

DEPARTMENT OF CHEMICAL TECHNOLOGY OF WOOD, PULP AND PAPER

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I. STAFF

Associate Professors:

Pavel Krkoška, Ph.D.

Ladislav Šutý, Ph.D.

Assistant Professors:

Emil Golis, Ph.D.

Vlasta Lužáková, Ph.D.

Pavel Mišovec, Ph.D.

Štefan Šutý, Ph.D.

Katarína Vizárová, Ph.D.

Research Fellows:

Tatiana Marcinčinová

Lujza Mozoľová

Igor Šurina, Ph.D.

Milan Vrška, Ph.D.

Ph.D. Students:

František Bednár

Rudolf Dorko

Radovan Tiňo

Eva Gemzická

Lívia Krištofová

Peter Scholtz

Technical Staff:

Jozefína Karabová

Jozef Mihál

Ivan Vajanský

Zuzana Žaškovská

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Papermaking Fibbers and Additives

Laboratory of Pulping Technology

Laboratory of Structure and Analysis of Wood

Laboratory of Structure and Properties of Paper

Laboratory of Natural Polymers

Laboratory of Wood Chemistry

Laboratory of Chemical Treatment of Wood

Laboratory of Biotechnology

Laboratory of Thermoanalytical Methods

GC-MS Laboratory

III. TEACHING

A. Undergraduate Study

6th Semester

Semestral Project

0-4 h

members of department

Paper and Printing

2-2 h

P. Krkoška, J. Panák

B. graduate Study

7th Semester

Physics of Polymers and Paper

2-2 h

M. Krištofič, Š. Šutý

Chemistry and Analysis of Wood

2-0 h

E. Golis, L. Šutý

Pulping Technology

3-1 h

L. Šutý, M. Vrška

Laboratory

0-8 h

E. Golis, K. Vizárová

Natural Polymers

2-1 h

V. Lužáková, D. Bakoš

Environmental Management

in Pulp and Paper Industry

2-0 h

E. Golis, K. Vizárová

8th Semester

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, M. Vrška
Laboratory	0-8 h	M. Vrška, E. Golis
Visiting of Pulp and Paper Mills	1 week	
Practical Training Course	3 weeks	

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	P. Mišovec, Š. Šutý
Chemical Aids in Pulp and Paper Industry	1-1 h	V. Lužáková, K. Vizárová

10th Semester

Thesis	0-27 h	
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C. Ph.D. Study

Foreign language (English, German)	6 months	Department of languages
Macromolecular chemistry	12 months	V. Chrástová
Technology of polymeric materials	12 months	P. Krkoška
Physics of polymers	12 months	M. Krištofič
Preparation of dissertation	24 months	Department (instructor)

D. Postgraduate study - formation

Pulp and Paper Technology Course	24-0 h	P. Krkoška, L. Šutý
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IV. CURRENT RESEARCH PROJECTS

A. Permanence and durability of paper (Assoc. Prof. Pavel Krkoška, Ph.D.)

At the present time for the production of pulp the extended kraft pulping and ECF or TCF bleaching are used. Both the extended kraft pulping and the ECF bleaching by the oxygen as well as by other oxidative agents give pulps with an adequately reduced DP and fiber strength. These pulps show during aging the pronounced decrease of brightness and fiber strength and strength of laboratory sheets. Commercial papers produced from them loaded with PCC and sized with AKD are more resistant to aging. The influence of some saccharides as precursors for low-molecular resin and furane compounds caused the coloring of paper during the accelerated aging was investigated. The new original additive for the application of hydrogen peroxide in bleaching of pulp in alkaline and acid medium was developed and verified. Obtained results by the application these additive are very hopeful. Deacidification does not eliminate but only retards the process of degradation of paper during the aging, and increased yellowing of newspaper was observed.

B. Papermaking fibres-new process of isolation, modification, recylation and preparing of paper (Assoc. Prof. Pavel Krkoška, Ph.D.)

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. With growing demand for deinking at conditions near to neutral pH value, new deinking chemicals become increasingly important. We have formulated three different blends of surfactants and examined their deinking efficiency as flotation aids in a conventional process using also other chemicals as well as in an alternative process without any other chemicals. Their deinking effectiveness was higher compared to traditionally used commercial deinking chemicals.

