

POCEK BULLETIN

Registration number:
CZ.02.01.01/00/23_021/0009004

Development of application potential in the field of polymeric materials in the context of fulfilling the principles of the circular economy (POCEK)

The POCEK project has recently been actively presented at the PLASTKO 2026 conference as well as at other major national and international events.

PLASTKO 2026 CONFERENCE: ZLÍN AS A CENTER FOR INNOVATION IN THE PLASTICS INDUSTRY

Zlín has once again confirmed its position as a major hub for the plastics industry and an innovation ecosystem. On April 22–23, 2026, Tomas Bata University in Zlín hosted another edition of the PLASTKO conference, which attracted approximately 200 experts from both the academic and industrial sectors. The conference's technical program included specialized lectures focused on current topics such as the circular economy, chemical recycling of plastics, new materials technologies, and innovative manufacturing processes.

The conference also provided a space for poster presentations, company exhibits, and informal discussions. The PLASTKO 2026 conference thus reaffirmed its role as an important platform connecting research, education, and industrial practice. For the POCEK project, this conference represents a significant tool for disseminating its results and building partnerships.



Co-funded by
the European Union



Ministry of Education,
Youth and Sports
of the Czech Republic



Tomas Bata University in Zlín
Centre of Polymer Systems



Presentation of the POCEK Project at the PLASTKO 2026 Conference

SCIENTIFIC OUTPUTS AND NEW FINDINGS

During the first half of 2026, the project team continued its intensive research, development, and project activities. During this period, six new grant proposals were prepared and submitted at both the national and international levels, further expanding opportunities for follow-up research and collaboration with the applied sector. Notable achievements also included the application of research outputs in the form of results with practical potential and the publication of six scientific papers in prestigious international journals. Another important milestone during the reporting period was the filing of a patent application, which confirms the high level of innovation and the practical applicability of the results achieved. Selected articles are presented in more detail in the following chapter.

BIODEGRADABLE PLASTICS AFFECT THE COMPOSITION OF THE MICROBIOME AND ORGANIC MATTER IN THE SOIL

In the journal **Soil Biology and Biochemistry**, the research team focused on how biodegradable polyesters—poly-3-hydroxybutyrate (PHB), poly(butylene succinate-co-adipate) (PBSA), and polybutylene adipate terephthalate (PBAT) affect soil microorganisms and create a specific microbial environment around their surface, known as the *plastisphere*. The study showed that individual polymers create distinct microbial communities and that their influence is not limited solely to the surface of the plastic itself. For bacteria, the *plastisphere* extended to a distance of approximately 1.25 mm, while for fungi, it extended up to 2.75 mm.



Co-funded by
the European Union



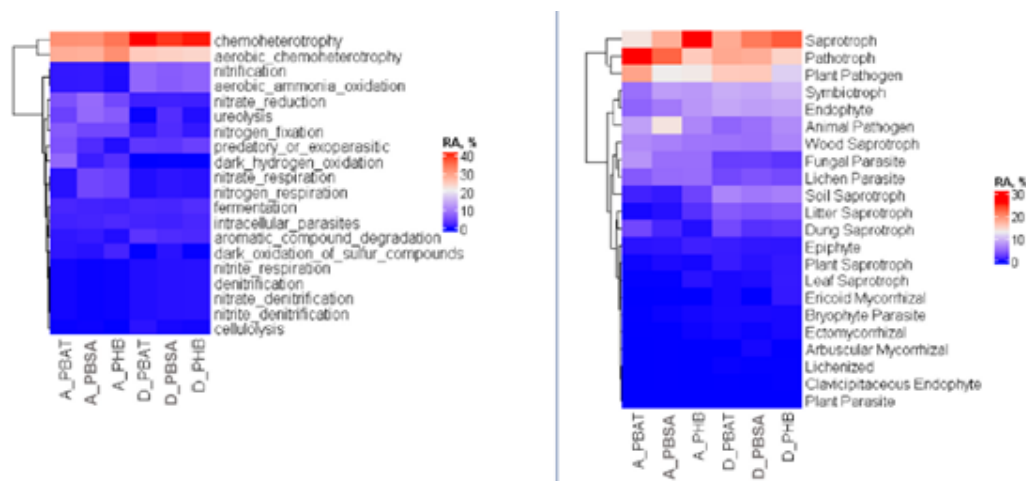
Ministry of Education,
Youth and Sports
of the Czech Republic



Tomas Bata University in Zlín
Centre of Polymer Systems

The most significant changes were observed in the more rapidly degrading PHB and PBSA, which influenced the carbon and nitrogen cycles while simultaneously promoting the decomposition of the original soil organic matter. Near the polymers, the proportion of nitrifying microorganisms decreased, and the structure of both bacterial and fungal communities changed. Some changes persisted even after 350 days, indicating that the ecological impact of biodegradable plastics can continue even in the advanced stages of their decomposition. The study thus highlights that when evaluating biodegradable polymers, it is necessary to monitor not only the rate of biodegradation itself but also their long-term impact on the soil microbiome and nutrient cycles.

