilities of retarding this process were studied. This can be achieved by impregnation of wood materials with appropriate mixtures and by subsequent precipitation of the formed products in the cell wall by acidification. The identification of compounds formed by thermolysis of starch and their derivatives was accomplished also by GC/MS methods.

C. Interaction of Nonprocess Components Under Pulping Condition (Vlasta Lužáková)

Yield and composition of the lipophilic wood extractives of the twelve domestic wood species have been studied by solvent extraction of the wood samples followed by fractionation of the isolated extractives using SPE, and the two pitch formation precursors, originated from wood, were evaluated. The calcium content, determined in the ashed wood samples by AAS, was evaluated as the third pitch formation precursor.
Chosen lipophilic fractions in the pulp treated with anti-deposit agents, the mixture of surfactants or an inorganic adsorbent, have been quantitatively analyzed.
An analytical procedure convenient for the determination of sterol structures present in the mixture of isolated lipophilic wood extractives was developed when appropriate chemical standards, the derivative agets and procedures, as well as GC-MS analysis were employed for that purpose.

D. New methods of valorisation of wood with regards to finalisation and environment protection (Svetozár Katuščák)

Research and development of competitive technologies and products in the woodworking area. Analyses of the trends wood composite panels and furniture research and production. Literature. Laboratory preparation and testing of wood panels from PIR and PCR raw materials. Research of wood composites with environmental quality (EQ) close to natural wood. Study of the methods of quantifying of parameters characterising natural wood in regards to Interior Air Quality (IAQ). Proposal of the complex of characteristic parameters for quantifiying EQ and image of wood composites from recycling in comparison with natural massive wood.

E. Influence of papermaking processes on the paper roughness (Štefan Šutý)

The aim of this work was identified the processes on the paper machine which influenced the paper roughness. From the literature was identified the processing parameters influenced on the paper roughness. The influence of the processing parameters was verified using the multivariable regresion with statistical calculation of the significantion of the parameters.

V. COOPERATION

A. Cooperation in Slovakia

North Slovakian Pulp and Paper Company, Ružomberok
Pulp and Paper Research Institute, Bratislava
State Forest Products Research Institute, Bratislava
Institute of Wood Ecology, Nitra
Technical University, Zvolen
Slovak National Archives, Bratislava
Institute of Chemistry of Slovak Academy of Sciences, Bratislava
Bukóza Co., Vranov
AssiDomän Packaging, Štúrovo; Kappa Štúrovo a.s.
Union of Pulp and Paper Industry of Slovak Republic, Banská Bystrica
Institute of Forest Ecology, Zvolen

B. International Cooperation

Department of Chemical Technology of Wood, Pulp and Paper, Technical University, Pardubice, Czech Republic
- Pulp and Paper Chemistry and Technology

Czech State Central Archives, Praha, Czech Republic
- Permanence and Durability of Paper

Leopold-Franzens University, Innsbruck, Austria
- Properties of Fibers from TMP

Institute of Papermaking and Paper Machines, Technical University of Lodz, Poland
- Cooperation in Pedagogical and Research Activities

University of Quebec - Trois Rivières, Canada
- Properties of Explosion Pulp
Pulp and Paper Research Centre, McGill University, Montreal, Canada
- Filling of Paper
Agricultural University, Faculty of Wood Technology, Poznan, Poland
- Chemical Techn. of Wood and Plant Raw Materials
University of Provence, Marseille, France
- Combustion
French Institute of Papermaking and Graphics Industry, Grenoble, France
- Pulp and Paper Chemistry and Technology
Universidade da Beira Interior, Covilhã, Portugal
- Program Socrates

C. MEMBERSHIP IN DOMESTIC ORGANIZATIONS AND SOCIETIES

Slovak Chemical Society, Bratislava	(P: Krkoška, I. Šurina, L. Šutý)
Slovak Society of Industrial Chemistry, Bratislava	(P. Krkoška, V. Lužáková, P. Mišovec, I. Šurina)
SK-Biom, Bratislava	(I. Šurina)
Union of Pulp and Paper Industry of Slovak Republic, Banská Bystrica	(P. Krkoška, L. Šutý, Š. Šutý)

D. MEMBERSHIP IN INTERNATIONAL ORGANIZATION AND SOCIETIES

TAPPI - Technical Association of the Pulp and Paper Industry, Atlanta, USA	(P. Krkoška)
Society of the Pulp and Paper Industry, Prague - Bratislava, Czech and Slovak republic	(I. Šurina)

E. TEMPUS PROGRAM

F. INTERNATIONAL SCIENTIFIC PROGRAMS

G. VISITORS FROM ABROAD

Prof. M. Milichovský	Technical University, Pardubice, Czech Republic, June and September, (4 days)
Prof. B. Alince	McGill University, Montreal, Canada, September 2001, (3 days)
Prof. W.Z.Tarnawski	Technical University of Lodz, Institute of Papermaking and Printing Technology, Poland, September 2001, (2 days)
Wei Shen, PhD	Australian Pulp and Paper Institute, Department of Chemical Engineering, Australia, December 2001, (1day)
Rogut R., PhD	Technical University of Lodz, Poland, September 2001, (2 days)
Prof. B. Kokta	University of Quebec - Trois Rivières, Canada (2 days)

H. VISITS OF STAFF MEMBERS AND PHD STUDENTS IN FOREIGN INSTITUTIONS

Szeiffová G.	McGill University, Montreal, Canada, December 2001
Buchtová A.	Faculty of Science of University Porto, Portugal, May (30 days)

VI. THESES AND DISSERTATIONS

A. Undergraduate Theses (BSc Degree) for state examinations after three years of study (supervisors are written in brackets):

Balontayová S.:	Influence of additives on strength properties of paper (Mišovec P.)
Coková A.:	Permanence and durability of hand made papers destined to restoration (Krkoška P.)
Černáková S.:	Influence of elektrokinetics properties of components of papermaking suspension to the retention of the filler (Šutý Š.)
Gorelková T.:	Verification of New Methods of Objective Evaluation of the Surface Resistance of Laminated Particleboards (Katuščák S.)
Hajdamárová I.:	Nonchlorine bleaching compounds in bleaching of low Kappa pulps (Vrška M.)
Husárik M.:	Pulp structure changes by accelerated ageing (Vizárová K.)
Kerekeš J.:	Interaction of lipophilic wood extractives and pitch controlling agents (Lužáková V.)
Kolláriková A.:	Influence process waterflow on final parameters of chemical and biological oxygene consuption (Helcman)
Miková G.:	The evaluation of the emission of volatile organic compounds from

lignocellulose materials (Katuščák S.)

Nemčeková A.: Composite properties of materials made from pulp fibres and synthetic latexes (Tiňo R.)

Pengerová V.: Optimization of process parameters at adsorptive core formation of Pantyliner with addition of SAP (Palka)

Tešlárová B.: Bonding ability of recycled fibers from waste paper (Mišovec P.)

B. Graduate Theses (MS Degree)

C. Dissertations (PhD)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents, CA and in ABIPST)

[1]* Fišerová M., Lužáková V.: Application of Surfactans as Kraft Pulping Additives. Bulletin PPRI, Bratislava, Vol.36, 1, 1-17 (2000)

[2] Katuščák S.: Photo – induced modification of the optical properties of lignocellulose materials. Effect of substrate surface on the photoyellowing of surface – coated lignin model compounds. In.: Drevársky výskum 45 (2) :1 – 14, 2000 (Published in 2001)

[3] Katuščák S., Kučera L.J.: Cie orthogonal and cylindrical color parameters and the color sequences of the temperate wood species. In.: Drevársky výskum 45 (3): 9 – 22, 2000 (Published in 2001)

[4]* Marcinčin A., Jurčišinová Z., Borsig E., Krištofič M., Marcinčinová T.: Fiberforming Blend Polypropylene – Polyvinyl Alcohol. Polymers for Advanced Technologies, 12, 2001, 1-5

B. Conferences (*international conferences)

[1] Buchtová A., Šurina I., Katuščák S., Miková G., Vrška M.: Vplyv prchavých organických látok (VOC) na ľudské zdravie. Influence of VOC on human health (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava11.-12.september 2001, ISBN 80-227-1566-2, 34-40

[2] Buchtová A., Ventura G., Martins A., Šurina I., Katuščák S.: Stanovenie emisií prchavých organických látok (VOC) pomocou FLEC (Field and Laboratory Emission Cell) - náhrada komorovej metódy. Determination of VOC emissions by FLEC (Field and Laboratory Emission Cell) (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava 11.-12.september 2001, ISBN 80-227-1566-2, 233-235

[3] Hanus J., Coková A., Krkoška P.: Niektoré historické a súčasné ručné papiere z hľadiska stálosti a trvanlivosti. Permanence and durability of some historical and present handmade papers (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava 11.-12.september 2001, ISBN 80-227-1566-2, 206-210

[4] Kerekeš J., Lužáková V., Šurina I.: Analýza sterolových štruktúr v zmesi lipofilných extaktívnych látok dreva. Analysis of Sterol Structures in the Mixture of Lipophilic Wood Extractives (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava, 11. - 12. September 2001, ISBN 80-227-1566-2, 227-232

[5] Krkoška P. , Tiňo R.: Číselný opis papierenských vlastností buničinových vlákien. Numerical description of papermaking properties of pulp fibers (in Slovak). In: 53.Zjazd chemických spoločností 3.-6. september 2001, Banská Bystrica, Zborník príspevkov ISBN 80-89029-23-X C-P1, 221-224, (in Slovak)

[6] Krkoška P., Vizárová K.: Stálosť a trvanlivosť niektorých buničín a papierov. Permanence and durability of some pulps and papers (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava11.-12.september 2001, ISBN 80-227-1566-2, 171-178

[7] Lužáková V.*, Marcinčinová T., Šutý Š.: Možnosti využitia merania náboja povrchu častíc vo výrobe buničiny a papiera. Possibilities of the Particle Charge Determination Usage in Pulp and Paper Production (in Slovak). In: 53. Zjazd chemických spoločností, 3.-6. September 2001, Banská Bystrica, Zborník príspevkov ISBN 80-89029-23-X C-P5, 230-231

[8] Marcinčin A., Legéň J., Hudecová D., Marcinčinová T., Šesták J., Spevárová E.: Antibacterial Chemical Fibres and Fibrous Materials. 1st AUTEX Conference TECNITEX 2001, Technical textiles, Designing Textiles for Technical Applications, Povoa de Varzim, University of Minko, Portugalsko, 27th and 28th June 2001.

[9] Marcinčin A., Legéň J., Marcinčinová T.: Antibacterial Viscose Fibres. In: Proceedings of 2nd Central Europen Conference on Fibro-Grade Polymers, Chemical Fibres and special Textiles (CEC Monograph series Vol 2), Slov. Univ. of Technol., Bratislava 2001, 239-243.

[10] Marcinčin A., Ujhelyiová A., Hricová M., Marcinčinová T.: Modification of Polypropylene Fibres by Polymeric Additives. International Millenium Congress on Inovations in Fibre , Jarn Fabric Technology and Finishing. Terrassa, Španielsko, 2001.

[11] Marcinčin A., Ujhelyiová A., Zemanová E., Marcinčinová T.: Mass pigmenting of polypropylene and polyethylene terephthalate fibres. In: Fibro-Grade Polymers, Chemical Fibres and special Textiles (Struszczyk H., Marcinčin A., Wlochovycz A. Eds) 1nd Central Europen Conference Monograph Series. Lodz, Poland 2001,Vol 1, 145-155

[12] Marcinčin A., Zemanová E., Marcinčinová T., Brejka O., Budzák D.: Rheological Properties of Polyester Pigment Concentrates. In: Proceedings of 2nd Central Europen Conference on Fibro-Grade Polymers, Chemical Fibres and special Textiles (CEC Monograph series Vol 2), Slov. Univ. of Technol., Bratislava 2001, 239-243.

[13] Mišovec P.: Väzbová schopnosť recyklovaných vlákien zo zberového papiera. Bonding ability of recycled fibers from waste paper (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava 11.-12.september 2001, ISBN 80-227-1566-2, 146-149

[14] Mišovec P.: Vplyv aditív na väzobnú schopnosť vlákien. Influence of additives on bonding ability of pulp fibres (in Slovak). In: 53.Zjazd chemických spoločností 3.-6. september 2001, Banská Bystrica, Zborník príspevkov ISBN 80-89029-23-X, C-P7, 234-235

[15] Šutý Š., Bieliková Ľ., Bednár F., Tiňo R., Buchtová A.: Účinnosť zrážok - parameter na predpovedanie retencie plniva v papieri. Collision efficiency the parameter for prediction the retention of the filler in the paper (in Slovak). In: Proceeding of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava11.-12.september 2001, ISBN 80-227-1566-2, 136-141

[16] Šutý Š., Majlenderová Z., Tiňo R.: Zmena veľkosti častíc flokuláciou indukovanou polyelektrolytom v procese plnenia papiera. Change of particle size by polyelectrolyte induced flocculation in the process of filling the paper (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava 11.-12.september 2001, ISBN 80-227-1566-2, 142 – 145
[17] Šutý Š., Szombathová A.: Použitie prírodných zeolitov ako plniva do papiera. Using the natural zeolits as a filler to the paper (in Slovak). In: 53.Zjazd chemických spoločností 3.-6. september 2001, Banská Bystrica, Zborník príspevkov ISBN 80-89029-23-X, C-P4, 228-229
[18] Tiňo R., Alince B.: Modelový systém sledovania depozície latexových častíc a vytvorenia latexovej viacvrstvy. Model systém of following of the latex particles deposition and creation of latex multilayers (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava11.-12.september 2001, ISBN 80-227-1566-2, 150-154
[19] Vizárová K,: Starnutie papiera a zmena farby. Ageing of paper and colour changes (in Slovak). In: 53. Zjazd chemických spoločností 3.-6. september 2001, Banská Bystrica, Zborník príspevkov ISBN 80-89029-23-X, C-P8, 236-237
[20] Vrška M., Šurina I.: Vápnik – trvalý problém pri výrobe buničín. Calcium - a Permanent Problem in Pulping Technology (in Slovak). In: Proceedings of conference " Pulp and Paper – Technology, Properties, Environment", Bratislava 11.-12. september 2001, ISBN 80-227-1566-2, 64-68.

C. Books and Textbooks

D. Patents

E. Others

[1] I. Šurina, PhD.: FChPT Project 10/01, EBA,s.r.o.
[2] I. Šurina, PhD.: FChPT Project 11/01, KAPPA Štúrovo a.s.
[3] I. Šurina, PhD.: FChPT Project 40/01, KAPPA Štúrovo a.s.
[4] V. Lužáková, PhD.: FChPT Project 43/01, SCP Ružomberok
[5] I. Šurina, PhD.: FChPT Project 63/01, D.V.M.
[6] I. Šurina, PhD.: FChPT Project 64/0, SCP Ružomberok
[7] I. Šurina, PhD.: FChPT Project 84/01, KAPPA Štúrovo a.s.
[8] Š. Šutý, PhD.: FChPT Project 86/01, SCP Ružomberok
[9] Š. Šutý, PhD.: FChPT Project 101/01, Purgina, Bratislava
[10] I. Šurina, PhD.: FChPT Project 118/01, Slovnaft, a.s., Bratislava
[11] S. Katuščák, PhD., FChPT Project 125/01, KAPPA Štúrovo a.s.
]12] I. Šurina, PhD.: FChPT Project 126/01, Jaroslav Samuhel
[13] M. Vrška, PhD.: FChPT Project 140/01, Fellegi Techn. Consulting, Bratislava
[14] S. Katuščák, PhD.: FChPT Project 152/01, MK
[15] V. Lužáková, PhD.: FChPT Project 197/01, SCP Ružomberok

DEPARTMENT OF ENVIRONMENTAL SCIENCES

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Technical Staff
Eleonóra Hornáčková, Marta Onderová

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Water Chemistry
Laboratory of Nuclear Analytical Chemistry

B. Research Laboratories:

Laboratory of Air Protection Technology
Laboratory of Microbiology and Ecotoxicology
Laboratory of Organic Chemistry
Laboratory of Radioecology
Laboratory of Water and Wastewater Technology
Laboratory of Computer Modelling

III. TEACHING

A. Undergraduate Study

5th semester (autumn)		
Nuclear Chemistry and Technology I.	(1-1)	Koprda, Dillinger
6th semester (spring)		
Environmental Technology	(2-0)	Piatrik, Čík, Koprda,
7th semester (autumn)		
Biology of Water, Soil and Air	(2-0)	Černáková, Fargašová
Atmospheric and Water Chemistry	(4-0)	Prousek, Bodík
Hydrology, Meteorology and Pedology	(2-0)	Fargašová, Čerňáková
Laboratory Practice I.	(0-8)	Harangozó, Bodík, Dillinger, Fargašová, Földesová, Čerňáková
Nuclear Chemistry and Technology II.	(2-0)	Koprda, Dillinger
8th semester (spring)		
Air Protection Technology	(2-0)	Čík, Prousek
Laboratory Practice II.	(0-8)	Derco, Dillinger, Čík
Radioecology	(2-0)	Harangozó, Dillinger
Wastewater Engineering	(2-2)	Derco, Drtil
9th semester (autumn)		
Branch - Technology of Environment		
Risk Properties of Substances	(2-0)	Prousek, Černáková
Laboratory Practice III.	(0-10)	Drtil, Harangozó, Čík
Liquidation and Utilization of Solid Wastes	(2-0)	Piatrik, Koprda
Environmental Technological Project	(3-0)	Drtil, Derco

Environmental Impact Assessment	(2-0)	Koprda, Piatrik
Control of Environmental Pollution	(2-0)	Harangozó, Dillinger
Special Ecology and Ecotoxicology	(2-0)	Fargašová, Prousek
Processes and Technology of Water Treatment	(3-0)	Hutňan, Bodík
Air Protection Technology and Air Treatment	(3-0)	Čík, Prousek

10th semester (spring)

Diploma Work	(0-30)	all members of the staff

B. PhD Study

1. Environmental Chemistry and Technology

Anaerobic Wastewater Treatment Processes	Derco, Hutňan
Progressive Methods of Wastewater Treatment	Derco, Drtil
Combination of Anaerobic-aerobic Wastewater Treatment Processes	Bodík
Simulation of Biological Processes of Wastewater Treatment	Derco
Utilization of Ozone for Wastewater Treatment	Derco

2. Nuclear Chemistry and Radioecology

Penetration of Radionuclide across Skin Barriers	Koprda, Harangozó
Study of Metal Transport from Abiotic to Biotic Systems	Koprda, Lesný
Effect of Aerosol Size Fractions on Health Risk Assessment	Koprda
The Use of Fenton Reaction to Wastewater Treatment	Koprda, Prousek

IV. CURRENT RESEARCH PROJECTS

A. The study of separation and immobilisation of radionuclides from nuclear power cycle by natural adsorbers (Pavel Dillinger)

The determination of sorption capacity of chemically modified natural zeolites towards some cations was studied by static radioexchange and AAS methods. It was studied the sorption of Sn(II), Zn(II), Cs(I) and Co(II). Radionuclides Sn-113, Zn-65, Cs-137 and Co-60 were used as radiotracers. The dependence of structure, sorption capacity and the desorption of natural and chemically modified zeolites for individual cations on pH, temperature and competitive cations (Cr, Zn, Ca, Cu, Fe, Cs, Co) was studied. All these parameters were studied on model water solutions labelled by radionuclides. The sorption of Sn from two chemical different solutions $SnCl_2$ and $SnCl_4$ was studied. It was studied the sorption of cations from mixed solutions (Cs + Co) by new types of natural and chemically modified sorbents (zeolite, mordenite, bentonite smectite, clays). We demonstrated that the sorption capacity of natural and chemically modified sorbents depend not only on these materials but also on the chemical properties of studied solutions and pH. The results of our research were presented in journals and in international conference XXIV. Days of radiation protection.

Determination of copper, cesium, selenium and other heavy metals in ashes from fy Duslo Šala by radionuclide X-ray fluorescence technique was done. Heavy metals Cu, Fe, Pb and Zn were determinated in agricultural refine plants (cereals) by AAS method.

It was developed the high-senzitive detection system for continuous Rn-222 monitoring in waters. The device can be used for the continual control of radon activity concentration in water sources, the daily and seasonal variations of radon activity in water systems and for the determination of the infiltration time of surface water into the ground water. The time variability of the volume activity of Rn-222 in the various depth of the soil and the radon exhalation's rate from the soil surface were studied.

B. Progressive Methods of Water, Wastewater and Activated Sludge Treatment (Ján Derco)

1.Utilisation of ozone for removal of biorefractory organics (J. Derco, A. Gulyásová)

The effectiveness of ozone treatment for improvement of the biodegradability of biorefractory organic pollutants contained in a landfill leachate after biological pre-treatment was also studied. Contaminants transformation was monitored by means of overall parameters related to the concentration of organic compounds in the treated samples, i.e., chemical oxygen demand (COD) and biochemical oxygen demand (BOD). Approximately 60 % reduction of COD in biologically pre-treated landfill leachate was observed after about 10 to 11.5 h lasting ozonation. Maximum observed BOD_5 value, measured by respirometric method was 244 mg dm^{-3}. Biodegradability expressed as BOD_5/COD ratio increased from zero up to a maximum value of 0.21, corresponding to the ozone consumption of 0.7 mg per mg of reduced COD.

2. Municipal wastewater treatment in anaerobic and aerobic reactors at low temperature (I. Bodík, E. Gašpariková)

The low temperature influence (5-25 ^{o}C) on the municipal wastewater treatment processes under anaerobic conditions has been studied. The reduction of the reactor volume and operational costs and determination of optimum combination of anaerobic and aerobic reactors for municipal wastewater treatment plants were the aim of research. The experiments with the real wastewater on the pilot-scale reactor on the wastewater treatment plants in Bratislava were realised.

3. Toxicity, accumulation and interactions of metals in water and terrestrial organisms (A. Fargašová)

During the tests the attention was dedicated to the effects and bioaccumulation of metals and their reciprocal interactions for selected freshwater benthic and plankton organisms and some terrestrial plants. For determination of metal accumulation in alga cells and plant roots and cotyledones the analytical methods AAS and RXFA were used. The obtained results help to solve problems connected with metal removing from the environment and to establish the limit values for some metals.

4. Anaerobic waste and wastewater treatment processes and technologies (M. Hutňan, M. Drtil, M. Horňák)

Laboratory experiments with anaerobic treatment of selected organic wastes have been realised. Experiments were carried out with sugar beet pulp as a by-product of sugar production and with grain distillery slops. Possibilities of the start-up of the sugar beet pulp anaerobic treatment with various types of inoculum were observed and compared. Aerobic treatment of sludge water from the

anaerobic treatment of sugar beet pulp was studied, too. From this research very good anaerobic degradation of the sugar beet pulp resulted. High efficiency of organic carbon and nitrogen removal during sludge water aerobic treatment was achieved. Grain distillery slops are interesting material for anaerobic treatment. They contain much more proteins as other types of the stillages (from molasses, fruits etc.). Therefore, different conditions of anaerobic degradation and different quality of sludge water can be assumed. From this point of view the process was studied. In addition, anaerobic processes and odour formation in sewer system were studied, too. Research was focused on the reasons, consequences and control methods of the septicity and hydrogen sulphide production in sewer systems.

5. Sludge treatment processes (M. Drtil, M. Hutňan)
Laboratory and pilot scale research on autothermophylic aerobic sludge digestion and its comparison with other digestion methods (psychrophylic aerobic digestion, anaerobic digestion) was realised. Excess sludge from medium loaded activation at industrial WWTP was digested. Attention was given to sludge removal efficiency, quality of sludge water, dewatering properties and hygienisation of the sludge.
Sludge water treatment by sorption in alginite was tested. Main attention was given to ammonium and phosphates removal. In addition, effect of alginite on sludge sedimentation, thickening and dewatering was determined.

6. Fenton and Photo-Fenton Reaction (J. Prousek)
Fenton reaction for the degradation of selected dyes such as Ostazine Yellow H-5G, Ostazine Blue H-P, Ostazine Green H-3G, and Brilliant Yellow have been studied. Similarly the Fenton reaction has been used for real coloured wastewater treatment with high initial COD and dye content values. Photo-Fenton and similar photochemical reactions have been tested for the degradation of dyes and some nitrogen heterocycles such as benzoimidazole and its derivatives. Tested photochemical systems were as follows: H_2O_2/Fe^{2+}/UV, H_2O_2/Fe^{3+}/UV, $H_2O_2/Fe(C_2O_4)_3^{3-}$/UV, $Fe^{2+}/H_2C_2O_4$/UV, and $Fe^{3+}/H_2C_2O_4$/UV. Best of all has been appeared the $H_2O_2/Fe(C_2O_4)_3^{3-}$/UV system.

7. Study of the apoptosis effect of berberine on various cellular effects (M. Čerňáková)
Berberine is an isoquinoline derivative which was isolated from Mahonia aquifolium. It has long been known to have some antibacterial and antiprotozoal properties. Furthermore, it binds to DNA around the neutral pH by intercalation in the GC-rich regions of DNA. It has also been known that berberine has an ability to induce the apoptosis. In our work, the antimutagenic actitivity of berberine and the interactions of enzymes – topoisomerase (TOPO-I) and (TOPO II) with berberine were estimated. The in vitro cytotoxicity of berberine to human cancer cells of the line Hela and of murine leucemic cell lines L 1210 were investigated in relation to the cytotoxic activity of berberine and the action of its molecular mechanism. The toxicity of berberine to various cell models. The effect of berberine on various kinds of the plant and animal kingdom living in water. The observations were completed by a combined effect of the UV- and γ-radiation. The antimicrobial activity of berberine was estimated in the various kinds of clinical bacteria sensitive and resistant to antibiotics; yeasts and fungi.

C. Penetration of Ionic Species across Skin, (Vasil Koprda)

In the case of body surface radionuclide contamination, the penetration of radionuclides across the human skin enhances internal contamination of an organism. To regulate this process, it is usefull to decrease the penetration rate of radionuclides or to increase the skin penetration barriers. The main objective of the research was the kinetic study of the transport of radionuclides ^{137}Cs, ^{60}Co, ^{90}Sr, ^{109}Cd, ^{147}Pm across the skin, to search for possibilities of reducing the transport of some compounds through skin, to enhance prevention of systemic body contamination by the formation of insoluble compounds and compounds with poor penetration qualities, by the formation of deposit in upper layers of skin, and using of absorption and retarding agents.
Two different types of animal permeation model of human skin: a) whole intact skin from abdominal region of 5-day rat (5DR), and b) whole intact skin from the same region of 9-day rat (9DR) were used to differenciate between transdermal and transfolicular permeation of radionuclide ions across the skin. To find out an existence of skin depot of permeated substances the skin splitted in epidermal-dermal junction was used. To define stratum corneum as the dominant permeation barrier the skin stripping was used.
The experimental results in diffusion chambers *in vitro* brought the following conclusions:
the 5DR skin was again found to be a suitable biological model for transdermal transport characterisation; the transport of metallic ions along hair follicles is important and in the case of the 9 DR skin it is even more pronounced than the transepidermal transport; the horny layer represents the most significant barrier to the penetration of ions; skin-protective and regenerative cream Indulona showed ion-permeation enhancing effect;
synthetic zeolite (zeolone) showed more suppressive features than natural zeolite (mordenite); the rate of ion penetration is proportional also to its amount in the donor solution, and reversely proportional to its charge; the ions were transported through skin in the decreasing order:$Cs^+ > Cd^{2+} > Sr^{2+} > Co^{2+} > Pm^{3+}$; carboxymethyl-chitin-glucan was found the more efficient inhibitor of ion transport than fibrilar beta-glucan, and both showed concentration dependence of the inhibition; concentration of radionuclides in epidermis was found lower than in derma.

D. Syntheses directed towards novel structurally well defined π-conjugated heterocyclic compounds and their oligomers (Gabriel Čík)

The mothod of chemical oxidative polymerization with $FeCl_3$ was used to synthesize the copolymer of dipyrido-[3,2-a; 2',3'-c]-thien-[3,4-c]azine and 3-dodecylthiophene. The copolymer was characterized by UV-VIS, ^1H and ^{13}C NMR and EPR spectrosscopy. It has been found that copolymer exhibits properties of low-band-gap polymer. The formation of reactive oxygen species due to irradiation by visible light of thiophene oligomers incorporated in the pentasile-type Na-ZSM-5 zeolite microstructure has been studied in aqueous medium. The oxidative oligomerization of thiophene was carried out in the zeolite channels after ion exchange of Na^+ for Cu^{2+}. By means of spin trapping, the hydroxyl radicals temporarily produced in situ were detected by EPR spectroscopy in aqueous suspension on the Cu-ZSM-5 sample with polythiophene deposited in the channels of the zeolite microstructure during illumination with visible light. Influence of the Cu(II)-complexes of thiophene oligomers synthesized by oxidative polymerization of thiophene with Cu^{2+} ions in ZSM-5 zeolite channels on fungicidal and antimicrobial properties was studied. It has been found that the heterogenous system culture medium-modified zeolite increases sporulation of the tested fungus (*Aspergillus niger*) and currently kills yeast (*Candida albicans*). As for the tested bacteria (G^+ *Staphylococcus aureus*, G^- *Escherichia coli*), the percentage of the killed cells increases due to light activation of the system. The light effect is assigned to photogeneration of the reactive

oxygen species, mainly ·OH radicals, which were registered in the water solution by EPR spectroscopy.

V. COOPERATION

A. Cooperation in Slovakia

Amylum SLOVAKIA s.r.o., Boleráz,	(M. Hutňan, M. Drtil, M. Onderová, M. Horňák)
ASIO-SK s.r.o., Bytča	(I. Bodík)
Association of Wastewater Treatment Experts in Slovak Republic, Bratislava	(I. Bodík, J. Derco, M. Drtil, A. Fargašová, E. Gašpariková, M. Horňák, M. Hutňan)
ČOVSPOL a.s. Bratislava	(M. Drtil)
Department of Analytical Chemistry, Faculty of Pharmacy, Comenius University, Bratislava	(M. Harangozó, A. Fargašová)
Department of Nuclear Chemistry, Faculty of Natural Sciences, Comenius University, Bratislava	(P. Dillinger, M. Földesová, V. Koprda)
Department of Nuclear Physics, Faculty of Mathematic and Physics, Comenius University, Bratislava	(P. Dillinger., M. Földesová, O. Holá)
Department of Physics, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava	(G. Čík)
Department of Plant Physiology, Faculty of Natural Sciences, Comenius University, Bratislava	(A. Fargašová)
Ekologické služby, s.r.o. Strážske	(J. Derco)
Faculty of Pharmacy, Comenius University in Bratislava	(M. Čerňáková, V. Koprda)
Faculty of Natural Science, Department of Chemistry, Matej Bel University in Banská Bystrica	(P. Dillinger., M. Földesová, M. Harangozó)
Institute of Chemistry, Faculty of Natural Sciences, Comenius University, Bratislava	(G. Čík, A. Fargašová)
Institute of Experimental Pharmacology, Slovak Academy of Sciences, Bratislava	(V. Koprda, P. Bendová).
Institute for Education of Slovnaft Co., Bratislava	(V. Koprda)
JANK GROUP a.s., Skalica	(M. Hutňan, M. Onderová, M. Horňák)
Kafiléria, a.s. Senec	(M. Hutňan)
Nuclear Regulatory Authority of the Slovak Republic , Bratislava	(V. Koprda)
ROSLO s.r.o., Batislava	(V. Koprda, Z. Kassai, A. Palinkasová, P. Bendová)
Research Institute of Nuclear Power Stations, Trnava Ltd.	(P. Dillinger., M. Földesová, V. Koprda)
SANEK s.r.o., Bratislava	(M. Hutňan, M. Onderová, M. Horňák)
Severoslovenské celulózky a papierne, a.s. Ružomberok	(J. Derco)
Slovak Society for Industrial Chemistry of Slovnaft Co., Bratislava	(V. Koprda)
Toxicological Section of Slovak Society for Industrial Chemistry, Bratislava	(V. Koprda)
Toxicological Chemistry Section of SCS at Slovak Acad. of Sci., Bratislava	(V. Koprda)
Water Research Institute, Bratislava	(I. Bodík, J. Derco, P. Dillinger, M. Drtil, M. Földesová, M. Harangozó, M. Hutňan, V. Koprda)

B. International Cooperation

ASIO s.r.o., Brno, Czech Republic,
- Waste water treatment processes (I. Bodík, M. Drtil)

Consiglio Nazionale delle Ricerche, Instituto di Chimica delle Macromolecole, Via E. Basini 15, 20133,
- Molecular materials and functional polymers (G. Čík)

Department of Chemistry and Physics, University of Agriculture, Cracow, Poland,
- Metal-metal interactions (A. Fargašová)

Faculty of Chemistry, VUT Brno, Brno, Czech Republic,
- Risk assessment of wood preservative compounds (A. Fargašová)
- Wastewater treatment technology (J. Derco)

School of Pharmacy, Dept. Pharm. Chem., King Edward VII. Ave, Cardiff, United Kingdom.
- Transcutaneous penetration of xenobiotics (V. Koprda).

Univ. Claude Bernard Lyon-1, ISPB, Dept. Galenic Pharm. , Lyon, France.
- Transcutaneous penetration of xenobiotics (V. Koprda)

C. Membership in Domestic Organizations and Societies

Association of Wastewater Treatment Experts in Slovak Republic, Bratislava	(I. Bodík, J. Derco, M. Drtil, A. Fargašová, M.Hutňan)
Biotechnological Society, Bratislava, Slovak Republic	(M. Čerňáková)
Czechoslovak Limnological Society, Prague-Bratislava, Czech Republic and Slovak Republic	(M. Čerňáková)

Czechoslovak Microbiological Society, Prague-Bratislava, Czech Republic and Slovak Republic	(M. Čerňáková)
Environmental Committee for Valuation and Identification of Products at the Ministry of the Environment SR	(A. Fargašová)
Expert Group of State Office for Nuclear Safety	(V. Koprda)
Pharmacological Soc. of Slovak Medical Society, Bratislava	(V. Koprda)
Slovak Chemical Society, Bratislava	(G. Čík, J. Derco, P. Dillinger, A. Fargašová, M. Harangozó, V. Koprda, J. Prousek)
Slovak Nuclear Society , Bratislava	(V. Koprda)
Slovak Pharmaceutical Society at SMS Bratislava	(A. Fargašová, M. Harangozó, V. Koprda)
Slovak Society of Chemical Engineering, Bratislava	(J. Derco, M. Hutňan)
Slovak Society of Industrial Chemistry, ZSVTS, Bratislava	(I. Bodík, J. Derco, M. Drtil, P. Dillinger, A. Fargašová, M. Földesová, M. Hutňan)
Slovak Society of Limnology at SAS Bratislava	(M. Čerňáková, A. Fargašová)
Society of Nuclear Medicine and Radiation Hygiene of SMS, Bratislava	(V. Koprda)

D. Membership in International Organizations and Societies

Association of Wastewater Treatment Experts, Brno, Czech Republic	(I. Bodík, J. Derco, M. Drtil, A. Fargašová, E. Gašpariková, M. Hutňan, M. Horňák)
Bulletin of Environmental Contamination and Toxicology, U.S.A. – Member of Editorial Board	(A. Fargašová)
Czech Chemical Society, Prague, Czech Republic	(V. Koprda, J. Prousek)
International Water Association, London, UK	(I. Bodík, J. Derco)
European Photochemistry Association, Mülheim, Germany	(G. Čík, J. Prousek)
EUROTOX Madrid, Spain	(A. Fargašová)
FECS Division on Chemistry and the Environment	(V. Koprda)
Journal of Trace and Microprobe Techniques, U.S.A. – Member of International Group of Correspondents	(A. Fargašová)
SECOTOX – International Society of Ecotoxicology and Environmental Safety, Munich, Germany	(A. Fargašová)

E. TEMPUS Programme

TEMPUS JEP-IB 13123/98
Coordinator: Anežka Moncmanová
Coordinating institution: STU, Bratislava
Title: Continuing Education in European Directives and Environmental Standards
Partners:
Universita degli Studi, Bari, Italy, TEMPUS Project
Vienna University of Technology, Vienna , Austria , TEMPUS Project
Institut für Őkologie, St. Pőlten, Austria , TEMPUS Project
NOWATECH, Ass., Bari, Italy, TEMPUS Project
ENEA, Rome, Italy, TEMPUS Project
Zväz hutníctva, ťažobného priemyslu a geológie SR, Bratislava
ASIO s.r.o., Bytča
Technická univerzita Zvolen, Fakulta ekológie a environmentalistiky, Zvolen
Duration: December 1998 to March 2001

F. International Scientific Programmes

COST Action 837 „Plant biotechnology for the removal of organic pollutants and toxic metals from wastewaters and contaminated sites“ (A. Fargašová)
Working Group 2 (WG2) – Toxic metals: screening and uptake studies
Working Group 4 (WG4) – Cultivation and utilization of plants
Coordinator: Dr. J. P. Schwitzguebel, Lausanne, Switzerland
Coordinators for Slovak Republic: Assoc Prof. A. Lux, Faculty of Natural Science, Comenius University, Bratislava; RNDr. D. Lišková, PhD., Institute of Chemistry SAS, Bratislava Partners: On the project participate 21 countries (the list of participants can be found on http://lbewww.epfl.ch/COST837)
Period: April 1998 to April 2002

G. Visitors from Abroad

Prof. M. Dohanyos	VŠCHT Praha, Czech Republic, January 2001 (1 day)
Prof. J. Wanner	VŠCHT Praha, Czech Republic, April 2001, October 2001, November 2001 (5 days)
Ing. K. Plotěný	ASIO Brno, Czech Republic, November 2001 (2 day)
Dr. Ing. T. Ertl	LU Vienna, Austria, November 2001 (2 days)
Assoc. Prof. D. Dulovics	TU Budapest, Hungary, November 2001 (1day)
Prof. M. Anke	FSU, Jena, Germany, May 2001 (3 days)
Dr. K.-W. Schramm	GSF-Nat.Res.Center for Environ. and Health, Neuherberg, Germany,June 2000 (1 day)
Prof.J. Matoušek	Chem.Faculty UT Brno, Czech Rep., April 2001 (I day)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

Bodík I.	Vienna University of Technology, Austria, January 2001 (2 days)
Bodík I.	Universita degli Study Bari, Italy, February 2001 (5 days)
Bodík I.	Conference "Anaerobic Treatment 2001", Klatovy, Czech Republic, October 2001 (3 days)
Bodík I.	Seminar "Legislative fűr die Kleinkläranlagen im Mitteleuropa", Kobilí (Czech Republic) January 2001, (2 days)
Drtil M.	Association of Wastewater Treatment Experts, Prague, Brno, Czech Republic, March, June, September 2001, (6 days)
Gašparíková E.	EuroLab Course "Pollution Surveillance and Control in Wetland Ecosystems, University of Veszprém Hungary, October 2001 (6 days)
Horňák M.	International Conference "Water and Environment", Pavlov, Czech Republic, November 2001 (2 days)
Hutňan M.	Prague Institute of Chemical Technology, Prague, Czech Republic, June 2001 (1 day)
Hutňan M.	Association of Watertreatment Experts of Czech Republic, Brno, Czech Republic, September 2001 (2 days)
Hutňan M.	Conference "Anaerobic Treatment 2001", Klatovy, Czech Republic, October 2001 (3 days)
Hutňan M.	Vienna University of Technology, Austria, January 2001 (2 days)
Moncmanová A.	Vienna University of Technology, Austria, January 2001 (2 days)

VI. THESES AND DISSERTATIONS

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

Adamčík M.:	The study of sorption conditions of Sn with natural sorbents by method of radiotracer. (P.Dillinger)
Angušová L.:	Anaerobic treatment of sugar beet pulp. (M. Hutňan)
Bartošová N.:	Ecotoxicological effects of copper complexes on freshwater algae. (A. Fargašová)
Bendová Petra:	The study of permeation of substances across the skin animal models. (V.Koprda)
Gašpariková E.:	The influence of the temperature on the anaerobic degradation of the primary sludge. (I. Bodík)
Godóová E.:	The study of the sorption of Sn and competitive cations Fe, Co, Cs by radioexchange and AAS methods. (M. Őldesová)
Hájnik P.:	The use of radioexchange method for the studying of sorption and desorption of Sn by various types of zeolites. (P. Dillinger)
Jankuliaková M.:	The use of radioexchange and AAS methods for the studying of sorption and desorption Sn and competitive ions Cr, Zn, Cu by natural and chemically modified zeolites. (M. Őldesová)
Kočanová S.:	Comparison of psychrophylic and thermophylic aerobic sludge digestion. (M. Drtil)
Kuruc M.:	Utilisation of ozone for transformation of biologically resistant organics. (J. Derco)
Okruhlicová T.:	Incineration of solid wastes in Duslo Šaľa a.s. (M.Harangozó)
Pajgerová L.:	Utilisation of auto-thermophylic aerobic sludge digestion at industrial WWTP. (M. Drtil)
Plodová M.:	The programmed death of cell-apoptosis induces by berberine isolated from Mahonia. (M. Čerňáková)
Tamášiová L.:	The content of heavy metals in wheat in depedencene on the soil composition. (M.Harangozó)
Vavreková L.:	Degradation of selected water pollutants by Fenton- and modified Fenton reaction. (J. Prousek)
Žemberová M.:	Photodegradation of selected environmental pollutants by the use of photocatalysis and photo-Fenton reaction. (J. Prousek)

B. Dissertations (PhD)

Buday J.:	Intensification of nitrogen removal from wastewater – substrate and product inhibition of nitrification. (Derco, Drtil)
Kassai Z.:	Effect of patterns of chemical substances on their transdermal permeation and possibility to influence the permeation by chemical substances. (Koprda, Harangozó)
Kovács A.:	Modelling of biological processes of nutrient removal. (Derco)
Miháliková E.:	Monitoring of chemical characteristics of size fractions of air aerosols regarding evaluation of their potential health risk. (Koprda)
Mrafková L.:	Anaerobic treatment of wastewater in high rate reactors. (Derco, Hutňan)

C. Dissertations (DrSc.)

Fargašová A.: Ecotoxicological tests utilization for metal toxicity determination on selected environmental components. FEE TU Zvolen.

D. Habilitation Theses

Brokeš P.: Possibilities of the use of membrane processes for recyclation of wastewater and secondary raw materials, Field: Chemistry and technology of environment, Sci. branch 28-95-9

Drtil M.: Selected problems of kinetics and regulation of processes of biologic removal of nitrogen, Field: Chemistry and technology of environment, Sci. branch 28-95-9

Krištín J.: Characteristics of aerosols in outdoor air, Field: Chemistry and technology of environment, Sci. branch 28-95-9

VII. PUBLICATIONS

Journals (*registered in Current Contents)

[1]* Bauerová K., Kassai Z., Koprda V., Harangozó M: Contribution to the penetration of radionuclides across the skin. Concentration dependence of strontium through the skin In Vitro. J. Appl. Toxicol. 21, 241-243 (2001)

[2] Bodík I.: Voda v internete, internet vo vode. Water in internet, internet in water (in Slovak). XXI. storočie 4(3), 55-56 (2001).