Physicochemical Properties of Wood Extractives in Pulp and in the Processing Media from the Aspect of Pitch Problems (Vlasta Lužáková, Ph.D.)

Wood extractives isolated from wood chips and black liquor by extraction with acetone were analysed using solid-phase extraction. The results shown that the solid-phase extraction technique is suited for separation and characterization of different lipid classes from acetone extractives and has many advantages over the traditional complicated isolation schemes. It enables systematic study of some lipid compounds responsible for the pitch formation and problems in wood pulping.

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
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 (Prof. Bobleter) (Properties of Fibers from TMP)
Institute of Papermaking and Paper Machines, Technical University of Lodz, Poland (Prof. Kawka), (Cooperation in Pedagogical and Research Activities)
University of Quebec - Trois Rivières, Canada (Prof. B. V. Kokta) (Process of Explosion Pulp)
Pulp and Paper Research Centre, McGill University, Montreal, Canada (Prof. B. Alince)
(Filling of Paper)
Agricultural University, Faculty of Wood Technology, Poznan, Poland (Prof. W. Pradzinski) (Chemical Techn. of Wood and Plant Raw Materials)
University of Provence, Marseille, France (Prof. Perichaud) (Combustion)
French Institute of Papermaking and Graphics Industry, Grenoble, France (Prof. J. Voilot)
(Pulp and Paper Chemistry and Technology)
Universidade da Beira Interior, Covilhã, Portugal (Prof. A. P. Duarte) (Program Socrates)

C. Membership in DOMESTIC Organizations and Societies

Slovak Chemical Society, Bratislava (E. Golis, P. Krkoška, I. Šurina, L. Šutý)
Slovak Society of Industrial Chemistry, Bratislava (E. Golis, P. Krkoška, V. Lužáková, P. Mišovec, I. Šurina)
SK-Biom, Bratislava (I. Šurina)
Union of Pulp and Paper Industry of Slovak Republic, Banská Bystrica (E. Golis, 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 Republics (I. Šurina)
AE-BIOM, Paris, France (I. Šurina)

E. TEMPUS Program

F. International Scientific Programs

G Visitors from Abroad

Prof. B. Alince: Mc Gill University, Montreal, Canada, 25. 9. - 8. 10. 1999
Prof. M. Milichovský: Technical University, Pardubice, Czech Republic, 7. 6. 1999

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

F. Bednár: Pulp and Paper Research Centre, McGill University, Montreal, Canada,
February 1998 (12 months), September 1999 (4 months)
Š. Šutý: Conference: History and Current Situation in Papermaking in Central
Europe, Pardubice, Czech Republic, 20. - 21.10. 1999
R. Tiňo: McGill University, Montreal, Canada, November 1998 (12 months)

VI. THESIS AND DISSERTATIONS

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

Foltín M.: Study of lignin structure (L. Šutý)
Fonódová S.: Kinetic of hydrogen peroxide decomposition –
usage in pulp and paper industry (G. Jakubíková)
Gorelková T.: Tissue papers and their microbiological purity (I. Šurina)
Hajdamárová I.: Influence of additives on paper strength (P. Mišovec)
Haraga R.: Study of black liquor evaporator scaling (L. Šutý)
Husárik M.: Changes of paper colouring by ageing (K. Vizárová)
Kerekeš J.: Isolation of wood extractives (T. Marcincinová)
Kolláriková A.: Deinking of recycled newspaper (P. Mišovec)
Kuruc M.: Study of black liquor composition (L. Mozoľová)
Nemčeková A.: Permanence and durability of paper (P. Krkoška)
Pengerová V.: Methods of analysis of wood according to calcium content (M. Vrška)
Suchý P.: Extractives compounds of wood and their analysis (I. Šurina)
Semanová S.: Interactions of black liquor with surfactants (V. Lužáková)
Tešlárová B.: Papermaking properties of pulp fibres (P. Krkoška)