For more information about the article, visit: <https://doi.org/10.1016/j.soilbio.2025.110050>



Analysis of the Plastosphere Microbiome – A Functional Comparison of Layers A and D for Individual Polymers.

VALORIZATION OF TOMATO WASTE BIOMASS: EXTRACTING VALUABLE PHENOLIC COMPOUNDS THROUGH A MORE ENVIRONMENTALLY FRIENDLY METHOD

A study published in the journal **Applied Food Research** investigated the potential of using waste biomass from tomato cultivation as a source of bioactive compounds. By combining steam explosion pretreatment with subsequent enzymatic hydrolysis, the researchers were able to significantly increase the release of phenolic compounds and flavonoids. Under optimal conditions, the phenolic compound content increased from approximately 2 to 21 mg GAE/g, and the flavonoid content from 2.6 to 8 mg RE/g.

The pretreatment disrupted the lignocellulosic structure of the biomass and made the bound bioactive compounds accessible, which was also reflected in an increase in antioxidant activity. After enzymatic hydrolysis, the most effective variants reached up to 25.4 mg TE/g. The study thus demonstrates a promising approach for converting underutilized agricultural waste into a source of valuable antioxidants with potential for food, packaging, and other material applications in accordance with the principles of the circular bioeconomy.

For more information about the article, visit: <https://doi.org/10.1016/j.afres.2026.102091>



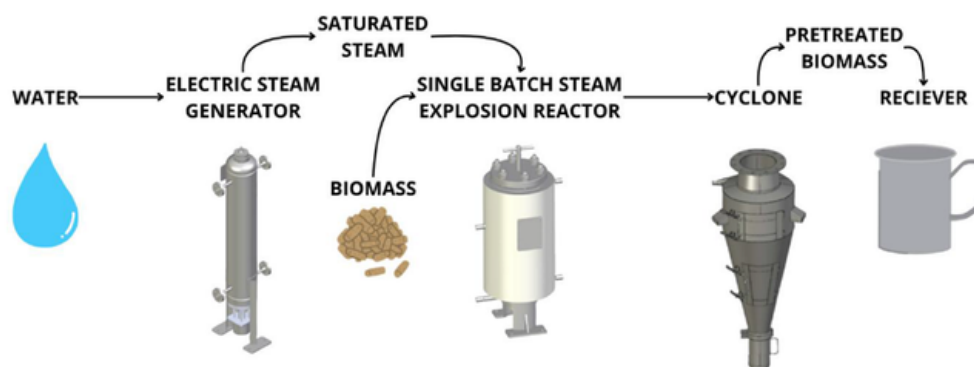
Co-funded by
the European Union



Ministry of Education,
Youth and Sports
of the Czech Republic



Tomas Bata University in Zlín
Centre of Polymer Systems



Simplified diagram of the steam explosion process.

REPEATED MECHANICAL RECYCLING OF TPU: HOW THE MATERIAL'S STRUCTURE AND VOLATILE ORGANIC COMPOUND EMISSIONS CHANGE

Researchers at the Center for Polymer Systems examined what happens to thermoplastic polyurethane (TPU) during repeated mechanical recycling in the journal **Polymer Degradation and Stability**. The material was subjected to one and two recycling cycles and subsequently evaluated in detail using a combination of chromatographic, spectroscopic, thermal, rheological, and mechanical methods. Repeated processing led to significant degradation of the polymer chains, with the molecular weight at the peak of the distribution decreasing by up to approximately 80%. At the same time, the material's viscosity decreased, indicating a gradual deterioration in its processability.

The study focused not only on the properties of the recycled polymer but also on the formation of volatile and low-molecular-weight degradation products. Among the identified substances were, for example, 1,4-butanediol, methylenediphenyl diisocyanate (MDI), and butylated hydroxytoluene (BHT). An interesting finding is the gradual increase in the proportion of 1-hexadecanol, which, according to the authors, could serve as a potential molecular indicator of TPU reprocessing; however, its usefulness as a marker will need to be further verified. The study thus demonstrates that when assessing the recyclability of polymers, it is not sufficient to monitor only their mechanical properties; one must also consider molecular degradation and changes in the profile of released substances, which can determine the possibilities for the safe reuse of the material.

