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# Editorial for the 100+75 Anniversary Issue of Periodica Polytechnica Chemical Engineering

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Guest-Editor

EDITORIAL

The Department of Organic Chemistry and Technolgy of the Budapest University of Technology and Economics celebrated the 100. and 75. anniversary of the foundation of the preceding departments, the Department of Organic Chemistry and the Department of Organic Chemical Technology, respectively, on November 29, 2013. The two former units were merged in January 1, 2007. The audience was addressed by the Rector, Professor Gábor Péceli and the Dean Professor Ferenc Faigl. This was followed by the summary of Professor Péter Huszthy (Deputy head) on the history of the two former departments. Then, the present Head, Professor György Keglevich surveyed the present and future educational and scientific challenges of the Department. Then, former Dean, Professor György Pokol, and the representatives of the major pharmaceutical factories, in order, Chief-Director Dr Erik Bogsch (Richter Plc), Research-Director Dr Imre Szentpéteri (EGIS-Servier) and Chief-Director Dr Pierre Faury (Chinoin-Sanofi) conveyed their laudation. The gift of Chinoin-Sanofi comprising equipment and instruments was acknowledged by the Dean. The celebration was followed by a poster session including the recent research results of the Department and by buffet. More detailed information about this nice session may be read in *Hungarian Chemical Journal* LXIX (10), 301 (2014).

This special issue of *Periodica Polytechnica Chemical Engineering* is devoted to summarize the major research activity of the Department of Organic Chemistry and Technology.

The contribution "Cyclopropanation of Some Alkaloids" by P. Keglevich, L. Hazai, Gy. Kalaus and Cs. Szántay comes from the Alkaloid Research Group. The vinca alkaloids vinblastine and vincristine have been widely used in antitumor therapy for about 50 years. These dimeric alkaloids have two monomer alkaloid parts: vindoline and catharanthine. The chemistry and pharmacology of vinblastine and vincristine are well-known, and a number of their derivatives were synthesized to improve their therapeutic properties. The main task of the alkaloid research group is to synthesize new derivatives of vindoline, vinblastine and vincristine that are of potential antitumor action.

The article "Rearrangement Reactions for the Synthesis of Some Oxa- and Aza-tricyclic Rings Heterocyclic Compounds" by M. Tőrincsi, G. Hornyánszky, P. Kolonits and L. Novák comprises the new rearrangement reactions of cycloalkenyl and geranyl ethers of isoquinolinols, quinolinols, and naphthols. The products were then subjected to acid-catalyzed cyclization to afford novel heterocyclic compounds. Carba analogues of physostigmine were also prepared by the aza-Claisen rearrangement. The mechanism of the new multi-step rearrangements is also discussed.

The Resolving Research Group summarized their results in the paper "Regularities between Separations of Enantiomeric and Diastereoisomeric Mixtures. Prediction of the Efficiency of Diastereomeric/Enantiomeric Separations on the Basis of Behaviour of Enantiomeric Mixtures" by E. Pálovics, Zs. Szeleczky, P. Bagi, F. Faigl and E. Fogassy. The biological activity of enantiomers may be different or even opposite, so the preparation of single enantiomers, for which there is a serious demand from industry, is necessary and inevitable. During common chemical syntheses racemic compounds are formed that should be resolved somehow. The results of a number of resolution processes elaborated and carried out by different methods were examined and compared. Regularities were observed and systematized that help to plan the separations and predict the efficiency of the separations of optical isomers.