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

Baďo M.:	Deinking of recycled newsprint paper (P. Mišovec)
Bálintová M.:	Deinking of waste paper by washing and flotation (V. Lužáková)
Bieliková L.:	Loading of paper by calcium carbonate (Š. Šutý)
Čerman M.:	Permanence and durability of papers (P. Krkoška)
Kovaľová M.:	Extractives in wood and black liquor (V. Lužáková)
Hujsová J.:	Analysis of different classes of wood from regard to calcium content (M. Vrška)
Dorko R.:	Formation of deposits during treatment of wood to paper (I. Šurina)

D. Dissertations (Ph.D. Degree) (supervisors are written in brackets):

Bednár F.:	Microparticulate retention systems (P. Krkoška)
Gemzická E.:	Dosing optimisation of chemicals and decreasing of pitch during pulp bleaching (P. Krkoška)
Krištofová L.:	Polymeric furane compounds (P. Krkoška)
Scholtz P.:	Influence of liquor calcium content on evaporator deposits formation (P. Krkoška)
Tiňo R.:	Papermaking properties of pulp fibers (P. Krkoška)
Dorko R.:	Impurities formation in paper production (M. Čeppan, I. Šurina)

VII. PUBLICATIONS

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

- [1] Bukovský V.: Is Deacidification a Step to the Rescue of Historic Newspapers? *Restaurator* 20, 77-96 (1999)
- [2] Fišerová M., Lužáková V.: Využitie povrchovoaktívnych látok v delignifikačných procesoch. Application of surfactants in delignification. (in Slovak) *Papír a celulóza* 54, (10), s. 249-250 (1999)
- [3] Fišerová M., Opálená E., Lužáková V.: Vplyv povrchovoaktívnych látok na sulfátovú delignifikáciu a pranie buničín. Effect of surfactants on kraft delignification and pulp washing. (in Slovak) *Papír a celulóza* 54, (9), p. 222-224 (1999)
- [4] Golis E., Jakubíková G., Gemzická E., Šutý L.: Viacstupňové TCF bielenie s novým aditívom. TCF bleaching with a new additive. (in Slovak) *Papír a celulóza* 54(4), 94-95 (1999)
- [5] Golis E., Šutý L., Šurina I., Krkoška P., Kvasnička J.: Podiel technologických emisií z výroby buničín v slovenských celulózkach na kvalitu ovzdušia metódou emisných faktorov. Contribution of technological emission from Slovak pulp and paper industry on air quality determined by emission factors. (in Slovak) *Papír a celulóza* 54 (5), 126-127 (1999)