For more information about the article, visit:

<https://doi.org/10.1016/j.polymdegradstab.2026.112285>



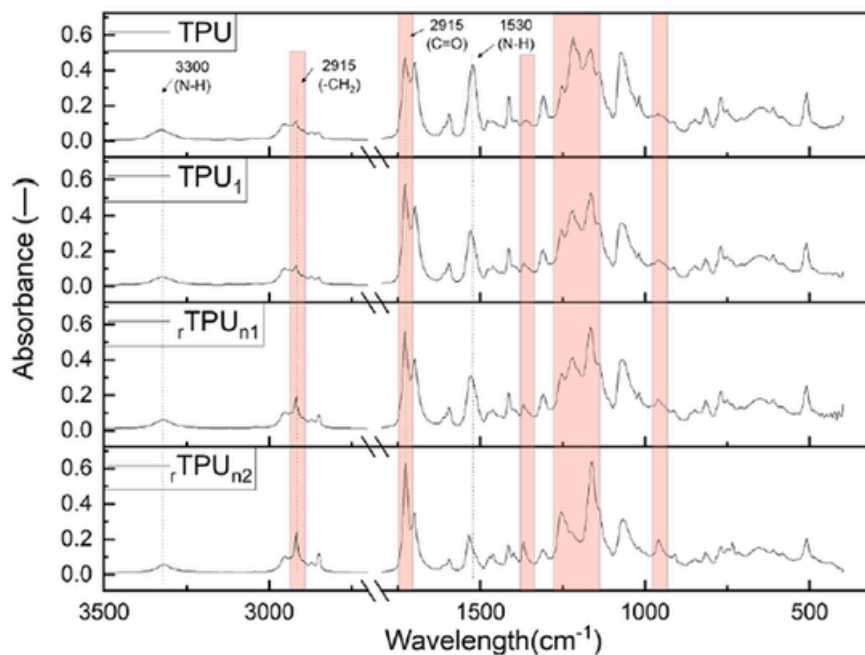
Co-funded by
the European Union



Ministry of Education,
Youth and Sports
of the Czech Republic



Tomas Bata University in Zlín
Centre of Polymer Systems



FTIR spectra of TPU samples during repeated recycling cycles.

INDUCTION-COUPLED PLASMA MASS SPECTROMETER

In the first half of 2026, an ICP-MS NexION 5000 inductively coupled plasma mass spectrometer was acquired as part of the POCEK project. The instrument enables highly sensitive qualitative and quantitative determination of elements at trace and ultra-trace concentrations in various types of samples. The use of collision and reaction gases effectively suppresses spectral interference, thereby increasing the accuracy and reliability of measurements. The instrument thus significantly expands the laboratory's analytical capabilities for research conducted as part of the project.



Incuction-coupled plasma mass spectrometer.



Co-funded by
the European Union



Ministry of Education,
Youth and Sports
of the Czech Republic



Tomas Bata University in Zlín
Centre of Polymer Systems

POCEK PROJECT PRESENTATION

The project was presented during a meeting of BioEast Hub members on April 14, 2026, at the Agrishow Brno 2026 trade fair. The event provided a forum for expert discussion on opportunities for the development of the bioeconomy, innovations in agriculture, and the collaboration between research organizations and the applied sector. Subsequently, on April 16, 2026, the project was also presented at a meeting with economic diplomats from the Embassy of the Czech Republic in Oslo, Stockholm, and Copenhagen, where participants discussed opportunities for international cooperation, support for innovation, and the potential application of research results in foreign markets. On April 25, 2026, the project was presented at Zlín BarCamp 2026, which traditionally brings together experts from various fields and creates a space for inspiring discussions, sharing experiences, and presenting new technological solutions.

Another opportunity to present the project was participation in the NoLimits Business Meetup on May 28, 2026. This networking event, designed for entrepreneurs, managers, and professionals, provides a space for sharing experiences, establishing business contacts, and exchanging know-how in the areas of entrepreneurship and personal development. The 37th meeting of directors of science and technology parks in the Czech Republic, held on June 4, 2026, in Olomouc, also served as an important platform for presenting the project's results. The meeting facilitated the sharing of experiences in the areas of innovation support, technology transfer, and the development of innovation infrastructure. In June, the project was also presented at the TRANSFERA National Technology Transfer Conference and the Creativity and Innovation Conference, which took place on June 10–11, 2026, in České Budějovice. The event brought together representatives from research organizations, universities, companies, and public administration, and provided a forum for discussion on current trends in knowledge transfer and intellectual property protection.



