Project title: Simultaneous elemental microanalytical method for environmental and food monitoring using passive sampling and miniaturized instrumentation based on microplasma optical emission spectrometry (MULTIPASS)

Degree of achievement of the estimated results stage 3 2024

Crt. No.	Type of result/product proposed	Assumed at contracting	Results (deliverables) achieved	Degree of achievement
1	Analytical methods	Microanalytical methods developed for environmental samples (DGT-SSETV-µCCP-OES) TRL4	3 Microanalytical methods developed for environmental samples (DGT-SSETV-µCCP-OES) TRL4	Fulfilled 100%
2	Analytical methods	Microanalytical methods developed for food samples (DGT-SSETV-µCCP-OES) TRL4	3 Microanalytical methods developed for food samples (DGT-SSETV-µCCP-OES) TRL4	Fulfilled 100%
3	Analytical methods	Developed analytical methods based on DGT and classical methods for comparison with (DGT-SSETV-µCCP-OES)	2 Developed analytical methods based on DGT and classical methods for comparison with (DGT-SSETV-µCCP-OES)	Fulfilled 100%
4	Demonstration report	Report on the demonstration of the usefulness and functionality of the new microanalytical methods DGT-SSETV-µCCP-OES	Report on the demonstration of the usefulness and functionality of the new microanalytical methods DGT-SSETV-µCCP-OES	Fulfilled 100%
5	Technical documentation	2 Standard operating procedures based on DGT-SSETV-µCCP-OES	2 Standard operating procedures based on DGT-SSETV-µCCP-OES	Fulfilled 100%
6	Technical documentation	VP on intellectual property rights for industrial research	VP on intellectual property rights for industrial research	Fulfilled 100%
7	National patent application	National patent application	National patent application	Fulfilled 100%
8	Scientific conferences	3 participations at national and international conferences	3 participations at national and international conferences	Fulfilled 100%
9	Scientific articles	2 articles with IF >3	5 articles with >3	Exceeded 250%
10	Phase report	Interim research report	Interim research report	Fulfilled 100%

Conference participations

- **2 Participations at the 50th International Conference of Slovak Society of Chemical Engineering (SSCHE), Tatranske Matliare, Slovakia, 20–24 May 2024**
  1. **S. Angyus, T. Frentiu, M. Frentiu, E. Covaci, M. Senila** Evaluation of mercury concentration and mobility in soils around a former chlor-alkali plant using diffusive gradients in thin films (DGT) technique (**Poster**)
  2. **E. Covaci, S. Angyus, M. Senila, M. Frentiu, T. Frentiu** Speciation of toxic metals in soil as total and labile fraction using diffusive gradients in thin films (DGT) passive sampling and determination by capacitively coupled plasma optical emission spectrometry (**Poster**)
- **1 Participation at the International Spring Seminar on Electronics Technology, 15-19 May 2024, Prague, Czech Republic**
  1. **S. Cadar, D. Petreus, T. Patarau, E. Szilagyi** Design of a flat coil electrothermal vaporization device for inductively coupled plasma optical emission spectrometry **(Poster).**

Published scientific articles

1. ***M. Senila, M.A. Resz, L. Senila, I. Torok***, Application of Diffusive Gradients in Thin-films (DGT) for assessing the heavy metals mobility in soil and prediction of their transfer to *Russula virescens*, *Science of The Total Environment*, 2024, 909, 168591 (*FI = 9.8*)
2. ***M. Senila, E. Kovacs***, Use of diffusive gradients in thin-film technique to predict the mobility and transfer of nutrients and toxic elements from agricultural soil to crops—an overview of recent studies, *Environmental Science and Pollution Research*, 2024 (*FI = 5.8*).
3. ***M. Senila, E.A. Levei, T. Frentiu, C. Mihali, S.B. Angyus,*** Assessment of mercury bioavailability in garden soils around a former nonferrous metal mining area using DGT, accumulation in vegetables, and implications for health risk. *Environmental Monitoring and Assessment*, 2023, 195, 1554 (*FI = 3.0*)
4. ***M. Senila, M.A. Resz, I. Torok, L. Senila***, Nutritional composition and health risk of toxic metals of some edible wild mushrooms growing in a mining area of Apuseni Mountains, Western Carpathians, *Journal of Food Composition and Analysis*, 2024, 128, 106061 (*FI = 4.3*)
5. ***M. Senila, O. Cadar, T. Frentiu, L. Senila, S.B. Angyus***, Diffusive Gradients in Thin-films as passive sampling tool for the measurement of labile species in fractionation analysis of metals (Fe, Mn, Cu, Zn and Pb) in beer, *Microchemical Journal*, 2024, 198, 2024, 110195 (*IF = 4.8*)