[3] Bodík I., Rajczyková E.: Základné problémy súčasného odvádzania a čistenia odpadových vôd v SR. The basic problems of the present draining and treatment of wastewater in the Slovak Republic (in Slovak). XXI. storočie 4(1), 30-32 (2001).

[4]* Čík G., Krajčovič J., Veis P., Végh D., Šeršeň F.: Characterization and properties of the copolymer of dipyrido-[3,2-a; 2',3'-c]-thien-[3,4-c]azine with 3-dodecylthiophene. Synth. Met. 118, 111-119 (2001)

[5]* Čík G., Šeršeň F., Bumbálová A.: In situ spin trapping of ·OH radicals photochemically generated by thiophene oligomers incorporated in copper-doped ZSM-5 zeolite in aqueous medium. Microporous and Mesoporous Materials 46, 81-86 (2001)

[6]* Čík G., Bujdáková H., Šeršeň F.: Study of fungicidal effect of the Cu(II)-complexes of thiophene oligomers synthezized in ZSM-5 zeolite channels. Chemosphere 44, 313-319 (2001)

[7]* Čík G., Šeršeň F., Dlháň L.: Electric conductivity of poly(3-dodecylthiophene) and its dependence on the conformational changes of polymer chains. Czech. J. Phys. 51, 257-271 (2001)

[8] Derco J., Kuffa R., Marová J.: Vplyv zrážacích činidiel na sedimentačné a odvodňovacie vlastnosti kalu. Influence of precipitiation agents on sedimentation and dewatering properties of activated sludge. (In Slovak). Vodní hospodářství, 5 (2001). Čistírenské listy 3, XI - XII (2001).

[9] Derco J., Kuffa R., Marová J.: Vplyv zrážacích činidiel na sedimentačné a odvodňovacie vlastnosti kalu. Influence of precipitiation agents on sedimentation and dewatering properties of activated sludge. (In Slovak). Vodní hospodářství, 7 (2001). Čistírenské listy 4, V -VII (2001).

[10] Derco J.: Procesy prebiehajúce v stokovej sieti. Processes in sewer system (In Slovak). Vodohospodársky spravodajca , 44 (1), 13 - 14, (2001).

[11] Derco J., Kovács A. Odstraňovanie nutrientov v aktivácii s časovou segregáciou. Nutrient removal in an intermittently aerated activated sludge process (in Slovak). Vodohospodársky spravodajca , 11, 8 - 10, (2001).

[12]* Derco J., Králik M., Kovács A.: Modelling of Nutrient Removal Processes in an Intermittently Aerated Bioreactor. Chem. Biochem. Eng. Q. 15 (4), 167 - 174, (2001).

[13] Derco J. Intenzifikácia procesov čistenia odpadových vôd znečistených ropnými a olejovými látkami. Intensification of an oil wastewater treatment processes (In Slovak). Ropa a uhlie 43 (1), 39 - 41, (2001).

[14] Derco J., Gulyásová A., Králik M., Mrafková L.: Treatment of an industrial wastewater by ozonation. Petroleum and Coal 43 (2) 92-97 (2001).

[15] Derco J., Králik M.: Optimisation of an oil wastewater treatment plant. Petroleum and Coal 43 (2) 85-88 (2001).

[16] Drtil M., Bodík I., Belica P.: Základné problémy súčasného odvádzania a čistenia komunálnych odpadových vôd. Actual problems of municipal wastewater collection and treatment (in Slovak). Eurostav 7/ 6, 10–12 (2001)

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[1] Koprda V.: Ekologické vplyvy energetických zdrojov. Ecologic effects of energetic sources (In Slovak), In: Aktuálne problémy kontaminácie životného prostredia z hľadiska toxikológie a ekotoxikológie (II.časť), (I. Beseda a kol.),Výber vedeckých prác popredných odborníkov v oblasti environmentalistiky. Actual problems of environmental contamination from toxicological and ecotoxicological point of view. Selection of scientific works of some prominent environmental specialists. Faculty of Ecology and Environmentalistic of TU, Zvolen 2001, kap.6.1., pp.145-156, ISBN 80-228-191-6

Textbooks

[1] Koprda V.: Jadrová a radiačná bezpečnosť, Nuclear and radiation safety (in Slovak). Textbook of The Course of EUROPROJECT, Inf. Consult.Centre of Environm.Legisl.and Norms of STU Bratislava, in the frame of TEMPUS IB JEP Project No.13123/98, ÚV TIP Nitra, Vyd. NOI Bratislava 2001, pp.65

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[3] Medveď, M. et al: Aplikovaná ekochémia. Applied Ecochemistry (in Slovak) Leonardo da Vinvi Programme, Project No.: SK/99/1/094125/PI/I.1a/FPI, development of Educational Modules for Speciality „Environmental Chemistry“, Pedagogická spoločnosť Jána Amosa Komenského, Banská Bystrica, 2001

[4] Prousek J.: Rizikové vlastnosti látok. Risk properties of substances (in Slovak). Publishing House of STU, Bratislava, 247 pp. (2001)

[5] Tőlgyessy J., Dillinger P., Harangozó M.: Jadrová chémia, Nuclear chemistry (in Slovak), vyd. Fakulta prírodných vied, Univerzita Mateja Bela, Banská Bystrica, pp. 315, 2001, ISBN 80-89029-15-9

[6] Tölgyessy J., Piatrik M., Schmidt R., Szakál, P., Kontic B.: Chemistry and Technology of Solid Wastes. Leonardo da Vinvi Programme, Project No.: SK/99/1/094125/PI/I.1a/FPI, development of Educational Modules for Speciality „Environmental Chemistry“, Pedagogická spoločnosť Jána Amosa Komenského, Banská Bystrica, 2001

[7] Tölgyessy, J., Samešová, D., Piatrik M., Daxnerová, O., Vaculčiková, D.: Chémia a manažment tuhých odpadov. Solid waste chemistry and management (in Slovak). Leonardo da Vinci Programme, Project No.: SK/99/1/094125/PI/I.1a/FPI, development of Educational Modules for Speciality „Environmental Chemistry“, Pedagogická spoločnosť Jána Amosa Komenského, Banská Bystrica, 2001

[8] Tölgyessy J., Dillinger P., Harangozó M.: Rádioekológia. Radioecology (in Slovak) Prírodovedecká fakulta KU, Bratislava, 60 pp. (2001)

[9] Tölgyessy J., Harangozó M., Dillinger P.: Monitoring životného prostredia . Environmental Monitoring (in Slovak). Prírodovedecká fakulta KU, Bratislava, 55 pp. (2001)

[10] Tölgyessy J., Harangozó M., Daxnerová O: Monitoring životného prostredia. Environmental Monitoring (in Slovak). FPV UMB, Banská Bystrica, 175 pp. (2001)

DEPARTMENT OF FIBRES AND TEXTILE CHEMISTRY

Head of the Department:
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I. STAFF

Full Professor:
Eberhard Borsig, PhD, DSc

Associate Professors:
Pavol Hodul, PhD, Michal Krištofič, PhD, Anton Marcinčin, PhD

Assistant Professors:
Jaroslav Legéň, PhD, Anna Ujhelyiová, PhD

Research Fellows:
Eva Bolhová, Marcela Hricová, Anna Murárová, PhD, Elena Zemanová, PhD

PhD Students:
Natália Karabcová, Eva Körmendyová, Zita Mlynarčíková, Silvia Pavlíková

Technical Staff:
Daniela Dančová, Gabriel Kužel, Albína Pokorná, Edita Štábelová

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Macromolecular Chemistry
Laboratory for Computer Modeling of Structure and Properties of Polymers
Laboratory of Polymer Fibre and Fibrous Material Structure (DSC, TMA, SALS, Surface Properties)
Laboratory of Fibre Technology
Laboratory of Textile Chemistry, Bleaching, Dyeing and Finishing
Laboratory of Fibre and Textile Testing
Laboratory for fibre spinning, drawing and texturing, extruders 16 and 30 mm
Laboratory for dyeing and finishing of fibres and textile materials (Ahiba, Pretema, Multicolor)

B. Research Laboratories:

Equipments:
DSC-Perkin Elmer and DTA (Derivatograph Q 1500 D)
TMA-50 M and TA (thermomechanical measurement)
Instron, model 1112 and Uster for mechanical properties
Dynamic viscoelastomer model Rheo-200
Alambeta for measurement of thermo - properties of textiles
Integral electrometer Polystat PS-1
Capillary rheometer
Computers PC-AT and XT
Unimode semiconductive laser 25mW, 690nm with universal optical set
Microscope Olympus model BHT
Laboratory equipments for light degradation of fibrous materials-Xenotest
for exhaust dyeing process and its evaluation ((Ahiba, Pretema, Multicolor)
Spinning machines with extruders, ø 16 mm and 30 mm respectively

III. TEACHING

A. Undergraduate Study

5th Semester (autumn)		
Macromolecular Chemistry	(2-0 h)	Borsig
6th Semester (spring)		
Technology of Materials	(2-0 h)	Marcinčin
Cosmetic and Indoor Chemistry	(2-0 h)	Hodul
Bachelor Project	(0-0-4 h)	
7th Semester (autumn)		
a) compulsory subjects:		
Macromolecular Chemistry II	(2-1 h)	Borsig
Physics of Polymers and Paper	(2-2 h)	Krištofič
Fiber Sci. and Technology	(2-2 h)	Marcinčin, Legéň

Laboratory of Fiber Sci. and Technology	(0-0-8 h)	Krištofič, Legéň, Karabcová
b) optional subjects:		
Structure of Fibrous Materials	(1-1 h)	Ujhelyiová, Murárová
Modelling of Polymer Structure and Properties	(1-1 h)	Rychlý, Marcinčin

8th Semester (spring)

a) compulsory subjects:		
Colorants and Textile Auxiliaries	(2-0 h)	Hodul, Murárová
Technical Textiles	(2-0 h)	Krištofič, Borsig
Principles of Textile Engineering	(2-0 h)	Ujhelyiová, Murárová
Laboratory of Textile Engineering	(0-0-8 h)	Legéň, Hodul, Mlynarčíková
b) optional subject:		
Physiology and Comfort of Clothing	(0-2 h)	Murárová
Special Chemical Treatment of Textiles	(0-2 h)	Ujhelyiová, Murárová

9th Semester (autumn)

Textile Chemistry and Technology	(2-2 h)	Hodul, Murárová
Technology of Polym. Films	(2-0 h)	Marcinčin, Ujhelyiová
Laboratory of Textile Chemistry and Technology	(0-0-10 h)	Hodul, Pavlíková, Bolhová
Fiber and Textile Testing	(2-0 h)	Legéň, Ujhelyiová

10th Semester (spring)

Seminary	(0-3-0 h)
Diploma Thesis	(0-0-27 h)

B. PhD study:

a) subjects:	
Physics of Polymers	Krištofič
Macromolecular Chemistry	Borsig
Technology of Polymeric Materials	Marcinčin
Organic Chemistry	
Physical Chemistry	

b) Seminaries
Experience from international conferences on polymers held in the year 2000, E.Borsig, Jan.12, 2001
Polypropylene composite fibres, S. Pavlíková, Jan. 21, 2001
Modification of polymers by solid additives A. Marcinčin, Feb. 8, 2001
Isotopically pure uniform polymers, O. Vogl, March 2nd, 2001
Evaluation of fibres by TMA method, E. Zemanová, March 16, 2001
Technical fibres and textiles, Š. Kišš, Tatrabent, May 14, 2001
Mechanical and thermal properties of PP/PA blend, Z. Mlynarčíková, Dec. 7, 2001

IV. CURRENT RESEARCH PROJECTS

A. Dispersion of organic pigments in synthetic polymers with particle size close to nano-scale (Anton Marcinčin)

The aim of the project is a solution of miscibility of polypropylene PP with polar polymers (PA, PET) and also with other additives with respect to achieve a spinning
of these blends. A polymer blend consisting of PP, branched PE and PET was studied by the DSC method. If PE was present in the blend in a minority amount an increase of amorphous phase and on the contrary an increase of crystallinity position in PP component were observed. The results showed that a partial miscibility of PP and LDPE over melting point was observed. On the other hand an decrease of PET crystallinity portion, which forms a disperse phase, was observed it is proportional to its amount in the blend. These morphological changes influence the sorption of dispersion dyes of the blend fibers.
Investigations of pigment dispersability in polypropylene (PP) and polyethylene terephtalate (PET), evaluation of the polymeric additives influence and processability of the system PET + pigment Black 7 during the preparation of fibres were examined.

On the base of the rheological measurements and mechanical-physical properties of fibres some low molecular additives for dispergation of antibacterial additives in PP fibres and the composition of blended fibres PET-polybuthyleneterephtalate-Black 7 (with better dispergation of Black 7) were found.

B. Fibre-forming Polypropylene-Polar Polymer Blends (Eberhard Borsig)

In the framework of this project polypropylene fibres modified with polymer additives based on:
a) polyethylene terephtalate
b) etylen - vinylacetate copolymer (EVAC)
and with some low- and high-molecular compatibilizers e.g. reactive compatibilizer - PP grafted by maleinanhydrid (PP-MAH) and alkyldiamid of carboxylic acid (ADCA) were prepared and their properties were investigated as well.

Influence of these compatibilizers on morphology of blend PP/PET fibres was investigated. Favourable influence of ADCA on compatibility of PP and PET components was found and this system rends multifibrillar type of fibres with higher elastic properties and higher sorption of disperse dyes as well. By using polyvinylacetate and ethylene-vinylalcohol copolymer this polyfibrillar structure of fibres becomes finer or even get lost. Simultaneously a good processability and disperse dyes uptake is conserved.

Some experiments about the preparation of PP composite fibres, using the filter SO MASIF C16 (capable to create inorganic nano-partides) and PP-MAH as the compatibiliser were made as well. Composite PP fibres were drawn at different drawing ratios which influence the degree of exfoliation and that of crystallization of created nano-particle as well. Nano-particle in PP fibres

generally cause a decrease the fibre tensile strength but elongation (orientation) of fibres cause a relatively higher increase of their tensile strength than at non-filled PP fibres. In some cases the tensile strenght of oriented fibres is very close to that of non -filled PP fibres with the same drawing ratio.

Thermal characteristics of blended PP/PET fibres (melting temperature, T_{m},, enthalpy of fusion, ΔH_{m},, at first and second heating, enthalpy of crystallization, ΔH_{c},) were estimated and showed (besides the supposed termodynamical incompatibility) mutual influence of two components of polymer blend. Minor component accelerates crystallization ability of major component. Non-isothermal measurements of these fibres led to the calculation of surface energi of crystallites in PP/PET fibres.

The results of thermo-mechanical measurements showed that higher elasticity and relaxation of PP/PET fibres is a consequence of the absence of interphace compound.

Modified PP fibres have better dyeability by exhaustion process. Dye uptake from the dyeing bath is considerably influenced by modification of fibre in the lateral and longitudinal direction. Changes in the linear density and mainly in the shape of fibre cross-section essentially improve dyeability of fibres which can be evaluated by K/S value from Kubelka-Munk equation.

PP/PET fibres with triangular 3 hollow cross-section have K/S value nearly 5 times higher in comparison with classic circular cross-section.

PP/EVAC blend circular fibres have their K/S value 4-13 times higher according to the amount and type of EVAC (5wt.% - 15wt.%) and according to the presence or absence of ADCA agent. Some other properties of yarns formed from these modified PP fibres (mainly physiologic) can be improved.

V. COOPERATION

A. Cooperation in Slovakia

Research Institute for Man-Made Fibres, Svit
Research Institute of Textile Chemistry, Žilina
Polymer Institute, Slovak Academy of Sciences, Bratislava
Slovenský hodváb a.s.,Senica
Chemosvit a.s., Svit
Rhodia Industrial Yarn a.s., Humenné
Nylstar a.s., Humenné
Merina a.s., Trenčín
Istrochem a.s., Bratislava

B. International Cooperation

Chemical Fibre Institute, Lodž, Poland
- Organisation of the 2nd Central European Conference

Technical University, Liberec, Czech Republic
- Exchange of staff members and students in the CEEPUS network

University of Maribor, Faculty of Mechanical Engineering, Maribor, Slovenia
- Cooperation in the CEEPUS project

University of Zagreb, Faculty of Textile Technology, Croatia
- Cooperation in the CEEPUS project

C. Membership in Domestic Organizations and Societies

Advisory Board of scientific Journal Autex Res. J.	(A. Marcinčin)
Chairman of Editorial Board of scientific journal Vlákna a textil (Fibres and Textiles)	(A. Marcinčin)
Advisory Board of scientific journal Vlákna a textil (Fibres and Textiles),	(A. Marcinčin, P. Hodul, A. Ujhelyiová, A. Murárová)
Executive Editor of scientific journal Vlákna a textil (Fibres and Textiles),	(P. Hodul)
Co-editor of scientific journal Vlákna a textil (Fibres and Textiles),	(A. Ujhelyiová, A. Murárová)
Commission of the Grant Agency VEGA of the Ministry of Education and Science SR	(A. Marcinčin)
Slovak Chemical Society, Bratislava	(E. Borsig, P. Hodul, M. Krištofič, A.Murárová, J. Legéň, E. Zemanová, A Ujhelyiová)

D. Membership in International Organizations and Societies

Assocation of Universities for Textiles (AUTEX), Gent, Belgium	(A. Marcinčin)
Committee for Slovak-Polish Conference	(A. Marcinčin)
Scientific council TU Liberec, Czech Rep.	(A. Marcinčin)
EPF, European Polymer Federation, Eidhoven, Holland	(E. Borsig)
Scientific Committe of Polymer Congres EPF	(E. Borsig)
Advisory Board of Scientific Journal Chemické listy (Chemical Letters), Prague, Czech Republic	(E. Borsig)
Journal of Macromolecular Science, Pure and Applied Chemistry, USA,	(E. Borsig)

E. Tempus Programme

F. International Scientific Programmes

CEEPUS
SI-007 Objective Measurements Technology in Textile and Clothing Engineering
M. Krištofič, network is formed by:
Faculty of Mechanical Engineering, University of Maribor, Slovenia - coordinator

Faculty of Textile Technology, University of Zagreb, Croatia
Faculty of Textile ScienceTechnical University of Liberec, Czech Republic
Textile Faculty, Technical University of Lódž, Poland
Faculty of Mechanical Engineering, Technical University of Budapest, Hungary
Faculty of Mechanical Engineering, Technical College for Light Industry, Hungary
January - December 2001

G. Visitors from Abroad

Nagy Veronika	Budapest University of Technology and Economics (BUTE) Hungary, January 10 - February 8 (CEEPUS)
Studničková Jarmila	Technical University of Liberec, Czech Rep. April 26 - May 24 (CEEPUS)
Martincová Alice	Technical University of Liberec, Czech Rep. March, 1st - 30 (CEEPUS)
Dr. Kokas-Palicska Livia	Technical College for Light Industry, Budapest, Hungary, May 25-June 4, (CEEPUS)
Feher Csilla	Technical College for Light Industry, Budapest, Hungary, June 18-July 13, (CEEPUS)
Wilk Eva	Technical University of Lódž, Poland, June 19-July 13, (CEEPUS)

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

E. Borsig	EPF Symposium Eidhoven, July 2001, (The Nederlands), 3 days
E. Borsig	Swiezedov Zdroj, September 2001, (Poland), 2 days
E. Borsig	Albert-Ludwigs Universität Freiburg, May 2001, (Germany), 30days
S. Pavlíková	University Gent, ERASMUS-SOCRATES, July 3.-Sept. 30, 2001, (Belgium), 30 days
Z. Mlynarčíková	University Gent, ERASMUS-SOCRATES, July 3.-Sept. 30, 2001, (Belgium), 30 days
A.Marcinčin	University of Terasse (Spain), University do Miňho (Portugal), Tecnitex 2001 (Technical Textiles), and 2001 International Textile Congres, June 16- July 3, 2001, 19 days

Visits of Students to Foreign Institutions:

Barníková, A.	TU Liberec, Czech Rep. (CEEPUS), March-April 2001, 1 month
Karabcová, N.	Technical College for Light Industry Budapest, Hungary (CEEPUS), March-April 2001, 1 month
Chovancová, L.	BUTE , Hungary (CEEPUS), March-April 2001, 1 month
Križanová, Z.	TU Liberec, Czech Rep. (CEEPUS), March-April 2001, 1 month

VI. THESES AND DISSERTATIONS

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

1. Barníková A.:	Influence of rheological properties of pigmented concentrates on spun-dyeing process of synthetic fibres (Marcinčin A.)
2. Bernáth J.:	Decolourization of waste water after dyeing with reactive dyes (Hodul P.)
3. Bolhová E.:	Thermal properties of blended synthetic fibres (Ujhelyiová, A.)
4. Chovancová L.:	Preparation of polypropylene composite fibres filled with inorganic filler (Borsig E.)
5. Karabcová N.:	Synthetic fibres based on polymer blend with modified cross-section (Legéň J.)
6. Kolníková E.:	Evaluation of supermolecular orientation of synthetic fibres (Zemanová E.)
7. Križanová Z.:	Evaluation of geometric and structural unevennes of synthetic fibres (Ujhelyiová A.)
8. Kucháriková D.:	Physical modification of synthetic fibres for improving some properties (Krištofič M.)
9. Rafajová A.:	Influence of geometric parameters of PET fibres on their dyeing (Murárová A.)

B.Dissertations (PhD)

C.Dissertations (DSc)

D.Habilitation Thesis

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Kósa, Cs., Danko, M., Fiedlerová, A., Hrdlovič, P., Borsig, E., Weiss, R. G.: Pyrenyl Flourescence as a Probe of Polymer Structure and Diffusion in a Polyethylene: Poly(butylmetacrylate)-co-polystyrene Interpenetrating Network and Related Polymers. Macromolecules 34, 2673-2681 (2001)

[2]* Greco, R., Iavarone, M., Fiedlerová, A., Borsig, E.: Optical properties of IPN-like networks

polyethylene/poly(butylmethacrylate-co-styrene) copolymer systems. III. Influence of copolymer crosslinker. Polymer 42, 5089- 5095 (2001)
[3]* Danko, M., Hrdlovič, P., Borsig, E.: Spectral Characteristics of Free and Linked Pyrene-Type Chromophores in Solution, Polymer Matrices, and Interpenetrating Networks. J. Macromol. Sci.-Pure Appl. Chem. A38(5&6) 467-486 (2001)
[4]* Borsig, E., Thomann, R., Fiedlerová, A., Müllhaupt, R.: Morphology of the Transparent IPN-like System PE: (BMA-co-S). J. Appl. Polym. Sci., 81, 2615-2620 (2001)
[5]* Marcinčin, A., Jurčišinová, Z., Borsig, E., Krištofič, M., Marcinčinová, T.: Fiber - forming Blend Polypropylene-Polyvinyl Alkohol. Polym. Adv. Technol. 12, 461-465 (2001)
[6]* Borsig, E., Fiedlerová, A.: Transparentný systém vzájomne preniknutých polymérových sietí. Transparent System of an Interpenetrating Polymer Networks. Plasty a kaučuk, Plastics and Rubber 38, 70-73 (2001)
[7] Hodul, P., Korcová, D., Lokaj, J., Murárová, A.: Effect of Additives on Soil Removal in Crease Resistant Finishing. Vlákna a textil 8(1) 8-12 (2001)
[8] Murárová, A.: Fyziológia odievania I. Tepelná regulácia človeka. Physiology of Clothing I. Men´s Thermal Regulation. Vlákna a textil 8(1) 48-49 (2001)
[9] Murárová, A.: Fyziológia odievania II. Odev ako "fyziologický" systém. Physiology of Clothing II. Apparel as a Physiological System. Vlákna a textil 8 (1) 50-52 (2001)
[10] Jambrich, M., Budzák, D., Marcinčin, A., Revús, M.: História rozvoja chemických vlákien vo svete a na Slovensku. Current Development of Chemical Fibers-Wide and in Slovakia. Vlákna a textil 8 (2) 77-89 (2001)
[11] Marcinčin, A.: Synthetic Fibres Based on Polymer Blends. Vlákna a textil 8 (2) 126-134 (2001)
[12] Hodul, P.: Biotechnológie v textilnom zošľachťovaní. Biotechnology in Textile Finishing. Vlákna a textil 8 (3) 211-217 (2001)
[13] Smole, S. M., Zemanová, E.: Structure and Properties of Supercritical Fluid, Water and Hot Air Treated PET Fibres. Vlákna a textil 8 (2) 184-186 (2001)
[14] Marcinčin, A., Brejka, O., Budzák, D., Hricová, M.: Vývoj polypropylénových vlákien farbiteľných vyťahovacím postupom a potlačou. Development of polypropylene fibres dyeable by exhaust proces and printing. Vlákna a textil (Fibres and Textiles) 8(1), 2001, p. 36-41
[15] Marcinčin, A., Ujhelyiová, A.: Pigmentácia syntetických vlákien v hmote. Masspigmenting of Synthetic Fibres. Vlákna a textil, 8(1), 2001, p. 42-47

B. Conferences (*international conferences)

[1]* Borsig, E., Lazár, M., Fiedlerová, A., Hrčková, Ľ., Marcinčin, A.: Some aspects of the solid state polypropylene grafting using peroxides. In: CD-ROM Proceedings of the European polymer Federation (EPF) Congress, Eidhoven (The Netherlands), July 15 - 20, 2001, Session 3, KN9
[2]* Murárová, A., Hodul, P., Jambrich, M.: Influence of Geometric PET Fibre Modification on Dyeing. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 1, Lódž, Poland 2001, 133-134
[3]* Hodul, P., Weberová, M., Marcinčin, A., Jedlovská, M.: β-cyklodextrine in textile finishing. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 1, Lódž, Poland 2001, 79-85
[4]* Krištofič, M.: PA6/Copolyamides Fibre-Forming Blends. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 1, Lódž, Poland 2001, 247-259
[5]* Marcinčin, A., Ujhelyiová, A., Hricová, M., Marcinčinová, T.: Modification of Polypropylene Fibres by Polymeric Additives. In: International Millenium Congress on Innovations in Fibre, Yarn Fabric Technology and Finishing, Terrassa, June 15-17, 2001, Spain
[6]* Borsig, E., Fiedlerová, A., Schulze, U., Pionteck, J.: Synthesis of IPN as a Method of Preparation of new Polymer Materials from Known Polymer Components. In: XV. Konferencja naukowa Modyfikacja polimerów Wroclav 2001 87-90
[7]* Marcinčin, A., Ujhelyiová, A., Zemanová, E., Marcinčinová, T.: Mass pigmenting of polypropylene and polyethylene terephtalate fibres. In: Fibre Grade Polymers, Chemical Fibres and Special Textiles. Central European Conference Monograph Series Vol. 1, pp. 145-155, Lodz 2001, Poland
[8]* Marcinčin, A., Legéň, J., Hudecová, D., Marcinčinová, T., Šesták, J., Spevárová, E.: Antibacterial Chemical Fibres and Fibrous Materials, 1st AUTEX Conference "Technitex 2001" Technical Textile, Designing Textiles for Technical Application. Povoa de Varzim (Univerzity of Minho), June 26-29, 2001 Portugal
[9]* Marcinčin, A., Ujhelyiová, A.: Morphology and Properties of PP/LDPE and PP/PET Blend Fibres. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 244-251
[10]* Krištofič, M.: Copolyamides Based on ε-caprolactam and Isophtalic Acid. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 252-255
[11]* Krištofič, M., Murárová, A.: Fibre- Forming Blends of Polar Polymers. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. - 7. 9. 2001, 256-259
[12]* Murárová, A., Krištofič, M., Hodul, P., Jambrich, M.: The Influence of Cross-section of PET Fibres on Dyeing In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5.-7. 9. 2001, 260-263
[13]* Pavlíková, S., Borsig, E., Marcinčin, A.: PP Nanocomposite Fibres. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. - 7. 9. 2001, 275-279
[14]* Marcinčin, A., Zemanová, E., Marcinčinová, T., Brejka, O., Budzák, D.: Rheological Properties of Polyester Pigment Concrentrates. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 290-294
[15]* Mlynarčíková, Z., Borsig, E.: Physical Properties of Polypropylene/Polyamide 6 Blend Fibres. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 295-298
[16]* Sroková, I., Ebringerová, A., Hodul, P.: Biopolymers from Polysaccharides. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 299-302
[17]* Legéň, J., Karabcová, N., Krištofič, M., Zemanová, E.: Blend Fibres Polypropylene/Polyethylene Terephtalate. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 346-348
[18]* Ujhelyiová, A., Bolhová, E.: Non-Isothermal Crystallization of PP/PET Blend Fibres. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 363-365
[19]* Körmendyová, E., Marcinčin, A.: Estimation of Miscibility of Polymer Blend and the Influence of Molecular Structure on

Polymer Miscibility. In: CEC Monograph Series, "Fibre-Grade Polymers, Chemical Fibres and Special Textiles", Vol. 2, Bratislava 5. -7. 9. 2001, 366-370

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[27]* Murárová, A., Krištofič, M., Jambrich, M., Hodul, P.: Požiadavky na textílie pre odievanie. Requirements for textiles clothing In: Zborník príspevkov z 53. Zjazdu chemických spoločností, E-P14, Banská Bystrica, 3. - 6. 9. 2001, 73-74

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[30]* Fiedlerová, A., Borsig, E., Greco, R., Iavarone, M.: Optické vlastnosti PN systémov: PE/BMA-co-MMA. Optical properties of IPN-like networks PE/BMA-co- MMA. In: 53. zjazd chemických spoločností,Banská Bystrica, 3. - 6. 9. 2001, F-PO7, 80-81

[31]* Kósa, Cs., Danko, M., Fiedlerová, A., Hrdlovič, P., Borsig, E., Weiss, R. G.: Pyrenylová flourescencia ako značka pre štúdium štruktúry polyméru a difúzie v PE: poly(butylmetakrylát-co-polystyrén) obsahujúca vzájomne preniknutú sieť a príbuzné systémy. Pyrenyl flourescence as a probe of polymer structure and diffusion in a polyethylene: poly(butylmethacrylate-co-polystyrene) interpenetrating network and related polymers. In: 53. zjazd chemických spoločností, Banská Bystica, 3. - 6. 9. 2001, F-PO13, 92

[32]* Hrčková, Ľ., Lazár, M., Borsig, E.: Polymerizácia dodecylmetakrylátu do vysokej konverzie. Polymerization of dodecylmethacrylate to high conversion. In: 53. zjazd chemických spoločností, Banská Bystica, 3. - 6. 9.2001, F-PO16, 96-97

[33]* Jambrich, M., Jambrich, P., Lučivjanský, J., Michlík, P., Murárová, A., Papajová, V., Revús, M.: The Development of Polypropylene Fibres in Slovakia. In: Proccedings I., 40th International Petroleum Conference, Bratislava, 17. - 19. 9. 2001, PE – 42

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C. Books and Textbooks

D. Patents

E. Research Reports

DEPARTMENT OF GRAPHIC ARTS TECHNOLOGY AND APPLIED PHOTOCHEMISTRY

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Ivana Lörinczová, Juraj Kindernay, František Belányi (from 1.10.2001)

Technical Staff:
Mária Bardúnová, Alena Dušeková, Juraj Hamza (till 30.9.2001), Martin Kovalčík

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories

Laboratory of Printing Technology
Laboratory of Photochemistry and Photography
Laboratory of Optical Spectroscopy and Photometry
Laboratory of Thin Films and Plasma Technology
Laboratory of Rheology

III. TEACHING

A. Undergraduate Study

6th Semester (spring)		
Paper and Print, Graphic Arts	(2-2 h)	Krkoška (Dept. Wood, Paper, Pulp), Panák
Term Project	(0-4 h)	Blažková, Čeppan, Havlínová, Jančovičová, Mikula, Panák, Reháková
7th Semester (autumn)		
Colloids Systems and Interfaces	(2-1 h)	Bakoš (Dept. Plastics and Rubber), Reháková
Polymer and Paper Physic	(0-2 h)	Jančovičová
Photochemistry and Photography I.	(2-1 h)	Čeppan, Reháková
Surface and Thin Film Technology	(2-0 h)	Mikula
Advanced Laboratory Course I.	(0-9 h)	Havlínová, Jančovičová, Mikula, Reháková
Typography and Text Processing	(0-2 h)	Kindernay
8th Semester (spring)		
Photochemistry and Photography II.	(2-0 h)	Čeppan
Printing Technology I.	(2-0 h)	Panák
Advanced Laboratory Course II.	(0-7 h)	Čeppan, Havlínová, Jančovičová, Lörinczová
Planning for Printing Production	(0-2 h)	Panák
9th Semester (autumn)		
Printing Technology II	(2-0 h)	Panák
Repronic	(1-3 h)	Mikula,
Advanced Laboratory Course III.	(0-14 h)	Panák, Jakubíková, Blažková, Čeppan, Havlínová, Jančovičová, Mikula, Reháková

IV CURRENT RESEARCH PROJECTS

A. The study of relations between physical and chemical properties of the constituents and structures of printed images and image information quality in graphic arts technologies for planar polymer materials (Michal Čeppan)

1. Study of physical and chemical properties of macromolecular systems in constituents and structure of colour images on planar polymer materials. Characterization of optical properties of multiplayer structures of images by methods of objective microphotometry, spectorphotometry and colorimetry.
2. Study of influence of surface and rheological parameters of macromolecular systems of printing inks on the course of their transfer on planar polymer materials in the process of printed image formation.
3. Study of photochemical reactions of selected photopolymerization systems and their relation to the stability and quality of printed images.

B. Coating thickness measurement of non-visible fluorescent UV colors (Contract with KASICO, a. s., printing house, Milan Mikula)

The effective layer thickness of a fluorescent UV sensitive color is not easy to control during a printing process. Classical densitometry cannot be applied because the fluorescent UV colors are non-visible. The problem was solved studying the fluorescent properties of the UV colors, their excitation and emission spectra. The prototype of a simple manual measuring system for technological application has been built up, based on appropriate excitation light source, detector, and applying the proper filtration of light. The prototype is now experimentally tested in the printing house.

C. Thickness measurement of the fountain solution layer on lithographic plates (Contract with Ekotrading - Inkflow a.s., Bratislava, Milan Mikula, Michal Čeppan)

The measurement of a dampening level of wetted lithographic plates during offset printing process is important print quality factor that is not commonly under control. The known solution using IR absorption at 2.9 micrometers is demanding and expensive. The problem was solved by the measurement of the fountain solution film thickness of the non-image area on the real litho plate, online on form cylinder during the printing process in the printing machine. The principle used is based on the change of gloss with wetting, it means on the measurement of light specularly and diffusionaly reflected from the wetted plate. Experimental arrangement was created and tested in cooperation with Ekotrading - Inkflow a.s., Bratislava.

D. Study of color shifts of prints on flexible packaging caused by adhesive laminating (Contract with Chemosvit, a.s., Michal Čeppan)

Adhesive laminating of flexible packaging materials changes gloss and overall appearance of the printed structures. Existence of thin metallic layer and primer interface cause significant and frequently unexpected and not easily predictable color shifts of prints. The goal of project was to map in the terms of color difference overall color changes of rotogravure prints on flexible packaging material caused by adhesive laminating by alumina foil.

V. COOPERATION

A. Cooperation in Slovakia

Chemosvit, Svit
Concordia Printing House, Bratislava
Inkflow-Ekotrading, Bratislava
Printing House BB, Banská Bystrica
Printing House Kasico, Bratislava

B. International Cooperation

Technical University Brno, Faculty of Chemistry, Czech Republic
- Photochemical properties of light sensitive layers

C. Membership in Domestic Organization and Societies

Slovak Union for Industrial Chemistry, Bratislava	(M. Čeppan, B. Havlínová, M. Mikula, J. Panák, V. Dvonka, J. Fedák, V. Jančovičová, J. Kindernay, M. Reháková, I. Lörinczová)

D. Membership in International Organization and Societies

European Photochemistry Association	(M. Čeppan)
International Society of Imaging Science and Technology, Springfield, USA	(M. Čeppan)
Graphic Arts Technical Foundation, Sewickley, USA	(M. Čeppan)

G. Visitors from abroad

Dr. Michal Ďurovič	State Central Archives in Prague, Czech Republic, June 2001 (2 days)
Dr. Ulrich Moosheimer	Fraunhofer-Institut for Process Eng. And Packaging, Freising, Germany, November 2001 (1 day)
Dr. Wei Shen	Australian Pulp and Paper Institue, Monash University, Australia (4 days)

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

M. Reháková	State Central Archives in Prague, Czech Republic, January 2001 (2 days)

A. Blažková, V. Bednár, M. Čeppan, I. Panák, V. Jančovičová, M. Reháková, J. Kindernay, I. Lörinczová, M. Kovalčík	Heidelberg Druck Machinen, A.G., Heidelberg, Germany, March 2001 (5 days)
B. Havlínová	State Central Archives in Prague, Czech Republic, March 2001 (3 days)
M. Čeppan	Faculty of Chemistry, Technical University of Brno, Czech Republic, May 2001 (2 days)
V. Jančovičová, B. Havlínová, A. Blažková, M. Reháková, A. Dušeková, J. Kindernay, I. Lörinczová, M. Kovalčík	International Fair EMBAX 2001, Brno, Czech Republic, May 2001 (1 day)
M. Čeppan, M. Mikula, J. Panák, M. Reháková	5th Seminar on Graphic Arts Technology, University of Pardubice, Czech Republic, September 2001 (3 days)

VI. THESES AND DISSERTATIONS

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

Babiaková D.:	The effect of accelerated aging on the stability of printing ink applied on a paper support. (B. Havlínová)
Belányi F.:	Study of changes of printed papers during accelerated aging. (B. Havlínová)
Belešová Ľ.:	Study of recording dyes properties and their affect on paper supports. (M. Ďurovič)
Burda V.:	Study of photopolymeric reactions of monomer mixtures. (A. Blažková)
Čellár D.:	Automatized measurement of the wetting level of a printing plate. (M. Mikula)
Čiernik R.:	Preparation and properties of photochemically modified polymer layers. (V. Jančovičová)
Danko S.:	Study of printability and adhesion properties of foils treated by surface discharge. (M. Mikula)
Halabicová M.:	Study of photolysis of iodonium salt. (V. Jančovičová)
Jakubíková Z.:	Ink transfer and wetting in offset lithography. (J. Panák)
Jurík M.:	Study of the image structure resolution using imaging photometry. (M. Čeppan.)
Kovalčíková M.:	Aging and aging evaluation of the salt graphic image. (M. Reháková)
Malec B.:	Study of accelerated light aging of graphical information. (M. Reháková)
Plachý M.:	Rheoviscosimetry of offset inks and their emulsions with fountain solutions. (J. Panák)
Studený P.:	Study of colour changes during the treatment of printed packeging foils. (M. Čeppan)
Šuťáková S.:	Preparation and properties of thin polymeric films using photopolymerization on different support. (A. Blažková)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Brunner R., Pinčík E., Mikula M., Záhora J.: Reflectance spectrometry of TiO_2 optical coatings on c-Si: The real data based simulation. Acta Phys. Slov. 51 (1) 17-26 (2001)

[2]* Kindernay J., Panák J., Mikula M.: Rheoviscometry of offset inks and their emulsions with water. Chem. Pap. 55 (1), 15-22 (2001)

[3]* Mikula M., Búc D., Pinčík E.: Electrical and Optical Properties of Copper Nitride Thin Films Prepared by Reactive DC Magnetron Sputtering. Acta Phys. Slov. 51, 35-43 (2001)

[4] Panák J., Gonová O.: Reologia offsetowych farb arkuszowych. Część I. Rheology of sheet-fed offset inks (in Polish). Part I. Poligrafika LIII (2), 57–59, ISSN 0373-9864 (2001)

[5] Panák J., Gonová O.: Reologia offsetowych farb arkuszowych. Część II. Rheology of sheet-fed offset inks (in Polish). Part II. Poligrafika LIII (3), 94–95; ISSN 0373-9864 (2001)

[6] Panák J., Gonová O.: Reologia offsetowych farb arkuszowych. Część III. Rheology of sheet-fed offset inks (in Polish). Part III. Poligrafika LIII (4), 68–69, ISSN 0373-9864 (2001)

B. Conferences (*international conferences)

[1] Čeppan M., Kosorín M., Mikula M., Pitoňák M.: Farebnosť potlače flexibilných obalov. Print Colourfulness of Flexible Packaging Materials (in Slovak). In: Proceedings of 4th Seminar on Graphic Arts Technology, Pardubice, Czech Republic, September 12.-13. 2001, p. 102-109, ISBN 80-7194-372-X

[2] Havlínová B., Babiaková D., Mináriková J., Kindernay J.: Vplyv urýchleného starnutia na potlačenú podložku. The Effect of Accelerated Aging on Printed Support (in Slovak). In: Proceedings of Pulp and Paper – Technology, Properties and Enviroment, Bratislava, September 11.-12. 2001, p. 202-205, ISBN 80-227-1566-2

[3] Havlínová B., Belányi F., Čeppan M., Reháková M.: Štúdium zmien potlačeného papiera počas urýchleného starnutia. Study of Printed Paper Changes During Accelerated Aging (in Slovak). In: Proceedings of 4th Seminar on Graphic Arts Technology, Pardubice, Czech Republic, 12.-13. 2001, p. 64-70, ISBN 80-7194-372-X

[4] Jančovičová V., Karovičová I., Blažková A., Kindernay J.: Fotopolymerizácia vinyléterov iniciovaná organokovovou soľou. Photopolymerisation of Vinylethers Iniciated by Organometallic Salt (in Slovak). In: Proceedings of 53th joint meeting of the Chemical Societies, Banská Bystrica, September 3.- 6. 9. 2001, ISBN 80-89029-24-8, p. 88-89

[5] Karovičová I., Jančovičová V., Čiernik R., Čeppan M.: Fotochemicky modifikovateľné bariérové vrstvy na báze polyvinylalkoholu. Photochemically Modified Barrier Layer on the Polyvinyl Alcohol Base (in Slovak). In: Proceedings of 53th joint meeting of the Chemical Societies, Banská Bystrica, September 3.- 6. 9. 2001, ISBN 80-89029-24-8, p. 90-91

[6] Kopáni M., Mikula M., Jergel M., Záhora J., Tucoulou R., Pinčík E.: About an Influence of Ar Ion Beam of Very Low Energy on a-Si:H Properties. In: Proceedings of 2th International Seminar on Semiconductor Surface Pasivation SSP 2001, Gliwice, Poland, 2001

[7] Mikula M., Černák M.: Účinnejšia koróna pre predtlačovú úpravu polymérnych fólií. More Effective Corona for Prepress Treatment of Polymeric Foils (in Slovak). In: Proceedings of 4th Seminar on Graphic Arts Technology, Pardubice, Czech Republic, September 12.-13. 2001, p. 82-88, ISBN 80-7194-372-X

[8] Mikula M., Reháková M., Kindernay J.: Urýchlené svetelné starnutie papiera a tlače pomocou nových svetelných zdrojov. Accelerated Aging of Papers and Prints Using New Light Sources (in Slovak). In: Proceedings of Pulp and Paper – Technology, Properties and Enviroment, Bratislava, September 11.-12. 2001, p. 198-201, ISBN 80-227-1566-2

[9] Panák J, Plachý M.: Vplyv vlhčiaceho roztoku na viskozitné vlastnosti heatsetových farieb. The Effect of Fountain Solutions on Viscosity Properties of Heatset Inks (in Slovak). In: Proceedings of 4th Seminar on Graphic Arts Technology, Pardubice, Czech Republic, September 12.-13. 2001, p. 51-63, ISBN 80-7194-372-X

[10] Reháková M., Malec B., Čeppan M., Mikula M.: Starnutie a hodnotenie starnutia grafických informácií. Aging and Aging Evaluation of Graphic Information (in Slovak). In: Proceedings of 4th Seminar on Graphic Arts Technology, Pardubice, Czech Republic, September 12.-13. 2001, p. 112-120, ISBN 80-7194-372-X

[11] Szeiffová G., Havlínová B.: Porovnanie stálosti a trvanlivosti ofsetového, kancelárskeho, recyklovaného a ručného papiera. Comparison of Stability and Durability of Offset, Office, Recycled and Hand Made Papers (in Slovak). In: Proceedings of Pulp and Paper – Technology, Properties and Enviroment, Bratislava, September 11.-12. 2001, Bratislava, September 11.-12. 2001, p. 217-221, ISBN 80-227-1566-2

DEPARTMENT OF INORGANIC CHEMISTRY

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II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratories of Practical Exercises

B. Research Laboratories:

Laboratory of Electrochemistry
Laboratory of Photochemistry
Laboratory of Magnetochemistry
Laboratory of Thermal Processing
Laboratory of Spectroscopy
Laboratory of X-ray Analysis
Laboratory of Powder Diffraction

III. TEACHING

A. Undergraduate Study

1st Semester (autumn)		
Inorganic Chemistry I	(3-2 h)	R. Boča, Kotočová, Melník, Šima, Valigura
Inorganic Chemistry I (Laboratory)	(3 h)	Baloghová, M. Boča, Broškovičová, Dlháň, Dunaj-Jurčo, Gembický, Hvastijová, Izakovič, Jorík, Macášková, Makáňová, Mašlejová, Mikloš, Moncoľ, Ondrejkovičová, Palicová, Papánková, Růžička, Segľa, Sirota, Sýkora, Tatarko, Vančová, Vrbová
2nd Semester (spring)		
Inorganic Chemistry II	(2-2 h)	Hvastijová, Koman, Melník, Ondrejovič, Sýkora
Inorganic Chemistry II (Laboratory)		Baloghová, M. Boča, Broškovičová, Dlháň, Gembický, Izakovič, Jorík, Macášková, Makáňová, Mašlejová, Mikloš, Ondrejkovičová, Palicová, Papánková, Růžička, Segľa, Sirota, Sýkora, Tatarko, Vančová, Vrbová
7th Semester (autumn)		
Chemical Bond and Chemical Structure	(2-0 h)	R. Boča
Chemistry of Coordination and Organometallic Compounds	(2-0 h)	Ondrejovič
Inorganic Photochemistry	(2-0 h)	Sýkora
Inorganic Syntheses	(2-0 h)	Valigura
Laboratory Practice in the Major I	(0-10 h)	R. Boča, Kotočová, Ondrejkovičová, Ondrejovič,

		Růžička, Segľa, Sýkora, Valigura
8th Semester (spring)		
Bioinorganic Chemistry	(2-1 h)	Melník
Crystallochemistry	(2-0 h)	Dunaj-Jurčo
Indirect Methods of Research Structural Studies of Inorganic Compounds	(2-2 h)	Mašlejová
Inorganic Materials	(2-0 h)	Koman
Laboratory of Speciality	(6 h)	
Laboratory Practice in the Major II	(0-6 h)	Jorík, Mašlejová, Mikloš
Reaction mechanisms of Inorganic Compounds	(2-0 h)	Šima
Spectral Methods of Control Technological Processes	(2-2 h)	Segľa
Technics of a Mixture Separation	(2-2 h)	Valigura
9th Semester (autumn)		
Bioinorganic Chemistry	(2-1 h)	Melník
Catalysis	(2-0 h)	Ondrejkovičová
Chemistry of Coordination and Organometallic Compounds	(2 h)	Ondrejovič
Inorganic Materials	(2-1 h)	Koman
Laboratory of Speciality	(10 h)	Mikloš, Koman, Mašlejová, Ondrejkovičová, Růžička, Šima, Valigura, Papánková

B. PhD Study

1st Semester		
Structure of Inorganic Substances	(30 h)	R. Boča, Ondrejovič
Recent Coordination Chemistry*	(30 h)	supervisors
2nd Semester		
Reaction Mechanisms of Inorganic Compounds	(30 h)	Šima
Recent Coordination Chemistry*	(30 h)	supervisors

* Studied and controlled individually in correspondence with the doctoral thesis.