Economic Diplomats at the Czech Embassy in Oslo, Stockholm, and Copenhagen.



**Co-funded by
the European Union**



Ministry of Education,
Youth and Sports
of the Czech Republic



**Tomas Bata University in Zlín
Centre of Polymer Systems**

FIRST GRADUATES OF THE SUSTAINABLE DEVELOPMENT MANAGEMENT PROGRAM

At the end of the 2025–2026 academic year, the first students in the master's program in Sustainable Development Management successfully passed their final state exams. Tomas Bata University in Zlín launched this program in response to the growing need for experts capable of integrating the economic, environmental, and social aspects of sustainability. The program prepares graduates to manage sustainable development processes, implement the principles of the circular economy, and meet the requirements of modern responsible business practices. The successful graduation of the first cohort of students represents a significant milestone in the development of sustainability-focused education at TBU.

NTK KNOWLEDGE TRANSFER ACADEMY

The National Technical Library (NTK) is preparing the NTK Knowledge Transfer Academy 2026/2027 program, a practice-oriented educational academy focused on transferring research results into practical applications. Over the course of eight thematic modules, participants will develop their own research or technology projects, focusing on assessing application potential, intellectual property strategy, market validation, business models, financing, and project presentation. The program runs from October 2026 to April 2027 in English and is intended for researchers, doctoral students, undergraduates, and professionals interested in the commercialization of research results.

More information: <https://www.techlib.cz/en/85391-ntk-knowledge-transfer-academy>

NEW OPPORTUNITIES FOR COLLABORATION WITH COMPANIES THROUGH THE UNIVERSITY TECHNOLOGY CENTER FOR PRACTICAL APPLICATIONS (UTCP) PROJECT

The potential for collaboration between Tomas Bata University in Zlín and the business community will expand further in 2026 thanks to the implementation of the University Technology Center for Practice (UTCP) project. The project opens up new opportunities for closer ties between the university's research units and companies and supports the effective transfer of research and development results into practice. As part of the UTCP project—Activity a) (Reg. No. CZ.01.01.01/04/23_040/0004758)—specialized research, development, and innovation services will be provided to businesses, particularly small and medium-sized enterprises. These services will help companies implement advanced technologies, validate new solutions, and develop innovative activities with high added value. Activity a) builds upon the UTCP project—Activity b) (reg. no. CZ.01.01.01/04/23_041/0005160), which aims to establish and develop the open research and innovation infrastructure of the Center for Polymer Systems. The state-of-the-art instrumentation and facilities created as part of this activity will enable more effective collaboration between the university and the industry in the fields of materials engineering, environmental technologies, and other advanced disciplines.

For more information, visit: <https://cps.utb.cz/en/news/en-aktualita-univerzitni-technologicke-centrum-pro-praxi-utcp>



Co-funded by
the European Union



Ministry of Education,
Youth and Sports
of the Czech Republic



Tomas Bata University in Zlín
Centre of Polymer Systems

SPIN-OFFS AS A PATH TO THE FUTURE

On October 15, 2026, Tomas Bata University in Zlín hosted a conference titled “Spin-offs as a Path to the Future,” focused on promoting knowledge transfer, the commercialization of research results, and the establishment of university spin-off companies. The event featured expert lectures, examples of best practices, a panel discussion, and opportunities for networking and individual consultations. The conference was organized by UPPER in cooperation with the Rector’s Office of Tomas Bata University in Zlín and the University Institute—Technology Transfer Center. Participants gained an overview of the possibilities for translating academic results into practical applications, learned from the experiences of successful companies, and received information on financing and developing innovative enterprises. The conference took place in the Wichterle Hall of the Faculty of Management and Economics at Tomas Bata University in Zlín.



PUBLISHED BY: TECHNOLOGY TRANSFER CENTER, NAD OVČÍRNAU 3685, ZLÍN
EMAIL: CTT@UTB.CZ WEBSITE: HTTP://WWW.UTB.CZ
EDITORIAL BOARD: IVANA BARTOŇÍKOVÁ, JARMILA STRÁŽNICKÁ, JAN GÖRIG, VLADIMÍR SEDLÁŘÍK, JANA JOSEFÍKOVÁ, LENKA HARANTOVÁ

PUBLICATION DATE: OCTOBER 2026



**Co-funded by
the European Union**



**Ministry of Education,
Youth and Sports
of the Czech Republic**



**Tomas Bata University in Zlín
Centre of Polymer Systems**