



Biography of Prof. Karel Kolomazník

Professor at Tomas Bata University in Zlín, Faculty of Applied Informatics, Zlín, Czech Republic

Professor Kolomazník, 82, was born in Kroměříž, Czech Republic, a beautiful historical town in the eastern part of the country. Its garden and Castle are listed as one of the World Heritage Sites of UNESCO (since 1998). He attended the University of Chemistry and Technology Prague, Faculty of Organic Technology, where he obtained an Engineer Degree in 1962 and Doctorate in 1967. In 1969, he joined Brno University of Technology, Faculty of Technology in Zlín as a Research Assistant, and later an Assistant Professor, Senior Lecturer and Professor. He was granted the degree of Doctor of Science in 1988 at Brno Technical University, Faculty of Civil Engineering, and Professorship in 1991. In 2001, the Faculty of Technology of Brno University of Technology was changed to the Faculty of Technology of Tomas Bata University in Zlín. In the same year, the Institute of Information Technologies (IIT) was founded at the Faculty of Technology, with Prof. Kolomazník as one of the leading researchers. In 2006, Prof. Kolomazník joined the newly established Faculty of Applied Informatics, where he currently holds the position of Professor of Engineering. In addition to his extensive educational activities, he is the head of a research group dealing with optimization of technological processes particularly in the field of valorization of waste generated by the tanning, leather and food processing industries. His rich research career has been devoted mainly to the following areas:

- Indirect modeling of manufacturing processes for natural and synthetic polymers in view of their rationalization and optimization.
- Development and implementation of recycling technologies for potentially hazardous waste of the meat, food and leather industries.
- Control algorithms of chemical reactors in the production of regenerated tanning salts through oxidation-reduction reactions.
- Transport phenomena in polymer systems.
- Optimization of manufacturing processes in the leather and textile industries.
- Development of modified aminoplasts from protein hydrolyzates.
- Production of biodiesel from waste fats and oils generated by the tanning, food and textile industries.

He is an active member of the American Leather Chemists Association (ALCA), the American Chemical Society (ACS), international consultant of the Leather Panel of UNIDO and long-time member of the International Union of Environment (IUE) Commission of International Union of Leather Technologists and Chemists Societies (IULTCS).

Prof. Kolomazník has led and participated in many successful projects funded e.g. by the Ministry of Education, Youth and Sports of the Czech Republic, Ministry of Industry and Trade or the Ministry of Agriculture, the Czech Science Foundation, the US-Asia Environmental Partnership programme, European Commission (EU Framework Programmes), etc. (see the list of selected projects below).

In addition, he has put many of his results into industrial practice in cooperation with commercial partners from both the Czech Republic and abroad. He has had a long-term cooperation with the Eastern Regional Research Center (ERRC) of the U.S. Department of Agriculture, Wyndmoor, PA where he successfully applied the ammonia-free deliming of white hide. He has been an international expert in the ERRC since 1984, and an international consultant in US-AEP (US – Asia Environmental Partnership) and UNIDO in Vienna. In NIKE Inc. (Ho Chi Minh City, Vietnam) he implemented a patented technology for the processing of manipulation waste from leather industry including the application of the products. In cooperation with the ECCO Tannery in Dongen (Netherlands) and a Mexican tannery in León he successfully tested the recycling technology of potentially hazardous chrome-tanned waste. He has been also active in industrial applications within the Czech Republic, e.g. implementation of a patented technology of a protein hydrolyzate production from animal-based organic waste in the Kortan, s.r.o. in Hrádek nad Nisou (for details see the list of selected industrial applications below).

Prof. Kolomazník is a holder of many national and international awards and appreciations. In 1998 he was awarded the Rolex Award for Enterprise and so far remains the only Czech holder of said award. In 1977 he and his colleagues received the EUREKA Golden Medal in the 32nd World Exhibition in Brussels, and in the same year the Prize of the Minister of Agriculture of Belgium. In 2009 he was awarded the prestigious Alsop Award of the American Leather Chemists Association for outstanding contribution for the American Leather Chemists Association. On the national level, he is a holder of the City of Zlín Award (in 2000), for his globally recognized contribution to the solution of contemporary ecological problems, particularly for the invention of progressive technologies of processing of leather waste, and for excellent representation of the city of Zlín in the world scientific community. He has also ranked three times among the top ten most distinguished personalities of the Zlín Region (2008, 2009 and 2014).