IV. CURRENT RESEARCH PROJECTS

A. New coordination compounds, their solid state structure, solution reactivity and applications (Milan Melník)

Structural data of thousands coordination and organometallic compounds of copper, iron, tin and germanium were classified and analysed and significant structural correlations and generalisations were formulated. The results have been utilised for searching biologically active compounds and spectrally, electrically and magnetically attractive substances. The structure of a number of complexes was solved, the results were compared with their biological activity, which generally have higher activity than that of related uncomplexed compounds. Some of the results have been patented. Donor-acceptor properties of 24 ligands were quantified for proposing their behaviour in biocomplexes.

A specific theoretical and experimental procedure characterising the construction of coordination polymers was elaborated. Crystal structure determination of some copper and nickel complexes contributed to the optimisation of favourable conditions for reactions of ligands forming new compounds in the coordination sphere.

The basic factors influencing the relation between the wavelength of irradiation and the photoredox efficiency of iron complexes were formulated. It was found that by photolysis of copper complexes generated hydroxyl radical in solutions participates in photodegradation of some pollutants. The results can be applied to improve ecology.

B. Induced transformations in coordination compounds (Roman Boča)

New complexes of the transition metal central atoms with interesting magnetic properties have been synthesized: mono-, bi-, tri-, tetra- and pentanuclear complexes. In addition to their characterisation by a temperature dependence of the magnetic susceptibility, also the magnetisation measurement until fields of 5.5 T have been done.

For solid Fe(II) complexes the circumstances influencing the spin transition from the low-spin to the high-spin state (the spin crossover)have been investigated. Complexes of Fe(II) with the heterocyclic N-donor multidentate ligands have been synthesized; these exhibit the spin crossover above the room temperature. Namely, the system $[Fe(bzimpy)_2](ClO_4)_2$ shows T_c = 403 K and it is perfectly reversible with the hysteresis width of 12 K. A new, combined model of the spin crossover has been outlined; it allows a description of the angled walls of the hysteresis loop.

The monograph “R. Boča: Theoretical Foundations of Molecular Magnetism (Elsevier, Amsterdam, 1999).” contributes to the theory of the molecular magnetism. Capabilities of the various experimental techniques were utilized: the single crystal and powder diffraction, VT-IR spectra, DSC susceptibility and magnetisation measurements, EXAFS, synchrotron powder diffraction, Moessbauer spectroscopy, etc.

C. Development and applications of methods for picking out of talented students in small as well as in larger groups with respect to the needs of the Faculty of Chemical and Food Technology of the Slovak Technical University (Anton Sirota)

A new version of a didactic creativity test in organic chemistry was tested in smaller groups of students. The test was proved to be sensitive and reliable enough for picking out talented students in higher courses of the Faculty of Chemical and Food Technology.

The research team elaborated a new statute of a special club named "SOCRATES" that gathers teachers and talented

students of the Faculty. When creating the club, the methods for picking out of talented students proposed by the research team, were applied and those experience and methods were used which have proved to be successful also at the secondary school level.

Some members of the research team prepared special examination and teaching texts and held lectures for students of the Summer School in Chemistry organized for talented secondary school students in July 2001. Moreover, several of them were involved into special training of the students who represented Slovakia at the 33rd International Chemistry Olympiad in July 2001 in Mumbai (India) and achieved the 15th place in the competition from among 55 countries of all over the world.

A new journal "Chemické rozhľady" for enhancement of chemistry teaching has been established and thanks to sponsors, it is distributed free of charge to all secondary schools in Slovakia. The editor-in-chief and his deputy are members of the research team.

Results of the research team were gathered in 23 reviewed papers (in Slovak) and published in journals. Besides that one plenary lecture was presented at the international conference on chemical education.

V. COOPERATION

A. Cooperation in Slovakia:

Department of Physical Chemistry, Slovak Technical University, Bratislava
Department of Organic Chemistry, Slovak Technical University, Bratislava
Department of Chemical Physics, Slovak Technical University, Bratislava
Department of Inorganic Technology, Slovak Technical University, Bratislava
Department of Microbiology, Biochemistry and Biology, Slovak Technical University, Bratislava
Department of Ceramics, Glass and Cement, Slovak Technical University, Bratislava
Institute of Medical Chemistry, Medical Faculty, Komensky University, Bratislava
Institute of Inorganic Chemistry, Slovak Academy of Science, Bratislava
Institute of Rheumatic Diseases, Piešťany
Department of Inorganic Chemistry, Faculty of Science UPJŠ, Košice

B. International Cooperation:

Technical University, Vienna, Austria
- Magnetic properties in solids and solutions

York University, Toronto, Canada
- X-ray analysis of transitions and non-transitions metal atoms

University of Helsinki, Finland
- X-ray analysis of solid compounds

University of Joensuu, Finland
- X-ray analysis of copper(II) compounds

Martin-Luther University, Halle-Wittenberg, Germany
- Structure and physical properties of transition metal complexis with non-linear pseudohalides

Technical University, Darmstadt, Germany
- New magnetic materials

University of Wroclaw, Poland
- Magnetic and x-ray analysis

C. Membership in Domestic Organizations and Societies:

Slovak Chemical Society
Czech and Slovak Society for Crystal Growth
Czech and Slovak Crystallographic Association
Regional Committee of Czech and Slovak Crystallographers
Crystallographic Society
EPA Slovakia National Group

D. Membership in International Organizations and Societies:

Czech and Slovak Crystallographic Association, Prague, Czech Republic	(Dunaj-Jurčo, Jorík, Koman, Mikloš)
Member of International Union of Crystallography, IUCr	(M.Dunaj-Jurčo)
Member of European Crystallographic Committee, EEC	(M.Dunaj-Jurčo)
American Chemical Society, USA	(M.Melník, J.Sýkora)
European Photochemistry Association, Switzerland	(J.Sýkora, M. Izakovič, M. Tatarko)
Member of EPA Standing Committee, Switzerland	(J.Sýkora)
EPA Local Treasurer, Switzerland	(J.Sýkora)
Finland Chemical Society	(M.Melník)
Member of MGMC Editorial Board, Brusel	(M.Melník)
International Information Center of International Chemistry Olympiads	(A.Sirota)

E. Tempus Programme:

F. International Scientific Programmes:

Scientific & Technological Cooperation Between Germany (TU Darmstadt) and Slovakia (STU Bratislava): New magnetic materials

- R. Boča, H. Fuess
Scientific Cooperation Between Germany (MLU Halle) and Slovakia (STU Bratislava): Untersuchungen zur Struktur und Reaktivität von Übergangsmetallkomplexen nichtlinearer Pseudohalogenide - M. Hvastijová, L. Jäger
Scientific Cooperation Between Poland (Wroclaw University) and Slovakia (STU Bratislava) ESF Project: Molecular Magnets.- R. Boča, M. Verdaguer, M. Melník, J. Mrozinski

G. Visitors from Abroad:

Prof. R. Grobelny	University of Wroclaw, Poland, June 2001 (3 days)
Prof. J. Mrozinski	University of Wroclaw, Poland, June 2001 (3 days)
Dr. E. Náhalska	University of Wroclaw, Poland, June 2001 (3 days)
Prof. H. Necefoglu	Kafkas University, Kars, Turkey, June 2001 (3 days)
Prof. M. Sundberg	University of Helsinki, Finland, June (2001) (5 days)

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

V. Jorík	University of Technology, Brno, Czech Republic, January 2001 (1 day)
M. Koman	Crystallographical Society, Prague, Czech Republic, February 2001 (1 day)
M. Melník	Masaryk University, Brno, Czech Republic, March 2001 (1 day)
M. Ružička	Physical Institute of Czech Academy of Sciences, Prague, Czech Republic, March 2001 (2 days)
R. Boča	University of Bern, Bern, Switzerland, April 2001 (10 days)
J. Šima	Technical University, Vienna, Austria, April 2001 (1 day)
P. Segľa	Technical University, Vienna, Austria, May 2001 (1 day)
D. Mikloš	Technical University, Vienna, Austria, May 2001 (1 day)
M. Melník	Technical University, Vienna, Austria, June 2001 (1 day)
R. Boča	Technical University, Darmstadt, Germany, June 2001 (27 days)
J. Moncoľ	Crystallographical Society, Bedřichov, Czech Republic, June 2001 (5 days)
B. Papánková	Technical University, Darmstadt, Germany, June 2001 (16 days)
Ľ. Dlháň	Technical University, Darmstadt, Germany, June 2001 (16 days)
M. Melník	York University, Toronto, Canada, July 2001 (30 days)
J. Šima	University of Veszprém, Hungary, July 2001 (6 days)
M. Gembický	Martin-Luther University, Halle/Saale, Germany, July 2001 (62 days)
A. Sirota	Homi Bhabha Center for Science Education, Mumbai, India, July 2001 (12 days)
R. Boča	Technical University, Darmstadt, Germany, August 2001 (16 days)
M. Hvastijová	Martin-Luther University, Halle/Saale, Germany, September 2001 (7 days)
M. Melník	University of Granada, Spain, November 2001 (5 days)
R. Boča	University of Mainz, Germany, December 2001 (3 days)
A. Sirota	University of Cambridge, England, December 2001 (4 days)

VI. THESES AND DISSERTATIONS

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

B. Dissertations (PhD):

M. Boča	Variations of magnetic properties of complexes and coordination-conditioned structure modulation. (D. Valigura)
M. Izakovič	Photocatalytic properties of copper complexes and their applications. (J. Sýkora)
M. Vrbová	Coordination compounds of higher complexity on base of heterocyclic ligands. (R. Boča)
M. Tatarko	Photochemical aspects of Fenton reactions. (J. Sýkora)
M. Gembický	Polynuclear complexes of polydentate ligands. (R. Boča)
D. Ondrušová	Study of metal dithiocarbamates and their influence on kinetics of vulcanisation of rubber mixtures. (E. Jóna)
M. Pajtášová	Study of carboxylato copper(II) and carboxylato cobalt(II) complexes and their influence on rubber-metal adhesion. (E. Jóna)
M. Palicová	Study of the structure, physical, chemical and biological properties of N-heterocyclic Cu(II)-carboxylates. (M. Melník)

D. Habilitation Theses:

P. Segľa	Reactions of nitriles in the coordination sphere of transition metal complexes

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Boča R., Boča M., Dlháň Ľ., Falk K., Fuess H., Haase W., Jaroščiak R., Papánková B., Renz F., Vrbová M., Werner R.: Strong Cooperativeness in the Mononuclear Iron(II) Derivative Exhibiting an Abrupt Spin Transition above 400 K. Inorg. Chem., 40, 3025-3033 (2001).

[2]* Boča R., Dlháň Ľ., Makáňová D., Mrozinski J., Ondrejovič G., Tatarko M.: Magnetic exchange coupling in tetranuclear copper clusters of the type $[Cu_4(\mu_4O)Cl_{6-n}Br_nL_4]$. Chem. Phys. Lett., 344, 305-309 (2001).

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B. Conferences (*international conferences)

[1] Balogová Z., Mazúr M, Valko M., Baran P., Dlháň Ľ, Valigura D.: Structure and EPR spectra of 1:1 copper(II) complexes with 2,2-bipyridine-N,N-dioxide ligand. Proc. 18th International Conference on Coordination and Bioinorganic Chemistry, Smolenice, Slovakia (2001).
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[3] Diáz J. G., Hvastijova M., Kožísek J.: Cyanamidonitrate-copper(II), nickel(II) and cobalt(II) complexes of imidazole and pyrazole ligands. 20th ECM, Krakow, Poland (2001).
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copper(II) complexes. Challenges for Coordination Chemistry in the New Century, Slovak Technical University Press, Bratislava, Slovakia (2001).
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[43]* Valent A., Kohútová M., Melník M., Švajlenová O., Hudecová D.: Antimikrobiálna aktivita N-salicylidén-D,L-alaninátomeďnatých komplexov. 53. Zjazd chemických spoločností, Banská Bystrica, Slovakia (2001).
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C. Books and Textbooks

1] Holloway C. E., Melník M.: Heterometallic tin compounds: classification and analysis of crystallographic and structural data. Part I. Dimeric derivatives. M.G.M.C., 24, 133-194 (2001).
[2] Holloway C. E., Melník M.: Heterometallic tin compounds: classification and analysis of crystallographic and structural data: Part II. Trimeric to polymeric derivatives. MGMC, 24, 467-581, (2001).
[3] Holloway C. E., Melník M.: Germanium coordination compounds: classification and analysis of crystallographic and structural data. MGMC, 24, 681-726 (2001).

D. Patents

[1] Brtko J., Hudecová D., Ficková M., Melník M., Uher M.: Komplexy 5-hydroxymetyl a 5-hydroxy-2-chlórmetyl-4H-pyrán-4-ónu a spôsob ich prípravy. PV 1726 (2001).

DEPARTMENT OF INORGANIC TECHNOLOGY

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Research Fellows:
Peter Adamčík; Vladimír Danielik, PhD; Vladimír Khandl; Matilda Zemanová, PhD;

PhD Student:
Michal Korenko; Marta Baníková;

Technical Staff :
Viliam Cauner; Eva Dekanová; František Kollár;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Molten Salt Chemistry Laboratories
Laboratories of Chemical Inorganic Syntheses and Industrial Inorganic Chemistry

B. Research Laboratories:

Molten Salt Chemistry and Electrochemistry Laboratories
Technical Electrochemistry Laboratories
Electroplating, Special Coatings and Corrosion Laboratories

III. TEACHING

A. Undergraduate Study

1. Introductory courses

3rd semester (autumn)		
Fundamental Principles of Inorganic Technology	(2-2 h)	Fellner, Adamčík, Danielik, Gabčová, Chovancová, Korenko, Valtýni, Žúžiová
5th semester (autumn)		
Corrosion and Material Surface Treatment	(2-0 h)	Chovancová
Laboratories of Corrosion	(0-2 h)	Chovancová, Adamčík, Zemanová

2. Advanced courses

7th semester (autumn)		
Phase Equilibria	(2-1 h)	Gabčová, Fellner
Applied Thermodynamics	(2-2 h)	Fellner, Danielik
Corrosion and Material Protection	(2-2 h)	Chovancová, Zemanová
Laboratories I.	(0-4 h)	Adamčík, Gabčová, Híveš, Chovancová, Žúžiová
8th semester (spring)		
Chemical Reaction Engineering	(2-2 h)	Valtýni, Híveš
Applied Electrochemistry	(2-1 h)	Híveš, Fellner
Laboratories II.	(0-8 h)	Danielik, Gabčová, Híveš, Chovancová, Žúžiová
9th semester (autumn)		
Fertilizers	(2-0 h)	Žúžiová, Gabčová
Electrochemical Engineering	(2-0 h)	Híveš, Fellner
Elements of System Engineering	(1-1 h)	Valtýni, Danielik
Laboratories III.	(0-10 h)	Danielik, Fellner, Gabčová, Híveš, Chovancová, Valtýni, Zemanová, Žúžiová

B. PhD Study

Inorganic Technology and Materials Subjects	(4h)	Fellner

IV. CURRENT RESEARCH PROJECTS

A. Thermodynamics and Kinetics of the Processes on the Phase Boundary Aluminium – Melt (Pavel Fellner)

Equilibrium contents of sodium, lithium and calcium in aluminium in contact with the melts of the system Na_3AlF_6 – AlF_3 – Al_2O_3 – LiF – CaF_2 were obtained in the temperature range 950°C – 1030 °C. A thermodynamic model describing the experimental data on the contents of alkali and earth alkaline metals in the aluminium cathode in aluminium electrolysis was developed.

The cathodic concentration overvoltage in Na_3AlF_6 – AlF_3 – Al_2O_3 melts was investigated, The melts contained 10 and 20 mass % of AlF_3. Experimental data on the cathodic overvoltage agreed well with the values calculated from the content of sodium in aluminium. It was found that the addition of 5 mass % CaF_2 or 5 mass % MgF_2 does not influence the overvoltage significantly, while the addition of 2 mass % LiF decreases the overvoltage by 20 mV at a cathodic current density of 0.25 $A.cm^{-2}$ and by 50 mV at 0.75 $A.cm^{-2}$.

B. Preparation and Properties of Oxide Layers on Aluminium (Marta Chovancoová)

Composite material on the aluminium formed by the anodic oxidation of the aluminium in the acid electrolyte and alumina layer prepared by the usage of sol-gel method increased the application ability of the aluminium (corrosion resistance, decorative properties).

The ways of the anodic aluminium sealing were compared (hydrothermal sealing, cold impregnation, method sol-gel and sealing by the PTFE dipping) by the corrosion tests and EIS measurements in the wide frequency range.

The growth of the oxide layer at the defined conditions have been studied in the galvanostatic regime in the four mixed electrolytes on the basis of the sulfuric acid solution in the dependence on time, current density, temperature and electrolyte composition.

The hard composite coatings were reached by the electrochemical way on the basis of the iron matrix and dispersed silicium particles as well the ultrahard ceramics on the basis of the polysilazanes.

V. COOPERATION

A. Cooperation in Slovakia

Institute of Inorganic Chemistry Slovak Academy of Science, Bratislava
Department of Electrotechnology, Faculty of Electrical Engineering and Information, Slovak University of Technology in Bratislava, Bratislava
Department of Chemical Machines and Equipment, Faculty of Mechanical Engineering, Slovak University of Technology in Bratislava, Bratislava

B. International Cooperation

Department of Applied Electrochemistry, Norwegian University of Science and Technology, Trondheim, Norway
- formation of carbides in aluminium electrolysis
- mechanism of anodic reaction in aluminium electrolysis
- inert anodes and anode effect in aluminium electrolysis
- behavior of sulfur and sulfur compounds in aluminium electrolysis
- contents of impurities in polarized aluminium in contact with cryolite-based melts

Technische Hochschule Darmstadt, Darmstadt, Germany
- infiltration of alumina by polysilazane Ceraset

Fachhochschule Münster, Germany
- ceramic superconductors

C. Membership in Domestic Organizations and Societies

Union of Slovak Scientific and Technological Societies	Fellner, Híveš, Gabčová, Chovancová, Valtýni, Žúžiová
Slovak Chemical Society	Fellner, Híveš, Gabčová, Chovancová, Valtýni, Žúžiová, Danielik, Zemanová
Slovak Society for Surface Treatment and Technology	Fellner, Chovancová
Slovak Cleaner Production Center	Chovancová

Membership in International Organizations and Societies

International Society of Electrochemistry	Híveš
EFCE Electrochemical Engineering	Fellner

E. Tempus Programs

SOCRATES Programme: Higher Education (ERASMUS)
Student mobility, cooperation with Fachhochschule Münster, Germany.
Four Students worked in the laboratories of Material Science for three moths.

F. International Scientific Programs

G. Visitors from Abroad

Prof. J. Thonstad	NTNU, Trondheim, Norway, May 2001 (1 week)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

P. Fellner	NTNU Trondheim, Norway, September 2001 (2 weeks)

J. Híveš	NTNU Trondheim, Norway, January 2001 (1 month), August 2001 (2 months)
M. Korenko	NTNU Trondheim, Norway, September 2001 (2 months)
M. Zemanová	Technische Hochschule Darmstadt, Darmstadt, Germany, February 2001 (1 month)
M. Chovancová	ČVUT Prague, Czech Republic, February 2001 (1 day)

VI. THESES AND DISSERTATIONS

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

Marta Baníková:	Investigation of content of iron and sulphur in cryolite-based melt. (Jana Gabčová)
Agáta Dráčová:	Correlation between conditions of preparation and properties of oxide layers. (Matilda Zemanová)
Henrieta Hanáková:	Investigation of phase diagram of the system NaCl - KCl - KF. (Vladimír Danielik)
Blažej Horváth:	Study of hydroxyapatites as selective catalysator for oxidation. (Milan Hronec)
Martina Charišová:	Preparation and study of physico-chemical properties of complex compounds on the basis of copper. (Peter Segľa)
Blanka Kubíková:	Ceramics based on Al_2O_3 for cutting tools. (Zdeněk Pánek)
Marián Kucharík:	Study of solidus-liquidus equilibria of the system NaCl - NaF - KF. (Jana Gabčová)
Miroslav Moric:	Preparation of composite coatings. (Ján Híveš)
Daniela Repáňová:	NPS liquid fertilizer of 9 : 11 : 6S type. (Jozef Papp)
Zuzana Spišiaková:	Study of vanadium impurities circulation in aluminium electrolytic cell. (Marta Chrenková)
Blanka Tkacziková:	Time dependence of anodic coatings sealed by the combined method. (Marta Chovancová)
Tomáš Trcka:	Carbothermic preparation of sialons. (Zoltán Lenčéš)
Jozef Vincenc Oboňa:	Phase equilibia in the system NaCl - KCl - $BaCl_2$. (Vladimír Danielik)
Adriana Vyjidáková:	Study of Cu(II) complexes. (Marián Koman)
Jarmila Cibulková:	Treatment of alkaline waste water. (Pavel Fellner)

B. Dissertations (PhD):

C. Dissertations (DSc):

D. Habilitation Theses:

Ján Híveš, PhD:	Electrochemical Processes in Aluminium Electrolysis.

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Danielik V., Gabčová J.: Phase diagram of the Na_3AlF_6 - NaF - Na_2SO_4. Thermochimica Acta 366, 79 - 87 (2001)

[2]* Fellner P., Híveš J., Korenko M., Thonstad J.: Cathodic overvoltage and the contents of sodium and lithium in molten aluminium during electrolysis of cryolite-based melts. Electrochimica Acta 46, 2379-2384 (2001)

[3]* Thonstad J., Rolseth S., Rodseth J., Tonheim J., Danielik D., Fellner P., Híveš J.: The Content of Sodium in Aluminium in Laboratory and in Industrial Cells. Light Metals 2001, 441 - 447 (2001)

[4]* Híveš J., Korenko M., Fellner P.: Fe - Si Composite Coatings. Chem. Papers 55 (2), 81 - 85 (2001)

[5]* Chrenková M. Danielik V., Silný A., Daněk V.: Phase Diagram of the System KF - KCl - KBF_4 - K_2TiF_6. Chem. Papers 55 (2), 75 - 80 (2001)

B. Conferences (*international conferences)

[1]* Fellner P., Danielik V., Híveš J., Thonstad J.: The Relationship between the Cathodic Overvoltage and the Contens of Alkali and Earth Alkaline Metals in Aluminium During Electrolysis. In: Proceedings of Eleventh International Aluminium Symposium, Trondheim September 19 - 22, 2001, pp. 89 – 96

[2]* Híveš J., Lorentsen O. A., Thonstad J.: Inert Anode under Electrochemical Impedance Spectroscopy Study. In: Proceedings of Eleventh International Aluminium Symposium, Trondheim September 19 - 22, 2001, pp.137 – 143

[3]* Fellner P., Danielik V., Híveš J., Thonstad J.: The Contents of Alkali and Earth Alkaline Metals in the Aluminium Cathode in Aluminium Electrolysis. In: Proceedings of 6th International Symposium on Molten Salt Chemistry and Technology, Shanghai, China, October 8 - 13, 2001, pp. 114 – 117, ISBN 7-81058-391-3

[4]* Chrenková M., Danielik V., Van V., Fellner P., Daněk V.: Structure and Properties of the LiF-NaF-K_2NbF_7 Melts. In: Proceedings of 6th International Symposium on Molten Salt Chemistry and Technology, Shanghai, China, October 8 - 13, 2001, pp. 86 – 93, ISBN 7-81058-391-3

[5] Chovancová M., Zemanová M., Híveš J., Fellner P., Grmanová I.: Corrosion of the Steel Materials in the Model Soil Elecrolytes. In: Proceedings of 12th International Conference Korózia úložných zariadení, Košice, 29. – 30. May 2001, pp. 11 – 15, ISBN 80-7099-582-3

[6] Danielik V., Híveš J., Gabčová J.: Katódové nadpätie pri elektrolýze kryolitových tavenín. Cathodic overvoltage in aluminium

electrolysis. (in Slovak) In: Proceedings of 53. zjazdu chemických spoločností, Banská Bystrica, 3. - 6. September 2001, pp. 193-194, ISBN 80-89029-23-X

[7] Híveš J., Korenko M., Fellner P.: Elektrochemické kompozitné povlaky typu Fe – Si. Electrochemical composite coatings based on Fe – Si. (in Slovak) In: Proceedings of 43. medzinárodnej galvanickej konferencie, Bratislava 26. - 27. June 2001, pp.59 – 64

[8] Chrenková M., Daněk V., Fellner P.: Elektrolytické pokovovanie v taveninách. Electrodeposition of metals in melts. (in Slovak) In: Proceedings of 43. medzinárodnej galvanickej konferencie, Bratislava 26. - 27. June 2001, pp. 70 – 74

[9] Zemanová M., Chovancová M.: Chromátovanie zinkových povlakov. Chromating of zinc coatings. (in Slovak) In: Proceedings of 43. medzinárodnej galvanickej konferencie, Bratislava 26. - 27. June 2001, pp. 54 – 58

[10]* Korenko M., Baníková M., Fellner P., Gabčová J., Thonstad J.: A Preliminary Study of the Dissolution of FeS in Cryolite Melts. In: Proceedings of Eleventh International Aluminium Symposium, Trondheim September 19 - 22, 2001, pp. 281

[11]* Danielik V., Híveš J.: Cathodic Overvoltage and the Content of Sodium in Molten Aluminium During Electrolysis of Cryolite Based Melts. In: Proceedings of Molten Salts : From Fundamental to Applications, Kas, Turkey 4-14 May 2001, pp. P14

[12]* Zemanová M., Nemčeková K., Chovancová M.: Corrosion Properties of Teflon Sealed Anodized Aluminium. In: Proceedings of 6th International Conference Theoretical and Experimental Problems of Materials Engineering, Púchov September 5 - 7, 2001, pp. 31

C. Books and Textbooks

[1] Thonstad J., Fellner P., Haarberg G., M., Híveš J., Kvande H., Sterten A.: Aluminium Electrolysis. Fundamentals of the Hall - Héroult Process. Aluminium-Verlag, Marketing & Kommunikation GmbH, Düsseldorf, Germany, pages 359 (2001), ISBN 3-87017-270-3

D. Patents

[1] Zemanová M., Fellner P., Chovancová M., Koštenská I.: Spôsob prípravy tenkých vrstiev oxidov na hliníku a hliníkových zliatinách. The method of preparation of thin oxide layers on aluminium and aluminium alloys. (in Slovak) SK 281503 (9. 4. 2001)

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Technical Staff:
Katarína Vépyová;

II. TEACHING AND RESEARCH LABORATORIES

English language classroom
German language classroom
Computer-operated Data Video Projector Room

III. TEACHING

A. Undergraduate Study

The English language represents a compulsory subject for each student of this faculty. In special cases, if a student has a better knowledge of a different world language, he may ask the dean to be given permission to take up one of the following languages: German, French, Spanish, Russian or Italian. A prerequisite of the latter case is the intermediate level in the chosen language. The programme is taught in two semesters in the first year of the study and ended with a 4-credit exam. The objective of the language study is not to teach the general language, but the language for specific – prospective professional purposes. It means the participants will be able to use the language in the study of their specialist area literature, to further develop all the language skills actively with the aim of mastering extensive reading and listening to texts, academic writing, poster and conference skills, etc. In the final exam students are expected to prepare a poster, present and support it with arguments in a discussion. The long-term aim is to finally enable all faculty graduates to present - at least - the essential part of their thesis in the state exams also in a foreign language.
In case of a student who does not speak any of the above languages, he may take up an elementary course in English first and then study the compulsory technical language in the second, or possibly the third year of the study.
The students who have chosen a different language than English in the first year, will have to pursue English in three more terms after passing the exam in their first foreign language.
Foreign students have a 2-term course of the Slovak language.
Besides the above - mentioned compulsory courses there is a wide range of recommended subjects offered, such as English conversation, preparatory courses for beginners, remedial courses of various levels, German, Russian and so on, according to the interest of students in the current year; these are also available to SUT employees.

B. PhD Study

Postgraduate students are offered optional seminars for technical English (2-4 hours per week) in which they are taught academic skills, such as presentation techniques, writing reports, abstracts, summaries, solving case studies, etc. Postgraduates are obliged to pass an examination in which they defend their scientific work results, prove their communication, discussion and other academic skills in English. The subject is taught by Alžbeta Oreská, Veronika Polóniová, Zuzana Štefanovičová and Magdaléna Horáková.

IV. CURRENT RESEARCH PROJECTS

A. Aspects of Teaching a Foreign Language for Specific Purposes at the University of Technology (Milan Kozlík)

The objective is to develop high quality course programmes tailored to the needs of our students.
Current results are:
- collection of new or adapted texts
- exploitation of our own reading materials from the department´s material bank
- devising new, more challenging tasks for the newly acquired materials
- unit design
- discussion and evaluation of the newly adopted units
- implementing new forms of active and independent learning (e.g.Critical thinking in reading and writing in ESP)
- introduction of "Effective Presentation" and "Socializing" video programmes into teaching successful poster presentations for undergraduate and postgraduate students
- presenting more challenging topics from science and technology in the annual faculty competition "Student Research Activities"
- further continual teaching staff development in methodology and informatics.

V. COOPERATION

A. Cooperation in Slovakia:

(1) Language departments within the Slovak University of Technology, Bratislava, and those of the Technical University, Košice: - joint project of preparing syllabuses for language state exam courses administered by SUT language departments which will - besides the general language- introduce also the area of scientific English;
(2) Cooperation with IASTE: oral interviews with applicants for mobility abroad (A. Oreská, V. Polóniová)
(3) Language section of the annual " ŠVOČ" (Students´ Scientific and Research Activity) competition (16 May 2000)
(4) Slovak Association of Translators and Interpreters (Polóniová)
(5) Language Department of the Civil Engineering Faculty: a joint workshop on "Critical Thinking in Teaching Languages " (6 December 2001)

B. International Cooperation:

CASAJC – Slovak and Czech Association of Language Centres in Higher Education (Polóniová – committee member

C. Membership in Domestic Organizations and Societies:

Slovak Association of Translators and Interpreters, Bratislava	Polóniová

D. Membership in International Organizations and Societies:

British Council - Resource Centre, Bratislava	Oreská, Horáková
CERCLES – European Confederation of Language Centres in Higher Education	Polóniová

International Scientific Programmes:

European Portfolio: A Language Passport to Unify Language Testing in Higher Education
Project promoter: Cercles/ CASAJC (Polóniová – team member)

VII. PUBLICATIONS

(1) Štefanovičová Z: Humour – the Spice of ELT. English Teaching Forum , Volume 39, July 2001, Washington D. C. 20520

B. Conferences

(1) Oxford University Press : On Teaching English in Slovakia (Oreská, Štefanovičová, 6 October 2001, Bratislava)

C. Books and Textbooks

(1) Oreská A., Harmanová M., Horáková M., Karvašová K., Kozlík M., Polóniová V., Štefanovičová Z.: English for Chemists. STU Publishing House, Bratislava 2001, ISBN 80-227-1543-3

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II. TEACHING AND RESEARCH LABORATORIES

A. TEACHING LABORATORIES:

Laboratory of Computerized Technique

III. TEACHING

A. Undergraduate Study

1st semester		
Economics	(2-0 h)	Velický
2nd semester		
Fundamentals of Environmental Philosophy	(2-0 h)	Špirko
5th semester		
Fundamentals of Management of Chemical and Food-Processing Enterprises	(2-2 h)	Šostroneková
Marketin	(2-2 h)	Ďurkovičová, Garajová
6th semester		
Introduction to Law	(2-0 h)	György
Semestral Project	(0-4 h)	Ďurkovičová, Šostroneková
Accounting	(2-2 h)	Šostroneková, Kajanová
7th semester		
Theory of a Firm	(2-2 h)	Herzka
Operations Research	(3-2 h)	Hesek
Strategic Management	(3-2 h)	Jozefček
Calculations and Prices	(2-2 h)	Kajanová
8th semester		
Capital Market and Enterprise Finances	(2-0 h)	Baran
Marketing	(2-0 h)	Ďurkovičová
Decision-Making in Business	(2-3 h)	Hesek
Human Resource Management	(2-2 h)	Herzka
Production Management	(2-3 h)	Zatrochová
9th semester		
Financial Management	(3-2 h)	Šostroneková
Analysis of Enterprise Economy	(3-2 h)	Baran
Logistics	(2-2 h)	Jozefček
Fundamentals of Mercantile and Financial Law	(2-0 h)	György
International Marketing	(2-2 h)	Ďurkovičová
Year´s Project	(0-4 h)	Ďurkovičová, Šostroneková

IV. CURRENT RESEARCH PROJECTS

A. Modern conceptions of the basic orientation of the firm´s strategic management (Agáta Ďurkovičová)

Part B: Strategic marketing and the organization of marketing.

At the present time characterized by permanent changes in the business activity marketing as an instrument of management is an inevitable prerequisite for the successful business. The knowledge and ability to employ the marketing appropriately permits enterprises to recognize in advance the market environment in which they operate. On the basis of the knowledge of this environment an enterprise is able to make correct decisions about its future position in the market. The marketing analysis belongs to basic marketing activities in conjunction with the management and provides information for other marketing-management activities.

An objective of this research stage is to perform the marketing analysis of the specific market segment, i.e. polymer-bonded rubber chemicals directed at finding the product´s perspective in terms of the present as well as future market requirements. The results of this research should serve as a basis for the formation of the enterprise marketing strategy.

The research work consists of 5 chapters which are divided into several sections. In the first part, attention is paid to the definition of the marketing presented as an instrument of management and to the position of the marketing analysis in the marketing management. The second part is aimed at the market and its segmentation. Here the specific market segment of the polymer-bonded rubber chemicals, the choice of target groups, and the market position are characterized. The third part provides an external analysis comprising the analysis of the microenvironment and that of the industrial environment. The fourth part is focused on the internal analysis of the enterprise where the financial and technological factors, enterprise organizational structure, and enterprise competitive position are elaborated. In the last part of the work, the results of the marketing analysis incorporating the SWOT analysis as a synthesizing instrument of the results obtained from the internal and external analysis of the enterprise are evaluated.

B. Philosophical-social aspects of macroeconomic theories, the environmental, ethical and legal dimensions of engineering-technological and economic activities with regard to their specificities in the chemical and food-processing industry (Dušan Špirko)

Part B: Genesis and development of views on the culture-nature relationship. Humanization strategies and environment. An engineer´s environmental and social responsibility. Legal aspects of the business risk. Philosophical fundamentals of management.

Scientific objectives of the 2-nd stage of works in 2001 are following:

Completion of the analysis of genesis and the development of views on the relations of nature in the European cultural tradition.
Analysis of the principles of current humanization strategies in relation to the environment.
Study of principles of the engineer´s social and environmental responsibility.
Social-psychological, political and environmental consequences of present changes in the character of the consumption of inhabitants.
Analysis of legal aspects of the risk in business.
Philosophical aspects of management.

In compliance with the research plan and its item “Development of principles of the environmental philosophy (especially ethics) with regard to the specificities of engineering and technological activities in the field of chemical and food industry” the analysis of genesis and the development of views on the relationship of man of nature in the European cultural traditions was completed at the second stage of the project. The matter in question were developmental changes in the value intentions of the relationship of man of nature in the Renaissance, Reformation and modern-age period. The Renaissance and Reformation had prepared a ground for radical changes in the relationship of man to nature in the modern-time period. The Renaissance justified transformation interventions of the active creative man (homo faber) into the natural environment while the Reformation found the reason for the above interventions, i.e the economic profit. The modern utilitarism legitimized man´s mastering the nature considering it as a source of the economic growth and an object of the human pragmatic-utilitarian manipulation. In the scientistically and technocratically oriented modern theories the nature appears as a dead sum of sources utilizable by man freely and without limitations. These conceptions have shown the society´s developmental trend aimed at the profit and government, which is nowadays from the environmental aspect perspectively dangerous because it leads to the subsequent global environmental crisis. Finally, the initial manifestation of criticism of the society´s modern developmental trend was of our concern.

Within this item, also the critical analysis of some solutions for proposed strategies of the humanization of nature, particularly for post-modern conceptions based on the so-called non-dualistic and non-anthropocentric approach to the nature was carried out and the appropriate attention was paid to the analysis of some principles of the engineer´s environmental and social responsibility. As for the next item of the research plan concerned with “The elaboration of principles of the business ethics with regard to the specificities of managerial and business activities in the chemical and food-industry field”, the study of changes in the character of the consumption of inhabitants and the social and psychological as well as political and environmental connections were an object of the project solutions. In agreement with the item of the research plan involving “The elaboration of principles of the commercial and financial legislation in the field of the chemical and food-processing industry in the Slovak Republic with respect to the approximation of the Slovak law to the legal system of the European Union” the analysis of legal aspects of the risk in business in the Slovak Republic was accomplished.Within the item of the research plan related to the “Analysis of the philosophical and social aspects of macroeconomic theories, principles, opinions, solutions and perspectives” the philosophical principles of the management as a key discipline of the economic management were developed.

V. COOPERATION

A. Cooperation in Slovakia

Economic University, Bratislava – Department of Marketing
Technical University, Zvolen – Department of Firm´s Economy
University of Transport and Communication, Žilina – Faculty of Management
Technical University, Košice
Philosophical Institute of the Slovak Academy of Sciences, Bratislava
Slovak Philosophical Association, Bratislava
Slovak Association for Purchasing and Logisties, Bratislava

B. International Cooperation

Technical University, Vienna, Austria
University of Chemistry and Technology, Prague, Czech Republic
Economic University, Prague, Czech Republic
Private College of Economic Studies, Praha
Masaryk University, Brno, Czech Republic
Technical University, Ostrava, Czech Republic
University of Pardubice, Czech Republic
Technical University, Darmstadt, FRG
St. Thomas University, Minnesota, U.S.A.

