

PRESS RELEASE**A JOINT SLOVAK-HUNGARIAN CHEMICAL RESEARCH LABORATORY HAS BEEN ESTABLISHED TO SUPPORT THE BIOECONOMY OF THE BORDER REGION**

The Interreg VA Slovakia-Hungary Cooperation Program supports a joint project of the Slovak Technical University (STU) in Bratislava and the ELKH Natural Science Research Center (TTK) (Project ID: SKHU / 1902 / 4.1 / 001), which aims to improve inter-institutional cooperation, promoting cross-border joint action in support of the bioeconomy in the border region. The total budget of the project is EUR 398 079, of which 69.4% will be spent by the applicants for the development of the instrumentation of their joint laboratory. The total budget of the Hungarian beneficiary is EUR 193,422, of which 85%, EUR 164,408.70, is financed from the European Regional Development Fund (ERDF). The remaining 15%, EUR 29,013.30, will be provided by the National Authority within the framework of a domestic co-financing contract.

The project supports all Slovak-Hungarian cross-border activities, in which the agricultural and industrial business units work together to produce marketable product from waste and by-product biomaterials, such as energy, fuel or chemicals.

The general goal of the project is to promote bioeconomic activities by providing the target groups with chemical information on renewable waste and by-product biomaterials in the Slovak-Hungarian border region. Knowledge relates to the structure, chemical properties, and possible conversion processes of biomaterials into chemical products. One of the immediate aims of the project is to expand the instrumental infrastructure in partners' existing joint laboratory to provide a wider range of knowledge of higher scientific value to economic operators and to spread solutions in the regional agriculture., which are in line with the principles of organic farming.

The lead beneficiary is the Department of Chemistry and Food Technology of STU (FCHPT STU). The leading participant in the project is the Department of Organic Technology, Catalysis and Petrochemistry (IOCP FCHPT). Its research interests include the transformation of raw materials from Slovakia, primarily the by-product of biodiesel production, glycerol, into fine chemicals and fuel components.

The Hungarian partner is the TTK Institute of Materials and Environmental Chemistry (TTK AKI). The active participant of the project is the Renewable Energy Research Group of the TTK AKI, which deals with the possibilities of reducing the harmful environmental effects of human activities and with the conversion of renewable energy and carbon sources into useful energy carriers and chemicals.

The Hungarian companies, currently interested in the project, are 3R-BioPhosphate Ltd. (www.biophosphate.net), the NUTRIMAN thematic network (www.nutriman.net), and the LLanden Consulting Ltd.. Their existing farming relations (e.g. Cigánd, Borsod-Abaúj-Zemplén county, and Dunasziget, Dam House, Győr-Moson-Sopron county) will be further expanded.

The largest amount of waste and by-product biomaterials to be processed are biopolymers. The first step in their chemical processing is depolymerization. It is understood that one of the most important characteristics of a biopolymers is their molecular weight distribution. The TTK AKI acquires an advanced gel permeation chromatograph (Advanced Polymer Chromatograph, APC) to determine the molecular weight distribution. The chromatograph can also be used in high performance liquid chromatography (HPLC) mode to separate and determine the composition of complex organic product mixtures.

The project winning researchers intend to find the most important bio-wastes and by-products occurring in the Slovak-Hungarian border region, to collect samples from them, and to organize and store the samples at the Slovak partner, setting up a so-called a Biobank. The TTK AKI Renewable Energy Research Group collects mainly lignocellulose-type samples in the Hungarian border region.

The research group depolymerizes lignocellulose by hydrolytic processes. In addition to the usual analytical methods, the new state-of-the-art analytical tools of the joint laboratory are used to characterize biopolymers and their depolymerized derivatives. Both laboratories are involved in the establishment of laboratory scale catalytic technologies that can be used to convert biomaterials and biomaterial derivatives into value-added chemicals, fuels or chemical intermediates that require further processing. The Joint Laboratory provides professional support to contractors interested in installing scaled-up process.

The task of the Hungarian partner is to enable the researchers to remotely monitor the devices of the virtual joint laboratory located at the partner institution by establishing a computer connection. The results are stored in a common electronic database installed in Hungary. The data is freely available to both partners via on-line computer and instrument connection and can be processed by instrument compatible computer programs.

The two-year project started on October 1, 2020. The objectives of the project are in line with the EU Bioeconomy Strategy, the BIOEAST Initiative of the Central and Eastern European Countries, the Regional Development Strategy of the Slovak Republic, and the Hungarian National Smart Specialization Strategy (S3).

Partners want to take advantage of the synergies of their expertise. Their cooperation is planned not only for the duration of the project, but also for the long term. The research is closely related to the education of young researchers, contributes to the improvement of the quality of university education and creates a basis for the development of new, domestic and EU collaborations.