In 2014, he was awarded the “Česká hlava” (Czech Brain) Award for 2014, in the category: Invention Award – Natural Sciences. “Česká hlava” is the most prestigious award in the field of science and innovation in the Czech Republic.

In October 28, 2018 he was awarded the Medal of Merit by the President of the Czech Republic in the field of Science and Education.

Complete List of Awards and Honors

1997 - EUREKA “Médaille d`or avec mention” for the technology “Hydrolyse des enzymes résiduelles du tannage, leur visualization et controle par ordinateur”, Brussels, 11/11/1997.

EUREKA “Prix Special” accorde par M. Karel Pinxten, Ministre de l`Agriculture et des Petites et Moyennes Enterprises” for the invention of “Hydrolyse des enzymes résiduelles du tannage, leur visualization et controle par ordinateur”, Brussels, 11/11/1997.

1998 - Rolex Award for Enterprise for the processing and recycling of potentially hazardous chrome-tanned waste produced by the leather industry using innovative technology based on low-boiling alkyl amines.

An industrial unit was built in Hrádek n. Nisou (Czech Republic) with the load capacity of 15 tons. The unit is still active, operated by the company Kortan Ltd.

2000 – City of Zlín Award for excellent representation of the city of Zlín in the world scientific community.

2003 - Certificate of Member in good standing for the year 2003, commemorating the 100th Anniversary year of The American Leather Chemists Association.

2008 - Honorary Doctorate of Engineering awarded by The Yorker International University, Florence, Italy.

2009 - Alsop Award of the American Leather Chemists Association for outstanding contribution for the American Leather Chemists Association. Complex recycling of chromium from solid and liquid wastes of the leather industry including proposal of automatic control algorithms of technological processes.

2012 - Werner von Siemens Excellence Award 2012, Czech Republic (top free finalist) in category „Most significant achievement in the field of development and innovation"—proposal of a technology for complex processing of tannery waste fats (head of the research team).

2012 – Czech Innovation, Czech Republic (top three finalists) in category Innovative Idea for the "Innovative catalytic-recycling system for biodiesel production from waste fats and oils"

2014 - Czech Brain Award, category Invention Prize for Natural Sciences for Total processing of chromium waste produced by the Leather Industry.

2018 - The Medal of Merit by the President of the Czech Republic in the field of Science and Education.

Selected research projects

- 1) EU Programme COPERNICUS 1994, Project No. ERB3512PL940974 "Recovery and Recycling of Chromium and Protein from Liquid and Solid Wastes from the Leather Industry".
- 2) Institutional research plan No. MSM 265200014 - New technological and environmental friendly trends in natural polymers treatment (1999-2004, MSM).
- 3) Institutional research plan No. MSM7088352102 - Modeling and Control of Processing Procedures of Natural and Synthetic Polymers (2005-2011, MSM).
- 4) USA – Asia Environmental Partnership, project No. USA-AEP 2096 Recycling and utilization of chrome-titanium sludge from manipulation waste of NIKE Inc.
- 5) USA for International Development No. 2002-015-UN Exchange program for sustainable growth.
- 6) OK 226 - Recovery and Recycling of Chromium and Protein from Liquid and Solid Wastes from the Leather Industry (1996-1997, MSM/OK).
- 7) 5th Framework Programme of the European Union, project No. G1RD-CT-2002-00772 RTD - Radically Environmentally Sustainable Tannery Operation by Resource Management – RESTORM.
- 8) Czech Ministry of Industry and Trade, No. FI-IM/101 - Obtaining protein from unconventional renewable source raw materials. (2004-2006, MPO/FI).
- 9) Czech Ministry of Agriculture, No. QH72117 - Biostimulators and biological inducers of resistance at cereals and oilseed crops. (2007-2011, MZE/QH).