C. Visitors from Abroad

October 24: Dr. Iveta Merlinová, Milano, Italy
October 11: Assoc. Prof. Ivan Gross, PhD. University of Chemistry and Technology, Prague, Czech Republic
October 31: Prof. Eduard Stehlík, PhD., Economic University, Prague, Czech Republic
November 8: Assoc.Prof. Hana Lošťáková, PhD., University of Pardubice

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree)

Barami S.:	Mission of the state budget in the Slovak Republic (Š. György)
Bc. Borosová Z.:	Position of the joint-stock company in economics of the Slovak Republic (Š. György)
Brinza M.:	Advertising as a key element in the communication mix (D. Špirko)
Čontošová S.:	The health insurance and health care budget and financing in conditions of VZP Dôvera (D. Baran)
Dojčanská E.:	Pricing in conditions of the B+Business centre, Ltd. (J. Kajanová)
Fonódová S.:	Management and development of human resources in Istrochem, Inc. (P. Herzka)
Ing. Korytár P.:	Application of controlling of the working capital in a small- and medium-size level of enterprises (D. Baran)
Kováč D.:	Analysis of job positions and the formation of professiograms in the human resource management of a firm (P. Herzka)
Liptáková A.:	Internet and the possibilities of its employment (A. Ďurkovičová)
Majtnerová A.:	The capital market position in the financial market system in the Slovak Republic (D. Baran)
Neczliová (Drozdová) L.:	Advertising and planning of media within the company´s marketing activities (D. Špirko)
Polčičová B.:	Motivation in managing people in a large company (P. Herzka)
Reiff M.:	Prospects of the Slovak capital market in the international context (D. Baran)
Roháčová L.:	Marketing strategies in Datalock, Inc. (M. Jozefček)
Rohošková L.:	Functions and possibilities of the internet audit in accounting (D. Hesek)
Sajanová Z.:	Assessment of the economic effectiveness of investment in the Slovak Republic (M. Zatrochová)
Bc. Svítková M.:	Financial policy in Slovnaft, Inc. (M. Šostroneková)
Šeboková M.:	Accounting as an information base in the financial management (D. Hesek)
Trokanová M.:	Marketing analysis of the market segment of rubber chemicals in Istrochem, Inc. (M. Zatrochová)
Václavíková K.:	Leasing as a possibility of the company´s financing (P. Velický)
Vallušová B.:	Accounting of costs and revenues and its exploitation in the decision-making process of a firm (J. Kajanová)

VII. PUBLICATIONS

A. Journals

[1] Baran D.: Problémy vymožiteľnosti práva v transformujúcich sa ekonomikách. Problems of the enforcement by law in transforming economics (in Slovak). Ekonomie a Management 1, 49-51 (2001). ISSN 1212-3606
[2] Baran, D.: Marketing of the territory in conditions of the Slovak Republic. Ekonomie a Management 3, 53-56 (2001). ISSN 1212-3606
[3] Baran, D.: Human resource marketing and the firm´s sphere. J. of Human Resource Management 1-2, 15-30 (2001). ISSN 1335-3888
[4] Herzka, P.: Aspects of the corporate culture in a chemical enterprise. J. of Human Resource Management 2, 10-21 (2000). ISSN 1335-3888
[5] Špirko, D.: Kresadlové zbrane radu M 1798 "Unterberger". Pechotná puška M 1798 a jej obmeny. Historicko-technická štúdia. Flintlock Firearms of the M 1798 "Unterberger" system. The musket of the M 1798 system and its variants. Historical-technical study (in Slovak). Guns, Shooters and Hunters 2, 7-8, 40-42 (2001). ISSN 1335-5740

[6] Špirko, D.: Kresadlové zbrane radu M 1798 "Unterberger" II. Jazdecké zbrane radu M 1798 a ich obmeny. Ručné strelné zbrane pre jágrov a ostrostrelcov. Ručné strelné zbrane pre osobitné účely a osobitné jednotky. Historicko-technická štúdia. Flintlock Firearms of the M 1798 "Unterberger" system II. Cavalry guns of the M 1798 system and their variants. Hand guns for jaegers and sharpshooters. Hand guns for special purposes and special forces. Historical-technical study (in Slovak). Guns, Shooters and Hunters 2, 9, 18-20 (2001). ISSN 1335-5740

B. Conferences with Proceedings (*international conferences)

[1] Baran, D.: Aplikácia controllingu pracovného kapitálu v podmienkach malých a stredných podnikov. Application of controlling of the working capital in conditions of the small- and medium-size enterprises (in Slovak). Scientific Conference, Senec, Economic University in Bratislava, 17-18 May 2001, p. 7-10. ISBN 80-225-1426-8

[2] Baran, D.: The system of taxation in the Slovak Republic viewed by an enterpriser. International Conference, VSB Ostrava, 11-12 September, 2001, p. 32-36. ISBN 80-7078-923-9

[3] Baran, D.: Uplatnenie metód kalkulovania nákladov prostredníctvom aktivít. Application of the methods of costing through activities (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 22-25. ISBN 80-227-1612-X

[4] Baran, D.: Communication in the international marketing mix. In: Proceedings of the Scientific Conference on the Global Business and Economic Development. Faculty of Management of the Comenius University in Bratislava, 7-9 November 2001, published on CD

[5] Baran, D.: Dôsledky globalizácie na rozvoj malých a stredných podnikov v Slovenskej republike. Consequences of globalization on the development of small- and medium-size enterprises in the Slovak Republic (in Slovak). International Conference, ZU Žilina, 13 November 2001, p. 11-14. ISBN 80-7100-897-4

[6] Ďurkovičová, A.: Marketingové stratégie uplatňované v strednej a východnej Európe. Marketing strategies applied in Central and Eastern Europe (in Slovak). In: Proceedings of the International Workshop on "the Instruction of Marketing Research in the Context with the Up-to-Date Marketing Theory and Practice. Economic University, Faculty of Commerce, Bratislava, February 2001. p. 8-12. ISBN 80-225-1412-8

[7] Ďurkovičová, A.: Marketing a internet. Marketing and internet (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 37-40. ISBN 80-227-1612-X

[8] György, Š.: Niektoré otázky dobrých mravov v podnikaní a problémy ekonomickej kriminality. Some questions of good manners in business and problems of the economic criminality (in Slovak). In: Proceedings of the International Seminar on "Humanization of the University Education of Policemen". Academy of the Police Force in Bratislava, Bratislava 2001, p. 199-202. ISBN 80-8054-169-8

[9] György, Š.: Niektoré právne aspekty rizika podnikania. Some legal aspects of the risk in business (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 51-53. ISBN 80-227-1612-X

[10] György, Š.: Niektoré aspekty dobrých mravov v obchodno-právnych vzťahoch. Some aspects of good manners in the commercial-legal relations (in Slovak). In: Proceedings of the International Seminar on the Role of Methodology in the Systematic Recognition of the Slovak Society in 2000. Ekonóm, Bratislava 2001, p.263-266. ISBN 80-225-1387-3

[11] Herzka, P.: Some facts about human resource management in the selected regions of Slovakia. In: Proceedings of the International Conference on the Global Business and Economic Development. Faculty of Management of the Comenius University in Bratislava, Bratislava 2001, published on CD

[18] Jozefček, M.: Podpora malého a stredného podnikania na Slovensku. Support to the small and medium enterprising in Slovakia (in Slovak). In: Proceedings of the Scientific Conference on the Business Environment in the Slovak Republic – Present State and Perspectives III. (in Slovak). Economic University, FPM, Bratislava. May 2001, p. 88-89. ISBN 80-225-1426-8

[19] Jozefček, M.: Podpora malého a stredného podnikania – personálne stratégie. Support to the small and medium enterprising – personnel strategies (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 63-64. ISBN 80-227-1612-X

[20] Kajanová, J.: Účtovníctvo nákladov a výnosov a jeho využitie v rozhodovacích procesoch. Accounting of costs and revenues and its employment in decision-making processes (in Slovak). International Scientific Conference of Postgraduate Students. Mendel Agricultural and Forest University, Brno, Mendel NET 2001, p. 273-276

[21] Kajanová, J.: Vplyv daňovej politiky na rozvoj podnikateľskej činnosti. Influence of the tax policy on the development of business activity (in Slovak). In: Proceedings of the Scientific Conference on the Business environment in the Slovak Republic – Present State and Perspectives III. Economic University, FPM, Bratislava 2001, p. 90-93. ISBN 80-225-1426-8

[23] Kajanová, J.: Účtovníctvo ako zdroj informácií. Accounting as a source of information (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 65-68. ISBN 80-227-1612-X

[24] Kajanová, J.: International accounting standards. In: Proceedings of the International Conference on the Global Business and Economic Development. Faculty of Management of the Comenius University in Bratislava, Bratislava 2001, published on CD

[27] Šostroneková, M.: Cenová stratégia – významný faktor ovplyvňujúci vstup na trhy. Price strategy – an important factor influencing the entry into markets (in Slovak). In: Proceedings of the Scientific Conference on the Business Environment in the Slovak Republic – Present State and Perspectives III. Economic University in Bratislava, Faculty of Management, Senec 17-18 May, 2001, p. 181-184. ISBN 80-225-1426-8

[28] Šostroneková, M.-Baran, D.: Influence of the competitive environment on pricing. In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 111-113. ISBN 80-227-1612-X

[29] Šostroneková, M.: Stav a perspektívy chemických a potravinárskych podnikov. The status and perspectives of chemical and food-processing enterprises (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September

2001, p. 11-15. ISBN 80-227-1612-X
[30] Šostroneková, M.: Cenová stratégia v chemických podnikoch Slovenskej republiky. Price strategy in chemical enterprises of the Slovak Republic (in Slovak). In: Proceedings of the International Conference on the Global Business and Economic Development. Faculty of Management of the Comenius University in Bratislava, Bratislava 2001, published on CD
[31] Špirko, D.: Vývojové zmeny hodnoty prírody, kríza tradičného hodnotového konceptu modernej kultúry a koncepcia trvalo udržateľného rozvoja. Evolutionary changes in the value of nature, the crisis of the traditional value concept of modern culture and the conception of the permanently tenable development (in Slovak). In: Proceedings of the International Seminar on the Role of Methodology in the Systematic Recognition of the Slovak Society in 2000. Ekonóm, Bratislava 2001, p. 71-80. ISBN 80-225-1387-3
[32] Špirko, D.: Neľahké bremeno zodpovednosti za svet. An oppressive burden of the responsibility for the world (in Slovak). In: Proceedings of the 2-nd Slovak Philosophical Congress, IRIS, Bratislava 2001, p. 466-476. ISBN 80-88778-23-9
[33] Špirko, D.: Zmeny v charaktere spotreby a ich sociálno-psychologické, politické a environmentálne súvislosti. Changes in the character of the consumption and their social-psychological, political and environmental connections (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 114-117. ISBN 80-227-1612-X
[34] Špirko, D.: Nová humanizačná stratégia. The new humanization strategy (in Slovak). In: Proceedings of the Scientific Conference on the Human Environment published on the occassion of the 10th anniversary of the Department of humanistic sciences of SvF STU in Bratislava. STU Bratislava 2001, p. 127-134. ISBN 80-227-1619-7
[35] Velický, P.: Koncepcia univerzálnej skutočnosti. Conception of the universal reality (in Slovak). In: Proceedings of the International Seminar on the Role of Methodology in the Systematic Recognition of the Slovak Society in 2000. Ekonóm, Bratislava 2001, p. 105-113. ISBN 80-225-1387-3
[36] Velický, P.: Filozofické základy manažmentu. Philosophical fundmentals of management (in Slovak).). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 118-122. 227-1612-X
[37] Zatrochová, M.: Podnikateľské prostredie na trhu obchodno-komerčných nehnuteľností. Business environment in the market of the trade-commercial real estates (in Slovak). In: Proceedings of the Scientific Conference on the Business Environment in the Slovak Republic-Present State and Perspectives III. FPM. Economic University, Bratislava 2001, p. 214-216. ISBN 80-225-1426-8
[38] Zatrochová, M.: Vývoj a problémy investovania v chemickom a potravinárskom priemysle na Slovensku. Development and problems of the investment in the chemical and food-processing industry in Slovakia (in Slovak). In: Proceedings of the 1-st International Conference on "New Trends in the Management of Enterprises". Faculty of Chemical and Food Technology of STU in Bratislava, Senec, 18-19 September 2001, p. 131-133. ISBN 80-227-1612-X
[39] Zatrochová, M.: Problémy rozvoja obchodných nehnuteľností na Slovensku. Problems of the development of commercial real estates in Slovakia (in Slovak). International Scientific Symposium on the Research of Economic and Managerial Processes in the Building Industry and Investment Projects. SVF STU Bratislava, Faculty of Civil Engineering, September 2001, p. 139-141. ISBN 80-227-1583-2

C. Books and Textbooks

[1] Baran, D. Analýza hospodárenia podniku. Analysis of the firm´s economizing policy (in Slovak). Publishing House of STU, Bratislava, 185 pp. (2001). ISBN 80-227-1517-4
[2] Baran, D.: Podnikový controlling. Controlling in a firm (in Slovak). Publishing House of STU, Bratislava, 119 pp. (2001). ISBN 80-227-1558-1
[3] Ďurkovičová, A.,Garajová, J.: Marketing. Marketing (in Slovak). Publishing House of STU, Bratislava, 116 pp. (2001) ISBN 80-227-1466-6

DEPARTMENT OF MATHEMATICS

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I. STAFF

Full Professors:
Vladimír Kvasnička, PhD, DSc

Associate Professors:
Imrich Fabrici, PhD, Anna Kolesárová, PhD, Jiří Pospíchal, PhD, Michal Šabo, PhD, Štefan Varga, PhD

Assistant Professors:
Jozef Antoni, PhD, Vladimír Baláž, PhD, Július Bánki, PhD, Štefan Boor, Ivan Garaj, PhD, Viera Grusková, PhD, Eva Hainzlová, Vladimír Haluška, PhD, Ľubomíra Horanská, Milan Jasem, PhD, Eva Rovderová, PhD, Soňa Sladká

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory equipped by personal computers for the Basics of Computer Science

III. TEACHING

A. Undergraduate study

1st semester (autumn)		
Calculus I.	(3-3 h)	Baláž, Fabrici, Grusková, Jasem, Kolesárová, Kvasnička, Šabo
Basic of Computer Science	(1-2 h)	Antoni, Bánki, Hainzlová, Pospíchal
2nd semester (spring)		
Calculus II.	(4-4 h)	Baláž, Fabrici, Grusková, Jasem, Kolesárová, Kvasnička, Šabo
7th semester (autumn)		
Calculus III.	(2-2 h)	Antoni, Garaj, Varga

B. PhD Study

2nd Semester (spring)		
Optimisation Methods and Advanced Mathematical Statistics	(2 h)	Kvasnička, Varga

C. Extracurricular lectures

Evolutionary Algorithms	(2-0 h)	Kvasnička, Pospíchal (see web address http://math.chtf.stuba.sk/evol/prednaska.htm, this lecture is presented for computer-science students of Faculty of Mathematics and Physics, Comenius University)
Introduction to Cognitive Sciences	(2-0)	Kvasnička, Pospíchal (see web address http://math.chtf.stuba.sk/kog_vedy.htm, this lecture is presented for students of Comenius University)
Cognitive Systems	(2-2)	Kvasnička (this lecture is presented for students of Technical University in Košice)

IV. CURRENT RESEARCH PROJECTS

A. Artificial neural networks (Vladimír Kvasnička)

The core of the project is the study of artificial neural networks, which are able to accept directly a structural information represented by acyclic rooted graphs. Such a generalization of neural networks is very important not only for chemical application of neural networks, where structural formulas are used as an input of molecules, but also for computer science in general, where the processing of a structural information belongs to its basic problems. An architecture of a neural network will be divided into two parts. In the first part the structural formula will be directly numerically processed, and the output will serve as an input for a standard neural network. The adaptation process, which optimizes the parameters of the neural network to achieve such an output of the neural network, that would be as close as possible to the required output, is applied to both parts of the neural network. The method will be tested for various classes of molecular properties and structural formulas. Our further activities are concentrated on

an application of recurrent neutral networks as cognitive devices for multi agent simulation calculations of an emergence of coordinated communication between agents. It was demonstrated, that if an analogue of Dawkins' memes is used, then a coordinated communication spontaneously emerges. On the other hand, if Dawkins' memes are ignored, then an emergence of coordinated communication between agents does not emerge.

B. Evolutionary algorithms (Jiří Pospíchal)

various evolutionary optimisation algorithms (genetic algorithms, simulated annealing, evolution strategies and tabu search) and their applications for solution of combinatorial NP-complete problems, graph theory problems and for adaptation of neural networks, as well as for optimisation of highly multimodal and deceptive functions. Theoretical study of fuzzy systems and implementation of a learning procedure of fuzzy neural networks by evolutionary algorithms. Artificial life studies are performed by making use of evolutionary algorithms as simulators of Darwinian evolution. An emergence of cooperation and altruism in multiagent systems is simulated. Artificial chemistry, typogenetics, models of evolution of autoreplicatory molecules and simulations of origin of life, Darwinian evolution on molecular level.

C. Theory of fuzzy systems (Anna Kolesárová)

The main goals of this project are the modeling of vagueness and the inference process from imprecise or vague premises. These topics are very important for knowledge-based systems, especially for fuzzy expert systems and the aggregation of vague data. In the area of approximate reasoning there are studied various types of inference rules dealing with the problem of deduction of conclusions in an imprecise setting. Namely, a compositional rule of inference based on various types of triangular norms (or other approximate operators) is studied. The methods which effectively simplify the computational complexity of an inference process are investigated. Since the aggregation of input data into a single output is a background of many theoretical and practical problems, we study various types of aggregation operators that can be successfully used in many valued logic, in the theory of approximate reasoning and decision making. Main attention is paid to the aggregation operators based on triangular norms to the construction methods of new aggregations operators and to the conditional aggregation of data.

D. Estimations of unknown parameters in statistical models of direct and indirect measurements (Štefan Varga)

Our specific field of interest has been estimations and predictions in regression models. Special regression models are models with unknown variance and covariance components called mixed regression models. Estimability and different types of estimations of these components and their applications are topics of our publishing activities.

E. Periodic weekly seminar on fuzzy sets and fuzzy logic (Michal Šabo)

Organised for staff of Department of Mathematics and students of our Faculty.

F. Periodic yearly workshop on cognitive science (Vladimír Kvasnička and Jiří Pospíchal).

An interdisciplinary approach to artificial intelligence, neuroscience and cognitive science, sponsored by Open Society Foundation.

V. COOPERATION

A. Cooperation in Slovakia:

Department of Mathematics and Descriptive Geometry, Faculty of Civil Engineering, Slovak Technical University, Bratislava
Department of Computer Science and Engineering, Faculty of Electrical Engineering and Information Technology, Slovak Technical University, Bratislava
Institute of Informatics, Faculty of Mathematics, Physics, and Informatics, Comenius University, Bratislava
Department of Cybernetics and Artificial Intelligence, Faculty of Electrical Engineering and Information Technology, Technical University of Košice

B. International Cooperation:

Department of Mathematics, University of Bayreuth
Institute of Mathematics, Johannes Kepler University, LINZ, AUSTRIA
Computer Chemistry Laboratory, Masaryk University, Brno, Czech Republic
Department of Organic Chemistry, University of Pardubice, Czech Republic
Faculty of Informatics, Masaryk University, Brno, Czech Republic
Dept. of Computer Science, University of Alcala, Spain
Department of Mathematical Methods and Models for Applied Sciences, University of Rome "La Sapienza", Italy

C. Membership in Domestic Organisations and Societies

Slovak Academic Society (Kvasnička)
Slovak Artificial Intelligence Society
Slovak Society of Mathematicians and Physicists
Slovak Computer Science Society
Slovak Mathematical Society

D. Membership in International Organisations and Societies

European Mathematical Society
The EURO Working Group on Fuzzy Sets
European Society for Fuzzy Logic and Technology

Visitors from Abroad

A. Rammer, University of New South Wales, Sydney, Australia, February 12-12, 2001.

H. Visits of Staff Members to Foreign Institutions

A. Kolesárová, M. Šabo:	22nd Linz Seminar on Fuzzy Set Theory, LINZ 2001, Linz , Austria, February 6-10, 2001
A. Kolesárová, M. Šabo:	Research stay, Johannes Kepler University Linz, Austria, February 2001, 8 days
A. Kolesárová:	Research stay, University of Alcala, Spain, July 2001, 3 days
A. Kolesárová:	Research stay, Ceepus, Budapest University of Technology and Economics, Hungary, June 2001, 21 days
V. Kvasnička, J. Pospíchal:	Invited plenary lecture at the conference Multi-Agent Systems and Application, Praque, Czech Republic, July 2-13, 2001
V. Kvasnička, J. Pospíchal:	Invited plenary lecture at the European Conference on Artificial Life, Praque, Czech Republic,September 10-14, 2001
V. Kvasnička, J. Pospíchal:	5th International Conference on Neural Networks and Genetic Algorithms, Prague, Czech Republic, April 22-25, 2001
V. Baláž, V. Kvasnička, J. Pospíchal, M. Šabo, Š. Varga:	3rd Scientific Colloquium, Prague, June 26-28, 2001
J. Pospíchal:	Conference Mendel ´2001, Brno, Czech Republic, June 6-8, 2001
Š. Varga:	Agriculture University of Athens, PhD lectures, May 2001, 1week

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Kolesárová A.: Collapsed input-based aggregation. Int. J. of Uncertainty, Fuzziness and Knowledge Based Systems 9, Vol.2 (2001) 217-228.

[2]* Kolesárová A.: Limit properties of quasi-arithmetic means. Fuzzy Sets and Systems 124, No.1(2001) 65-71.

[3]* Kolesárová A., Vivona D.: Entropy of T-sums and T-products of L-R fuzzy numbers. Kybernetika 37 (2001) 127-145.

[4]* Kvasnička V., Pospíchal J.: Autoreplicators and hypercycles in typogenetics. J. Chem. Structure (Theochem) 547(2001)119-138.

[5]* Kvasnička V.: An evolutionary simulation of modularity emergence of genotype-phenotype mappings. Neural Network World 5(1) (2001) 473-491.

[6] Rovderová E.: Nonlinear ordinary differential equations in physics (Nelineárne obyčajné diferenciálne rovnice vo fyzike). Obzory matematiky, fyziky a informatiky, Vol. 30 No. 1 (2001) 1-7.

[7]* Šabo M., Kolesárová A., Varga Š.: Ret operators generated by triangular norms and copulas. International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems. Vol. 9, No. 2 (2001) 169-181.

B. Conferences (*international conferences)

[1]* Baláž V.: Zeros and Fixed Points of Continuous Functions and the Structure of Function Space C(R). Proceedings of 3rd Scientific Colloquium, June 26-28.2001, Inst. Chem. Technol., Prague 2001, ISBN 80-7080-423-8, pp.108-112.

[2]* Calvo T., Kolesárová A., Komorníková M., Mesiar R.*: A Review of Aggregation Operators. Univ. of Alcalá, Madrid, 2001, ISBN 84-8138-448-8.

[3]* Garaj I.: Sequential plan of Poisson distribution (Sekvenčný preberací plán Poissonovho rozdelenia), Proceedings of Mechanical Engineering 2001, STU Publishing, 22. November 2001, pp. 670-675

[4]* Kolesárová A*., Záhonová V. : Parametric evaluation of aggregation operators. Proc. Int. Conf. Mechanical Engineering 2001, SjF STU, Bratislava, November 2001, pp. 684—689.

[5]* Kolesárová A*., Vivona D.: Measure of fuzziness of T-sums and T-products of L-R fuzzy numbers. Proc. 9th Zittau Fuzzy Colloquium 2001, Zittau, 2001, pp. 46-54. ISBN 3-9808089-0-4

[6]* Kolesárová A*.: A note on the construction of aggregation operators by Mobius transform. Proc. Int. Conf. Uncertainty Modelling 2001, Bratislava, 2001, pp. 174-183.

[7]* Kolesárová A.*, Mordelová J.: 1-Lipschitz and kernel aggregation operators. Proceedings AGOP 2001, Oviedo, Spain, 2001, pp. 71-75.

[8]* Kvasnička V.*, Pospíchal J.: A study of autoreplicators and hypercycles by typogenetics. In: J. Kelemen, P. Sosik: Advances in Artificial Life, ECAL 2001, LNAI 2159, Springer 2001, pp. 37-54.

[9]* Kvasnička V., Pospíchal J.: A Multi-agent Study of Interethnic Cooperation. Lecture notes in artificial intelligence, vol. 2086, Springer 2001, pp. 415-435.

[10]* Kvasnička V.: Artificial chemistry - a new metaphor for evolutionary algorithms. 6th Online World Conference on Soft Computing in Industrial Applications (WSC6), http://www.cranfield.ac.uk/wsc6

[11]* Kvasnička V.: A Simulation of Spiking Neurons by Sigmoid Neurons. In V. Kurkova, N.C. Steele, R. Neruda, M. Karny (eds.): Artificial Neural Nets and Genetic Algorithms; Proceedings of ICANNGA, Prague 2001. Springer Verlag, Wien 2001, pp. 31-34.

[12]* Kvasnička V.: Artificial chemistry. Proceedings of 3rd Scientific Colloquium, June 26-28.2001, Inst. Chem. Technol., Prague 2001, ISBN 80-7080-423-8, pp. 118-129.

[13]* Kvasnička V.: Artificial chemistry – a new metaphor for evolutionary algorithms. Proceedings of MENDEL 2001, PC-DIR, Brno, ISBN 80-214-1894-X, pp. 91-96.

[14] Kvasnička V.: Connectionism and a modularity of mind in cognitive science (Konekcionizmus a modularita mysle v kognitívnych vedách). In proceedings Cognitive Science IV (KOGNITÍVNE VEDY IV: Mozog a kognícia), Slovak society for artificial intelligence, 7. 12. 2001, Bratislava, pp. 79-95.

[15] Kvasnička V.: Creativity through the cognitive glases (Kreativita optikou kognitívnych vied). In J. Kelemen, V. Kvasnička, J. Pospíchal: Cognition and Artificial Life (Kognice a umělý život). FPF SU Opava, 2001, ISBN 80-7248-107-X, pp.153-166, in Slovak.

[16]* Pospíchal J.*, Kvasnička V.: Multistage Decision Making for a Fuzzy Automaton by Simulated Annealing 6th Online World Conference on Soft Computing in Industrial Applications (WSC6), http://www.cranfield.ac.uk/wsc6

[17]* Pospíchal J.*, Kvasnička V.: Sixth European Conference on Artificial Life (ECAL 2001), Prague, Czech Republic, 9--14

September 2001 (report on conference) BULLETIN OF THE EATCS 72, October 2001, pp. 254 -261
[18]* Pospíchal J.: Applications of Evolutionary Algorithms in Chemistry. Proceedings of 3rd Scientific Colloquium, June 26-28.2001, Inst. Chem. Technol., Prague 2001, ISBN 80-7080-423-8, pp.150-159.
[19]* Pospíchal J.: Evolutionary optimization algorithms: A survey and new trends. In: Energy and Information in Non-linear Systems" (A. Gottvald, Ed.), Proc. of The 4th Japan-Central Europe Joint Workshop on Energy and Information in Non-linear Systems (Brno, Nov. 10-12, 2000); CSAEM, Brno, 2001, pp. 24-27.
[20] Pospíchal J.: Modelling of tragedy of the commons (Modelovanie tragédie spoločného). In the proceedings J. Kelemen, V. Kvasnička, J. Pospíchal: Cognition and Artificial Life (Kognice a umělý život). FPF SU Opava, 2001, ISBN 80-7248-107-X, pp.265-276.
[21]* Pospíchal J.: Optimization of Expensive Functions by Surrogates Created from Neural Network Ensembles. In V. Kurkova, N.C. Steele, R. Neruda, M. Karny (eds.): Artificial Neural Nets and Genetic Algorithms; Proceedings of ICANNGA, Prague 2001. Springer Verlag, Wien 2001, pp. 51-54.
[22]* Pospíchal J.: Tragedy of the commons in transportation networks. Proceedings of MENDEL 2001, PC-DIR, Brno, 2001, ISBN 80-214-1894-X, pp. 97-102.
[23]* Rovderová E.: Problem of solitary water waves. The 1st International Conference on Applied Mathematics and Informatics at Universities ´2001, pp. 130-133.
[24]* Sarkoci P.*, Šabo M.: Information boundedness principle and relevancy transformation operators. Proc. of the international conference UNCERTAINTY MODELLING '2001, M. Komorníková, R. Mesiar (Eds.), Sept. 24-28, 2001, Bratislava, Slovakia, Fac. Civil. Eng., 2001, pp. 111-121.
[25] Šabo M.: A quality of fuzzy connectives in an inference process (Kvalita fuzzy spojok v inferenčnom procese). In proceedings of D-posets in a systeme of quantum structures (D-posety v systéme kvantových štruktúr), KM, Fak. PVO, VA Liptovský Mikuláš, 19,-21.10.2001, Kalenik, Liptovský Peter
[26]* Šabo M.: On Some Connectives in Many Valued Logic. Proceedings of 3rd Scientific Colloquium, June 26-28.2001, Inst. Chem. Technol., Prague 2001, ISBN 80-7080-423-8, pp.136-139.
[27]* Varga Š.: Different types of uncertainty in regression models. Proceedings of 3rd Scientific Colloquium, June 26-28.2001, Inst. Chem. Technol., Prague 2001, ISBN 80-7080-423-8, pp.136-139.
[28]* Varga Š.: Statistical method in Biology, Biotechnology and Chemistry. Lectures in the PhD Course on Food Science and Technology. Agriculture University in Athens. May 2001.
[29]* Varga Š.: Uncertainty in regression models. Proceedings of PRASTAN 2001. Kočovce, September 2001, 154 - 159.

C. Books and Textbooks

[1] J. Kelemen, V. Kvasnička, J. Pospíchal (eds.): Cognition and Artificial Life (Kognice a umělý život). FPF SU Opava, 2001, ISBN 80-7248-107-X, pp.153-166, in Slovak and Czech.

E. Other publications

Conferences organized by the department:
Cognition and Artificial Life (KOGNÍCIA A UMELÝ ŽIVOT), 15.-17. Marc 2001, Smolenice, Slovakia (see web homepage http://math.chtf.stuba.sk/smolenice/index.htm).
Cognitive Science IV (KOGNITÍVNE VEDY IV: Mozog a kognícia), 7. 12. 2001, FCHPT STUBratislava (see web homepage http://math.chtf.stuba.sk/CogSci_2001.htm)
2nd Seminar on Fuzzy Set Theory and Quantum Structures. Vyhne, May 18-20, 2001.

DEPARTMENT OF MILK, FATS AND FOOD HYGIENE

Head of Department:
Assoc.Prof. Štefan Schmidt, PhD

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I. STAFF

Associate Professors:
Jozef Augustín, PhD; Vladimír Frank, PhD; Jarmila Hojerová, PhD; Vladimír Palo, PhD; Ľubomír Valík, PhD

Assistant Professors:
Mária Greifová, PhD; Vladimír Mastihuba, PhD; Stanislav Sekretár, PhD; Jaroslav Zemanovič, PhD;

Research Fellows:
Bernadette Hozová, PhD; Ľudovít Kuniak, PhD; Vlasta Kuklišová;

PhD students:
Martina Hrčková; Denisa Lauková; Iveta Kukurová; Terézia Machalcová; Ivana Niklová; Helena Kanďárová;

Technical Staff:
Vilma Grmanová; Anna Horvátová; Edita Kovačičová; Eva Nováková; Margita Piatriková;

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Milk Chemistry and Technology
Laboratory of Fat Chemistry and Technology
Laboratory of Food Microbiology
Laboratory of Cosmetology
Laboratory of Applied Biotechnology

III. TEACHING

A. Undergraduate Study

1st semester (autumn)		
Laboratory Practice Biology	(0-1 h)	Augustín
5th semester (autumn)		
Fundamentals of Hygiene and Sanitation	(1-1 h)	Hojerová
6th semester (spring)		
Cosmetic and Household Chemistry	(1-1 h)	Hojerová
Packaging and Packaging Materials	(1-1 h)	Sekretár
Fats Chemistry and oleochemistry	(1-1 h)	Schmidt, Sekretár
Semestral Project	(0-4 h)	all Department Staff
7th semester (spring)		
Dairy Chemistry and Technology I.	(2-0 h)	Greifová
Laboratory Practice Dairy Chemistry and Technology I.	(0-3 h)	Greifová, Mastihuba
Laboratory Practice Special Food Analysis	(2-2 h)	Augustín, Hojerová, Sekretár
Food Microbiology	(2-0 h)	Valík
Laboratory Practice Food Microbiology	(0-4 h)	Valík, Frank, Hozová
Food Unit Operations	(2-2 h)	Schmidt
Special Practice Food Unit Operations	(0-2 h)	Schmidt
Semestral Project	(0-4 h)	all Department Staff
8th semester (spring)		
Laboratory Practice Dairy Chemistry and Technology	(0-3 h)	Greifová, Mastihuba
Fats, Detergents and Cosmetics	(4-0 h)	Schmidt, Sekretár, Hojerová, Zemanovič
Laboratory Practice Fats, Detergents and Cosmetics	(0-3 h)	Schmidt, Sekretár, Hojerová, Zemanovič
Microbiology of Milk, Fats and Cosmetics	(2-0 h)	Valík
Laboratory Practice Microbiology of Milk, Fats and Cosmetics	(0-2 h)	Valík, Kuklišová
9th semester (autumn)		
Special Food Microbiology	(2-0 h)	Valík
Laboratory Practice Special Food Microbiology	(0-2 h)	Valík
Food Ecohygiene	(2-0 h)	Frank
Laboratory Practice Food Ecohygiene	(0-2 h)	Augustín
Special Dairy and Fat Technologies	(2-0 h)	Schmidt, Mastihuba
Laboratory exercise Special Dairy and		

Fat Technologies	(0-4 h)	Schmidt, Greifová, Sekretár, Mastihuba
Side effluents in Food Industry	(2-0 h)	Augustín
Laboratory Practice Side Effluents in Food Industry	(0-2 h)	Augustín

10th semester (spring)

Diploma Project	(0-27 h)	all Department Staff

B. PhD Study

IV. CURRENT RESEARCH PROJECTS

A. Rapid, specific detection of Listeria monocytogenes by antibody.based techniques and on line sensor technology; development of improved control of food safety for industry and the consumer (Katarína Horáková)

Food as a vehicle of infection for *Listeria monocytogenes* was not recognised until 1980s. Prior to this the disease, which can cause central nervous system infection and sepicaemia, was either from an unknown source or was know to be transmitted direct from an animal reservoir or via hospital cross-infection. At particular risk are compromised individuals such as pregnant women and those with underlying disease. The overall objective of the project is to develop rapid, specific test methods for the detection of *Listeria* in foods, wit the aim of introducing appropriate quality control into food production processes of the CCE partners. The method will be used both to assess the quality of raw material and the final food product, including where possible on line sensor technology. Partial objectives: to raise novel antibodies; optimise the laboratory technology; validation of the method; to introduce the method for routine detection; to disseminate the results.
Improving of the functional and biological values of foods and cosmetic products.

B. Stabilisation of foods containing fats by application of new types of natural antioxidants (Štefan Schmidt)

Minimisation of the *trans*-isomers fatty acids' formation during the partial hydrogenation of vegetable oils. Optimisation of the conditions during the transesterification of triacylglycerols as alternative to the hydrogenation. Development of the predictive microbiology by the using of computer's technique and the mathematical simulation of the relations between micro-organisms and foods. Investigation of the response of micro-organisms to the factors of the external and internal background with the aim to minimise their growth or reproduction. Increasing of the functional and biological properties of foods by the enzymatic hydrolysis of the proteins. Application of the stabilisers to the improvement of the stability of the physical and chemical properties of the cosmetic and food products at the required microbiological safety.

C. Improvement of nutrition and sensory quality of foods via optimising of physico-chemical and biological factors (Vladimír Frank)

The project analyses factors, which affect the selected technically relevant microorganisms, i.e. those microbes causing fermentation, spoiling and/or health risks of foods. Application of isolation and separation methods for determination of volatile compounds in investigated foods and sensory profiling of flavour alterations initiated by chemical and microbial changes of food are under intensive search as well. Other branch of project deals with improvement of technical properties of fats via randomization process, which concurrently saves the biological value of fat products considering, that essential fatty acids content remains unchanged after the process.

V. COOPERATION

A. Cooperation in Slovakia

Central Laboratory Milex - Progres, a.s., Bratislava
Dairy Plant Levice
De Miclén, a.s, Levice
Dimenzia, s.r.o., Kežmarok
Institute of Dairy Research, Žilina
Institute of Human Nutrition, Bratislava
Institute of Preventive and Clinical Medicine, Bratislava
Milex, Nové Mesto nad Váhom
National Institute of Public Health, Bratislava
Nuclear Powerplant Jaslovské Bohunice
Palma - Henkel, a.s., Nové Mesto nad Váhom
Palma - Tumys, a.s., Bratislava
PHARMASUN, Bratislava
Rajo, a.s. Bratislava
Ress, s.r.o., Senica
Slovak Academy of Sciences, Institute of Chemistry, Bratislava
Slovak Academy of Sciences, Institute of Molecular Biology, Bratislava
Slovak Academy of Sciences, Institute of Pharmacology, Bratislava

B. International Cooperation:

Aluso sro, Prague, Czech Republic
- Development of cosmetic products

BBSRC Institute of Food Research, Norwich, Great Britain
- Development of improved control of food safety for industry
- Support for database of predictive microbiology.

BRDC (Biotechnology Research and Development Corporation) Peoria, IL, USA
- Enzymatic modification of natural polymers

Dublin City University, Biomedical and Environmental Sensor Technology Centre, Dublin, Ireland
- Development of improved control of food safety for industry

Institute of Chemical Technology, Department of Biochemistry and Microbiology, Prague, Czech Republic
- Development of improved control of food safety for industry

Institute of Chemical Technology, Department of Dairy and Fat Technology, Prague, Czech Republic
- Education of dairy and fat technology
- Natural antioxidants

Johnson Matthey, Prague, Czech Republic & Johnson Matthey, Royston, UK
- Toxicity and antimicrobial efficacy study of cosmetic preservatives

Gimex, sro, Zlín, Czech Republic
- Toxicity and antimicrobial efficacy study of cosmetic preservatives

Gimex, sro, Zlín, Czech Republic
- Household Chemistry

Milcom-Dairy Research Institute, Prague
- Development of improved control of food safety for industry

NCAUR (National Center for Agricultural Utilization Research), ARS, USDA, Peoria, IL, USA
- Enzymatic modification of natural polymers

Technical University Vienna, Department of Biotechnology, Austria
- Proteolytic Enzymes of *Brevibacterium linens*

Food and Agriculture Organization of the United Nations (FAO)
-.Consultations on food microbiology

C. Membership in Domestic Organizations and Societes:

Commission for Technical Standards no 79 (Cosmetics) of Slovak Institute for Technical Standards (J. Hojerová)
Slovak Society of Cosmetology (J. Hojerová)
Editorial board of Bulletin of Food Research (Š. Schmidt)
Expert of the Slovak National Accreditation Service – Technical Commission TVA-L4 (B. Hozová)
Incheba, Joint Stock Company - Technical Committee for Cosmetics (J. Hojerová)
Members of Committee of the Slovak Chemical Society (Š. Schmidt)
Member of Committee of the Food Section SCHS (B. Hozová, Š. Schmidt, J. Zemanovič)
Slovak Academy of Agriculture (V. Palo)
Science - Technical Society (B. Hozová)
Slovak Chemical Society (V. Frank, M. Greifová, Ľ. Kuniak, V. Mastihuba, I. Niklová, V. Palo)
Slovak National Committee of International Dairy Federation (V. Palo)
Slovak Gold – Technical Committee for Cosmetics and Household Products(J. Hojerová)
Slovak Society of Agricultural, Food and Forestry Science (J. Augustín, V. Palo)

D. Membership in International Organizations and Societes

Federation of European Chemical Societies, Division of Food Chemistry (Schmidt)
Editorial board of European Journal of Lipid Science and Technology (Š. Schmidt)
Czechoslovak Microbiology Society (J. Augustín, M. Greifová, B. Hozová, Ľ. Valík)
Austrian Chemical Society, Austria (J. Zemanovič)
International Federation Society of Cosmetic Chemists (IFSCC), USA (J. Hojerová)

E. Tempus Programme:

F. International Scientific Programmes:

Copernicus project PL 979012 ”Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology”.

G. Visitors from Abroad:

Dr. József Baranyi	Institute of Food Research, UK (1 day)
Prof. Vladimír Filip	University of Chemical Technology, Prague (3 days)
Ludmila Karamonová MSc.	Institute of Chemical Technology, Prague, Czech Republic (4 weeks)
Dr. Petr Roubal	Milcom-Dairy Research Institute, Prague (2 weeks)
Prof. Karl Bayer	University of Agriculture,Vienna, Austria (1 day)
Mgr. Marek Szoltysik	University of Agriculture, Wroclav, Poland (1 day)

Visits of Staff Members and PhD Students to Foreign Institutions:

Mária Greifová	Institute of Chemical Technology, Prague, Czech Republic (2 weeks)
Jarmila Hojerová	Herbacos – Bofarma sro, Pardubice, Czech Republic (3 days)
Helena Kaňďarová	National Institute of Public Health, Prague, Czech Republic (2 days)
Vladimír Mastihuba	Institute of Chemical Technology, Prague, Czech Republic (1 weeks)
Ľubomír Valík, Denisa Lauková	University of Chemical Technology, Prague (2 days)
Ľubomír Valík	National Nutrition Centre, Vilnius, Lithuania (2 weeks)

VI. THESES AND DISSERTATIONS

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

Boráková – Králiková Miroslava	Effect of prooxidative factors on quality of vegetable oils (Š. Schmidt)
Garajová Elena	Use of hydrolases in derivatisation of saccharides (V. Mastihuba)
Halabuková Adriana	Dynamics of microbiological properties of Agaricus bisporus (V. Frank)
Hartiníková Henrieta	Use of rosemary in stabilisation of fats (S. Sekretár)
Husárová Lenka	Hydrophobic modifications of proteines (V. Mastihuba)
Kanďárová Helena	Actual problems in evaluation of stability of UV filters in cosmetics (J. Hojerová)
Kohútová Monika	Validation of analytical methods for detection of UV filters in cosmetics (J. Hojerová)
Kuzmová Daniela	Study of growth dynamics of selected contaminants in raw milk and dairy products in region of Eastern Slovakia (J. Augustín)
Laššová Lenka	Analysis of growth of yeasts depending on control of media pH temperature (Ľ. Valík)
Melišová Denisa	Effect of external conditions on the growth and production of amines by Enterococcus faecium (M. Greifová)
Michalovičová Zuzana	Microbiological control of yoghurt production (Ľ. Valík)
Mrózová Zuzana	Dairy related decarboxylases – assay and emplyment (V. Mastihuba)
Rusňáková Monika	Proteolysis of food proteins by selected proteases (M. Hrčková)
Šutariková Katarína	Chemical and microbial indicators of quality of bryndza cheese (M. Greifová)
Švaňová Ľubica	Production of polygalacturonidase by microorganisms (Candida boidinii and *Cryptococcus laurentii*) in physiological and stress conditions (J. Augustín)
Turicová – Zajíčková Renáta	Relation of hygienic and sensoric quality of croissants to external (sorbic acid) and internal (aw) conditions of storage (B. Hozová).
Vrbovská Lucia	Characterisation of extracts from evening primrose according to their antioxidant activity (I. Niklová)
Zajacová Lucia	Effect of additives on the oxidation stability of fats during their microwave (S. Sekretár)
Žemberová Jaroslava	Microbiological properties of selected frozen foods (V. Frank)

B. Dissertations (PhD):

C. Dissertations (DSc):

D. Habilitation Theses:

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Buchinger W., Tomaschová J., Zemanovič J., Hampel W. A.: Autodegradation of the extracellular proteases of Brevibacterium linens ATCC 9172. Food Chemistry 74, 61-68, (2001)

[2] Hojerová J., Jantová S., Hanusová B., Vollek W.: Antimicrobial efficacy of some interesting preservatives for cosmetics. SÖFW - Journal 127 (8), 9-15, (2001).