Recent results of the Polar Organometallic Research Group and the Group dealing with hydrogenations incorporating also the major part of the Organic Chemical Technology Research Group of the Hungarian Academy of Sciences at the Organic Chemistry and Technology Department, BME were summarized in the article "Synthesis and Application of New, Optically Active Compounds as Catalysts and Ligands in Enantioselective Reactions" by, B. Mátravölgyi, E. Kovács, L. Hegedűs, Zs. Jászay, A. Thurner, Sz. Deák, Zs. Erdélyi, T. S. Pham, K. Gönczi, Sz. Sólyom, L. Tőke and F. Faigl. Novel methods for the efficient preparation of optically active compounds were developed to obtain new atropisomeric 1-phenylpyrrole derivatives, 4-aminobutan-1-ol and 3,4-disubstituted pyrrolidine derivatives,

as well as optically active α- and β-aminophosphonic acids. The products obtained by selective organometallic, organocatalytic, phase transfer catalytic and catalytic hydrogenation reactions may be used as valuable new chiral ligands or organocatalysts, and may serve as building blocks for practically important biologically active compounds.

A part of the research projects on macrocycles comprises the synthesis of sugar-based crown ethers and lariat ethers, and their application as enantioselective catalysts in asymmetric phase transfer catalytic reactions that is described in the paper "Sugar-based Crown Ethers in Enantioselective Syntheses" by P. Bakó, Zs. Rapi and Gy. Keglevich. These days, the asymmetric catalysis has not only theoretical significance, but it has also practical importance in the pharmaceutical industry, in the preparation of pesticides and cosmetics. Significant results have been achieved in this field; a few glucopyranoside-based chiral crown ethers generated high enantioselectivity in Darzens condensation, epoxidations and Michael reactions.

The research activity of the Bioorganic Chemistry Group is summarized in the article "From Synthetic Chemistry and Stereoselective Biotransformations to Enzyme Biochemistry – The Bioorganic Chemistry Group at the Budapest University of Technology and Economics" by Z. Boros, G. Hornyánszky, J. Nagy and L. Poppe covering multidisciplinary fields, such as development of novel chemicals, chemoenzymatic or enzymatic synthetic methods including stereoselective biotransformations with lipases, ammonia-lyases and further biocatalysts in batch and continuous-flow reactions. Novel enzyme immobilization methods, along with enzyme structural and mechanistic studies by experimental and computational techniques are also summarized.

In the last years, the importance of the heterogeneous catalysis increased significantly in preparative organic chemistry as it is demonstrated by the paper "Supported Metal Catalysts in Organic Syntheses" by Á. Kiss, J. Németh, A. Fodor and Z. Hell. The environmentally more benign heterogeneous catalytic methods play an important role in industrial-scale syntheses as well. New catalytic methods elaborated using mineral-type acidic or basic solid materials are summarized as well. The materials applied can also serve as support for heterogeneous metal catalysts.

New challenges dictated by green chemistry were aimed at by the Organophosphorus and Environmentally-Friendly Research Group whose recent results were comprised in the paper "Environmentally Friendly Chemistry with Organophosphorus Syntheses in Focus" by Gy. Keglevich, A. Grün, P. Bagi, E. Bálint, N. Zs. Kiss, R. Kovács, E. Jablonkai, T. Kovács, E. Fogassy and I. Greiner. The research discussed embraces microwave-assisted organic syntheses in the field of the alkylation of CH-acidic compounds, the Kabachnik-Fields condensation, P-C coupling reactions, the Pudovik reaction and the esterification of phosphinic acids. In another field, racemic cyclic phosphine oxides were resolved into optical isomers and were utilized as P-ligands in platinum complexes after deoxygenation. Last but not least, the synthesis of dronic acids/dronates used as medicines in the treatment of osteoporosis was optimized by selecting the ideal set and molar quantity of the P-reactants used as starting materials in reaction with the corresponding substituted carboxylic acids.

Pharmaceuticals of biological origin and probiotics are important, but very sensitive types of medicines. In the paper „Film Coating as a New Approach to Prepare Tablets Containing Long-Term Stable *Lactobacillus acidophilus*" the authors, i.e. I Wagner, Zs. K. Nagy, Á. Suhajda, H. Pataki, P. Sóti, T. Vigh, A. Balogh, A. H. Harasztos and Gy. Marosi, present two methods to enhance the survival rate of probiotic bacteria and their viability during storage. Production of tablets containing living bacteria in this way, seems industrially feasible.