- 10) Czech Ministry of Industry and Trade, No. FI-IM5/195 - *Development of Technology and Produce Microbe Biomass as a Source Valuable Proteins and their Hydrolysates (Carriers of Biologically Active Substances) (2008-2010, MPO/FI).
- 11) Czech Ministry of Industry and Trade, No. FI-IM5/183 - *Dry fermentation of Biomass and RDF to Production Electrical Energy From Biogas (2008-2010, MPO/FI).
- 12) 7th Framework Programme of the European Union, EUREKA-Eurostars No. E!4829 „LIPIDIESEL - Adding value to lipid waste streams through a new production process for biodiesel“.
- 13) Prof. Kolomazník is a key researcher and leader of the research team of Alternative Energy Sources in ED2.1.00/03.0089 - The Centre of Security, Information and Advanced Technologies (CEBIA-Tech) (2011-2014, MSM/ED).
- 14) Within the frame of the Foreign Talents STI Grants he was invited in 2018/19 as a foreign expert to participate in the FIRST project “Recycling of waste containing chromium produced by Vietnam tanning industry”, coordinated by the Center for Application Research and New Technology Transfer (A&T Center) – Leather and Shoe Research Institute in Hanoi, Vietnam.

Recently, he is the leading researcher of an international INTER-EUREKA project FERTI-MAIZE – Innovative Foliar Fertilizer Based on Protein By-Products for Maize Treatment (coordinated by Probstdorfer Saatzuch Romania, SRL) and a national project funded by the Ministry of Industry and Trade of the Czech Republic “Research and development of processes of microbial hydrolysis for the preparation of components with high biological value“.

Industrial Applications

- 1) Environmentally friendly and economically viable technology of biodiesel production from waste fats and oils, based on innovative patented method of the pre-treatment of the input raw material and a catalytic system of organic bases.
- 2) Proposal of a technology and control algorithm of production of protein hydrolyzates obtained from hydrolysis of yeast biomass for medical and nutrition applications (food supplements and supportive treatment for oncological patients, personalized nutrition for various groups according to their specific needs).
- 3) Successful technology of ammonia-free delimiting of white hide (Bošany Tanneries, Slovak Republic, and the tannery in Třebechovice pod Orebem, Czech Republic).
- 4) One of the most important industrial applications was implementation of a technology for the processing of manipulation waste from leather manufacturing of the NIKE Inc. in Ho Chi Minh City, Vietnam, including applications of products. The technology was developed within the US-Asia Environmental Partnership project (US-AEP). The hybrid technology was based on alkali hydrolysis with subsequent enzymatic hydrolysis (alkaline protease), the products of which were on one hand liquid protein hydrolyzate applicable as organic nitrogen fertilizer, and on the other hand a solid part (chrome-titanium sludge) that can be used as inorganic pigment (enamel) in ceramic industry.
- 5) Successful testing of a recycling technology for potentially hazardous chrome-tanned waste in leather manufacturing in cooperation with the ECCO tannery in Dongen, Netherlands, and tanneries in León, Mexico.
- 6) Implementation of a patented technology in Kortan, Hrádek nad Nisou, Czech Republic, for the dechromation of shavings, chrome-tanned waste of leather industry.
- 7) Software application for optimization and rationalization of leather manufacturing processes.
- 8) Utilization of waste tannery fats in biogas production.

9) Technology for the processing of protein-based waste produced by a textile company Tonak, Nový Jičín, Czech Republic. The resulting hydrolyzate found application as an organic nitrogen fertilizer with stimulating effect, suitable for organic farming.

Media coverage (international)

1) <https://www.rolex.org/rolex-awards/applied-technology/karel-kolomaznik>

2) "Waste Not, Want Not" by Edmund Doogue, in the Rolex Awards Journal "For Enterprise" (No. 24, February 2009)

3) <http://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=13156>

4) Scientific Achievement Award by the Board of Directors of the American Biographical Institute (USA) for excellent performance in the field of Leather Manufacturing –global recognition for Prof. Kolomaznik in 1000 World Leaders of Scientific Influence, Permanent Record at the U.S. Library of Congress, Washington D.C., 2001.

5) Report from the presentation of the Alsop Award 2009 by the American Leather Chemists Association. In Journal of the American Leather Chemists Association, Vol. 104, pp. 288-289, 2009.