B. CONFERENCES (*International Conferences)

- [1]* Bednár F., Alince, B.: Retenčný systém Hydrocol. Retention system Hydrocol. (in Slovak) In: 51. zjazd chemických spoločností. Nitra, 6.-9.9.1999. E-P11, (1999) ISBN 80-227-1250-7
- [2]* Bukovský V.: Degradácia novinového papiera - vplyv svetla. Degradation of newspaper - light influence on. (in Slovak) In: Zborník príspevkov 51. Zjazd chemických spoločností, sekcia E, Drevo, celulóza, papier, Nitra 6.-9. september 1999, STU Bratislava, s. E-P10 (1999) ISBN-80227-1250-7
- [3]* Fišerová M., Lužáková V.: Využitie povrchovo-aktívnych látok v delignifikačných procesoch. Application of surfactants in delignification. (in Slovak) *Papírenská konferencie. Technical Audicity, New Phenomenons, Theories. Pardubice, ČR, (20.-21.10.1999)*
- [4]* Fišerová M., Lužáková V.: Odfarbovanie zberového papiera flotačnými činidlami na domácej surovínovej báze. Waste paper deinking by flotation reagents from domestic resources. (in Slovak) In: 51. zjazd chemických spoločností. Nitra, 6.-9.9.1999. E-P13, (1999), ISBN 80-227-1250-7
- [5]* Krkoška P.: Vznik farebných látok pri starnutí papiera. Formation of colouring compounds in paper ageing. (in Slovak) In: Zborník príspevkov 51. Zjazd chemických spoločností, sekcia E, Drevo, celulóza, papier, Nitra 6.-9. september 1999, STU Bratislava, p. E-P9 (1999) ISBN-80227-1250-7
- [6]* Krkoška P., Lužáková V., Šurina I., Šutý L.: Pedagogická a vedeckovýskumná spolupráca Výskumného ústavu papiera a celulózy a Katedry chemickej technológie dreva, celulózy a papiera, ChtF STU. Pedagogical and scientific co-operation of Pulp and paper research institute with Department of chemical technology of wood, pulp and paper, ChtF STU (in Slovak) In: Zborník z medzinárodného sympózia "Polstoročie práce pre celulózo-papierenský priemysel", Kamenný mlyn 29.9. 1999 SR, s. 13., (1999)
- [7]* Krkoška P., Šurina I.: La formation des cadres pour les industries papetières en Europe Centrale. IP'99., International Colloquium EFPG/IRFIP on «Human Resources, Formation and Competencies: Offers and Needs for the Paper Industry of the 21st Century», Commission Européenne (DG XXII), Grenoble, 12-14 October 1999, France, 11 p. (1999)
- [8]* Krkoška P., Šutý L., Golis E., Šutý Š.: Program výuky chemickej technológie dreva, celulózy a papiera v porovnaní s niektorými vysokými školami v zahraničí. Pulp and paper study program on Slovak Technical University in comparison with some study programs of foreign universities. (in Slovak) Zborník medzinárodnej konferencie "Historie a súčasnosť papírenstvá ve střední Evropě", Pardubice 20.-21.10. (1999).
- [9]* Marcinčin A., Brejka O., Budzák D., Zemanová E., Marcinčinová T.: Development of colour Concentrates for Polypropylene and Polyethylene Terephthalate Spun Dyed Fibres. In: Proceedings of the 3rd International Conference on New Products and Production Technologies for a New textile Industry. Gent, July 1.-2. 1999. Belgium Department of Textiles Universiteit Gent, Belgium. p. 169-177 (1999)
- [10]* Marcinčin A., Borsig E., Marcinčinová T.: Rheological Properties, Processing and Structure of Fibre – forming Polymer blends. Sixth European Symposium on Polymer Blends. Max Planck Institut für Polymerforschung, Mainz, Germany, máj 1999, p. 79.

- [11]* Mikulášová M., Šurina I.: Transfer antimikrobiálnych látok z papiera určeného pre kontakt s potravinami. Transfer of anti-microbial compounds from paper used in contact with foods. (in Slovak) In: Zborník XX. Xenobiochemické sympóziu, Smolenice 20-21. 5. 1999, Vydavateľstvo STU Bratislava, s. 63, (1999)
- [12]* Vizárová K., Soldán M.: Štúdium zafarbenia papiera pri urýchlennom starnutí UV VIS spektroskopiou. UV/VIS spectroscopy study of paper colouring during accelerated ageing (in Slovak) In: Zborník príspevkov 51. Zjazd chemických spoločností, sekcia E, Drevo, celulóza, papier, Nitra 6.-9. september 1999, STU Bratislava, s. E-P5 (1999) ISBN-80227-1250-7
- [13]* Vrška M., Hujsová J.: Príspevok podielu vápnika v dreve k tvorbe inkrustov v technológii výroby buničín. Contribution of calcium content in wood to the incrust formation in pulping technology. (in Slovak) In: 51. zjazd chemických spoločností. Nitra, 6.-9.9.1999. E-P15, (1999) ISBN 80-227-1250-7

C. Books and Textbooks

D. PATENTS

- [1] Lužáková V.: Licence Agreement # 1 / 99 (Using of Patent # SR 279 085)

E. OTHERS

- [1] Krkoška P.: ChtF Project # 30 / 98.
- [2] Vrška M.: ChtF Project # 161 / 98.
- [3] Lužáková V.: ChtF Project # 164 / 98.
- [4] Šurina I.: ChtF Project # 6 / 99.
- [5] Lužáková V.: ChtF Project # 63 / 99.
- [6] Šurina I.: ChtF Project # 80 / 99.
- [7] Šurina I.: ChtF Project # 100 / 99.