[3] Hozová B., Kratmüllerová M.: Assay of antibiotic detection limits in cow´s milk model samples and comparison of sensitivity of various detection systems (disk diffusion method, Delvotest SP and Penzym S 100). Czech J. Food Sci. 19 (4), 125-131, (2001).

[4] Hozová B., Lenkeyová I.: Interakcie antibiotík - teoretické poznatky a praktické skúsenosti. Interactions of antibiotics – theoretical knowledge and practical experience (in Slovak). Mliekarstvo, 32 (2), 38-42, (2001).

[5] Hozová B., Minarovičová Ľ.: Verification of suitability of selected detection systems for estimating antibiotic residues in goat´s milk. Czech J. Food Sci. 19 (6), 207-212, (2001).

[6] Hrčková M., Zemanovič J.: Funkčné vlastnosti proteínov v potravinách. Functional properties of proteins in foodstuffs (in Slovak). Bull. potrav. výsk. 40 (3), 191-20, (2001)

[7] Jantová S., Hojerová J., Hanusová B., Mikulášová M.: Cytotoxická a genotoxická aktivita vybraných konzervačných látok pre kozmetické prostriedky. Cytotoxic and genotoxic activity of preservative additives for cosmetic agents (in Slovak). Česká a Slovenská farmacie 50 (5), 238-242, (2001).

[8]* Kolarova N., Augustín J.: Production of Polysaccharide Hydrolases in the Genus Rhizopus. Folia Microbiol. 46 (3), 223-226, (2001)

[9]* Mastihubová M., Mastihuba V., Kremnický Ľ., Willet J.L., Côté G.L.: Chemoenzymatic preparation of novel substrates for feruloyl esterases. Synlett (10), 1559-1560, (2001)

[10]* Niklová I., Schmidt Š., Habalová K., Sekretár S.: Effect of evening primrose extracts on oxidative stability of sunflower and rapeseed oils. Eur. J. Lipid Sci. Technol. 103 (2001), No. 5, 299-306.

[11] Sekretár, S.: Spôsoby aktívneho balenia. Methods of active packaging (in Slovak). Packaging 5 (1), 6-7, (2001).

[12]* Tkáč J., Voštiar I., Šturdík E., Gemeiner P., Mastihuba V., Annus J.: Fructose biosensor based on d-fructose dehydrogenase immobilised on a ferrocene-embedded cellulose acetate membrane. Analytica Chimica Acta 439, 39–46, (2001)

[13] Valík Ľ., Lauková D., Görner F.: Obsah Bacillus cereus a celkový počet mikroorganizmov v pasterizovanej smotane. Content of Bacillus cereus and total count of microorganisms in pasteurised cream (in Slovak). Bulletin potravinárskeho výskumu, 40 (3), 209-219, (2001)
[14] Valík Ľ., Piecková E.: Growth modelling of heat resistant fungi: the effect of water activity. International Journal of Food Microbiology, 63 (1-2), 11-17, (2001)
[15] Valík Ľ.: Svetový deň mlieka na Chemickotechnologickej fakulte STU. The International Day of Milk on Faculty of Chemical Technology, SUT (in Slovak). Mliekarstvo, 32 (2), 7, (2001)

B. Conferences (*international conferences)

[1] Augustín J., Kolarova N.: Produkcia hydroláz polysacharidov u Rhizopus. Production of hydrolases of polysaccharides by Rhisopus (in Slovak). In: Proceedings from 22nd Congress of the Czechoslovak Society for Microbiology - Health and Microorganisms, Košice 5th-9th September 2001. Slovakia. p. 115 (2001).
[2] Augustín J.: Izolácia, purifikácia a zdroje prírodných biopolymérnych látok typu alfa -, a beta –glykánov pomocou extrakčných metód. Isolation, purification and sources of natural biopolymer substances like alpha and beta glycans employing extraction methods. In: Zb. Proceedings from LABORALIM 2001, 7.-8.2.2001 Banská Bystrica, 69-73 (2001).
[3] Augustín J.: Biologicky aktívne látky a ich farmakologické účinky u hlivy ústricovitej (Pleurotus ostreatus). Biologically active substances and their pharmacological activities from oyster mushroom (Pleurotus ostreatus) (in Slovak). Proceedings from 22nd Congress of the Czechoslovak Society for Microbiology - Health and Microorganisms, Košice 5th-9th September 2001. Slovakia. p. 113 (2001).
[4] Augustín J., Hudecová D.: Produkcia hydroláz polysacharidov u Aureobasidium pullulans. Production of hydrolases of polysaccharides by Aureobasidium pullulans (in Slovak). In: Proceedings from 22nd Congress of the Czechoslovak Society for Microbiology - Health and Microorganisms, Košice 5th-9th September 2001. Slovakia. p. 114 (2001).
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C. Books and Textbooks

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D. Patents

DEPARTMENT OF ORGANIC CHEMISTRY

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II. TEACHING AND RESEARCH LABORATORIES

Laboratory practice:
Basic Skills in Organic Chemistry Laboratory I, II.
Organic Synthesis Laboratory Projects I, II
Research laboratories:
Laboratory of Organic Synthesis
Laboratory of Chiral Cycloaddition Reactions
Laboratory of Heterocyclic Chemistry
Laboratory of Stereoselective Synthesis
Laboratory of Applied Organic Synthesis
Laboratory of Natural Compounds
Laboratory of Nuclear Magnetic Resonance Spectroscopy
Laboratory of IR and UV Spectroscopy
Laboratory of Gas Chromatography

III. TEACHING

A. Undergradute Study

3rd semester		
Organic Chemistry	(2-2h)	Marchalín, Gracza
Organic Chemistry Laboratory	(0-4h)	all teachers and research workers
4th semester		
Organic Chemistry	(2-2h)	Fišera, Považanec, Uher
Organic Chemistry Laboratory	(0-5h)	all teachers and research workers
5th semester		
Chemical Information	(1-1h)	Uher
6th semester		
Chemical Specialities	(2-2h)	Mravec, Štibrányi
Semestral Project	(0-4h)	Fišera, Gracza, Jedlovská, Marchalín Považanec, Stankovský, Špirková, Štetinová
7th semester		
Organometallic Compounds	(1-1h)	Ondruš

Mechanisms of Organic Reactions I	(3-1h)	Fišera
Bioorganic Chemistry	(2-0h)	Uher
Laboratory Project I	(0-10h)	Šafař, Ondruš
Organic Chemistry III	(1-1h)	Považanec
8th semester		
Organic Synthesis	(2-1h)	Floch
Asymmetric Synthesis	(2-1h)	Gracza
Stereochemistry	(0-2h)	Štibrányi
Spectroscopic Methods in the Control of Technological Processes	(2-2h)	Milata, Segľa
Laboratory Project II	(0-6h)	Šafař, Štibrányi
Training at Industrial Production Floor 1	5 days	Fišera, Gracza, Považanec, Šafář, Štibrányi, Végh
9th semester		
Mechanisms of Organic Reactions II	(1-1h)	Marchalín
Applied Organic Synthesis	(1-1h)	Považanec
Chemistry of Heterocyclic Compounds	(2-0h)	Stankovský
Physical Organic Chemistry I	(0-2h)	Milata
Chemistry of Natural Compounds	(2-0h)	Berkeš
Laboratory Project	(0-10h)	Fišera, Gracza, Považanec, Šafář, Štibrányi, Végh
10th semester		
Diploma Seminar		Považanec
Diploma Thesis Project		Berkeš, Fišera, Gracza, Marchalín, Milata Považanec, Špirková

IV. CURRENT RESEARCH PROJECTS

A. Stereoselective cycloadditions of heterocyclic compounds (Ľubor Fišera)

The primary aim of Prof. Fišera´s research is devoted to the search of the stereoselective and regioselective cycloaddition reactions of chiral or achiral 1,3-dipoles to achiral or chiral alkenes and heterocyclic compounds possessing an endo- or exocyclic C=C double bond with the subsequent transformations of so prepared adducts to the bioactive iminopolyols, β-amino acids, lactones, lactames as well as to the new heterocyclic compounds, hardly accesible by another way and which can have a potential biological activity (pharmaca, agrochemicals).

In the past several years, considerable success has been achieved in this group in the utilization of heterocyclic compounds as dipolarophile components in the 1,3-dipolar cycloaddition (some 60 papers published in this field). The last papers have been devoted to the stereo- and regioselectivity of nitrile oxide and nitrone cycloadditions to heterocyclic derivatives having exo- and endocyclic C=C double bond. The syntheses of chiral dipoles and dipolarophiles from the natural materials such as sugars, α-aminoacids are included. Finally, the utilization of so prepared adducts as the synthetic equivalents by means of photochemical and reductive transformations are used for the synthesis of products of diverse biological activities.

B. Synthesis, reactions and biological activity of 2H-2-pyranones and 2H-1-benzopyran-2-ones. (Ľubomír Floch)

The title α-pyrones have found applications in medicine and as agrochemicals. The research project aims at preparation of designed α-pyrones in order to build them into more complex molecules with expected pesticidal and antiproliferation activity. Novel sulfonyl-α-pyrones built in sulfonylureas have been synthesized, the target molecules having molecular formula α-pyrone (or benzopyrone)-SO_2-NH-CO-NH-heterocycle. The testing of biological activity is carried out in cooperation with the Deparment of Microbiology, Biochemistry, and Biology (Prof. K. Horáková).

C. Stereoselective reactions in natural product synthesis (Tibor Gracza)

The study of stereoselective reactions and their applications for the syntheses of naturally occuring compounds, or optically pure building blocks, represents the principal research area of Dr. Gracza´s group. A new, general approach to optically active anhydroalditols have been developed, using the stereocontrolled palladium(II)-catalyzed oxycarbonylation of enitols as a key step. This strategy have been applied in the total syntheses of some cytotoxic natural dihydroxystyryl lactones like (+)-goniofufurone and its 7-epimer, as well as their enantiomers. Extension of Pd(II)-promoted bicyclization to optically pure unsaturated aminopolyols offered a very potent way to polyhydroxylated saturated nitrogen heterocycles, many of which are glycosidase inhibitors (related to deoxynojiromycin, DMDP, castanospermine, swainsonine).

D. Stereoselective synthesis of indolizines and indolizidines (Štefan Marchalín)

4-Arylsubstituted 1,4-dihydropyridines are well-known compounds used in the treatment of hypertension and other circulatory disorders. In the area of 1,4-dihydropyridines are investigated the reactions of 4-aryl-2-formyl-1,4-dihydropyridines. The reactions of 2-for-myl-1,4-dihydropyridines with compounds with active methylene group were tested. Simple modifications of reaction condition lead to changing of chemo- and/or regioselectivity of reaction**.** The simple and new methods of preparation of substituted 3-aminoindolizines, di- and tetrahydroindolizines were discovered.The phenanthroindolizidine alkaloids, i.e., tylophorine and antofine, exhibit a wide range of biological properties including antitumor activity. In spite of the intense progress in the synthesis of phenanthroindolizidine alkaloids especially in their stereospecific synthesis there has been no report about the stereospecific synthesis of heteroanalogs of tylophorine. Our approach to alkaloid synthesis using *N*-heteroarylmethyl-5-oxoprolines as building blocks allowed us to prepare chiral and racemic hetero[*f*]indolizidines, closely related compounds of tylophorine. The new enantiopure (*S*)-thieno- and furo[*f*]indolizidines were synthesized in four steps from easily available (*S*)-*N*-thienyl(furyl)methyl-5-

oxoprolines.

E. Synthesis and spectral properties of fused heterocycles (Viktor Milata)

In last years rich experience in the synthesis of substituted push - pull ethylenes, which are remarkable for their significantly polarised multiple bond, has been collected. Reactions of various types (hetero)arylamines (substituted anilines, aminobenzimidazoles, aminobenzotriazoles, quinoxalines etc.) with activated alkoxyethylenes (alkoxymethylene derivatives of propanedinitrile, dialkyl propanedioates, 2,4-pentanedione, alkyl 3-oxobutanoates, 3-oxobutanenitrile or alkyl cyanoacetates), structure of products and their synthetic utilisation in thermal cyclisation (Gould - Jacobs reaction) - which produce the nalidixic acid type quinolones, imidazoquinolones, triazoloquinolones, pyrazinoquinolones were studied. Also research on dihydropyridines, glutaric acid derivatives and reactions of 1-hydroxymethylbenzotriazole, 1-hydroxymethylbenzimidazole is being carried out.

F. Synthesis of analogues natural products (František Považanec)

The principal research area of Dr. Považanec concerns the study of preparation and reactions of heterocyclic compounds, the emphasis being on polycyclic heterocyclic compounds with built-in 1,4-diazepine skeleton. Dr. Považanec is interested mainly in the cyclization and cyclocondensation reactions, which are expected to furnish polycyclic heterocycles possessing bioactivity.
Recently, chiral substrates aroused his interest in that they allow one to prepare polycyclic heterocycles carrying one or more chiral centres. The presence and appropriate configuration of chiral centres has been recognized as pivotal factor in influencing the range of bioactivity of the diazepine-type substrates.

G. Imidoyl chlorides and imidoyisothiocyanates in the synthesis of new condensed ring´s systems (Štefan Stankovský)

In series of quinazoline compounds was found a new synthetic method on the basis of imidoyl or amidinoyl isothiocyanates that enables to avoid the complicated processes starting from anthranilic acid. The obtained quinazoline-4-thiones were used for the synthesis of fused 1,2,4-triazolo-, dihydroimidazolo-, trihydropyrimido, and tetrazolo-quinazolines. Quinazoline fused benzotriazepines and benzotetrazepines were prepared by the suitable functionalization of quinazoline skeleton.

H. Synthesis of fused quinazoline derivatives (Katarína Špirková)

The research activity of Dr. Špirková concentrates on condensed quinazolines, aiming at preparation of tricyclic, potentially bioactive structures, such as 1,2,4-triazolo[4,3-c] quinazolines, 2*H*-imidazo- and 2,3-dihydropyrimido[1,2-c]quinazolines. The annelation of further rings takes place across the thione bond of 3*H*-quinazoline-4-thiones by cyclisation and cyclocondensation reactions.
The quinazolines are also the cornerstone of research into synthesis and properties of structural analogues of folic acid. The target molecules are both classical and non-classical antifolates, based on the 3*H*-quinazoline-4-thione skeleton.

I. Synthesis of nitrogen, phosphorous heterocycles (Ladislav Štibrányi)

Synthesis of 5- and 6-membered nitrogen heterocycles. Preparation and study of substituted triazacyclotriphosphazenes carrying nitrogen, sulphur, or oxygen-containing heteroaromatic ligands. Study of nucleophilic reactions on the hexachlorotriazacyclotriphosphazene with ligands capable of metal-complexing. Computer modelling of structure and reactivity. Preparation of derivatives substituted by 1,3-dithiane and their transformation into carbonyl derivatives.

J. Transformation of γ-pyranone derivatives to the analogues of naturally occuring bioactive compounds (Michal Uher)

Project is geared at the preparation of the derivatives with possible biological activity with the perspective to use in pharmacology, cosmetics, agriculture and food industry. γ-Pyranone derivative 5-hydroxy-2-hydroxymethyl-4H-pyran-4-one (kojic acid) serves as main substrate for the transformation multifunctional. Its manufacture by fermentation is patented in Slovakia. Its decomposition leads to non-toxic products that can enter the circulation of biogenic elements in the nature.

K. Synthesis of oligomers and polymers, based on novel five-membered heterocycles, aiming at study and utilization of their conductivity and opto-electronic propperties (Daniel Végh)

Basic research in the field of novel five-membered heterocycles their oligomers and polymers. Search for simple, high-yield synthetic routes leading to heterocycles the oligomers of which will serve as model for polyheterocycles. The latter are expected to possess electric, opto-electric and electroluminescent properties, qualifying such materials as optical storage media, antistatic coatings, and electronic membranes for microelectronics. Also, they can be used in designing electrochemical energy sources, for instance as polymeric electrolytes, novel batteries, as well as in optical sensors and biosensors for monitoring the environment. We intend to design such novel compounds, capitalizing on the relationships between structure and physical properties, solubility, polymer workability. Based on theoretical consideration and calculated predictions we synthesized novel 2,3-substituted thieno[3,4]pyrazine and new pentacyclic dipyrido [3,2-a, 2´,3´-c]-thieno-[3,4]azine derivatives, systems with lowest bandgap (0,7 eV). In order to study the effect of the substituent on the chemical and physical properties (also electrical conductivity) twelve new 3-(3-thienyl)glutaric acid derivatives were prepared by easy, novel one step procedure in multigram quantities. Homo or hetero oligo- and polymerization of derivatives were achieved by chemical and electrochemical polymerisation.

V. COOPERATION

A. Cooperation in Slovakia

Slovakofarma, Hlohovec
Synkola, Bratislava
Duslo, Šaľa
Slovak Academy of Sciences, Bratislava
Institute of Chemical Technology, Bratislava
Institute of Food Research, Bratislava
Tau-Chem, Bratislava

Chemko, Strážske
Institute of Drugs Research, Modra
Tatra Trade, Prievidza
Institute of Preventive Medicines, Bratislava
National Center of Onkology, Bratislava
Georganics, Bratislava
Q-Chem, Bratislava

B. International Cooperation:

Inst. für Organische Chemie TU Vienna, Austria
- The synthesis of heterocyclic compounds, organization of Blue Danube Symposium on
- Heterocyclic Chemistry.

Inst. für Organische Chemie Univ. Stuttgart, Germany
- Stereoselective dipolar cycloaddition and oxycarbonylation reactions

Inst. für Organische Chemie Univ. Berlin, Germany
- Stereoselective reactions of chiral nitrones

Inst. de Chimie Moleculaire d´Orsay, France
- Resau formation recherche.

Institute de Chimie Moleculaire, Orsay, Univ. Paris-Sud, France
- NMR study of chiral compounds and cooperation in exchange of students.

Lab. de Chimie, Univ. Le Havre, France
- The synthesis of condensed heterocyclic compounds.

Inst. für Festkörperphysik der Uni Vienna, Austria
- New materials for microelectronics.

Cambridge University, Cambridge, Great Britain
- The synthesis of natural polytetramic compounds.

Institute of Organic Chemistry, Univ. Debrecen, Hungary
- The synthesis of heterocyclic compounds.

Institute of Organic Chemistry, TU Wroclaw, Poland
- The synthesis of heterocyclic compounds.

Institute of Organic Chemistry, U Warsaw, Poland
- The synthesis of heterocyclic compounds.

Institute of Organic Chemistry, AU Krakow, Poland
- The synthesis of heterocyclic compounds.

UNED, Madrid, Spain
- The synthesis of heterocyclic compounds, NMR spectroscopy.

Univerzita, Pardubice
- The synthesis of heterocyclic compounds

C. Membership in Domestic Organizations and Societies

Slovak Chemical Society (Scientific Committee Member Prof. M. Uher, Scientific Committee Member Dr. V. Milata, Head of Group of Organic Chemistry Prof. Ľ. Fišera and 30 Members)

D. Membership in International Organizations and Societies

American Chemical Society (Prof. Ľ. Fišera)
German Chemical Society (Prof. Ľ. Fišera, Dr. T. Gracza)
Czech Chemical Society (Prof. Ľ. Fišera, Dr. T. Gracza, Dr. Š. Marchalín, Dr. V. Milata)

E. TEMPUS Programme

F. International Scientific Programmes

G. Visitors from Abroad

Prof. U. Jordis	T. Univ. Vienna, Austria, April 2001 (1 day)
Prof. M. Kočevar	Univ. Ljubljana, Slovenia, April 2001 (2 days)
N. Puljic	IUT Orsay, Univ. Paris-Sud, France, May-June 2001 (60 days)
A. Raux	IUT Orsay, Univ. Paris-Sud, France, May-June 2001 (60 days)
Prof. S. Polanc	Univ. Ljubljana, Slovenia, June 2001 (4 days)
Dr. A. Kos	MDL, Switzerland, June 2001 (1 day)
C. Ikonomidi	Univ. Athen, Greece, June-July, 2001 (42 days)
H, Arp-Nielsen	Univ. Bronshej, Denmark, June-July, 2001 (42 days)
Prof. F. Sauter	T. Univ. Vienna, Austria, July 2001 (2 days)
Prof. H. Fröhlich	T. Univ. Vienna, Austria, July 2001 (2 days)
Prof. G. Hajos	Academy Budapest, Hungary, July 2001 (2 days)
Prof. B. Stanovnik	Univ. Ljubljana, Slovenia, July 200y (2 days)
Prof. H.-U. Reissig	Univ. Berlin, Germany, October 2001 (3 days)
Prof. E. M. Carreira	ETH Zürich, Switzerland, October 2001 (1 day)
Dr. H. Thiele	Brucker, Bremen, Germany, December 2001 (1 day)
Prof. U. Beifuss	Univ. Hohenheim, Germany, December 2001 (3 days)

H. Visits of Staff Members and Postgraduate Students to Foreign Institutions

M. Babjak	Kutná Hora, ČR, 4 days

D. Berkeš	Kutná Hora, ČR, 4 days
I. Blanáriková	Kutná Hora, ČR, 4 days
K. Cvopová	Kutná Hora, ČR, 4 days
P. Černuchová	Univ. Paris-Sud, Orsay, Francúzko, 90 days
B. Dugovič	Kutná Hora, ČR, 4 days
R. Fischer	Praha, ČR, 4 days, Kutná Hora, ČR, 4 days
Ľ. Fišera	Univ. Vienna, Austria, 4 days, Ustroň, Poland, 5 days, Brno, ČR, 2 days
T. Gracza	Kutná Hora, ČR, 4 days
K. Hrnčáriková	Univ. Katowice, Poland, 5 days
E. Jedlovská	Kutná Hora, ČR, 4 days
K. Kadlečíková	Univ. Le Havre, Francúzko, 180 days
A. Kolarovič	Degussa, Germany, 180 days
A. Koreňová	Katowice, Poland, 5 days
A. Lásiková	Kutná Hora, ČR, 4 days
Š. Marchalín	Univ. Le Havre, Francúzko, 60 days
V. Milata	Kutná Hora, ČR, 4 days, Katowice, Poland, 4 days
Univ. Vienna, Austria, 10 days	
V. Ondruš	Univ Stuttgart, Germany, 59 days
J. Sikoraiová	Kutná Hora, ČR, 4 days
K. Špirková	Kutná Hora, ČR, 4 days
J. Štetinová	Kutná Hora, ČR, 4 days
L. Štibrányi	Kutná Hora, ČR, 4 days
M. Uher	Univ. Katowice, Poland, 5 days, Univ. Krakow, Poland, 5 days
D. Végh	Univ. Vienna, Austria, 3 days, Univ. Györ, 15 days, Hungary,
Univ. Mosonmagyarövar, 3 days, Hungary	
J. Žúžiová	Kutná Hora, ČR, 4 days

VI. THESES AND DISSERTATIONS

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

Balážová S.:	α-Amino acids as building blocks in the synthesis of chiral ACE inhibitors (F. Považanec)
Bradáč V.:	Preparation and utilization of chiral maleinimides (V. Ondruš)
Bučko M.:	Synthetic utilization of imidoyl and amidinoyl isothiocyanates in the synthesis of benzotriazocines (K. Špirková)
Brath H.:	Synthesis and reactions of chiral furo[f]indolizidinediones (Š. Marchalín)
Černuchová P.:	Preparation and spectral properties of condensed quinoxalines (V. Milata)
Drucková A.:	Utilization of 1,3-dipolar cycloadditions of chiral nitrones in the design of modified nucleosides (Ľ. Fišera)
Gubala V.:	Thienyl substituted derivatives of α- aminobutanoic acid (D. Berkeš)
Jakubec P.:	Crystallization-induced dynamic resolution (CIDR) and its utilization in preparation of enantiomerically pure α-amino acids (D. Berkeš)
Kapitán P.:	Stereoselective palladium (II)-catalysed oxycarbonylations of unsaturated polyols. Synthesis of (+)-goniothalesdiol (T. Gracza)
Mandúch R.:	Reduction of substituted 4-aryl-2-aminobutanolides. Preparation of enantiomerically pure derivatives of 1-aryl-3-aminobutane-1,4-diol (D. Berkeš)

B. Dissertations (PhD):

Szemes F.:	Synthesis and reactivity of hetero[*f*]indolizidines (Š. Marchalín)
Gogová A.:	Syntheses and reactions of α-pyrones (Ľ. Floch)
Kubáň J.:	Stereoselectivity of Chiral Nitrone Cycloadditions (Ľ. Fišera)
Lásiková A.:	Synthesis of new heterocyclic compounds and their oligomers with proposed biological activity as angiotensin II receptor antagonists (D. Végh)

VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

[1]* Bardošová M., Hodge P., Koreňová A., Nakanishi F., Tredgold R. H.: Polymerisaton of Langmuir-Blodgett Film. Comparison of two different methods. Thin Solid Film 397, 8-11 (2001)

[2]* Blanáriková I., Dugovič B., Fišera L., Hametner Ch., Prónayová N.: 1,3-Dipolar cycloadditions of D-erythrose- and D-threose-derived nitrones to maleimides. ARKIVOC 2 (Printed ed.), 1091-1103 (2001) ISSN 1424-6376. http://www.arkat-usa.org/ark/journal/Volume2/Part3/Sauter/FS-133F/FS-133F.pdf

[3]* Blanáriková I., Fišera L., Kopaničáková Z., Salanski P., Jurczak J., Hametner Ch.: Synthesis of chiral amino acid - derived nitrones and 1,3-dipolar cycloadditions with acrylic acid methyl ester. ARKIVOC 2001, 2. http://www.arkat-

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[4]* Bobošíková M., Clegg W., Coles S. J., Dandárová M., Hursthouse M. B., Kiss T., Krutošíková A., Liptaj T., Prónayová N., Ramsden Ch. A.: The oxidative rearrangement of furan-2-carboximidamines: Preparation and properties of 2-acylaminofurans. J. Chem. Soc. Perkin Trans. 1, 680-689 (2001)
[5]* Boduszek B., Végh D., Koreňová A., Uher M.: Novel heterocyclic aminophosphonic acids derived from furan and thiophene. Polish J. Chem. 75, 1271-1275 (2001)
[6]* Brtko J., Hudecová D., Bransová-Bobálová J., Novotný L., Eybl V., Melnik M., Uher M.: Kojic acid: A superior source of biologically active compounds (Current Experiance). Biomarkers and Enviroment 4, 26-30 (2001)
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[9]* Hrdlovič P., Krajčovič J., Végh D.: Spectral Characteristics of bisthiophenes and terthiophenes linked with heterocyclic unit in solution and polymer matrix. Journal of Photochem. and Photobiol. A: Chemistry 144, 73-82 (2001)
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[11]* Kettmann V., Lokaj J., Kratky C., Marchalín Š., Sikoraiová J.: trans-5,6a-Dihydro5-phenylisoindolo[1,2-b]benz[1,3]oxazepin-11-one. Acta Cryst. E57, 612-614 (2001)
[12]* Kolarovič A., Berkeš D., Baran P., Považanec F.: Crystallization-induced dynamic resolution (CIDR) and its application to the synthesis of unnatural N-substituted amino acids derived from aroylacrylic acids. Tetrahedron Lett. 42, 2579-2582 (2001)
[13]* Kováč M., Sabatié A., Floch L.: Synthesis of coumarin sulfonamides and sulfonylurea. ARKIVOC 2001 Part 3 211 (11 strán). http://www.arkat-usa.org/ark/journal/Volume2/Part3/Abramovitch/RA-216S/RA-216S.pdf.
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dihydropyridine-3,5-dicarboxylate. Acta Cryst. C57, 1073-1074 (2001)

B. Conferences (*international conferences)

[1]* Babjak* M., Gracza T.: Pd(II)-Catalysed cyclizations of unsaturated polyols. In: XXV. Konference organických chemiku, Kutná Hora, Máj 14-17, 2001. Česká Republika. Edited by Pařík P. p. 75-76 (2001), ISBN 80-7194-349-5

[2]* Berkeš D., Gubala V., Považanec, F.: Thienyl substituted derivatives of α-aminobutanoic acid. Practical approach to enantiomerically pure γ-hydroxy-α-aminooctanoic and γ-hydroxy-α-aminononanoic acids., The Fifth International Electronic Conference on Synthetic Organic Chemistry (ECSOC-5) a0033 (12pp), 2001, (http://www.mdpi.net/ecsoc-5)

[3]* Berkeš D*., Kolarovič A., Považanec, F. Crystallization-induced dynamic resolution (CIDR) in the synthesis of nonracemic α-aminoacids., Sborník XXV. Konference organických chemiků, Kutná Hora, ČR. KS12 (2pp.) 2001. Vydavateľ - Univerzita Pardubice, ISBN 80-7194-349-5

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[6]* Blanáriková* I., Fišera Ľ., Salanski P., Jurczak J., Hamenter Ch.: Stereoselectivity in 1,3-dipolar cycloaddition of chiral a-amino acid – derived nitrones. In: XXV. Konference organických chemiku, Kutná Hora, Máj 14-17, 2001. Česká Republika. Edited by Pařík P. p. 78-79 (2001), ISBN 80-7194-349-5

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[10]* Černuchová P., Milata V. *, Saloň J., Prónayová N.: Preparation, properties and reactions of condensed quinoxaline derivatives. Materialy zjazdove, XLIV Zjazd Naukowy, Katowice 9-13.9.2001, Edited by Mrzigod J., Beata Makarucha, p. S6-P13 (2001) ISBN 83-90-1844-5-1

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D. Patents

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DEPARTMENT OF ORGANIC TECHNOLOGY

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I. STAFF

Full Professors:
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Associate Professors:
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Research Fellows:
Zuzana Cvengrošová, PhD; Magdaléna Štolcová, PhD; Dana Gašparovičová; Katarina Fulajtárová;

PhD students:
Michal Báhidský; Jana Horniaková; Vieroslav Krátky; Blažej Horváth; Erik Juhás

Technical Staff:
Eva Šuleková; Jozef Tánczos; Ľudmila Tvarožková;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Technological laboratory I, 2, 3, 4
Computer seminar room

B. Research Laboratories:

Laboratory of catalytic processes
Laboratory of reactor technique
Laboratory of spectroscopic methods

III. TEACHING

A. Undergraduate study

1. Introductory courses

4th semester (spring)		
Organic Technology and Petrochemistry	(3-1 h)	Hronec, Králik, Kaszonyi
6th semester (spring)		
Fine Chemicals	(2-2 h)	Mravec
Semestral Project I	(0-4 h)	Cvengrošová, Kaszonyi, Králik, Mravec, Štolcová, Vojtko

2. Advanced Courses

7th semester (autumn)		
Chemical-Engineering Thermodynamics	(0-2 h)	Vojtko
Catalysis	(2-0 h)	Hronec
Engineering Calculations on a Computer	(1-2 h)	Kaszonyi
Processes of Organic Technology	(2-1 h)	Králik
Laboratory Practise I.	(0-8)	Vojtko, Mravec, Krátky, Horniaková
8th semester (spring)		
Kinetics and Reactors	(0-2 h)	Kaszonyi
Process Design	(2-1 h)	Hronec, Králik
Technology of monomers and polymers	(2-0)	Vojtko
Special Organic Products	(2-0 h)	Mravec
Analysis of Complex Organic Systems	(0-2 h)	Štolcová, Cvengrošová
Laboratory Practise II.	(0-7 h)	Cvengrošová, Hronec, Kaszonyi, Králik, Mravec, Štolcová
9th semester (autumn)		
Coating materials	(2-0)	Kramár, Lapeš
Manufacturing of Pharmaceuticals	(2-1 h)	Mravec
Laboratory Practise III.	(0-14 h)	Cvengrošová, Hronec, Kaszonyi, Králik, Mravec, Štolcová, Vojtko
10th semester (spring)		
Seminar to Master's Theses	(0-3 h)	Cvengrošová, Hronec, Kaszonyi, Králik, Vojtko,

		Štolcová

B. Postgraduate study

Catalysis	(2-0)	Hronec

IV. CURRENT RESEARCH PROJECTS

A. Catalysts for industrial applications (Milan Hronec)

1. Synthesis of new inorganic catalysts and their application

Various oxidation processes (a direct synthesis of phenol and aniline from benzene, partial oxidation of methane) in the gas phase were studied. Hydroxyapatite and apatite catalysts were mainly used and positive effect of ammonia on the yield of desired products was registered. Catalytic behaviour was correlated with physical-chemical properties of the prepared catalysts.

2. Catalysis over zeolites

A detail study of reaction pathways in the alkylation of polyaromatics over zeolite catalysts was performed. Transalkylation of alkylated biphenyls with cyclohexene, which was used as a solvent, was observed. Experimental optimisation based on a proper reaction system and conditions allowed to maximise the yield of the desired linear alkylated polyaromatics.

3. Microporous organic materials

Further relationships among morphology, accessibility and catalytic activity of metal catalysts supported on functional polymers were studied. The developed catalysts were tested in the hydrogenation of olefins, substituted nitroaromatics and water-phase reduction of nitrates.

V. COOPERATION

A. Cooperation in Slovakia:

Slovnaft, Bratislava
DUSLO, Šaľa
Biotika, a.s. Slovenská Ľupča

B. International Cooperation:

ENSCM, Montpellier, France:
- zeolite catalysts
- physico-chemical characterisation of solid catalysts

Universita di Padova, Italy:
- polymer supported catalysts, characterisation

Italian National Centre of Research, Padova - Legnaro, Italy:
- preparation of organic supports for catalysts

Czech Academy of Science, Prague:
- characterisation of polymeric materials as supports for catalysts

C. Membership in Domestic Organisations and Societies:

Editorial Board of Journal: Petroleum and Coal,	(M. Hronec, M. Králik)
Editorial Board of Journal: Vlákna a textil (Fibers and Textile)	(M. Hronec)
SCHS (Slovak chemical Society)	(Hronec, Kaszonyi, Králik, Mravec)
SPCH (Slovak Society for Industrial Chemistry), Chairman of the Catalysis Society	(M. Hronec)

D. Membership in International Organisation and Societies:

National representative of the European Federation of Catalysis Societies (EFCATS) (M. Hronec)
Member of the European Academy of Sciences and Arts (M. Hronec)

F. International Scientific Programmes

1. Project No. 8217: Alkylation of polynuclear aromatics for the selective synthesis of dialkylated monomers, precursors of advanced polymers: activity and selectivity of zeolitic catalysts and computational analysis of the experimental results (D. Mravec):
   - ENSCM-CNRS (UMR 5618), Montpellier, France
   - Institute of Polymers, Slovak Academy of Sciences, Bratislava
   - Department of Organic Technology, Slovak University of technology, Bratislava
2. Project No. 33S6: Charakteriesieren und Testen von Katalysatoren (M.Hronec):
   - Insitut fur Physikalische und Theoretische Chemie, TU Wien
   - Department of Organic Technology, Slovak University of Technology, Bratislava
3. Optimisation of the catalytic properties of synthetic organic matrices through chromatographic and spectrometric analysis ("ad hoc" project without an official registration number, financed individually by participants involved) (M. Králik):
   - Department of Inorganic, Metallorganic and Analytical Chemistry, University of Padova, Italy
   - Department of Physical Chemistry, University of Padova, Italy
   - Italian National Centre of Research, Padova - Legnaro, Italy
   - Czech Academy of Science, Prague
   - Department of Organic Technology, Slovak University of Technology, Bratislava
   - Period of co-operation: January 1997-December 2001

G. Visitors from Abroad

Prof. H. Vinek	TU Wien, May 17, bilateral project
Prof. B. Corain	Univeristy of Padova, May 18 – 20, scientific collaboration
Dr. J. Joffre	ENSC Montpellier, May 28 – June 1, 2001, scientific collaboration (project)
Prof. L. Červený	VSCHT Prague, June 6, state exams
Prof. B. Corain	University of Padova, July 30 - August 1, scientific collaboration
Dr. P. Moreau	ENSC Montpellier, September 10-17, scientific collaboration (project)
Dr. P. Canton	University of Venice, November 7-9, scientific collaboration
Prof. H. Vinek, Dr. G. Foltinger	TU Wien, November 14, bilateral project

H. Visitits of Staff Members and PhD Students to Foreign Institutes:

V. Krátky	University of Padova, November 2000 – April 2001, NATO scholarship
J. Horniaková	ENSC Montpellier, January 2001 – July 2001, NATO scholarship
M. Hronec	VŠCHT Pardubice, January 24 – 25, 2001
M. Hronec	VŠCHT Praha, March 20
M. Báhidský	Praha, March 27 - 31, School on catalysis EFCAT
M. Hronec	VŠCHT Pardubice, April 2 - 3
M. Králik	Univeristy of Padova, May 1 – 6, collaboration on the project
M. Hronec	VŠCHT Praha, June 5 – 6, 16
M. Hronec, A Kaszonyi, M. Báhidský	TU Wien, July 3, bilateral project
D. Mravec	Montpellier, July 8-23, conference IZC 13, bilateral French-Slovak project
M. Králik	University of Padova, July 26 – 30, collaboration on the project
M. Hronec	Limerick, September 1 – 7, conference Europacat V
M. Hronec	Berlin, September 15 – 21, World congress about oxidation processes
M. Báhidský	TU Wien, October 10 – 18, bilateral project
B. Horváth	TU Wien, October 12, bilateral project
M. Králik	ENSCM Montpellier, October 15 – 23, French-Slovak project
M. Hronec, J. Vojtko	Rožnov p/R, October 22 – 24, conference APROCHEM
M. Králik, J. Horniaková, V. Krátky	Praha, November 5 – 6, Symposium on catalysis
M. Hronec	Kecskemet (Hungary), November 8 – 10, invited lecture HAS
M. Hronec	Val. Meziříči DEZA, November 15 – 16, invited lecture, collaboration
M. Hronec, M. Štolcová, M. Báhidský	TU Wien, December 17, bilateral project

VI. THESES AND DISSERTATIONS

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

Babálová S.:	Terc.butylácia toluénu na zeolitových katalyzátoroch. Tert-butylation of toluene over zeolite catalysts (Mravec D.)
Gogová Z.:	Oxidácia cyklohexylamínu na cyklohexanónoxím v plynnej fáze. Gas phase oxidation of cyclohexylamine to cyclohexanone oxime (Cvengrošová Z.)
Janíčková J.:	Štúdium vlastností katalyzátorov oxidačnej dimerizácie amínu. Study the properties of the catalysts for the oxidation dimerization of aniline (Štolcová M.)
Jaško Z.:	Vplyv UV a IČ žiarenia na oxidáciu cyklohexylamínu. Influence of UV and IR radiation on the oxidation of cyclohexylamine (Kaszonyi A.)
Ješíková I.:	Katalytická redukcia dusičnanov vo vode na bázických Pd-Cu katalyzátoroch. Catalytic reduction of nitrates in water over basic Pd-Cu catalysts (Králik M.)
Juhás E.:	Premena metánu na fosfátových katalyzátoroch. Transformation of methane over phosphate catalysts (Štolcová M.)
Mečárová M.:	Hydrogenácia chlórnitrobenzénov. Hydrogenation of chloronitrobenzenes (Králik M.)
Michalica P.:	Syntéza pyridínu kondenzačnou reakciou karbonylových zlúčenín, alkoholov a NH_3. Synthesis of pyridine by condensation reaction of carbonyl compounds, alcohol and NH_3 (Cvengrošová Z.)
Oswald E.:	Aminácia benzénu amoniakom. Amination of benzene by ammonia (Kaszonyi A.)
Radičová G.	Katalytická redukcia dusičnanov vo vode na slabokyslých Pd-Cu katalyzátoroch. Catalytic reduction of nitrates in water over weak-acid Pd-Cu catalysts (Králik M.)

B. Dissertation (PhD)

Michvocík M.	Alkylation of polycyclic aromatic hydrocarbons over zeolite catalysts (Mravec D.)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Corain B., Králik M.: Generating of palladium nanoclusters inside functional cross-linked polymer frameworks. J. Mol. Catal. A: Chemical 173, 99 - 115 (2001)

[2]* Horniaková J., Mravec D., Králik M., Leško J., Graffin P., Moreau P.: Tert-butylation of biphenyl over HY a H-beta zeolites, formation and identification of main and by-products. Appl. Catal. A: General 215, 235 - 244 (2001)

[3]* Horniaková J., Králik M., Kaszonyi A., Mravec D.: A practical approach to the treatment of adsorption-desorption isotherms, acidity and catalytic behaviour of zeolite catalysts. Micropor. Mater. 46, 287 - 298 (2001)

[4]* Horniaková J., Mravec D., Moreau P.: Tert-butylation of biphenyl over mordenites. Catal. Lett. 75 (3 - 4), 163 - 167 (2001)

[5]* Králik M., Biffis A.: Catalysis by metal nanoparticles supported on functional organic polymers. J. Mol. Catal. A: Chemical 177, 113 - 138 (2001)

[6]* Štolcová M., Kaszonyi A., Hronec M.: Reaction of N-alkyl-2-benzothiazolesulphenamide with acetic anhydride in the presence of acids. I. Technological aspects. J. Mol. Catal. A: Chemical 172, 165 - 173 (2001).

