

**Final Report regarding the Bilateral State Scholarship mobility application, with registration number: AK-00162-002/2021**

The mobility period started at the host institution, Biological Research Center, Szeged, Hungary, with the date of 21<sup>st</sup> of February. Given the high number of COVID cases reported by the authorities, both in Hungary and Romania, the starting date was slightly delayed comparing to the proposal.

The experiments were made under the supervision of Prof. Laszlo SZABADOS in the Laboratory of Arabidopsis Molecular Genetics, plant biology section and the Laboratory of Proteomics Research, and it involved training and support to acquire technical skills in mass spectrometry for different purposes.

The Small Paraquat resistance protein (SPQ) was originally identified due to its capacity to confer paraquat resistance to overexpressing *Arabidopsis* plants, and therefore, SPQ phosphorylation was investigated *in vivo* by mass spectrometry using epitope-tagged SPQ expressing Arabidopsis lines. Furthermore, SPQ interacting proteins were identified in order to reveal potential protein-protein interactions. For that reason, epitope-tagged SPQ (eg. GFP-SPQ or HA-SPQ) were expressed in *spq* mutant background. Immunoprecipitation of epitope-tagged SPQ from plant extracts were performed and interacting proteins were subsequently identified by mass spectrometry.

During the mobility period I had the opportunity to make professional connections with several scientific institutes and researchers like Janda Tibor and Dernovics Mihaly from the Centre for Agricultural Research, Martonvasar. These visits allowed me to get familiarized with metabolomic analysis of *Astragalus exscapus* ssp. *transsilvanicus* extracts using chromatographic separation coupled with mass spectrometry (UPLC-Vion IMS-QTOF-MS, Waters). The samples were analyzed in combined ion mobility + MSe mode using positive and negative ionization setups in the *m/z* range of 100-2000 and several bioactive components of interest were identified. The laboratory work took place in between 21-26 March, and future perspectives were discussed related to further analysis of the *A. exscapus* ssp. *transsilvanicus* plant, obtained *in vitro* from seeds.

As my field of interest is extended to food science and technology and I explored the opportunity to visit the Hungarian University of Agricultural and Life Sciences, where I established contact

with prof. Laszlo Abranko. During the visit I acquired some technical knowledge regarding the implementation of the simulated digestion process published by Nature Protocols and developed by the INFOGEST group for static *in vitro* digestion of food matrices. Microencapsulated carotenoids were subjected to the *in vitro* protocol and the individual carotenoids (lycopene, beta-caroten and lutein) were determined by HPLC-DAD-MS before and after the process, to evaluate the encapsulation efficiency of the target compounds. The laboratory work took place in between 5-9 April, and future perspectives were discussed related to further characterization of the microcapsules and the possible publication of the results.

The mobility was finalized on the 20<sup>th</sup> of June. The scholarship and the visits were great experience, both professionally and socially. Therefore, I would like to express my gratitude to Prof. Laszlo Szabados for his dedicated coordination and to Tempus Public Foundation for the grant opportunity. As future perspectives were outlined in collaboration with several scientific institutes, I hope for a new bilateral project in the future.

Kind regards.

Katalin Szabo

A handwritten signature in blue ink, appearing to be 'Katalin Szabo', written over the printed name.