[7]* Štolcová M., Grošková D., Hronec M.: RP-HPLC for the determination of N-phenylhydroxylamine and related compounds. Chromatographia 53, S 456 - S 459 (2001)

[8]* Štolcová M., Kaszonyi A., Hronec M., Liptaj T., Staško A., Leško J.: Reaction of N-alkyl-2-benzothiazolesulphenamide with acetic anhydride in the presence of acids. II. Spectral studies. J. Mol. Catal. A: Chemical 172, 175 - 186 (2001)

[9]* Králik M., Horniaková J., Mravec D., Jorík V., Michvocík M., Moreau P.: Texture of dealuminated mordenite catalysts modified with cerium and catalytic properties in the isopropylation of biphenyl. Studies in Surface Science and Catalysis 135, 313 (2001)

[10]* Mravec D., Horniaková J., Králik M., Hronec M., Joffre J., Moreau P.: Shape-selective tert-butylation of biphenyl over H.MOR, H - Y and H - BEA zeolites in the liquid phase. Studies in Surface Science and Catalysis 135, 280 (2001)

[11]* Joffre J., Mravec D., Moreau P.: Computational analysis of the shape-selective isopropylation of biphenyl over large-pore zeolites. Studies in Surface Science and Catalysis 135, 264 (2001)

[12]* Derco J., Králik M., Kovács A.: Modelling of Nutrient Removal Processses in an Intermittently Aerated Bioreactor. Chem. Biochem. Eng. 15(4), 167-174 (2001)

[13] Králik M., Macho V., Brautbar N., Vachalková A., Mikulec J.: Engine fuels in the 21st century. Petroleum and Coal 43 (2), 72 - 79 (2001)

[14] Derco J., Králik M.: Optimisation of an oil wastewater treatment plant. Petroleum and Coal 43 (2), 85 - 88 (2001)

[15] Derco J., Gulyásová A., Králik M., Mrafková L.: Treatment of an industrial wasterwater by ozomation. Petroleum and Coal 43 (2), 92 - 97 (2001)

[16] Mravec D., Horniaková J., Moreau P., Joffre J.: Shape-selective alkylation of biphenyl: Comparison between tert-butylation and isopropylation over different zeolites. Petroleum and Coal 43 (2), 107 - 110 (2001)

[17] Štolcová M., Juhás E., Hronec M.: Partial oxidation of methane over iron - calcium - phosphorus catalysts. Petroleum and Coal 43 (2), 111 - 114 (2001)

[18] Brautbar N., Králik M., Macho V., Mikulec J., Vachálková A.: A continuation of the MTBE story. Petroleum and Coal 43 (2), 101 - 106 (2001)

B. Conferences (*international conferences)

[1]* Liptáková B., Hronec M.: Oxidation of Benzene Over Mixed Calcium-Copper hydroxyapatite Catalysts. XXXIII. Symposium on Catalysis, Prague Nov. 5 - 6. 2001, 2 pp. (Po)

[2]* Krátky V., Králik M., Mečárová M., Zalibera Ľ., Hronec M.: Selective hydrogenation of chloronitrobenzenes over palladium supported catalysts. Europacat V, 2. - 7. 9. 2001, 13 - P – 14 (Po)

[3]* Štolcová M., Hronec M.: Partial oxidation of methane over Ca-Fe-P containing catalysts. 53. zjazd chemických spoločností, Banská Bystrica, 3. - 6. 9. 2001, Zborník príspevkov p. 15 –16 (Le)

[4]* Králik M.: Syntetické funkcionalizovaé organické polyméry ako nosiče pre katalyzátory s dispergovanými kovmi. Synthetic fuctional polymers as supports for catalysts with dispersed metals. 53. zjazd chemických spoločností, Banská Bystrica, 3. - 6. 9. 2001, Zborník príspevkov p. 17 –18 (Le)

[5]* Kaszonyi A., Hronec M.: Direct amination of benzene by ammonia. 53. zjazd chemických spoločností, Banská Bystrica, 3. - 6. 9. 2001, Zborník príspevkov p. 58 –59 (Le)

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[7]* Macho V., Králik M.: "Sírny" katalytický systém karbonylačnej redukcie a reduktívnej karbonylácie aromatických nitrózo- a nitrozlúčenín. Sulphur catalytic system of the carbonylative reduction and reductive carbonylation of aromatic nitroso and nitrocompounds. 53. zjazd chemických spoločností, Banská Bystrica, 3. - 6. 9. 2001, Zborník príspevkov s. 29 –30 (Po)

[8]* Štolcová M., Kaszonyi M., Hronec M., Fulajtárová K.: Identification of minor components fromed from N-alkyl-2-mercaptobenzothiazole derivatives in an acidic medium.
11th International Symposium Advances and Applications of Chromatography in Industry, Bratislava, August 27 - 31, 2001, ISSN 1335-8413,2 pp (Po)

[9]* Králik M. Catalysis by dispersed metals in the 1st year of the 21st century. 28th International Conference SSCHE, Proceedings on CD ROM, Tatranské Matliare (SK), 21 – 25 May, 2001, ISBN 80-227-1533-6, 11 p (Pl.Le)

[10]* Králik M., Ješíková I., Radičová G.: Recent results from the catalytic water-phase removal of nitrates over Pd-Cu catalysts supported on basic and mild-acid ionic resins 28th International Conference SSCHE, Proceedings on CD ROM, Tatranské Matliare (SK), 21 – 25 May, 2001, ISBN 80-227-1533-6, P115, 6 pp (Po)

[11]* Krátky V., Mečárová M., Zalibera Ľ., Králik M.: Effect of a solvent on the selectivity in the hydrogenation of chlorinated nitroaromatics. 28th International Conference SSCHE, Proceedings on CD ROM, Tatranské Matliare (SK), 21 – 25 May, 2001, ISBN 80-227-1533-6, P117, 4 pp (Po)

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International Conference on Theoretical and Experimental Problems of Materials Engineering. ISBN 80-968099-5-4, p. 29 (Le)
[13]* Brautbar N., Králik M., Macho V., Mikulec J., Vachálková A.: A continuation of the MTBE story. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X,L-A-1, 13 pp (Le)
[14]* Králik M., Macho V., Brautbar N., Vachálková A., Mikulec J.: New trends in solution of technological and acological problems with dialkyl ethers applied in reformulated gasoline. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X,L-A-3, 17 pp (Le)
[15]* Kaszonyi A., Cvengrošová Z., Hronec M.: Oxidation of cyclohexylamine over polyoxometalates of tungsten. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X,L-E-4, 9 pp (Le)
[16]* Macho V., Králik M., Cingelová J., Kavala M.: Possibilities of one-stage preparation and utilization of epoxy-compounds from dienes. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X, L-E-5, 10 pp (Le)
[17]* Štolcová M., Hronec M., Juhás E.: Partial oxidation of methane over iron - phosphorus catalysts. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X,L-E-7, 7 pp (Le)
[18]* Derco J., Gulyásová A., Králik M., Mrafková L.: Treatment of an industrial wastewater by ozonation. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X,L-G-4, 12 pp (Le)
[19]* Cvengroš J., Cvengrošová Z., Hóka Cs.: Transesterification of vegetable oils to methylesters and determination of conversion by TLC method. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X, P-D-24, 6 pp Le)
[20]* Mravec D., Horniaková J., Moreau P.: Shape - selective alkylation of biphenyl. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X, P-E-38, 8 pp (Po)
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[22]* Derco J., Králik M.: Optimalization of an oil wastewater treatment plant. 40 th International Petroleum Conference, 17. - 19. Sept. 2001, ISSN 1335-888X, P-G-50, 7 pp (Po)
[23]* Krátky V., Králik M., Štolcová M., Zalibera Ľ., Hronec M.: Hydrogenation of chloronitrobenzenes, catalys and solvent effects. XXXIII. Symposium on Catalysis, Prague Nov. 5 - 6. 2001, 2 pp (Le)
[24]* Horniaková J., Mravec D., Králik M., Moreau P.: Shape - selective tert-butylation of biphenyl. XXXIII. Symposium on Catalysis, Prague Nov. 5 - 6. 2001, 2 pp (Le)
[25]* Biffis A., Ricoveri R., Králik M., Jeřábek K., Corain B.: Highly chemoselective hydrogenation of 2-ethylanthraquinone to 2-ethylanthrahydroquinone catalyzed by palladium metal dispersed inside very lipophilic functional resins. XXXIII. Symposium on Catalysis, Prague Nov. 5 - 6. 2001, 3 pp (Po)
[26]* Gomory J., Králik M.: Selective hydrogenation of pseudoionone to hexahydropseudoionone. XXXIII. Symposium on Catalysis, Prague Nov. 5 - 6. 2001, 2 pp (Po)
[27] Macho V., Králik M., Cingelová J., Vajdová J.: Hydrogenácia vyšších monokarboxylových a dkarboxylových kyselín na vyššie alkoholy a dioly. Hydrogenation of higher monokarboxylic and dicarboxylic acids to higher acohols and diols. Chemprogres 2001. jún 2001, Púchov, pp 31-32 (Le)
[28] Macho V., Králik M., Komora L., Cingelová J.: Pokroky v príprave organických medziproduktov: laktónov a alkyllaktónov, alkanolov diolov a amidov karboxylových kyselín. Advances in the preparation of intermediates for: lactones, alkyllactones, alkanols, diols and amids of carboxylic acids. APROCHEM, Rožnov p/R., ČR, 22. - 24. 10. 2001, Zborník s. 210 – 213. (Le)
[29] Vojtko J.: Nové smery využitia pyrolýzy v organickej technológii. New Trends in Exploitation of Pyrolysis in OrganicTechnology. APROCHEM, Rožnov p/R., ČR, 22. - 24. 10. 2001, Zborník s. 216 – 221 (Le)

C. Books and Textbooks

[1] Corain B., Králik M. (Eds.): Catalysis with Supported Palladium Metal at the Turn of the 21st Century. Special issue of J. Mol. Catal. A: Chemical 173(1-2) (2001) ISSN 1381-1169. 356 pp
[2] Corain B., Jerabek K., Králik M. (Eds.): Catalysis inside Functional Synthetic Resins: The issue of Catalysts Accessibility and Stability. Special issue of J. Mol. Catal. A: Chemical 177 (2001) ISSN 1381-1169. 170 pp

D. Patents

[1] Kaszonyi A, Bábi J.: Leptacie činidlo na sklo. Etching agent for glass. SK 3084 (3. 12. 2001)
[2] Macho V., Mravec D., Vojtko J., Králik M., Gattnár O., Varga I., Šnupárek V., Škoda A.: Spôsob výroby kyseliny azelaovej a/alebo kyseliny malónovej a/alebo ich metylesterov. Manufacture of azelaic acid and/or malonic acid and/or their methyl esters. SK 281462 (9. 4. 2001)

E. Research reports

[1] Hronec M. et al.: New catalysts for industrial applications. Final report on the SK VEGA project 1/6049/99.

DEPARTMENT OF PETROLEUM TECHNOLOGY AND PETROCHEMISTRY

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Technical Staff:
Adriana Brezová; Marcela Hadvinová; Dagmar Machatová; Marta Olleová; Emil Pribiš; Helena Šuňalová;

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Catalysts Characterization
Laboratory of High Pressure Reactors
Laboratory of Gas and Liquid Chromatography
Laboratory of Chemistry and Analysis of Fuels
Laboratory of Pyrolysis
Laboratory of Rheology of Lubricants
Laboratory of Infra-Red Spectroscopy
Laboratory of Natural Gas Conversion
Wiped-film Molecular Evaporator

III. TEACHING

A. Undergraduate study

4th Semester (spring)		
Organic Technology and Petrochemistry	(3-1 h)	Bajus, Smiešková, Daučík
7th Semester (autumn)		
Catalysis	(0-1 h)	Hudec
Analysis of Petroleum Products	(2-0h)	Daučík
Technology of Crude Oil	(3-0 h)	Židek, Smiešková
Combustion Processes	(1-2 h)	Smiešková
Engineering Calculations on Computer	(0-2)	Ambro
Laboratory exercise 1	(0-8 h)	Daučík
8th Semester (spring)		
Alternative Fuels	(2-0 h)	Bajus
Catalytic and Thermal Processes in Crude Oil Treatment	(3-0 h)	Židek
Tribology	(2-0 h)	Hájeková
Kinetic and Reactors	(0-2 h)	Hudec
Laboratory exercise II	(0-8 h)	Hudec
9th Semester (autumn)		
Petrochemistry	(3-0 h)	Bajus
Refinery and Petrochemical Plants	(1-1 h)	Daučík
Laboratory exercise III	(0-10 h)	Hudec

B. PhD study

Technology of Cruide Oil	(3 h)	Židek
Petrochemistry	(3 h)	Bajus
Catalytic and Thermal Processes in Crude Oil Treatment	(3 h)	Židek

IV. CURRENT RESEARCH PROJECTS

A. New catalysts for industrial applications (Milan Hronec)

In petroleum industry and petrochemistry, still growing applications find a catalytic materials with precisely defined structure and acido-basic properties. Among such suitable catalysts, zeolites and ordered mesoporous materials play role as basic components. The project is oriented to development of knowledge of the role of heterogeneous catalysts in selected refinery and petrochemical processes, to develop the relation between composition, structure and method of the catalysts preparation and their catalytic properties. The research is oriented into following subjects:

1. Characterization of influence of extraframework aluminum on acid and catalytic properties of zeolites USY and steamed ZSM-5 (measured by XRD, IR, TPDA, surface area, pore size distribution, distribution of Broensted and Lewis acid sites and their common induction effect). Influence of the stabilization conditions and method of following acid modification are studied.
2. Study of method of the incorporation and quantity of zinc and it influence on the activity of Zn-ZSM-5 zeolites in aromatization of light hydrocarbons - examination of liquid ion exchange as well as solid state ion exchange, characterization of samples by TPDA, IR and by catalytic tests.
3. Preparation of materials with ordered mesoporous structure as MCM-41. Such materials are potential suitable components of the new generation of FCC, HC and HR catalysts in relation to their wide mesoporous structure with the pore diameter of 4 - 10 nm.
4. Hydrorefining (HDS, HDN) of middle petroleum distillates with the aim to explain the reason of lower color stability of gasoline, kerosene an gas oil from hydrocracking of heavy residues. Studies are carried out in a laboratory pressure reactors using commercial hydrorefining catalysts under conditions used in refineries.

B. Interactions between composition and properties of fuels, lubricants and heavy oil products (Pavol Daučík)

Oil products quality improvement is a general trend to utilize more effectively the expensive raw material, to prolong the lifetime of machines and equipment where oil products are used. Nowadays it is an obvious requirement to minimize the negative effects of oil products on the environment. Fuels, lubricants and heavy oil products form the major part of products which are actually used in all fields of industry and common consumption Functional properties are the deciding factors for the product choice in certain use in practice. At comparable qualitative parameters, the economic standpoint is the decisive factor in the choice from the appropriate supply. Then, the price regarding the consumption and qualitative properties is the deciding criteria in the product choice. Nowadays the product choice is expressively influenced by ecological standpoint. It is unequivocal that ecological and economic standpoints contradictory effect on the product choice. Hence, the ecological criteria is influenced only by legislation stated rules. Ecological viewpoint gets then its priority and in some countries the maximum content of aromatics, sulfur and metals are determined by law.

Project is aimed at the interactions between the composition and the properties of oil products and additives. The main target is the evaluation of oxidative stability, reological properties, effects of additives on functional properties of fuels, lubricants and heavy oil products. Project`s intention is to utilize correlation between composition and properties of the product to evaluate the quality and the optimal composition of the given product. From the ecological standpoint the determination of aromatic hydrocarbons content, sulfur and metal content is significant, with the goal to evaluate the effect of minimization of the content of these compounds on the functional properties of products.

C. Thermal and catalytic conversion of petroleum and alternative feedstock to refinery products and petrochemical and theirs biodegradability (Martin Bajus)

Most intermediates and monomers in the petrochemical industry are currently produced starting from alkenes and aromatics as building blocks. Alkenes are obtained mainly by steam cracking (pyrolysis) of hydrocarbon from petroleum and natural gas. The original aim of the research project is based on copyrolysis of high and low molecular hydrocarbons, for example: hexadecane and heptane. Under conditions of copyrolysis of hydrocarbons of paraffinic character to low molecular alkenes and aromatics, there occurs a minimal process of secondary reactions and as a result of which are formed highly molecular sediments, pitches and coke in the reactor and heat exchange apparatus in the pyrolysis system and carbon oxides. A significant theoretical contributions is expected in the clarification of the interaction taking place in the copyrolysis between different hydrocarbons, in the determination of how, in the interaction, the overall kinetics of pyrolysis and the composition of products change.

We found promoting influence of tin on LiO/Al_2O_3 catalyst as the oxidative coupling of the low molecular alkanes (methane) and of dimethylether to the higher hydrocarbons and ethers. We observed the mutual influence of hydrocarbons during copyrolysis of individual hydrocarbons reflecting in the rate of decomposition of individual components ahnd in products distribution. It was similar during study of coke formation. The contribution is the decrease of coke formation during copyrolysis of studied hydrocarbons.

From soil and wastewaters contaminated by crude oil was isolated microbial consortium (Pseudomonas putida, Kleibsiella planticola, Xanthomonas maltophilia) able to degrade naphtalene (0.3 g/L) and mixed culture (Alcaligenes xylosoxidans a Klebsiella pneumoniae) degrading phenol substances (catechol, hydroquinone, resorcinol) at concentration 0.5 g?L. The optimal composition of basis nutrient elements (N, P, S) for the growth of microorganisms on naphtalene as a sole souce of carbon was determined.

V. COOPERATION

A. Cooperation in Slovakia

SLOVNAFT, j.s.co., Bratislava
SLOVNAFT-VURUP, Bratislava
NAFTA, Gbely, j.s.co.
PETROCHEMA Dubová, j.s.co.
SPP (Slovak Gas Industry), Bratislava
EKOIL, j.s.co, Bratislava
Institute of Chemistry, Faculty of Natural Sciences, Commenius University, Bratislava

Department of Nuclear Physics and Technology, Faculty of Electrical Engineering, Bratislava

B. International cooperation

Spolana, j.s.co., Neratovice, Czech Republic
- utilization of alfa-olefins

Ecole Nationale Superieure de Chimie, Montpellier, France
- Xe-NMR-characterization of dealuminated zeolites

Institute of Physico-Chemistry and Electrochemistry, Academy of Sciences, Prague, Czech Republic
- Evaluation of zeolites by infra-red spectroscopy
- Determination of adsorption properties of ZSM-5 zeolites

C. Membership in Domestic Organizations and Societes

Slovak Society of Industrial Chemistry, Bratislava	(E. Hájeková, M .Bajus, P. Daučík, P. Hudec, B. Liptáková, A. Smiešková, Z.Židek)
Slovak Society of Chemical Engineering, Bratislava	(P.Hudec, A.Smiešková, Z.Židek)
Slovak Zeolite Association	(P.Hudec - chairman, A.Smiešková, Ľ.Šabo, Z.Židek)

G. Visitors from Abroad

Prof. L. Zanzotto	University of Calgary, Calgary, Canada, September 2000 (7 days)

H. Visits of Staff Members and Ph.D. Students in Foreign Institution

E. Hájeková	University of Calgary, Calgary, Canada, June – August 2000 (90 days)

VI. THESES AND DISSERTATIONS

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

Chvojková M.:	Contents supervision of zinc, calcium, sulphur and phosphorus in oils (P. Daučík)
Kortišová A.:	Reological properties of vaselines and greases (J. Ambro)
Pechová A.:	Pyrolysis of communal and industrial wastes in the flow reactor (E. Hájeková)
Ráczová R.:	Hydrorefining of oil distillates (A. Smiešková)
Semanová S.:	Pyrolysis of communal and industrial wastes in the bantch reactor (E. Hájeková)
Slišková M.:	Oxidative dehydrogenation of ethers (M. Bajus)
Vaňová M.:	Chromatographic determination of the middle distillates composition (P.Daučík)
Vlachovičová Z.:	Solubility of polymers and study of the transformation of fatty acids methylesthers (M. Bajus)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

1] Bajus M.: Reformulované a alternatívne palivá- súčasnosť a budúcnosť. Reformulated and Alternative Fuels – the Presence and the Future (in Slovak). Ropa, uhlie, plyn a petrochémia 43(2), 20-24 (2001).

[2] Hájeková E., Bajus M., Lederer J., Novák V.: Coking of Different Gas Oil Fractions During Pyrolysis, Petroleum and Coal 43 (2), 98-100 (2001)

[3] Hudec P., Smiešková A., Židek Z., Šabo Ľ., Liptáková B: Deep-bed dealumination of ZSM-5 zeolites. Changes in structure and catalytic activity: Studies in Surface Science and Catalysis 135, 29-P-26/1-8 (2001)

[4] Zikánová A., Kocirik M., Derewinski M., Sarv P., Dubský J., Hudec P., Smiešková A.: Mobilization of Surface Species during Transformation of Etylene over HZSM-5 Catalysts., Studies in Surface Science and Catalysis 135, 24-P-10/1-8 (2001)

B. Conferences (*international conferences)

[1]* Bajus M.: Hydrocarbon Technologies for the Future, Current Trends in Oil and Petrochemical Industry. In: CD ROM Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17.-19., 2001, Pl-5

[2]* Daučík P., Hudec P., Ambro J., Židek Z.: Testing of low-temperature properties of diesel fuels. In: CD ROM Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17.-19., 2001, L-D-7

[3]* Daučík P., Hudec P., Ambro J., Židek Z.,Leško J., Jakubík T: Methods of determination of diesel fuels composition. In: Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17.-19., 2001, L-D-6

[4]* Daučík P., Hudec P., Ambro J., Židek Z.,Leško J., Jakubík T: Nitrogen compounds isolation and their identification in middle distillates. In: Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17.-19., 2001, P-D-26

[5]* Hájeková E., Bajus M., Lederer J., Novák V.: Coking of Different Gas Oil Fractions During Pyrolysis. In: CD ROM Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17.-19., 2001, P-E-37

[6]* Hudec P., Smiešková A., Židek Z., Stefankovicsová G., Daučík P., Šabo Ľ., Ambro J.: Influence of Nitrogen Compounds on Color Degradation of Motor Fuels. In: Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17. – 19., 2001, L-D-5

[7]* Hudec P., Smiešková A., Židek Z., Stefankovicsová G., Daučík P., Šabo Ľ., Ambro J.: Study of catalytic improvement of

colour unstability of middle distillates. In: Proceedings of the XXXIII. Symposium on Catalysis, Prague, Czech Republic, Nov. 5.-6. 2001, p.18

[8]* Liptáková B., Hronec M.: Oxidation of Benzene over Mixed Calcium-Copper hydroxyapatite catalysts. In: Proceedings of the XXXIII. Symposium on Catalysis, Prague, Czech Republic, Nov. 5.-6. 2001, p. 49

[9]* Smiešková A., Hudec P., Ráczová R., Šabo Ľ., Židek Z.: Comparison of Conventional and Y Zeolites Containing Hydrorefining Catalyst in Denitrogenation of Middle Fuel Distillates Derived from Different sources. In: Proceedings of the XXXIII. Symposium on Catalysis, Prague, Czech Republic, Nov. 5.-6. 2001, p. 54

[10]* Svitaň R., Ilkovič J., Biskupičová E., Bajus M.: Oxidative Coupling of Methane. Poster P-E-34. In: CD ROM Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17. – 19. , 2001

[11]* Svitaň R., Bajus M.: Membránové reaktory pre separáciu vodíka. Membrane reactors for hydrogen separation (in Slovak). In: CD ROM Proceedings of the 48th Conference of Chemical and Process Engineering, CHISA 2001, Srní, Šumava, Czech Republic,October 15.-18., 2001, V3.16.

[12]* Šabo Ľ., Hudec P., Smiešková A., Balážová K., Židek Z.: Mesoporous Materials as Support for Nickel Hydrogenation Catalyst. In: CD ROM Proceedings of the 40th International Petroleum Conference, Bratislava, Slovak Republic, September 17.-19., 2001, L-A-6

[13]* Šabo Ľ., Hudec P., Smiešková A., Balážová K., Židek Z.: Hydrogenation activity of Nickel Supported Mesoporous Materials., 1st. EFCAT School 2001, Prague, Czech Republic, March 27. - April 1. 2001, p.1

[14]* Šimon P., Okuliar J., Daučík P.: Practical Importamce of the Kinetics of Induction Period. 28 International Conference of Slovak Society of Chemical Ingeneering. Tatranské Matliare, Slovak Republic, May 21. – 25. , 2001, L-44

D. Patents

[1] Bajus M.,Snopek P., Magač A., Kuľka A., Kaščák S.: Spôsob aktivácie organických látok. Organic compounds activation (in Slovak), Sk 281993, (8.10.2001) Slovak Republic

E. Others

[1] Bajus M.: Cesta zarúbaná paragrafmi. The route logged with paragraphs. (in Slovak) STOP Vol.31 č.25-26, (8-9) (2001)

[2] Bajus M. a kolektív: Ekologické palivá, diskusia, názorové fórum o bionafte, Ecological fuels, discussion forum about biodiesel. (in Slovak) TREND, 11, 31, p. 8A - 9A.(2001).

[3] Bajus M.: Telecast „Ekonomika Slovenska“. „Slovak economics“ (in Slovak), Vystúpenie v ST, Propagácia výsledkov výskumu o ekologických palivách č.3/2001 STV2 12.3.2001, repr. STV1, 17.3.2001.

[4] Bajus M.: telecast “Mýtus o bionafte“. „The mythos about biodiesel“. (in Slovak), Vystúpenie v ST, STV1, 6.7.2001

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Emeritus Fellows:
Ján Mikuláš Lisý, PhD; Alexander Tkáč, PhD, DSc, Ladislav Valko PhD, DSc, Augustín Jurkovič

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories

Laboratory for the Basic Course of Physical Chemistry
Laboratory for the Advanced Course of Physical Chemistry
Laboratory of Electronics
Laboratory of UV-VIS and IR Spectroscopy

B. Research Laboratories

Laboratory of Differential Scanning Calorimetry
Laboratory of EPR Spectroscopy
Laboratory of Material Study and Light Scattering
Laboratory of Molecular Distillation

C. Special Measuring Instruments

Electron Paramagnetic Resonance Spectrometer BRUKER ER 200D-SRC
Differential Scanning Calorimeter DSC-7 Perkin-Elmer with an accessory for dynamic DSC

III. TEACHING

A. Undergraduate study

1. Introductory courses

3rd semester (winter)		
Physical Chemistry I.	(3-2 h)	S. Biskupič, A. Gatial
Laboratory Practice in Physical Chemistry I.	(0-3 h)	J. Reguli
4th semester (summer)		
Physical Chemistry II.	(3-2 h)	S. Biskupič, P. Kovařík, A. Gatial, J. Antalík
Laboratory Practice in Physical Chemistry II.	(0-3 h)	P. Šimon

2. Advanced courses

5th semester (winter)		
Physical Fundamentals of Spectroscopic Methods	(2-2 h)	A. Staško, V. Brezová
6th semester (summer)		
Biophysical Chemistry	(2-2 h)	M. Valko
7th semester (winter)		
Chemical Physics I.	(2-1 h)	P. Pelikán

Thermodynamics	(2-1 h)	P. Šimon
Kinetics and Catalysis	(2-1 h)	P. Kovařík
Colloid Chemistry	(2-0 h)	J. Antalík
Statistical Treatment and Evaluation of Experimental Data	(2-0 h)	M. Breza
Group Theory and Symmetry	(2-0 h)	M. Breza, V. Kvasnička
Special Laboratory Practice I	(0-8 h)	P. Rapta
8th semester (summer)		
Chemical Physics II.	(2-1 h)	S. Biskupič
Solid State Physics	(2-0 h)	M. Breza
Special Laboratory Practice II.	(0-6 h)	P. Rapta
Traineeship		
Excursion		
9th semester (winter)		
Molecular Spectroscopy	(2-1 h)	A. Staško
Chemical Physics III.	(2-0 h)	A. Gatial
Special Laboratory Practice III.	(0-10 h)	P. Rapta

IV. CURRENT RESEARCH PROJECTS

A. Structure and Reactivity in Chemical and Biological Systems (Andrej Staško)

The research activity of our group is focused on the intermediates formed in various organic and aqueous systems, which are formed during photochemical and electrochemical processes and simultaneously monitored by different spectroscopic methods (EPR, UV/Vis, and NIR). One of the most investigated systems remains new carbon structures (fullerenes, nanotubes), where the formation of the corresponding anions is followed in the cathodic or photochemical reduction. Recently we expanded such studies also to the dimeric forms of C_{60} (C_{120}, $C_{120}O$). The results obtained bring new aspects in the follow up reactions of fullerene anions in the solutions.

To obtain a new quality of information we are developing in situ spectroelectrochemical techniques under a simultaneous exploitation of EPR, UV/Vis, NIR spectroscopy and cyclic voltammetry. These studies were recently expanded to the measurements at different temperatures, what enables an unambiguous assignment of the spectral data to the species generated in the electron transfer reactions and their follow up reactions with neighbourhood. This is frequently not possible if the experiments as electrochemical, optical or EPR measurements are carried out separately, especially if more unstable intermediates or complex spectroscopic data are expected. The technique developed was successfully applied in the fullerene investigations, reversible dimerisation of ion radicals and in the redox processes of new oligomeric and polymeric structures as candidates in sensor applications and as light emitting diode components.

The quantitative EPR spectroscopy remains a permanent problem due to the very limited reproducibility, as various parameters (position of the sample in the cavity, its shape, changing parameters of spectrometer and others) are very sensitively reflected in the integral intensity of EPR signals. To map and to eliminate these error sources an intensive research is curried out in numerous laboratories. Systematic investigations and a valuable contribution to this field was lately published from our laboratory, where the influence of the probe position, its size and other parameters were described enabling the elimination of many errors frequently neglected so far. The results obtained allow predict the change of EPR amplitude on the position and the shape of the sample.

The role of the radical processes is increasingly recognised not only in the living organisms but also in the foods, where the radical mechanisms are frequently responsible for their loosing quality. Based on this assumption, various methods to test the quality of foods were elaborated. We also started research in this field applying EPR spin trapping in the investigations of stability of beer probes from the Slovak and Czech market and then also from the German market and suggested a procedure enabling to compare and to predict the beer stability of various probes. Similarly we suggested and tested by now some procedures to evaluate the antioxidant - scavenging activity of wine probes.

B. Development and Application of Computational Methods to the Study of Structure, Dynamics and Properties of Molecular Systems (Stanislav Biskupič)

1. A new method for generation of the relativistic Gaussian basis sets has been elaborated and implemented. The optimization method is based on the stochastic two-step procedure.

2. Theoretical treatment for calculation of the interaction energy of two closed shell systems and the molecular complex containing one open and one closed shell system has been formulated and applied in order to test the reliability of the proposed theory. New method is based on the 3rd order many body perturbation theory. The superposition error elimination was the subject of our investigations, too.

3. Precise calculations based on the MR SDCI method has been applied in order to obtain a good estimation of the potential hypersurface for HFF open shell molecular system with the aim to use it as a basic input for the future molecular dynamics studies. Sufficiently large active space has been used in all calculations.

4. Quantum chemical study of the azomethane decomposition has been done. Several kinetic parameters of the reactions under study were calculated.

5. Infrared spectra of selected organic compounds have been registered. Their interpretation and conformational analysis is based on the ab initio method with inclusion of the correlation energy.

6. Based on the newly developed theoretical treatment the calculation of the adiabatic and/or nonadiabatic corrections to the energy and vibrational frequencies has been done.

7. Periodic solid state systems have been studied within the originaly reformulated theoretical treatments on the basis of the INDO type semiempirical hamiltonian.

8. The mutual influence between perturbation of the electronic structure of molecules and perturbations of regular

geometric arrangement of atoms in molecules has been studied. In systems with degenerate electronic states, the perturbations are due to vibronic interactions, whereas in cis-trans phosphazenes the perturbations are a consequence of non-equivalence of interatomic interactions.

C. MATERIALS – Physico-chemical Methods of their Study and their Preparation (Peter Šimon)

The method for the evaluation of kinetic parameters of induction periods has been elaborated. The method enables to estimate the length of nonisothermal induction periods in the processes such as rubber curing, polymer and oil oxidation, freezing of undercooled liquids etc. The method is expected to be applied in the quality management and risk assessment in technological processes.

Degradation and stabilisation of PVC is studied both experimentally and theoretically. The attention is paid to the non-hazardous stabilizer mixtures based on tocoferyl acetate.

The thermochemical behaviour of selected complex compounds of Ni, Cu and Co has been studied from the point of view of their application as adhesion promotors in rubber curing.

The influence of glass transition and nonisothermal treatment of amorphous metal metals $Fe_{100-x}B_x$ ($13<x<21$) on the relative permeability, core-losses and magnetic induction has been investigated.

The processes occurring in foods and food packaging are modelled with the aim of hazard assessment in critical control points.

A method for the parameter evaluation in implicit and nonlinear models without the necessity of using any linearisation is suggested.

D. Separation in Molecular Evaporator (Ján Cvengroš)

The research project is focused on the theory of molecular distillation, the development of the short-path evaporators with wiped film and on the applications of molecular distillation. The main results in 2001 are as follows:

1. Further development of the mathematical model of the molecular distillation comprising all till now known factors which influence the process. The model allows to evaluate the influence both process and construct parameters on the output and separation, to render the information about the unmeasurable parameters, to simulate different situations in the evaporator and to optimise the process. Using the model, the effect of entrainment separator was studied, as well as the feed temperature influence on the evaporator efficiency, the influence of the evaporating film hydrodynamics and the possibilities of divided condenser. Good agreement was achieved by comparison between experimental and model results.
2. The shape of RTD-curves from the study of profiled wipers with passage channels indicates that there are three different regimes in the liquid flow on the evaporating cylinder according the liquid load, peripheral speed of wiper, its construction and its sense of movement. The strand regime with the liquid flow downward along the screw tread at prolonged residence time is considered favourable for molecular distillation to perform efficient evaporation under gentle conditions at a lowered temperature.
3. Some interesting applications of molecular evaporators were developed (regeneration of used mineral oils, purification of some medicaments, PCB contaminated oils treatment, preparation of neutral methyl esters of vegetable oils and others).

E. Calculation of Electron Structure of Solid State Materials and Synthesis of New Type of Materials (Peter Pelikán)

The program package for calculation of electron structure of solid state systems with translation symmetry were elaborated. The program uses complete Hartree-Fock operator including electron-electron interaction and he is applicable on the various levels of the theory (semiempirical methods, ab initio treatment, DFT theory). Up to now performed results were obtained using quasi-relativistic INDO method.

The proposed method is based on the calculation of finite clusters with modulo-cyclic boundary conditions. These conditions allow the Fourier transformation of the atomic orbitals to the Bloch funcktions, which follow the periodicity of the infinite crystal. After this transformation the secular problem transforms into a quasi-diagonal matrix what significantly decreases the computational time. Consequently, clusters up to 100,000 atoms can be calculated.

Calculation of such big clusters automatically incorporates long-distance interactions that may have dominant influence on the electron properties of the studied solid state systems. At the same time modulo-periodic conditions eliminate the so-called boundary effects (that limit the traditional cluster approach) that represent unsaturated bonds on the cluster boundaries.

Calculation of electron density is performed for tens of thousands points of the first Brillouin zone and provides the density matrix in a close neighborhood of the bulk limit.

The method incorporates the algorithm for inclusion of correlation effects that have a strong influence on the topology of the band structure and on the energy gap between the valence and conductive bands.

Automatic optimization of the geometry allows the calculation of various possible geometric arrangements in the solid state that can strongly influence physical and chemical characteristics of the studied systems.

F. The Role of Trace Metals and Light in Camptothecin – Serum Albumin Interactions (NMR and EPR Studies) (Marián Valko)

The anticancer drug camptothecin (CPT) is a plant alkaloid that has recently gained approval for clinical trials as a treatment of gastric, rectum, and bladder tumors. The drug exists in two forms, a lactone form which is biologically active and a carboxylate form which is not. It has been shown that in the presence of human serum albumin (HSA) the drug converts to the biologically inactive form and therefore the liposomal stabilization of the lactone form of the drug is of primary importance. In this connection the high resolution NMR study is planned to elucidate the stabilization of the lactone form of the drug and the nature of the binding mode with HSA. It is generally believed that camptothecin activity occurs through a free radical mechanism. We also believe, that the role of trace metals is in particular important. Our preliminary results show that upon irradiation (365 nm light) copper(II)-CPT complex generates free radicals which may cause DNA damage to cancer cells. The aim of the proposed project is to further investigate a radical mechanism of the action of the drug.

G. Charge Density Studies of 3d-element Complexes from X-Ray Diffraction Data (Jozef Kožíšek)

By studying the charge density of selected coordination compounds following questions could be elucidate:

1. Compounds which produce excellent quality crystals (potentional low R-value could be reached) like

Bis{bis(methoxycarbimido)-aminato}Cu(II) complex is a good model for *3d*-electron distribution at a special coordination number and homogeneous/heterogeneous coordination sphere.

2. In blue protein model compounds like $[Cu(bite)(BF_4)]$ and $[Cu(bite)(BF_4)_2]$ the mechanisms and reason for special redox properties in biological systems are studied (so-called „blue proteins").

3. In spin crossover system đ-stacking of benzimidazole rings probably forms information chanels responsible for interesting magnetic properties of these Fe(II) coordination compounds.

4. Asymmetric synthesis is fashionable and coordination compound like Ni-complexes of the Schiff base are catalysts. What is the reason for such high selectivity?

5. In unusual coordination polyhedron for Cu(II) the distribution of *3d*-electrons should help to understand bonding properties.

H. Non-formal Education in Chemistry (Ján Reguli)

The aim of this project is to prepare supporting educational materials to help chemistry teachers in basic and secondary schools. In 2001 a coloured periodic table „Origin of the Names of Chemical Elements" with accompanying booklet (28 pp.) was published. This material was approved by the Ministry of Education. Several other educational materials for secondary school teachers and for gifted students interested in chemistry were published (including the tasks for Chemistry Olympiad). Results of this project are summarised in the monograph „Non-formal Education in the Field of Chemistry" (Vyd. STU 2001, 109 pp., in Slovak).

V. COOPERATION

A. Cooperation in Slovakia

Department of Histology, Faculty of Medicine, Comenius University, Bratislava
Department of Chemistry, Faculty of Pedagogy, University of Trnava, Trnava
Faculty of Natural Sciences, Comenius University, Bratislava
Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava
Faculty of Natural Sciences, University P. J. Šafárik, Košice
Department of Chemistry, Faculty of Industrial Technologies Púchov, University of Trenčín
Institute of Experimental Pharmacology, Slovak Academy of Sciences, Bratislava
Research Institute of Drugs Modra
EKOIL Bratislava
EKOTIPS Bratislava
DETOX Banská Bystrica
Duslo Šaľa
Q-CHEM Modra
OTEZA Martin
DAMT-MDT Martin
Slovak Hydrometeorological Institute, Bratislava
LikoSpol Bratislava
Research Institute of Chemical Fibres, Svit

B. International Cooperation

Institut fűr Theoretische Chemie und Strahlenchemie, Universität Wien, Austria
- Ab initio calculations of potential energy surfaces of small molecules using multiconfiguration methods

Institut fűr Analytische Chemie, TU Dresden, Germany, Department of Chemistry, University of Oslo, Norway: Measurement
- Interpretation and theoretical calculation of vibrational IR and Raman spectra of some organic molecules.

University of Technology Darmstadt, SRN
- Crystal structures of organic and coordination compounds

Royal Institute of Technology, Stockholm, Sweden
- Molecular dynamics of N_4

Max-Planck-Institut für Strömungforschung, Göttingen, Germany
- Photodissociation of HNCO

State University of New York, Buffalo, USAD
- FT calculations of blue proteins model compounds

School of Pharmacy and Chemistry, John Moores University, Liverpool, United Kingdom (Dr Harry Morris)
- Spectroscopy of transition metal compounds

Multifrequency EPR Center, Chemistry Department (Dr. Eric McInness)
University of Manchester, Manchester, UK
Chemistry Program, Roosevelt University, Chicago, USA (Assoc. Prof. Joshua Telser)
NMR Center, Bremen University, Bremen, FRG (Prof. Dieter Leibfritz, NMR spectroscopy)
University of Poznan, Poland
IFW Dresden e. V., Dresden, Germany
- Novel EPR techniques, intermediates in electrochemical reactions

Institut für Makromol. Chemie, TU München, Germany
- Material for light diodes

Institute of Physical and Theoretical Chemistry, Technical University, Graz, Austria
- EPR spectroscopy, education

CIBA Späzialitetenchemie GmbH, Grenzach, Germany (Dr. Krajnik)
- Purification of products on molecular evaporator

Department of Instrumental and Analytical Science, UMIST, Manchester, UK (Dr. Kvasnik)
- Development of fibreoptic distributed sensors for ammonia

University of Technology, Sydney, Australia (Dr.A.Ray, Dr.P.Thomas)
- Processes with induction period

VSCHT, Institute of Polymers, Czech Republic (Dr.Z.Vymazal)
- Nonisothermal degradation of PVC

Faculty of Chemistry, Technical University, Brno, Czech Republic
LUKAS Research, Prague, Czech Republic (Dr.R.Lukáš, Dr.L.Kalvoda)
- Development of fibreoptic distributed sensors for ammonia

Faculty of Chemical Technology, University of Pardubice, Czech Republic (Prof.Drdák)
- Modelling of microbial growth

University of Saskatchewan, Canada (Dr.R.Šilerová)
- Properties of thiol thin layers on gold particles

C. Membership in Domestic Organisations and Societies

Slovak Chemical Society	
Institute of Inorganic Chemistry, Slovak Academy of Sciences - member of Scientific Board	(P. Pelikán)
Chemical Papers - member of Editorial board	(P. Pelikán)
Slovak Academic Society, Bratislava	(P. Pelikán)
Slovak Society of Chemical Engineers	(J. Cvengroš)
Slovak Vacuum Society	(J. Cvengroš)
Slovak Group for Thermal Analysis and Calorimetry	(P. Šimon)

D. Membership in International Organisations and Societies

International Society for Theoretical Chemical Physics, Germany	(S. Biskupič)
International ESR Society, USA	(S. Biskupič)
American Chemical Society, USA	(A. Staško)
American Oil Chemist's Society, USA	(J. Cvengroš)
Journal of Thermal Analysis and Calorimetry – regional editor	(P. Šimon)
International Confederation for Thermal Analysis and Calorimetry	(P. Šimon)

F. International Scientific Programmes

1. NATO program for thermo-electric materials (P.Pelikán)

2. CEEPUS program – (Project SK-102) co-operation with University Graz (Austria), University Poznan (Poland), University Veszprém (Hungary), University Sofia (Bulgaria), Masaryk University Brno (Czech Republic), University Maribor (Slovenia), Bulgarian Academy of Sciences (Bulgaria), Pedagogical University Zielona Gora (Poland), Babes-Bolyai University Cluj (Romania). (A. Staško)

3. Charge Density Analysis of Transition Metal Complexes by Accurate X-Ray Diffractions Methods, NSF-CHE96155, SUNY Buffalo, USA, 1999-2002 (J. Kožíšek).

4. 1 year NATO Collaborative linkage grant LST.CLG.977743: „Protein binding and photochemistry of the anticancer drug camptothecin„ (Marián Valko In collaboration with Dr. H. Morris, Liverpool and Prof. J. Telser, Chicago).

G. Visitors from abroad

Prof. P. Janderka	Masaryk University Brno, Czech Republic, 14 days
Dr. K. Ranguelova	Bulgarian Academy of Sciences, Bulgaria, 14 days
The co-ordinators CEEPUS meeting (Project SK-102)	Prof. G. Grampp, University Graz (Austria), Prof. S. Lamperski, University Poznan (Poland), Prof. N. Yordanov, University Sofia (Bulgaria), Prof. J. Vřešťál, Masaryk University Brno (Czech Republic), Prof. A. Wieckowski, Pedagogical University Zielona Gora (Poland), Prof. I. Baldea, Babes-Bolyai University Cluj (Romania), 3 days.
Prof. P. Coppens	State University of New York, Buffalo, USA, 4 days.
Dr. Paul Thomas	University of Technology, Sydney, Australia, 1 month.
Dr. Frank Kvasnik	DIAS UMIST, Manchester, UK, 3 days
Dr. H. Morris	John Moores University, Liverpool, UK, 10.7.2001-4.8.2001
Prof. J. Telser	Roosevelt University, Chicago, USA, 19.7.-23.7.2001
Dr. Jesús García Díaz	28 days
Dr. Miriam Martinello	National University of Rio Quarto, Argentina, 4 days.

H. Visits of Staff Members and Postgraduate Students to Foreign Institutions

M. Bittererová	Royal Institute of Technology, Stockholm, Sweden, (12 months)
M. Breza	State University of New York, Buffalo, USA, September 2001 (23 days)
V. Brezová	Institute of Theoretical and Physical Chemistry, University Veszprém (Hungary) (10 days)
J. Kožíšek,	TU-Darmstadt, Germany, July-August 2000 (40 days)
J. Kožíšek	ECM-20 Conference, Atlanta, USA,, August 2001 (6 days).
J. Kožíšek	DESY-HASYLAB, Hamburg, Germany (2x 6 days).
D. Dvoranová	University Poznan (Poland) (1 month)
R. Klement	Institut Charles Sadron, UPR 22-CNRS, 6, rue Boussingault, F-67083 Strasbourg Cedex, France (9 months)

P. Rapta	IFW Dresden, Germany (3 months)
I. Vrábel	University of Vienna, Austria, January-September 2001 (9 months)
P. Šimon	DIAS UMIST, Manchester, UK (5 days)
P. Šimon	University of Saskatchewan, Canada (1 month)
M. Valko	John Moores University, Liverpool, UK August-September 2001(4 week)

VI. THESES AND DISSERTATIONS

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

Fronc M.:	Study of solid state electronic structure using exact X-ray diffraction data. (J. Kožíšek)
Chalupková - Pírová K.:	Salt-aqueous oscillator. (V. Adamčík)
Lichnerová E.:	Redox properties of stobadine pyroindol derivatives investigated using spectroelectrochemical EPR and UV/visible techniques. (P. Rapta)
Okuliar J.:	Oxidation of mineral oils and drugs – study of the non-isothermic induction period. (P. Šimon)
Polovka M.:	Radical intermediates formed during beer ageing. (V. Brezová)
Slovák K.:	Investigation of tocopherols influence in the stabilization mixtures for PVC. (P. Kovařík)
Švorec J.:	Forbidden transitions and their interpretation in the EPR spectra of copper(II) complexes. (M. Valko)

B. Dissertations (PhD)

E. Klein:	Study of the thermal degradation of polyvinyl chloride.

C. Dissertations (DSc)

P. Šimon:	Kinetics of thermal degradation and stabilization of selected polymers.

D. Habilitation Thesis

M. Mazúr:	Development of EPR techniques applied to the study of transition metal systems.
P. Rapta:	Radical intermediates in electrochemical redox reactions studied by in situ spectroelectrochemical techniques.

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Baňacký P., Pelikán P., Valko M., Buchta S., Hanic F., Cigaň A.: Electron Paramagnetic Resonance of High-Tc Superconducting Composites YBa2Cu3-xScxO6±. J. Phys. Chem. B 105, 1943-1946 (2001).

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[15]* Lukeš V., Breza M., Végh D., Hrdlovic P., Krajcovic J., Laurinc V.: Non-linear optical properties of new bridged bis-thienyls I.

Pyrazine-based bridges. Theory, synthesis and spectra. Synth. Metals 124, 279-286 (2001).
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B. Conferences (*international conferences)

[1]* Baloghová Z., Mazúr M., Valko M., Baran P., Dlháň L., Valigura D.: Structure and EPR spectra of 1:1 cooper complexis with 2,2'-bipyridine-N,N'dioxide ligand. Book of Abstracts, p. 45, 18th International Conference on Coordination and Bioinorganic Chemistry, Smolenice, Slovak Republic, June, 4-8, 2001.

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[6]* Biskupič S.: Fitovanie hyperplôch potenciálnej energie. Zborník príspevkov 53. zjazdu chemických spolocností, B. Bystrica, 3.-6. september 2001, p. 291-292.
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[26]* Mazúr M.: Error sources in quantitative EPR spectroscopy. Book of Abstracts. p. 46, 7th International workshop EMARDIS and APPLIED EPR, Sofia, Bulgaria, June, 09-18, 2001.
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[39]* Rapta P., Dunsch L.: Quantitative in situ ESR/UV-VIS-NIR voltammetry - a powerful tool for solving the puzzles in organic electrochemistry. Book of Abstracts. Prague-Dresden Electrochemical Seminar, Jetřichovice, Czech Republic, December, 5-7, 2001.
[40]* Reguli J.: Doplnkové materiály pre zatraktívnenie vyučovania chémie. Additional Materials for Chemical Education (in Slovak). Zborník príspevkov 53. zjazdu chemických spoločností, Banská Bystrica, 3.-6. 9. 2001. 1. diel, str. 127-128 (2001).
[41]* Reguli J., Linkešová M., Slanicay J: Pôvod názvov chemických prvkov. Origin of the Names of Chemical Elements(in Slovak). Zborník príspevkov 53. zjazdu chemických spoločností, Banská Bystrica, 3.-6. 9. 2001. 1. diel, str. 164-165 (2001).
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[45]* Šimon P., Okuliar J. & Daučík P.: Practical importance of the kinetics of Induction periods. 28th International Conference of Slovak Society of Chemical Engineering, Tatranské Matliare.

C. Books and Textbooks

[1] Reguli J. :Neformálne vzdelávanie v oblasti chémie. Non-formal Education in Chemistry (in Slovak). Vydavateľstvo STU, Bratislava 2001, 109 pp.; ISBN 80–227–1553–0.
[2] Reguli J., Linkešová M., Slanicay J: Pôvod názvov chemických prvkov. Origin of the Names of Chemical Elements(in Slovak). FCHPT STU Bratislava 2001, 28 pp.

E. Other Publications

[1] Reguli J.: Fyzikálna chémia. Letná škola chemikov, kat. B. Physical Chemistry for the Summer School of Chemistry (in Slovak). IUVENTA, Bratislava, 2001, 20 str.
[2] Reguli J.: Fyzikálna chémia. Letná škola chemikov, kat. C. Physical Chemistry for the Summer School of Chemistry (in Slovak). IUVENTA, Bratislava, 2001, 22 str.

DEPARTMENT OF PHYSICAL EDUCATION

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Technical Staff:
Gabriela Boršányiová

II. TEACHING AND RESEARCH LABORATORIES:

Gym 14x21 m – ground /volleybal, basketball, football/
Two Body Building rooms 15x5 m and 10x5 m

III. TEACHING:

Aerobic	(2 h)	D. Sochorová
Kalanethics	(2 h)	D. Sochorová
Harmonic gymnastics	(2 h)	D. Sochorová
Healing gymnastic	(2 h)	D. Sochorová
Athletic sport	(2 h)	V. Lendel
Basketball	(2 h)	P. Bartok
Football	(2 h)	P. Bartok
Handball	(2 h)	M. Bobrík
Body building	(6 h)	M. Bobrík, P. Bartok, V. Lendel, J. Moravcová
Swimming	(2 h)	J. Fehér, I. Turčáni
Canoeing and kayak	(4 h)	M. Bobrík
Volleyball	(2 h)	J. Moravcová
Winter sports camp /skiing/		M. Bobrík, J. Fehér
Summer sports camp /		M. Bobrík, J. Fehér

IV. RESEARCH PROJECT:

State of Physical and Motor Development of Undergraduates of FCHFT STU in Bratislava (Viliam Lendel)

V. COOPERATION IN SLOVAKIA:

Faculty Physical Education and Sport of the Comenius University, Bratislava;
Research Institute of Physical Culture, Bratislava;
Institute of History, Slovak Academy of Sciences, Bratislava.

VI. PUBLICATIONS:

A. Journals

B. Conferences (*international conferences)

[1]* Bobrík, M.: Nemci na Slovensku a slovenská otázka počas a po skončení prvej svetovej vojny (1916-1919), s. 105-112. Germans in the Slovakia and the slovaks Question during and after the I. World War (1916-1919) In: Mommsen, H., Kováč, D., Malíř, J., Marková, M.: První světová válka a vztahy mezi Čechy, Slováky a Němci. The First World War and the Conections between the Czechs, Slovaks and the Germans. Matice moravská Brno 2000. Česko-německá komise historiku, česká sekce 2000, ISBN 80-902304-8-2. Publikáciu financovalo Ministerstvo zahraničných vecí Českej republiky

[2] Bobrík, M., Lendel, V.: Stav telesného a funkčného rozvoja poslucháčov CHTF STU v Bratislave. State of Physical and Functional Development of Undergraduates of CHTF STU in Bratislava In: Optimalizácia zaťaženia v telesnej a športovej výchove. Optimisation of the load in physical and sport education. Bratislava, 23.5.2001, s. 24-29. ISBN 80-227-1541-7.

[3] * Bobrík, M., Lendel, V.: Telesné a funkčné ukazovatele rozvoja poslucháčov FCHPT v Bratislave. Physical and Functional Parameters of Undergraduates of FCHPT STU in Bratislava. In: Telesná výchova, šport, výskum na univerzitách. Physical Education, Sport, Research on the universities. Zborník referátov z medzinárodnej konferencie, Bratislava 2001, s. 45-50. ISBN 80-227-1605-7.

[4]* Bobrík, M.: Problémy telesnej výchovy na VŠ v SR cez prizmu posledného desaťročia. Problems of physical education on the universities in the SR and view of last ten yers. In: Perspektívy školskej telesnej výchovy a športu pre všetkých v SR. Perspectivs of physical education and sport for all in the SROV. Zborník z celoslovenského vedeckého seminára, Bratislava

2001, s. 62-68. ISBN 80-89075-01-0.

[5]* Lendel, V.: Skúsenosti, problémy a perspektívy vyučovania telesnej výchovy na Fakulte chemickej a potravinárskej technológie STU v Bratislave. Experiences, problems and pespectieves of teaching physical education at Faculty chemical and foods technology STU in Bratislava. In: Perspektívy školskej telesnej výchovy a športu pre všetkých v SR. Zborník z celoslovenského vedeckého seminára, Bratislava 2001, s. 62-68. ISBN 80-89075-01-0.

DEPARTMENT OF PLASTICS AND RUBBER

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Assistant Professor:
Pavol Alexy, PhD

Senior Research Fellow:
Viera Khunová, PhD

Research Fellow:
Ľudmila Černáková, PhD

PhD Students:
Gabriela Crkoňová; Lenka Hajdučíková; Denisa Koniarová; Miroslav Kršiak; Henrich Krump; Lenka Precnerová; Petra Volfová

Technical Staff:
Mária Dočolomanská, Viera Godályová, Božena Lebocová, Mária Pekarovičová, Anna Tatarková

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Polymer Synthesis
Laboratory of Polymer Solutions
Laboratory of Polymer Modification
Laboratory of Thermal Analysis
Laboratory of Polymer Rheology
Laboratory of Electron Microscopy
Laboratory of Polymer Processing and Estimation of its Mechanical and Physical Properties
Laboratory of Biomaterials

III. TEACHING

A. Bacalarate Study

5th semester (autumn)

Macromolecular Chemistry	(2-0 h)	Chrástová
Corrosion and Material Surface Treatment	(2-2 h)	Chovancová, Špirk

6th semester (spring)

Technology of Materials	(2-0 h)	Hudec, Marcinčin, Majling
Technological Project	(0-4 h)	

B. Graduate Study

7th semester

Polymer Physics	(2-2 h)	Cifra, Krištofič, Šutý
Colloids and Interfaces	(2-1 h)	Bakoš, Mikula
Laboratory from Macromolecular Chemistry	(0-8 h)	Černáková, Volfová, Crkoňová
Macromolecular Chemistry II	(2-1 h)	Chrástová
Production and Processing of Plastics	(3-0 h)	Hudec
Production and Processing of Rubber	(3-2 h)	Kyselá

8th semester

Additives for Plastics	(2-0 h)	Hudec
Biotechnological Polymers	(2-0 h)	Bakoš
Methods of Polymer Characterisation	(2-0 h)	Černáková
Design of Experiments	(1-1 h)	Alexy
Laboratory from Production of Polymers	(0-8 h)	Alexy, Kyselá, Krump, Kršiak
Production, Properties and Processing of Plastic	(2-0 h)	Hudec (for students of Faculty of Architecture)

9th semester

Polymer Processing	(3-1 h)	Špirk
Polymer Blends and Composites	(2-0 h)	Khunová

Polymer Recycling and Waste Disposal	(2-0 h)	Špirk, Hudec, Khunová
Polymer Testing	(0-2 h)	Alexy
Laboratory from Processing of Polymers	(0-10h)	Alexy, Hudec, Kršiak, Krump

10th semester

Diploma work	(0-27 h)	

IV. CURRENT RESEARCH PROJECTS

A. Study of Synthesis of Crosslinked Polymers and their Properties (Viera Chrástová)

The project deals with synthesis of functionalized poly(styrene)/poly(butyl acrylate) dispersions with core-shell morphology of latex particles. The functional monomers especially N-methylol acrylamide and N-izobutoxy methylacrylamide are used at the course of two step emulsion polymerization for introduction of reactive groups into polymer chains. The influence of crosslinking reactions on colloidal characteristics of such modified dispersions and mechanical properties of their film are studied with the aim to obtain dispersion with application properties suitable for the formulation of ecological paints.

The crosslinking of unsaturated elastomers in the presence of amine-free accelerators is investigated, too. These accelarators do not form carcinogenic N- nitrosamines. The study is predominantly concerned with the research of the ageing-resistant behaviour of the natural rubber vulcanizates cured in the presence dialkyldithiophosphates or their combinations with thiazoles. The eventual ageing resistance was evaluated on the base of the changes of the primary properties of cured materials and on the changes of the arrangement of the network.

B. Polymer Mixtures, Composites and Recycling (Eugen Špirk)

The aim of the research project is the study of correlation between the structure, physical - mechanical, rheological and thermal properties of composites with a high content of soft and hard magnetic fillers based on thermoplastic and elastomeric matrix.

In the region of rubber blends the attention is oriented on following environmental problems:

- the formulation of rubber blends recipes from the viewpoint of nitrosoamine free cured system
- the applications of grinding rubber in polymer blends.

Further the research works are oriented on the reactive processing of particulate polymer composites based on the inorganic fillers and thermoplastic polymer matrix. The objective of this part is to identify effective modifier enable moulding of the composite with improved performance properties, as well as the effect of the reactive modifier on the interphase structure development.

The main research effort in the field of polymer recycling is aimed to the development of an environmentally viable and economically effective mode of improving mechanical and rheological properties of recycled thermoplastic waste.

C. The study of the macromolecular systems of hyaluronic acid with biologically active substances for biomaterial applications (Dušan Bakoš)

The scientific aims of the project are in developing the biosynthetic skin substitute, which is able to be definitely incorporated in body. The study results of the basic properties of biopolymers of extracellular matrix, collagen and hyaluronic acid. The developed membranes with excellent biological and mechanical properties are chemically modified to synchronise biodegradation and wound healing.

The preparation of the complex membrane based on collagen and hyaluronan was standardised on the basis of cytotoxicity and biodegradability testing and other properties. The pharmacological documentation was elaborated for clinical trial as skin covering, as well.

Based on received approval for the clinical trial, new application possibilities of the membrane were studied. Perspective applications rise in guide tissue regeneration in stomatology, as an antiadhesive membrane in orthopaedic surgery and skin covering with a possibility of controlled release of bioactive substances.

D. The development of ecologically acceptable flame retardant magnesium hydroxide based polymer composites (Viera Khunová)

The project aims to develop application specific halogen free flame retardant composites based on magnesium hydroxide and thermoplastics materials. This is being achieved via reactive processing that results in modification of the interfacial region between the filler particle surface and the polymer matrix.

The main research and experimental effort of the project is focused on optimisation of reactive processing conditions of modified polyolefine/magnesium hydroxide composites and their evaluation in relation to end-use properties. It was found, that under the determined optimum conditions, mechanical properties increased not only beyond that of the unmodified composite but also beyond the equivalent yield values of the unfilled matrix. The enhancement of major mechanical properties, i.e., tensile strength, elongation to break and impact strength, exceed the improvement afforded by current organic coupling agent pre-treatment systems.

The project is supported by British Council in Bratislava, the collaborative partner is the Manchester Metropolitan University, Manchester, UK.

E. New generation of inks for rotogravure printing (Viera Khunová)

The project is focused on formulation of polymer based hot melt inks (HMI) for rotogravure printing with specific demand on their physical stage. The significance of developed hot melt ink when compared to current toluene based ink is that they neither produce liquid nor volatile waste to pollute the environment.

On going phase of the project research is focused on rheological behavior, characterisation of polymer/pigment interphase, as well as kinetics of melting and solidification process.

The project is supported by NATO science program, the collaborative partner is the Western Michigan University, MI, USA.

V. COOPERATION

A. Cooperation in Slovakia:

Chemolak, a.s. Smolenice
Rubber Research Institute, Matador, a s. Púchov
Research Institute of Processing and Application of Plastics, a. s. Nitra
Polymer Institute, Slovak Academy of Sciences, Bratislava
Research Institute of Chemical Technology, a. s. Bratislava
Matador, a.s. Púchov
Vegum, a.s. Dolné Vestenice
Plastika, a.s. Nitra
Slovnaft, a.s., Bratislava
NCHZ, a.s., Nováky
SELEKT a.s. Bučany
Orthopedical Clinic, School of Medicine, Comenius University, Bratislava
Burn Department and Skin Bank, Ružinov Hospital, Bratislava
Institute of Medical Biology, Faculty of Medicine, UK, Bratislava

B. International Cooperation:

Martin Luther University of Halle - Wittenberg, Institute of Materials Science, Merseburg, Germany
- Modification of Polymers and Polymer Processing

Technical University of Szczecin, Institute of Material Engineering, Szczecin, Poland
- Chemical and Physical Modification of Polymers

Poznaň University of Technology, Institute of Materials Technology, Poznaň, Poland
- Testing and Processing of Rubber Blends and Reinforcing Materials

Western Michigan University, Kalamazoo, USA
- The development of new generation of hot-melt inks for rotogravure printing

The Manchester Metropolitan University, Faculty of Science and Engineering, Manchester, U. K.
- Reactive Processing of Particulate Polymer Composites

University of Minho, Department of Polymer Engineering, Guimaräes, Portugal
- Development of biomaterials

University of Pisa, Department of chemistry and Industrial Chemistry, Pisa, Italy
- Biodegradable Plastics

Clinica Puerta de Hierro, Cirugia Experimental, Madrid, Spain
- Chemical Modification and Biocompatibility
- Testing of Collagen Membranes

National University of Singapore
- Testing of hybrid polymer membranes

Polymer Institute Brno, Czech Republic
- Testing of Polymers

C. Membership in International Organisations and Societies:

European Biomaterial Society, Italy	(D. Bakoš)

G. Visitors from Abroad:

Dr. Ivan Kelnar	Institute of Macromolecular Chemistry, Prague, (2 days)
Prof. Eduardo Jorge-Herrero	Clinica Puerta de Hierro, Cirugia Experimental, Madrid, Spain (5 days)
Dr. Evelyn Dayss	Martin Luther University of Halle - Wittenberg, Institute of Materials Science, Merseburg, Germany (5 days)
Dipl. Ing. Sybill Illisch	Martin Luther University of Halle - Wittenberg, Institute of Materials Science, Merseburg, Germany, (5 days)
Dr. Jaroslav Kučera Dr. Eva Nezbedová Dr. Josef Křivánek	Polymer Institute Brno, Czech Republic, (1 day)

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

P. Alexy, I. Hudec, E. Špirk	Martin Luther University of Halle-Wittenberg, Institute of Materials Science, Merseburg, Germany, June 2001, (5 days)
D. Bakoš	BPPT, Agency for the Assessment and Application of Technology, Jakarta, Indonesia (7 days) Summer School of Biomaterials, Alvor, Portugal (14 days) University of Bahrain and Gulf University, Manama, Bahrain (8 days) ICS-UNIDO, Trieste, Italy (4 days)
I. Hudec	Polymer Institute Brno, Czech Republic, November 2001, (1 day) Politechnika Szczecinska Szczecin, Poland, November 2001, (3 days)
I. Hudec, P. Alexy	15th International Trade Fair for Plastics and Rubber, Dusseldorf, Germany, October 2001, (4 days)
V. Khunová	The Manchester Metropolitan University, Faculty of Science and Engineering, Manchester, U. K., January 2001, (10 days)

Western Michigan University, Department of Paper and Printing Kalamazoo, MI, USA, January-February 2001 (4 weeks)
Politechnika Szczecinska Szczecin, Poland, November 2001, (4 days)
Universität Gesamthochschule, Kassel, Germany, Novermber 2001, (3 days)

VI. THESES AND DISSERTATIONS

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

Cíbik B.:	Evaluation of filler activity in rubber mixtures (E. Špirk)
Figura A.:	Influence of crosslinking in solution on the polyolefine properties (I. Chodák)
Figura T.:	The modification of dynamic-mechanical properties of rubber mixtures (E. Špirk)
Kozlík R.:	Utilisation of collagen hydrolysate in polymer blends (I. Hudec)
Martisovic J.:	Study of properties of functionalized poly(styrene)/poly(butyl acrylate) dispersions (L. Černaková)
Rehák L.:	Utilisation of reactive modifiers for preparation of micro and nanoscale polymer composites in melt (V. Khunová)
Práznovská B.:	Surface plasmochemical treatment of reinforcing materials for tire construction (I. Hudec)
Vanovčanová Z.:	Study of structure and properties of PVAL modified with collagen hydrolysate (D. Bakoš)
Perinová Z.:	Synthesis and properties of poly(styrene)/poly (butyl acrylate) dispersions applicable for coatings. (V. Chrástová)
Precnerová L.:	Development of PVAL–collagen hydrolysate blends for film blowing production (P. Alexy)
Sulyoková A.:	The influence of phosphoric accelerators on the sulphur vulcanisation of natural rubber (G. Kyselá)

B. Dissertations (PhD)

Crkoňová G.:	The study of environmentally degradable blends of plastics with biopolymers (D. Bakoš)
Hajdučíková L.:	The study of transport processes of biologically active compounds in complex biopolymer membrane (D. Bakoš)
Koniarová D.:	The study of macromolecular compositions based on biopolymers for biomaterials application - external form (D. Bakoš)
Kršiak M.:	Utilisation of collagen hydrolysate in polymer blends (D. Bakoš)
Krump H.:	Surface treatment of textile reinforcing materials for tire construction (I. Hudec)
Reksová V.:	Surface plasmochemical treatment of reinforcing materials for tire construction (I. Hudec)
Volfová P.:	The effect of synthesis and formulation additives on the properties of polymer-styrene-acrylate dispersion (V. Chrástová)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Alexy P., Bakoš D., Crkoňová G., Kolomazník K., Kršiak M.: Blends of polyvinylalcohol with collagen hydolysate: thermal degradation and processing properties, Macromol. Symp., Vol. 170, 41-49, (2001)

[2] Alexy P., Košíková B., Crkoňová G., Kozánková J., Martiš P., Precnerová L.: Effect of EVA copolymers on morphology and mechanical properties of polyethylene-lignin blends, Ropa, uhlie a petrochémia, 43(1), 42-45, (2001)

[3]* Crkoňová G., Alexy P., Bakoš D., Kolomazník K., Šimková B., Precnerová L.: Blends of polyvinylalcohol with collagen hydrolysate: properties of water-soluble blown films, Macromol. symp., vol. 170, 51-59, (2001)

[4]* Khunová V., Liauw C. M.: Property tailoring of particulate polymer composites by reactive processing, Macrom. Symp., 170, 197-204, (2001)

[5]* Liauw C. M., Khunová V., Lees G. C. and Rothon R. N.: Interphase structure development in impact modified PP/$Mg(OH)_2$ composites reactively processed with 1,3 Phenylene Dimaleimide, Macrom. Symp., 170, 205-211, (2001)

[6] Košíková B., Alexy P., Mikulášová M., Kačík K.: Characterization of Biodegradability of Lignin – Polyethylene Blends, Wood Research, 46(1), 31-36, (2001)

[7] Mikulášová M., Košíková B., Alexy P., Kačík F., Urgelová E.: Effect of blending lignin biopolymer on the biodegradability of polyolefin plastics, World Journal of Microbiology and Biotechnology, Vol. 17, 601-607, (2001)

[8] Ráheľ J., Černák M., Hudec I., Štefečka M., Kando M., Chodák I.: Surface modification of polyester monofilaments by atmospheric-pressure nitrogen plasma, Plasmas and Polymers, Vol. 5, 119-127, (2000)

[9]* Volfová P., Chrástová V., Černáková Ľ., Mrenica J., Kozánková J.: Properties of polystyrene/poly(butyl acrylate) core/shell polymers modified with n-methylol acrylamide, Macromol. Symp., 170, 283-290, (2001)

B. Conferences (*international conferences)

[1]* Alexy P., Bakoš D., Hudec I., Špirk, E., Kozánková J., Kolomazník K., Radusch H.-J., Chodak I., Kršiak M., Crkoňová G., Precnerová L.: Morphology and properties of Polyvinylalcohol-Collagen Hydrolysate Films, In.: 8. Tagung Problem seminar Deformation und Bruchverhalten von Kunststoffen, Halle 20-2. juni 2001, Tagungsskript, p. 255-262

[2] Bakoš D., Alexy P.: Úloha biodegradovateľných polymérov v biomateriáloch, (The role of biodegradable polymers in biomaterials), (in Slovak), In: 53. Zjazd chemických spoločností B. Bystrica September 3.-6, 2001, Zborník príspevkov, p. 30-32

[3] Bakoš D.: The role of biomacromolecules in biomaterial applications, Conf. Structure and Stability of Biomacromolecules – SSB´01, Košice, September 12-14, 2001, Book of Abstracts p.7-8

[4] Bakos D.: Biodegradable Polymers in Medicine, ICS-UNIDO Int. Meeting on Recycling and Environmentally Degradable Plastics from Renewable Resources, Proceedings BPPT-Jakarta, Indonesia, September 11-14, 2001, ISBN 979-8465-24-5, pp. 57-60

[5]* Brezáni J., Špirk E.: Vplyv spracovateľských prísad na spotrebu energie pri miešaní zmesí, (The influence of processing aids on energy consumption during the preparation of polymer blends), (in Slovak), In: The 13th International Slovak Rubber conference 2001, Púchov, May 23-24, 2001, CD

[6] Crkoňová G., Kršiak, M., Alexy, P., Kozánková, J., Precnerová, L., Hanzelová, S.: Využitie hydrolyzátu kolagénu v PVAL fóliách, (Utilization of collagen hydrolysate in PVAL films), (in Slovak), In: 53. Zjazd chemických spoločností B. Bystrica, September 3-6, 2001, Zborník príspevkov, p. 28-29

[7]* Černáková Ľ, Chrástová V., Volfová P., Zahoranová A.: Polystyrene/Poly(Butyl Acrylate) Dispersions Having N-Methylol Groups. A Spectroscopic Study. In: Proceedings of the 15th Bratislava International Conference of polymers, Nonconventional Polymer Dispersions, Smolenice, June 25-28, 2001, p.11-13

[8]* Černáková Ľ., Chrástová, V., Volfová, P.: Study of Crosslinking Reactions in Polystyrene/Poly(Butyl Acrylate) Dispersions with N-Methylol Groups. In: 53. Zjazd chemických spoločností, Banská Bystrica, September 3-6, 2001, p.104-105, ISBN 80-89029-24-8.

[9]* Danihel Ľ., Vojtaššák J., Bakoš D., Böhmer D., Danišovič Ľ., Blaško M., Poruban D.: Identification of growing cells in artificial biomembranes by immunohistochemistry, In: Progress in Basic, applied and diagnostic histochenistry, of Slovak Society for Histochemistry and Cytochemistry, 38th International symposium, Bratislava, October 26-27, 2001. Book of Abstracts, p.12

[10]* Chrástová V., Černáková Ľ., Mrenica J., Volfová P.: Crosslinking Reaction in Styrene/(Butyl Acrylate) Core-Shell Emulsion Polymerization. In: Proceedings of the 15th Bratislava International Conference of polymers, Nonconventional Polymer Dispersions, Smolenice, June 25-28, 2001, p. 14-16

[11]* Hajdučíková L., Bakoš D., Jorge-Herrero E.: The scaffold from collagen and hyaluronan as a carrier of bioactive substances, In: Proceedings of 28th Int. Conf. of Slovak Soc. of Chem. Engn., Tatranské Matliare, Slovakia, May 21-25, 2001, CD-ROM (Eds. Markoš J., Štefuca V.), ISBN 180-227-1350-3

[12]* Hudec I., Bobík M., Barczi O., Klabník M., Alexy P., Krump H.,: Determination of thermophysical properties of rubber, In: VIII Medzynarodowa Konferencja Naukowa-Techniczna-Rydzyna, 2001, Poland, p. 77-78

[13]* Hudec I., Krump H., Janypka P., Reksová V., Černák M., Šimor M., Surface treatment of reinforced materials for tire construction, In: VIII. Medzynarodowa konferencja Naukowo-Techniczna, Rydzyna, 2001, p. 79 – 82

[14]* Hudec I., Krump H., Janypka P., Reksová V., Černák M., Ráheľ J., Šimor M.: Možnosti povrchovej úpravy výstužných materiálov plazmou pri atmosferickom tlaku, (Possibilities of surface plasma treatment of reinforced materials under atmospheric pressure), (in Slovak), In: Zborník prednášok z 13.ročníka medzinárodnej konferencie Interguma, May 23-24, 2001, Púchov, p. 33,1-6

[15]* Janypka P, Reksová V., Hudec I., Krump H., Ráheľ J., Černák M.: Surface treatment of reinforcing materials for tire construction by atmospheric-pressure plasma, In: 13th Symposium on Application of Plasma Processes, January 15 – 21, Tále, (2001), p. 23 – 26

[16]* Khunova V., Pekarovicova A., Pekarovic J.: Solvent free hot melt inks, Bunicina a Papier- technológie, vlastnosti, životné prostredie (Pulp and Paper-Technology, Properties and Environment), September 11-12, 2001, Bratislava, p. 130-135, ISBN 80 -227 -1566 –2,

[17]* Khunová V., Hudec I., Mátel F.: New Developments in Plastics Waste Management and Recycling in The Slovak Republic, In: Central European Conference: Recycling of Polymer Materials Science-Industry, November 7-9, 2001, Szczecin, Polad, p 130-134, ISBN 83-88764-XX-11-X

[18]* Khunová V: New Development in Plastics Waste Management and Recycling in the Slovak Republic, In: Plastic Recycling in Europe, Kassel, Germany, November 12-13, 2001, CD

[19]* Košíková B., Alexy P., Mikulášová M.: Nové alternatívne spôsoby ekologického využitia lignínových polymérnych produktov izolovaných z odpadov chemického spracovania dreva, (New methods of ecological utilisation of lignin polymer products isolated from wood wastes), (in Slovak), In: Chemprogres 2001, celoštátny seminár, Púchov, June 16, 2001, Zborník súhrnov prednášok, p. 26

[20]* Košíková B., Kačík F., Alexy P., Mikulášová M.: Spectral and molecular characteristics of fraction isolated from biodegraded polyethylene containing lignin derived from chemical wood treatment, Metody badan w chemii i chemicznej technologii drewna na przeloie wiekow, In: II. Miedzynarodowa konferencja naukova, Poznan, October 18-20, 2001, p. 4

[21]* Kršiak M., Crkoňová G., Alexy P., Hudec I., Kozlík R., Šimková B.: Možnosti prípravy modifikovaných PVAL vlákien vytláčaním z taveniny, (Preparation of modified PVAL fibres by extrusion), (in Slovak), in: 53. Zjazd chemických spoločností, B. Bystrica, September 3-6, 2001, Zborník príspevkov p. 26-27

[22]* Krump H., Šimor M., Ráheľ J., Černák M., Hudec I.: Surface Modification of Polyester Cord by Diaphragm Underwater Electric Discharge, In: Proceedings of the 13th International Slovak Rubber Conference 2001. Púchov, May 23-24, 2001, 68, p. 1-4

[23] Krump H., Šimor M., Ráheľ J., Černák M., Hudec I.: Povrchová úprava polyesterových kordov cez diafragmový elektrický výboj vo vodných roztokoch, Surface treatment of polyester cords by diaphragm electric discharge in water solutions, (in Slovak), In: Zborník príspevkov, 53. zjazd chemických spoločností, Banská Bystrica, September 3-6, 2001, p. 37 – 38

[24]* Kyselá G., Bielik I., Sulyoková A.: Study of bis(diisopropyl)thiophosphoryl disulfide influence on sulphur vulcanization of natural rubber, In: Proceedings of the 13th International Slovak Rubber Conference, Púchov, May 23-24, 2001, p. 46, CD-

Papers, Plenary Papers
[25]* Liauw C. M., Khunová V., Lees G. C, Rothon R. N.: Reactively Processed High Performance Impact Modified Polypropylene, Eurofillers 2001, July 9-12, 2001, Lódž, Poland, p. 18-20,
[26]* Pekarovicova A., Atkinson J., Pekarovic J., Khunova V.: New Generation of Inks for Rotogravure, NPIRI 45th Annual Technical Conference, Scotsdale, Arizona, October 17-19, 2001, Chapter 10. [3]
[27] Sláma J., Grusková A., Mydla M., Vicen R., Vicenová S., Hudec I., Valko L.: Kompozitné organické magnetiká, Organo-composite magnetic materials, (in Slovak), In: Chemprogres 2001, June 14, 2001, Púchov, p. 29-30
[28]* Šimková B., Precnerová L., Kozánková J., Alexy P.: Vývoj zmesí pre vodorozpustné biodegradovateľné fólie na báze PVAL, (Development of blends for water-soluble biodegradable films based on PVAL), (in Slovak), In: 53. Zjazd chemických spoločností B. Bystrica, September 3-6, 2001, Zborník príspevkov, p. 110-111
[29]* Šimor M., Černák M., Krump H., Hudec I.: Surfacemodification of polyester cord by diaphragm underwater electrical discharge, In: 13th Symposium on Aplication of Plasma Processes, January 15-21, Tále, 2001, p. 136-137
[30]* Šimor M., Černák M., Krump H., Hudec I.: Surface modification of polyester cord by diaphragm under water electrical discharge, In.: XXV ICPIG, Nagoya, July 17-22, 2001, p. 63-64
[31]* Viselka, M., Špirk E., Hudec I., Illisch S.: Dynamicko-mechanické vlastnosti zmesí, (Dynamic mechanical properties of polymer blends), (in Slovak), In: Proceedings of the 13th International Slovak Rubber Conference 2001. Púchov, May 23-24, 2001, p. 26, CD-Papers
[32]* Volfová P., Chrástová V., Černáková Ľ., Kozánková J.: Study of selected properties of polystyrene/poly(Butyl Acrylate) films functionalized with n-methylol acrylamide, In: Proceedings of the 15th Bratislava International Conference of polymers, Nonconventional Polymer Dispersions, Smolenice, June 25-28, 2001, p. 72-74.
[33]* Volfová P., Chrástová V., Černáková Ľ., Kozánková J.: Study of polystyrene/poly(butyl acrylate) dispersions functionalized with n-methylol acrylamide, In: Zjazd chemických spoločností, Banská Bystrica, September 3-6, 2001, p. 52-53, ISBN 80-89029-24-8

C. Patents

[1]* Alexy,P., Bakoš,D., Kolomazník, K., Sedlák, M., Sedláková, E.,: Polymérny vodorozpustný biodegradabilný materiál a spôsob jeho prípravy (Polymer water-soluble biodegradable material and method for its preparation), (in Slovak), SK 281537, January 18, 2001
[2]* Latika,A., Alexy,P., Považancová,M., Végh, Z.., Wenchich,Š., Fiedler,K., Sandtnerová,A., Kunovská,T.: Prostriedok na zlepšenie optických a mechanických vlastností polyolefínov a kompozícia na báze polyolefínov (Agent for improvement of the optical and mechanical properties of polyolefins and composition based on polyolefins), (in Slovak), SK 281539, April 09, 2001

DEPARTMENT OF INFORMATION ENGINEERING AND PROCESS CONTROL

Head of the Department:
Prof. Ján Mikleš, PhD, DSc

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I. STAFF

Full Professor:
Ján Mikleš, PhD, DSc;

Associate Professors:
Monika Bakošová, PhD; Ján Danko, PhD; Ján Dvoran, PhD; Miroslav Fikar, PhD; Alojz Mészáros, PhD;
Assistant Professors:
Mária Karšaiová, PhD; Magdaléna Ondrovičová; Anna Vasičkaninová; Anna Zemanovičová, PhD;

PhD students:
Anton Andrášik; Jozef Dzivák; František Jelenčiak; Michal Kvasnica; Ľubomír Šperka;

Technical staff:
Eva Fuseková; Andrea Kalmárová; Anna Širicová; Stanislav Vagač;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Measuring Instruments and Techniques
Laboratory of Process Control
Laboratory of Gas Analysis
Computer Laboratory (PC 486, Pentium)
Computer Laboratory (LINUX)

B. Research Laboratories:

Laboratory of Chemical Reactor Analysis and Control
Laboratory of Biochemical Process Analysis and Control
Laboratory of Distillation Column Analysis and Control
Laboratory of Modelling and Simulation
Laboratory of Computer Aided Design (Siemens – SIMATIC S-7 300)

III. TEACHING

A. Undergraduate Study

2nd semester (spring)		
Informatics	(1-2 h)	Ondrovičová, Vasičkaninová
5th semester (autumn)		
Computer Based Data Processing	(0-2 h)	Dzivák, Fikar, Jelenčiak, Karšaiová, Ondrovičová, Vasičkaninová
6th semester (spring)		
Automatic Control Fundamentals	(2-0 h)	Bakošová, Danko, Fikar
Laboratory Exercises of Automatic Control Fundamentals	(0-2 h)	Andrášik, Bakošová, Danko, Dzivák, Fikar, Jelenčiak, Karšaiová, Kvasnica, Mészáros, Ondrovičová, Vasičkaninová
Bachelor projects	(0-4 h)	Bakošová, Dvoran, Fikar, Mikleš, Ondrovičová, Vasičkaninová
7th semester (autumn)		
Process Control	(1-2 h)	Mészáros
Process Dynamics	(2-0 h)	Bakošová
Operating Systems	(1-1 h)	Jelenčiak
Control Devices and Systems	(2-1 h)	Danko
Computer Programs	(1-2 h)	Vasičkaninová
Laboratory Projects	(0-8 h)	Bakošová, Danko, Mikleš, Karšaiová, Vasičkaninová
8th semester (spring)		
Optimisation	(2-1 h)	Dvoran

Control Theory I	(2-2 h)	Karšaiová, Mikleš
Laboratory Exercises of Control Theory I	(0-2 h)	Mikleš
Experimental Identification	(2-0 h)	Fikar
Laboratory Project II	(0-6 h)	Danko, Dvoran, Mészáros
Modelling and Control of Polymerisation Processes	(2-2 h)	Dvoran
Process Dynamics	(2-0 h)	Bakošová
Laboratory Exercises of Process Dynamics	(0-1 h)	Bakošová
9th semester (autumn)		
Control Theory II	(2-0 h)	Mészáros
Laboratory Exercises of Control Theory II	(0-2 h)	Mészáros
Intelligent Control Systems	(2-0 h)	Dvoran
Semestral Project	(0-10 h)	Dvoran, Karšaiová, Mészáros, Mikleš, Ondrovičová
CAD Systems	(2-0 h)	Karšaiová
Industrial Applications of Process Control	(2-0 h)	Mikleš
Control of Technological Processes	(1-2 h)	Bakošová
10th semester (spring)		
Diploma Theses		Dvoran, Karšaiová, Mészáros

B. PhD Study

Topics in Control Theory	(2 h)	Mikleš
Software and Hardware of Control Systems	(2 h)	Danko
Intelligent Control Systems	(2 h)	Dvoran
Modelling and Simulation of Processes	(2 h)	Mészáros

IV. CURRENT RESEARCH PROJECTS

A. Development of advanced control methods for chemical reactors, distillation columns and other plants in chemical and food technology (Ján Mikleš)

The main goals of the project can be formulated in the following items:
To derive mathematical models of chemical and biochemical processes: an exothermic reactor for decomposition of H_2O_2, a tray distillation column and a stuffed distillation column for separation of binary mixtures, a warm-air drying chamber, a biochemical reactor.
To develop methods and algorithms for system identification: closed-loop identification, identification based on artificial neural network, identification of physical system parameters from measured data.
To investigate modern optimisation methods and algorithms for nonlinear high-order systems, especially for distillation columns and biochemical reactors.
To investigate robust stabilisation and robust feedback control of multivariable systems.
To develop adaptive control methods and adaptive control algorithms for systems of the chemical and food technology.
To include principles of artificial intelligence (expert systems, fuzzy control, neuro-fuzzy control, artificial neural networks) into control structures for chemical processes.
To investigate the predictive control method and to create control algorithms based on the Youla-Kučera parameterisation for solving unconstrained or constrained control problems.
To verify all theoretical results on laboratory models chemical processes.
To transform theoretical and experimental results into industrial conditions and to demonstrate benefits and advantages of advanced process control in chemical and food industry.
The most important results of the project are following:
development of receding horizon iterative dynamic programming with discrete time models,
using Youla-Kučera parameterisation in control design for decoupled control systems,
design of a closed-loop identification method based on the Youla-Kučera parameterisation without model reduction,
pH control in a laboratory fermenter.

B. Adaptive and intelligent control strategies for processes of chemical/biochemical technology (Alojz Mészáros)

The main goals of the project can be listed as follows:
Design of a new predictive, intelligent control strategy on basis of ANN, (the PID-ANN-P algorithm), and its simulation for linear and non-linear systems.
Design of a new robust, intelligent control strategy on basis of ANN (the PID-ANN-R algorithm), and its simulation for linear and non-linear systems; without as well as in presence of noise and disturbances; without as well as with constraints on control.
Testing the PID-ANN-R procedure on non-linear models of chemical processes.
Design of adaptive λ-tracking control and its verification for non-linear SISO and MIMO systems.
Implementation of control algorithms introduced using ANN (the PID-ANN, PID-ANN-P and PID-ANN-R algorithms) to computer control of laboratory fermenter LF-3; testing performance for real physical circumstances
Implementation of control algorithms derived on basis of λ-tracking policy to direct computer control of laboratory distillation column.
Computer control of laboratory distillation column using adaptive predictive approaches involving low order concentration gradient models.
Selection of the most „successive“ algorithm from the methods proposed and its transformation into software module, suitable for industrial control application.
Original results obtained in the frame of the project are:
adaptive intelligent PID controller with predictive performance,

robust and adaptive controller in terms of neural networks,
application of adaptive λ-tracking for control of MIMO nonlinear chemical processes – chemical reactor and distillation column.

V. COOPERATION

A. Cooperation in Slovakia

Department of Automatic Control Systems, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava
Department of Automation and Control, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava
Department of Automation and Measurement, Faculty of Mechanical Engineering, Slovak University of Technology, Bratislava
Institute of Control Theory and Robotics, Slovak Academy of Sciences, Bratislava
Department of Cybernetics and Artificial Intelligence, Faculty of Electrical Engineering and Informatics, Technical University of Košice, Košice
Department of Management and Control Engineering, BERG Faculty, Technical University of Košice, Košice
Slovnaft, Inc., Bratislava
NCHZ, Inc., Nováky
ProCS, Ltd., Šaľa

B. International Cooperation

Department of Process Control and Computer Techniques, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czech Republic
- Control system design

Department of Computing and Control Engineering, Institute of Chemical Technology, Prague, Czech Republic
- Control of bioreactors

Department of Control Theory, Institute of Information Technologies, Tomas Bata University, Zlín, Czech Republic
- Adaptive control
- Robust control

Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic, Prague, Czech Republic
- Adaptive control
- Predictive control

Trnka Laboratory for Automatic Control, Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic
- Adaptive control
- Predictive control

LSGC-CNRS, Ecole Nationale Superieure des Industries Chimiques (ENSIC), Nancy, France
- Dynamic optimisation of distillation columns
- Control of distillation columns

Ecole Nationale Superieure des Ingenieurs de Genie Chimique-Chemin de la Loge (ENSIGC), Toulouse, France
- Neural networks
- Predictive control

Ruhr University, Bochum, Germany
- Closed-loop identification
- Predictive control

Technical University of Budapest, Budapest, Hungary
- Modelling of chemical processes

Technical University of Vienna, Vienna, Austria,
- Optimisation of combustion processes

C. Membership in Domestic Organisations and Societies

Slovak Society of Cybernetics and Informatics, Bratislava	A. Mészáros, J. Mikleš
Slovak Society of Chemical Engineering, Bratislava	M. Bakošová, J. Danko, J. Dvoran, M. Fikar, M. Karšaiová, A. Mészáros, J. Mikleš, M. Ondrovičová, A. Zemanovičová
Slovak Union of Industrial Chemistry, Science-Technical Society, Bratislava	M. Bakošová, J. Danko, J. Dvoran, M. Fikar, M. Karšaiová, A. Mészáros, J. Mikleš, M. Ondrovičová, A. Vasičkaninová, A. Zemanovičová

D. Membership in International Organisations and Societies

International Federation of Automatic Control, Laxenburg, Austria	J. Mikleš
European Federation of Biotechnology, Brussels, Belgium	A. Mészáros
The New York Academy of Sciences, New York, USA	A. Mészáros

E. International Scientific Programmes

1. INCO COPERNICUS

No. CP97:7010, The European Network for Industrial Application of Polynomial Design Methods – EUROPOLY
Coordinator at the FCFT STU: J. Mikleš
Coordinator of the project: Czech University of Technology, Prague, Czech Republic;
Participants: Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic, Prague, Czech Republic; University of Twente, Twente, Netherlands; University of Glasgow, Glasgow, Great Britain; Uppsala University, Uppsala,

Sweden; University of Strathclyde, Strathclyde, Great Britain; Politecnico di Milano, Milan, Italy; CNRS – LAAS, Toulouse, France, Tomas Bata University, Zlín, Czech Republic; Department of Information Engineering and Process Control, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovakia; Warsaw University of Technology, Warsaw, Poland; Swiss Federal Institute of Technology, Zurich, Switzerland; ProCS, Ltd., Šaľa, Slovakia; Compureg Plzeň, Plzeň, Czech Republic;
Period: January 1998 – December 2001

2. LEONARDO

No. RO/00/B/F/PP141028, Eurocompetencies Transfer in Vocational Guidance for Young Specialists in Bioscience Field
Coordinator at the FCFT STU: V. Báleš
Coordinator of the project: Ost European Centrum, University Hohenheim, Germany;
Participants: Ost European Centrum, University Hohenheim, Germany; Romanian Society of Biotechnology and Bioengineering, Bucharest, Romania; Research Institute for Chemistry, Bucharest, Romania; University Politehnica, Bucharest, Romania; Pluri Consultants SRL, Bucharest, Romania; University of Agronomic Sciences and Veterinary Medicine, Bucharest, Romania; CERA Foundation, Bucharest, Romania; Department of Chemical and Biochemical Engineering, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovakia; Department of Information Engineering and Process Control, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovakia; Natural Resources Institute, University of Greenwich, Greenwich, Great Britain
Period: November 2000 – November 2003

3. Project of Austrian - Slovak Scientific Cooperation: Aktion Österreich – Slowakei

No. 26s12, Optimierung des Verbrennungsprocess von dem Standpunkt des Umweltschutzes (Optimisation of a Combustion Process from the Environmental Point of View)
Coordinator at the FCFT STU: A. Zemanovičová
Coordinator of the project: Technical University of Vienna, Vienna, Austria
Participants: Department of Information Engineering and Process Control, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovakia; Technical University of Vienna, Vienna, Austria
Period: April 1999 – December 2001

4. Project of Slovak – Czech Scientific Cooperation

No. 112/344 Rozvoj metód moderného riadenia procesov chemickej a potravinárskej technológie (Development of Advanced Control Methods for Processes of Chemical and Food Technology)
Coordinator at the FCFT STU: J. Mikleš
Participants: Department of Information Engineering and Process Control, Faculty of Chemical and Food Technology, Bratislava, Slovakia; Department of Process Control and Computer Techniques, University of Pardubice, Pardubice, Czech Republic
Period: January 2000 – December 2001

F. Visitors from Abroad

Prof. P. Dostál	Tomas Bata University, Zlín, Czech Republic, June 2001 (1 day)
F. Dušek, PhD	University of Pardubice, Czech Republic, June 2001 (3 days)
D. Honc	University of Pardubice, Czech Republic, June 2001 (3 days)
J. Macháček, PhD	University of Pardubice, Czech Republic, June 2001 (3 days)
Prof. I. Taufer	University of Pardubice, Czech Republic, March 2001 (2 days)
Prof. I. Taufer	University of Pardubice, Czech Republic, June 2001 (2 days)
Prof. I. Taufer	University of Pardubice, Czech Republic, November 2001 (4 days)

G. Visits of Staff Members and PhD Students to Foreign Institutions

A. Andrášik	University of Pardubice, Pardubice, Czech Republic, November 2001 (4 days)
M. Bakošová	Tomas Bata University, Zlín, Czech Republic, June 2001 (2 days)
M. Bakošová	University of Pardubice, Czech Republic, September 2001 (3 days)
M. Bakošová	Conference Information Engineering and Control, Prague, Czech Republic, September 4, 2001
M. Bakošová	University of Pardubice, Czech Republic, November 2001 (2 days)
J. Dvoran	Conference Information Engineering and Control, Prague, Czech Republic, September 4, 2001
M. Fikar	ENSIC, Nancy, France, July 2001 (24 days)
M. Fikar	ENSIC, Nancy, France, September - December 2001 (4 months)
M. Kvasnica	ENSIGC, Toulouse, France, July 2001 (14 days)
A. Mészáros	Technical University of Budapest, Hungary, January, 2001 (2 days)
A. Mészáros	Technical University of Bucharest, Romania, June 2001 (5 days)
A. Mészáros	World MultiConference on Systemics, Cybernetics and Informatics, Orlando, USA, July 22-25, 2001
A. Mészáros	Technical University of Budapest, Hungary, September, 2001 (2 days)
A. Mészáros	Technical University of Budapest, Hungary, October, 2001 (1 day)
A. Mészáros	Tomas Bata University, Zlín, Czech Republic, October 2001 (2 days)
A. Mészáros	University Hohenheim, Stuttgart, Germany, November 2001 (6 days)
J. Mikleš	European Control Conference, Porto, Portugal, September 3 – 7, 2001
J. Mikleš	Ruhr University, Bochum, Germany, July 2001 (25 days)
J. Mikleš	University Erlangen, Nurnburg, Germany, August 2001 (4 days)
M. Ondrovičová	University of Pardubice, Czech Republic, September 2001 (3 days)
M. Ondrovičová	University of Pardubice, Czech Republic, November 2001 (2 days)
A. Vasičkaninová	Technical University of Vienna, Austria, October 2001 (5 days)

A. Vasičkaninová	University of Pardubice, Czech Republic, November 2001 (2 days)
A. Zemanovičová	Technical University of Vienna, Austria, February 2001 (1 day)
A. Zemanovičová	Technical University of Vienna, Austria, June 2001 (2 days)
A. Zemanovičová	Technical University of Vienna, Austria, August 2001 (22 days)
A. Zemanovičová	Technical University of Vienna, Austria, September 2001 (1 day)
A. Zemanovičová	Technical University of Vienna, Austria, October 2001 (1 day)
A. Zemanovičová	Technical University of Vienna, Austria, November 2001 (1 day)
A. Zemanovičová	University of Pardubice, Czech Republic, November 2001 (2 days)
A. Zemanovičová	Technical University of Vienna, Austria, December 2001 (1 day)

VI. THESES AND DISSERTATIONS

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

Dutková I.:	Identification and control of laboratory fermenter LF3. (A. Mészáros)
Nikodémová L.:	Testing of an optimisation toolbox in MATLAB environment (J. Dvoran)
Skurková M.:	Decentralised control of a tray distillation column. (M. Karšaiová)
Tallo M.:	Neuro-fuzzy based control system for a technological process. (J. Dvoran)
Jankovčin J.:	Optimisation and control of a chemical reactor. (M. Karšaiová)
Majerník P.:	Application of PLC and SCADA systems for control of real processes. (A. Mészáros)
Šperka Ľ.:	Artificial neural network based system identification and control. (A. Mészáros)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1] Andrášik A., Mészáros A., Šperka Ľ.: Adaptívne inteligentné PID riadenie v prediktívnom zmysle. Adaptive intelligent PID control in predictive form (in Slovak). AT&P Journal 8 (plus1), 39 – 41 (2001).

[2] Andrášik A., Mészáros A.: Riadenie pH v laboratórnom fermentore LF-3. Control of pH in laboratory fermenter LF-3 (in Slovak). AT&P Journal 8 (4), 63 – 64 (2001).

[3] Bakošová M., Ondrovičová M., Dvoran J., Debnárová L.: Riadenie rektifikačnej kolóny. Control of a distillation column (in Slovak). AT&P Journal 8 (11), 52 – 53 (2001).

[4] Dvoran J., Hudáček P.: Simulačné overenie hybridného neuro-fuzzy riadiaceho systému. Verifying of a hybrid neuro-fuzzy control system by simulations (in Slovak). AT&P Journal 8 (plus1), 18 – 21 (2001).

[5] Mészáros A.: Niektoré otázky riadenia procesov biochemickej technológie. Some aspects of control of biochemical processes (in Slovak). AT&P Journal 8 (4), 60 – 62 (2001).

[6] Mikleš J., Čirka Ľ., Fikar M.: Adaptívne LQ riadenie CSTR s využitím YK parametrizácie regulátora a modelu objektu. Adaptive LQ control of a CSTR using YK parameterisation of a controller and a process model (in Slovak). AT&P Journal 8 (11), 57 – 59 (2001).

[7]* Rusnák A., Fikar M., Latifi M. A., Mészáros A.: Receding Horizon Iterative Dynamic Programming with Discrete Time Models. Computers Chem. Engng. 25 (1), 161-167 (2001).

[8] Zemanovičová A.: Spaľovací proces. AT&P Journal 8 (4), 65 – 67 (2001).

B. Conferences (*international conferences)

[1]* Andrášik A., Mészáros A.: Identification and computer control of a laboratory fermenter. In: Proc. 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 302 (2001).

[2]* Bachmann G., Hofbauer H., Zemanovičová A., Vasičkaninová A.: Determination of the calorific value of heterogeneous materials in a multi-kilogram capacity calorimeter. In: CD ROM of the 40th Int. Petroleum Conf.. Bratislava (Slovakia), Sept. 17-19, 2001. Slovnaft, Inc., Bratislava, CD ROM P-G-57.

[3]* Bakošová M., Dvoran, J.: Laboratory of real processes at the DPC FCFE STU Bratislava. In: Proceedings of the Conf. Information Engineering and Control. Prague (Czech Republic), September 4, 2001. Masaryk Academy of Work, Prague, pp. 87–88 (2001).

[4]* Bakošová M., Mészáros A., Ondrovičová M., Karšaiová M.: Application of adaptive λ-tracking for control of MIMO nonlinear chemical processes. In: CD ROM of full texts of the 28th Int. Conf. of SSCHE. Tatranské Matliare (Slovakia), May 21–25, 2001. SSCHE Bratislava, CD ROM P123 (2001).

[5]* Bakošová M., Mészáros A., Ondrovičová M., Karšaiová M.: Application of adaptive λ-tracking for control of MIMO nonlinear chemical processes. In: Proceedings of the 28th Int. Conf. of SSCHE. Tatranské Matliare (Slovakia), May 21–25, 2001. STU Bratislava, p. 121 (2001).

[6]* Bakošová M., Mészáros A.: Decentralized Adaptive Control of Distillation Columns - A Case Study. In: Proc. World MultiConf. on Systemics, Cybernetics and Informatics SCI 2001. Orlando (USA), July 22-25, 2001. Int. Institute of Informatics and Systemics, Orlando, p. 563-568 (2001).

[7]* Bakošová M., Ondrovičová M., Karšaiová M.: Decentralized Adaptive Control of Distillation Columns. In: Proc. 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 316 (2001).

[8]* Bakošová M., Ondrovičová M., Karšaiová M.: Decentralized Adaptive Control of Distillation Columns. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 148 (2001).

[9]* Čirka Ľ., Fikar M., Mikleš J.: A deterministic LQ tracking problem: Parametrisation of the controller and the plant. In: Proc. 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 304 (2001).
[10]* Čirka Ľ., Fikar M., Mikleš J.: A deterministic LQ tracking problem: Parametrisation of the controller and the plant. In: CDROM Medzinárodnej konferecie SSKI Kybernetika a informatika. Piešťany (Slovakia), April 5-6, 2001. SSKI Bratislava, CD ROM (2001).
[11]* Čirka Ľ., Fikar M., Mikleš J.: A deterministic LQ tracking problem: Parametrisation of the controller and the plant. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 237 (2001).
[12]* Čirka Ľ., Fikar M., Mikleš J.: A deterministic LQ tracking problem: Parametrisation of the controller and the plant. In: Zborník abstraktov Medzinárodnej konferecie SSKI Kybernetika a informatika. Piešťany (Slovakia), April 5–6, 2001. SSKI Bratislava, pp. 142–143 (2001).
[13]* Čirka Ľ., Mikleš J., Fikar M.: A deterministic LQ tracking problem: Parametrisation of the controller. In: Proc. 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 303 (2001).
[14]* Čirka Ľ., Mikleš J., Fikar M.: A deterministic LQ tracking problem: Parametrisation of the controller. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 236 (2001).
[15]* Danko J., Ondrovičová M.: An approach to the control of a laboratory tank system. In: Proc. 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 319 (2001).
[16]* Danko J., Ondrovičová M.: An approach to the control of a laboratory tank system. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 216 (2001).
[17]* Dvoran J., Dvoranová J., Tallo M., Jelenčiak F., Dzivák J.: Design of Neuro-Fuzzy Control for a Stirred Tank Reactor. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 192 (2001).
[18]* Dzivák J., Mikleš J., Jelenčiak F.: Nonlinear feedback control of a continuous stirred tank reactor. In: Proc. 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 310 (2001).
[19]* Dzivák J., Mikleš J., Jelenčiak F.: Nonlinear feedback control of a continuous stirred tank reactor. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 48 (2001).
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[21]* Halldorsson U., Fikar M., Unbehauen H.: Multirate approach to nonlinear predictive control. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 29 (2001).
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[23]* Jelenčiak F., Mikleš J.: Process identification: nonlinear systems. Identifikácia procesov: nelineárne systémy (in Slovak). In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 80 (2001).
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[25]* Karšaiová M., Bakošová M., Ondrovičová M.: Control of Distillation Columns. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 215 (2001).
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[27]* Kožka Š., Mikleš J.: An identification based on the Youla-Kucera parameterisation without model reduction. In: Proceedings of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 308 (2001).
[28]* Kožka Š., Mikleš J.: An identification based on the Youla-Kucera parameterisation without model reduction. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 229 (2001).
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of Technology Bratislava, Slovak Republic. p. 147 (2001).
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[36]* Kvasnica M., Fikar M.: Solving LMI problems using LMI Control toolbox. In: Summaries Volume of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. Slovak University of Technology Bratislava, Slovak Republic. p. 47 (2001).
[37] Kvasnica M., Kožka Š., Mikleš J.: Využitie riadiaceho automatu Simatic S7-300 pri riadení laboratórneho reaktora. Using of a PLC Simatic S7-300 for control of a laboratory reactor (in Slovak). In: CDROM Medzinárodnej konferecie SSKI Kybernetika a informatika. Piešťany (Slovakia), April 5– 6, 2001. SSKI Bratislava, CD ROM.
[38] Kvasnica M., Kožka Š., Mikleš J.: Využitie riadiaceho automatu Simatic S7-300 pri riadení laboratórneho reaktora. . Using of a PLC Simatic S7-300 for control of a laboratory reactor (in Slovak). In: Zborník abstraktov Medzinárodnej konferecie SSKI Kybernetika a informatika. Piešťany (Slovakia), April 5–6, 2001. SSKI Bratislava, pp. 91 – 92 (2001).
[39]* Mészáros A., Andrášik A., Bakošová M.: Modeling and identification of a laboratory fermenter using neural networks. In: CD ROM of full texts of the 28th Int. Conf. of SSCHE. Tatranské Matliare (Slovakia), May 21–25, 2001. SSCHE Bratislava, CD ROM P308 (2001).
[40]* Mészáros A., Andrášik A., Bakošová M.: Modeling and identification of a laboratory fermenter using neural networks. In: Proceedings of the 28th Int. Conf. of SSCHE. Tatranské Matliare, May 21. – 25. 2001. SK. STU, Bratislava, p. 174 (2001).
[41]* Mészáros A., Andrášik A.: Adaptive intelligent PID control with predictive performance. In: Proc. World MultiConf. on Systemics, Cybernetics and Informatics SCI 2001. Orlando (USA), July 22-25, 2001. Int. Institute of Informatics and Systemics, Orlando, pp. 569 – 574 (2001).
[42]* Mészáros A., Andrášik A.: Robust and adaptive control in terms of neural networks. In: Proceedings of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 301 (2001).
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[44]* Ondrovičová M., Bakošová M., Karšaiová M.: Process Parameters Estimation Using Close-Loop Identification. In: Proceedings of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 317 (2001).
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[47]* Vasičkaninová A., Zemanovičová A.: Neuro-fuzzy controller design for combustion process. In: Proceedings of the 13. Int. Conf. Process Control'01. Štrbské Pleso, High Tatras (Slovakia), June 11-14, 2001. KIRP CHTF STU Bratislava, CD ROM 306 (2001).
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C. Technical Reports

[1] Fikar M.: Dynamic Optimisation of Small-size Wastewater Treatment Plants. Technical report. Laboratoire des Sciences du Genie Chimique, CNRS, Nancy, France, 2001.

DEPARTMENT OF SACCHARIDES AND FOOD PRESERVATION

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I. STAFF

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Associate Professors:
Ladislav Dodok, PhD; Jolana Karovičová PhD; Mária Takácsová,PhD;

Assistant Professors:
Alica Burisová; Gabriel Greif; Eva Hybenová, PhD; Mária Kováčová, PhD; Ladislav Staruch, PhD; Soňa Škrovánková

Research Fellows:
Viola Buchtová; Marta Kostičová; Zuzana Smelíková, PhD; Anna Stahelová

PhD Students:
Silvia Grochalová; Zlatica Kohajdová; Drahomíra Lukáčová; Kitti Németh

Technical Staff:
Žofia Fórová; Katarína Halasová; Jarmila Mikletičová; Helena Morávková; Gabriela Sisáková; Eva Vosátková

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Sugar Technology
Laboratory of Starch Chemistry and Technology
Laboratory of Cereal Technology
Laboratory of Canned Products
Laboratory of Meat and Meat Products
Laboratory of Microbiology
Sensory Laboratory
Laboratory of Food Chemistry and Analysis
Laboratory of Food Preservation
Laboratory of Separation Methods

III. TEACHING

A. Undergraduate Study

5th semester (autumn)		
Food Chemistry	(2-0-0 h)	Takácsová
Fundamentals of Food Technology	(2-0-0 h)	Karovičová
6th semester (spring)		
Food Analysis	(2-0-0 h)	Kováčová
Laboratory of Food Analysis	(0-0-4 h)	Kováčová
7th semester (autumn)		
Chemistry and Technology of Saccharides	(2-2-0 h)	Burisová
Theory of Food Preservation	(3-1-0 h)	Greif
Semestral Project	(0-0-5)	
Food Foreign Substances	(2-0-0 h)	Hybenová
8th semester (spring)		
Cereal Chemistry and Technology	(4-1-0 h)	Dodok
Sugar Technology	(4-0-0 h)	Dandár
Food Chemistry II	(2-0-0 h)	Takácsová
Laboratory of the Specialization I.	(0-0-5 h)	
Preserved and Frozen Food Technology	(2-1-0 h)	Karovičová
Meat and Poultry Technology	(2-1-0 h)	Staruch
Raw Materials for Canning Industry	(2-0-0 h)	Karovičová, Staruch
Semestral Project	(0-0-5)	
9 th semester (autumn)		
Food Evaluation	(2-0-2 h)	Príbela, Škrovánková
Chemical Engineering Processes in Saccharide Technology	(2-0-0 h)	Dandár
Technology Optimizing in Canning Industry	(1-1-0 h)	Greif

Laboratory of the Specialization II.	(0-0-4 h)	
Electives:		
Optimizing of Sugar Technology	(2-0-0 h)	Dandár
Food Analysis II	(2-0-2 h)	Prachár
Meat and Poultry Technology II	(2-0-0 h)	Staruch

10th semester (spring)

Diploma Thesis	(0-0-27 h)	all members of the staff

IV. CURRENT RESEARCH PROJECTS

A. Optimizing of physicochemical and biological effects with respect to increase of nutritive and sensory value of foodstuffs (Alexander Dandár)

Physicochemical properties of amaranth starches were studied. On the basis of our results the starches mentioned above will be used in pharmaceutic industry too. Technological proposal for production of new cereal products (cereal mixtures) with higher nutritive value was submitted.
The data for production of food supplements with glucan of the highest quality were worked out. Clinical tests with oncological patients were made. Natural food additives (cereal and pseudocereal starches and legume starch) were added into selected food products to increase their nutritive value, sensory properties and durability.
Suitable methods for determination of antioxidative effects of natural substances were tested. The kinetics of colorant formation in the process of liming of raw juice was evaluated. Effect of temperature, amount of lime milk, amino acids and reducing sugars concentration on colorants formation was analysed.
Natural additives (ascorbic acid, alfa-tocopherol acetate, bacteriocins, starters combined with mould) into fermented meat products to increase their durability and sensory properties were tested.

B. Bioconservation of plant and animal raw materials using probiotic bacteria of human health promoters to eliminate the food contaminants and to increase the nutritive value of food products (Jolana Karovičová)

Isolation and identification of lactic acid bacteria and their selection on the basis of lactic and acetic acids production were studied. The changes of nitrates and nitrites concentration and the production of free amino acids and biogenic amines in selected plant substrates were analysed. Probiotic properties of selected strains of Lactobacillus for example survival at low pH value and the production of bacteriocins and their growth in selected substrates were studied. Sensory evaluation of lactic fermented vegetables as well as vegetable juices was made. This evaluation was realized by group of specialists using the profile method. The results of sensory and analytical methods were evaluated by PCA method. Lactic bacteria of *Enterobacter aerogenes* were analysed under different conditions (different concentration of glucose, potassium sorbate, sodium benzoate, NaCl) Their growth and production of metabolite on synthetic substrates (MPB, GTK) and on natural one (cabbage juice) at different temperature were observed.
Validity parameters of organic acids by capillary ITP were defined.

V. COOPERATION

A. Cooperation in Slovakia

Ministry of Agriculture of Slovak Republic, Bratislava
Institute of Food Research, Bratislava
Slovak Academy of Sciences, Bratislava
Považský cukrovar Co, Trenčianska Teplá
Slovak Sugar Technology Association, Bratislava
OLD HEROLD Co, Trenčín
SLOVAMYL Ltd, Bratislava
Mäsozávod, Bratislava
University of Agriculture, Nitra
ADIPO Ltd, Nitra

B. International Cooperation

Institute of Food Research, Prague, Czech Republic
College of Agriculture, Brno, Czech Republic
Škrobárny Co, Brno, Czech Republic
Institute of Chemical Technology, Prague, Czech Republic
Institute of Food Research, Manchester, UK
Akademia Ekonomiczna, Wroclaw, Poland
Technical University, Berlin, Germany
Technical University, Lodž, Poland

C. Membership in Domestic Organizations and Societies

Slovak Society of Agricultural, Food and Forestry Sciences, Bratislava	(A. Dandár, M. Takácsová, L.Staruch)
Slovak Academy of Agricultural Sciences, Bratislava	(A.Dandár, L.Dodok)
Slovak Academy of Technical Sciences, Bratislava	(A.Dandár)
Foundation “SLOVAK GOLD”, Bratislava	(L.Staruch)
Slovak Institute of Technical Normalization, Bratislava	(L.Dodok, L.Staruch)

The Union of Slovak Butchers, Bratislava	(L. Staruch)
Slovak National Commitee of International Commission for Uniform Methods of Sugar Analysis - ICUMSA	(A. Dandár)
Slovak Agricultural Academy, Nitra	(A. Príbela, A. Dandár. L. Dodok)

D. Membership in International Organizations and Societies:

International Commission for Uniform Methods of Sugar Analysis - ICUMSA, Italy	(A. Dandár)
American Chemical Society	(A.Dandár)
Commission International Technique de Sucrerie - CITS, Brussels, Belgium	(A.Dandár)
Verein der Zuckerfabriken Östereichs, Vienna, Austria	(A. Dandár)
Stowarzysesnie Technikov Cukrownikow, Wroclaw, Poland	(A. Dandár)
WEPSA – World Poultry Scientific Association, Israel	(L.Staruch)

F. International Scientific Programmes:

SOCRATES/ERASMUS

a/ 55792-CP-1-98-FR-ERASMUS-ETN, /FOODNET-Food Studies in Europe

A. Dandár – FCHFT STU, ENSIA, Massy Cedex, France

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

A. Dandár, Takácsová	Technical University Krakow, Poland, June 2001 (4 days)
A. Dandár	Commission International Technique de Sucrerie - CITS, Brussels, Belgium, February 2001 (3 days)
A. Dandár	Zuckerfabrik Hohenau, Austria, November 2001 (2 days)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after 5 years of study (supervisors are written in brackets)

Bunová J.:	Study of pectic substances – new pectic esters. (E.Malovíková)
Dziváková – Horváthová E.:	Study of flow properties in cereal starch and meal after addition of different xylanes. (A.Burisová)
Džupová A.:	Modern trends in bread production. (L.Dodok)
Golasová K.:	Effect of the components of pectin jelly on its properties. (A.Burisová)
Grochalová S.:	Study of the stability and antioxidative effects of flavonoids in onion. (M.Kováčová)
Chomová – Lojová Ľ.:	Study of amino acids in spices. (V.Buchtová)
Kubová A.:	Effect of NaCl concentration and pH value on the growth of *Enterococcus faecium* and on tyramine production (G.Greif)
Krahulcová - Guľáková J.:	Analysis of lactic fermented products. (Z.Kohajdová)
Lukačová D.:	Determination of selected metabolites of microorganisms by capillary isotachophoresis. (J.Karovičová)
Mikušincová - Ďurinová N.:	Determination of vitamin B12 in vegetarian food. (E.Hybenová)
Moskaľová M.:	Use of lactic acid in meat industry. (L.Staruch)
Pavláková B.:	Separation of non-starch polysaccharides from pseudocereals and effect of hemicelulose on properties of dough. (Z.Hromádková)
Šiška R.:	Effect of improvers on rheological properties of dough and of final product (L.Dodok)
Uličná K.:	Determination of microbial activity by MICROZYM – L analyser during saccharose extraxction. (A.Dandár)
Vadovič P.:	Effect of natural antioxidants on stability of lipids. (M. Takácsová)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Burisová A., Dodok L., Škrovánková S., Serulová D.: The influence of substitution of wheat flour by amaranth flour on fermentative gas production and quality of bread. Rostlinná výroba 47, 2001, p. 276-279.

[2]* Burisová A., Tomášková B., Sasinková V., Ebringerová A.: Isolation and characterization of the non-starch polysaccharides of amaranth seed. Chemical Papers, 55, 2001, p. 254-260.

[3] Burisova, A.-Dodok, L.: Objavte zlato Inkov. Zdravie, č. 8, 2001, s. 16-17.

[4]* Dandár, A., Kopecký, J., Uličná, K.: Stanovenie stupňa mikrobiálnej kontaminácie pri extrakcii sacharózy pomocou analyzátora MICROZYM – L. Determination of bacterial contamination during extraction of saccharose by MICROZYM – L analyser (in Slovak). Listy cukrov. a řep. 117, 2001, 192-193.

[5]* Dang,M.N., Takácsová, M., Nguyen, D.V.,Kristianová, K.,: Antioxidant activity of essential oils from various spices. Nahrung

45, 2001, p.64-66.
[6] Karovičová J., Greif G., Kohajdová Z., Hybenová E.: Využitie multivariačnej analýzy pri hodnotení mliečne fermentovaných zeleninových štiav. Application of multivariate analysis in evaluation of fermented vegetable juices (in Slovak). Bull Food Res. 40(2), 119-131 (2001).
[7] Karovičová J.: Biogénne amíny-vznik, metódy stanovenia a výskyt v potravinách. Biogenic amines – formation, methods of determination and its presence in foods (in Slovak). Bull Food Res. 40(2), 75-89 (2001).
[8] Kohajdová,Z., Karovičová,J.: Biogénne amíny-vznik, metódy stanovenia a výskyt v potravinách. Bull Food Res. 40(2), 75-89 (2001)
[9] Staruch, L. - Strmiska, F.: Využitie štartovacích kultúr v mäsovom priemysle. Starters application in meat industry (in Slovak). Výživa a zdravie, 46, 2001, s. 17 - 20.
[10] Staruch, L., Staruchová, M., Kajaba, I., Strmiska, F.: Hovädzie mäso. Beef (in Slovak). Výživa a zdravie, 46, 2001, s. 58 – 62.
[11]* Uličná, K., Dandár, A., Kopecký, J., Fabián, A., Paulenová, Ľ.: Použitie prípravkov typu SUCAZUR v cukrovarníctve. Using of SUCAZUR in sugar technology (in Slovak). Listy cukrov. a řep 117, 2001, 156-159.

B. Conferences (*international conferences)

[1]* Dodok L., Buchtová V., Hozová B., Staruch L., Burisová A.: Vplyv zlepšujúcich prípravkov na reologické vlastnosti ciest. Effect of improvers on rheological properties of the dough (in Slovak).In: Proceedings of the 32nd Symposia „New Trends of Food Production and Evaluation“, Skalský Dvůr, Czech Republic, May 28. - 30. 2001, p. 47
[2]* Buchtová, V., Staruch, L., Dodok, L., Chomová, Ľ.: Štúdium koncentrácie aminokyselín v korení. Study of amino acids concentration in spices (in Slovak). In: Proceedings of the 32nd Symposia „New Trends of Food Production and Evaluation“, Skalský Dvůr, Czech Republic, May 28. - 30. 2001, p. 51
[3]* Staruch, L., Chalupka, B., Sirotná, Z., Heriban, Ľ.: Kyselina mliečna a jej uplatnenie pri dekontaminácii jatočných tiel. Application of lactic acid in the process of decontamination of slaughterhouse animals (in Slovak). In: Proceedings of the 32nd Symposia „New Trends of Food Production and Evaluation“, Skalský Dvůr, Czech Republic, May 28. - 30. 2001, p. 52
[4]* Kováčová, M., Takácsová,M., Gajdoštínová, N.: Faktory vplývajúce na stabilitu flavonoidov. Some factors which have the influence on the stability of flavonoids (in Slovak).In: Proceedings of the 32nd Symposia „New Trends of Food Production and Evaluation“, Skalský Dvůr, Czech Republic, May 28. - 30. 2001, p.27-28
[5]* Németh, K., Takácsová, M., Stahelová, A., Hencz, M., Staruch, L.: Application of Cereals for Rapessed Oil Stabilisation. International Conference of Young Scientists Tavazsi Szél 2001, April 20.-22.4.2001, Szent István Egyetem Gödöllö, Hungary (lecture)
[6] Buchtová, V.,Dodok, L, Chalupka, B.: Štúdium obsahu aminokyselín v jemnom trvanlivom pečive. Study of amino acids content in bisquits (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p.78-81
[7] Dandár, A., Kopecký, J., Uličná K.: Stanovenie stupňa kontaminácie v extraktore pomocou prístroja MIKROZYL-M. Determination of the degree of contamination in extractor by MIKROZYL –M (in Slovak). In: :Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p.41-47
[8] Uličná, K., Dandár, A., Kopecký, J., Fabián, J., Paulenová, Ľ.: Výsledky meraní mikrobiálnej kontaminácie s použitím biocídu *SUCAZUR* v prevádzke cukrovaru. The measurement of microbial contamination in sugar factory by biocide SUCAZUR (in Slovak). In.: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p.256-260
[9] Staruch,L., Chalupka,B., Sirotná,Z., Heriban, Ľ.: Dekontaminácia povrchu jatočných tiel aplikáciou kyseliny mliečnej. Decontamination of slaughterhouse animals by lactic acid (in Slovak). In.: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p.226-235
[10] Ondrejka, J. - Staruch, L.:Nutnosť aplikácie systému HACCP v spoločnom stravovaní. Application of HACCP in communal eating (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 261-267
[11] Šoltýsová, J. Staruch, L.:Význam a kontrola polyfosfátov v potravinách.Importance and control of polyphosphates in foods (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 311-314
[12] Golian, J. Pavelka, M. Staruch, L.: Zhodnotenie obsahu vybraných chemických prvkov v mäsových výrobkoch. Evaluation of selected chemical elements in meat products (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 346-349
[13] Škrovánková, S.-Takácsová, M.-Magdolenová, C.: Senzorické hodnotenie horkej chuti červených vín I. Sensory analysis of bitter taste in red wine I (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 241-244
[14] Škrovánková, S.-Takácsová, M.-Magdolenová, C.: Senzorické hodnotenie horkej chuti červených vín II. Sensory analysis of bitter taste in red wine II (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 245-248
[15] Kováčová, M., Takácsová, M., Longauerová, Z: Porovnanie antioxidačných účinkov rutínu a flavonoidov pohánky. Comparison of antioxidative effects of rutine and flavonoids in buckwheat (in Slovak). In:. Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 149-151
[16] Németh, K., Takácsová, M., Stahelová, A.,Ambrušová, D.: Antioxidačný účinok ovsa a prosa v repkovom oleji. Antioxidative effect of oat and millet in rape seed oil (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 189-192
[17] Stahelová, A., Takácsová, M., Németh, K.: Zloženie a antioxidačné vlastnosti olív a olivového oleja. Composition and antioxidative properties of olive and of olive oil (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 218-221
[18] Takácsová, M., Kováčová, M., Papalová, Z.: Vplyv rozmarínu na stabilitu lipidov mäsa. Effect of rosemary on the stability of meat lipids (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 253-255
[19] Dodok L., Buchtová V. Hozová B. Burisová A.: Vplyv zlepšujúcich prípravkov na reologické vlastnosti cesta a finálneho

výrobku. Influence of improvers on rheological properties of the dhough and of final product (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p.91-94

[20] Burisová A., Dodok L., Ebringerová A., Hromádková Z.: Vplyv prídavku glukurónoxylánu na vlastnosti pšeničného cesta. Effect of glucuronoxylane addition on the properties of wheat dough (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 82-86

[21] Hromádková Z., Tomášková B., Ebringerová A., Burisová A.: Frakcionácia zložiek pohánky obyčajnej. Fractionation of buckwheat components (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 107-113

[22] Hybenová E., Karovičová J., Greif G., Rybárová Z.: Produkcia organických kyselín v zeleninovej šťave.Organic acids production in vegetable juices (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 117-122

[23] Hybenová E., Karovičová J., Greif G., Trúchla Ľ.: Redukcia cudzorodých látok v priebehu mliečnej fermentácie. Reduction of foreign substances during lactic fermentation (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 128-133

[24] Karovičová J., Greif G., Hybenová E., Kohajdová Z.: Použitie PCA pri hodnotení chuti mliečne fermentovaných zeleninových štiav. Application of PCA in evaluation of taste of lactic fermented vegetable juices (in Slovak).In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 134-137

[25] Karovičová J., Polonský J., Kohajdová Z., Greif G.: Validácia kapilárnej izotachoforézy pri stanovení organických kyselín. Validity of capillary isotachophoresis in determination of organic acids (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 138-143

[26] Kohajdová Z., Karovičová J., Greif G.: Metódy stanovenia biogénnych amínov v potravinách. Methods of biogenic amine determination in foods (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 144-148

[27] Greif G., Greifová M., Karovičová J.: Vplyv teploty na rast vybraných fekálnych baktérií a produkciu amínov. Influence of temperature on the growth of selected fecal bacteria and on the production of amines (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 305-310

[28] DODOK, L, BUCHTOVÁ, V.,HOZOVÁ, B., BURISOVÁ, A.: Vplyv zlepšujúcich prípravkov na tvorbu a reologické vlastnosti cesta a finálneho výrobku. Effect of improvers on the formation and on rheological properties of the dough and of final product (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 91-94

[29] Lenkeyová, I. Greifová, M. Staňková, A., Sádecká, Ž., Greif, G.: Vplyv konzervačných látok na rast *Enterobacter aerogenes* a produkciu biogénnych amínov. Effect of preservatives on the growth of *Enterobacter aerogenes* and on the production of biogenic amines (in Slovak). In: Proceedings of the XIII th International Conference LABORALIM 2001, B. Bystrica, Slovak Republic, February 7.-8. 2001, p. 295-304

[30] Takácsová, M., Kováčová, M.,Nguyen, D.V.: Antioxidačný účinok extraktov cesnaku. Antioxidative effect of garlic extracts (in Slovak). In: Proceedings of XXVIII th Seminary about Food Quality, Brno 2001, Czech Republic, p. 5

C. Books and Textbooks

[1] Pokorný, J., Trojáková, M., Takácsová, M.: The use of natural antioxidants in foodproducts of plant origin. In: Antioxidants in Food . Edited by Jan Pokorný, Nedyalka Yanishlieva and Michael Gordon, CRC Press Boca Raton Boston, New York, Washington DC, p. 355-372 (2001)

CENTRAL LABORATORIES

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I. STAFF

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Štefan Holotík, PhD;Tibor Jakubík, PhD;Tibor Liptaj, PhD;

PhD Student:
Svatava Kašparová; Pham Tran Nghia;

Technical Staff:
Svatava Kašparová; Peter Kottaš; Mária Mravcová; Eva Pappová; Naďa Prónayová; Walter Weis

II. TEACHING AND RESEARCH LABORATORIES

B. Research Laboratory

Laboratory of NMR Spectroscopy (NMR)
Laboratory of Mass Spectrometry (MS)
Laboratory of X-Ray Microanalysis

IV. CURRENT RESEARCH PROJECTS

A. Development of NMR techniques for the structure determination of modular molecules (Tibor Liptaj)

The main goals of the project are:

a/ development of the NMR techniques which provide long-range structural information on the studied molecules. These methods relay on measurement and interpretation of residual dipolar coupling constants which appear in high resolution spectra because of partial orientation of molecules.

The main results are:

a/ development of the methods for the precise determination of the value of coupling constants

b/ determination of the dipolar $^{1}J(C\text{-}H)$ coupling constants in the model oligosaccharide.

Direct participation on other projects:

NMR laboratory cooperates mainly with:

Department of organic chemistry
Department of organic technology
Department of petroleum technology and petrochemistry
Department of physical chemistry
Department of anorganic chemistry
Department of analytical chemistry
Department of biochemical technology
Department of biochemistry and microbiology
Department of plastics and rubber

MS Laboratory cooperates mainly with:

Department of organic chemistry
Department of organic technology
Department of petroleum technology and petrochemistry
Department of analytical chemistry
Department of biochemistry and microbiology

Laboratory of Microanalysis cooperates with:

Department of organic chemistry
Department of ceramics, glass and cement

V. COOPERATION

A. Cooperation in Slovakia

Faculty of Medicine, Jesenius University, Martin
Institute of Preventive and Clinical Medicine, Bratislava
Pharmacobiochemical Laboratory, Medical Faculty, Comenius University, Bratislava

Derer Hospital, Bratislava
Drug Research Institute, Modra
Slovak Academy of Sciences, Institute of Inorganic Chemistry, Bratislava
Slovak Academy of Sciences, Chemical Institute, Bratislava
Viticultural and Enological Research Institute, Šenkvice
Comenius University, Faculty of Natural Sciences, Bratislava
Comenius University, Faculty of Pharmacy, Bratislava
Science and Conservation Research Institute Bratislava
Research Istitute of Animal Production, Nitra
Chemical Factory, Nováky
Slovnaft, Bratislava
Duslo, Šaľa
Slovakofarma, Hlohovec
Glass Factory, Nemšová
Ceramics Factory, Čáb
Technical Glass Factory, Bratislava

B. International Cooperation:

The University of Edinburgh, Chemistry Department, The King´s Buildings, Edinburg, England
- Development of NMR techniques for structure determination of multi-modular proteins

Université Blaise Pascal, Department of Organic and Bioorganic Chemistry, Clermont-Ferrand, France
- The NMR study of the celular metabolism of the Fibrobacter succinagenes using C-13 labolled substrate

Universita di Bari, Facolta di Medicina Veterinaria, Instituto di Clinica Chirurgica, Italy
- Study of the ischemia and reperrfusion on the metabolic map of rabbit CNS.

Department of Fine Organic Chemistry, ECPM/ University L. Pasteur, Strasburg, France
- NMR characterization of chiral compounds

C. Membership in Domestic Organizations and Society:

Slovak Spectroscopic Society, Bratislava (T.Liptaj)

G. Visitors from Abroad:

Prof. Dušan Uhrín	The University of Edinburgh, England, March 2001 (11 days) December 2001 (11 days)

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

Pham Tran-Nghia	The University of Edinburgh, England, January - February 2001, (14 days)
Tibor Liptaj	Université Blaise Pascal, Department of Organic and Bioorganic Chemistry, Clermont-Ferrand, France, January – April 2001 (95 days)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Blanáriková I., Dugovič B., Fišera L., Hametner C., Prónayová N.: 1,3-Dipolar cycloadditions of D-erythrose- and D-threose-derived nitrones to maleimides. Arkivoc 2(2), 1091-1103 (2001)

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