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

Achievement degree of estimated results stage 2 2023

Crt. No.	Type of result/product proposed	Assumed at contracting	Results (deliverables) achieved	Degree of achievement
1	Report on optimisation of DGT-SSETV-µCCP-OES equipment operating conditions	Optimization report on the DGT-SSETV-µCCP-OES equipment optimization for the determination of As, Sb, Se	Optimization report on the DGT-SSETV-µCCP-OES equipment optimization for the determination of As, Sb, Se	Fulfilled 100%
2	Product - Specialized software, Rh microfilament temperature control	Specialized software for evaporation temperature control As, Sb, Se	Specialized software for evaporation temperature control As, Sb, Se	Fulfilled 100%
3	Report on optimisation of DGT-SSETV-µCCP-OES equipment operating conditions	Working conditions optimization report for plasma micro-torch for simultaneous multi-element determination by DGT-SSETV-µCCP-OES (As, Sb, Se)	Working conditions optimization report for plasma micro-torch for simultaneous multi-element determination by DGT-SSETV-µCCP-OES (As, Sb, Se)	Fulfilled 100%
4	Report on the experimental analytical performance of the SSETV-µCCP-OES methods	Experimental report on the improvement of the analytical performance of SSETV-µCCP-OES methods with and without DGT	Experimental report on the improvement of the analytical performance of SSETV-µCCP-OES methods with and without DGT	Fulfilled 100%
5	Experimentation report - analytical performance comparison study	Comparative study of analytical performance for DGT-SSETV-µCCP-OES with traditional methods GFAAS, TDAAS, ICP-OES and European legislation requirements	Comparative study of analytical performance for DGT-SSETV-µCCP-OES with traditional methods GFAAS, TDAAS, ICP-OES and European legislation requirements	Fulfilled 100%
6	Environmental sampling methods validation report	Validation report on DGT-SSETV-µCCP-OES based methods for simultaneous multi-element determination in environmental samples	Validation report on DGT-SSETV-µCCP-OES based methods for simultaneous multi-element determination in environmental samples	Fulfilled 100%
7	Food sample method validation report	Validation report on DGT-SSETV-µCCP-OES based methods for simultaneous multi-element determination in food	Validation report on DGT-SSETV-µCCP-OES based methods for simultaneous multi-element determination	Fulfilled 100%

Crt. No.	Type of result/product proposed	Assumed at contracting	Results (deliverables) achieved	Degree of achievement
		samples	in food samples	
8	Scientific conferences	4 participations at national and international conferences	8 participations at national and international conferences, 6 posters and 2 oral presentations	Exceeded 200%
9	Scientific articles	2 articles with IF >3	3 articles with IF >3	Exceeded 150%
10	Phase report	Interim research report	Interim research report	Fulfilled 100%

Conference participations

- **3 participations at the 49th International Conference of Slovak Society of Chemical Engineering (SSCHE), Tatranske Matliare, Slovakia, 15–18 May 2023**
  1. **E. Covaci, S.B. Angyus, M. Senila, M. Frentiu, T. Frentiu**. Elimination of spectral interference between Cd and As in their monitoring in water by using *in-situ* diffusive gradients in thin film passive sampling and detection by *ex-situ* microplasma optical emission spectrometry set-up equiped with a low-resolution microspectrometer. (**Poster**)
  2. **E. Covaci, S.B. Angyus, M. Senila, M. Frentiu, T. Frentiu**. Evaluation of green and white degree of a method based on *in-situ* diffusive gradients in thin film passive sampling coupled with *ex-situ* microplasma optical emission spectrometry set-up for determination of toxic elements in river water. (**Poster**)
  3. **S.B. Angyus, M. Senila, E. Covaci, T. Frentiu, M. Frentiu**. Monitoring of toxic trace metals in river water using *in-situ* diffusive gradients in thin film passive sampling and small-sized electrothermal vaporization capacitively coupled plasma microtorch optical emission spectrometry. (**Poster**)
- **2 participations at the 4th Young Researchers' International Conference on Chemistry and Chemical Engineering (YRICCCE IV), Debrecen, Hungary, 1–3 June 2023**
  1. **S.B. Angyus, M. Senila, E. Covaci, T. Frentiu**. Diffusive gradients in thin film and electrothermal vaporization capacitively coupled plasma optical emission spectroscopy method for the evaluation of bioavailable Cu, Zn, Cd and Pb fraction in agricultural soils. (**Oral presentation**)
  2. **E. Covaci, S.B. Angyus, M. Senila, M. Frentiu, T. Frentiu**. Greenness and whiteness of small-sized electrothermal vaporization capacitively coupled plasma optical emission spectrometry with *in-situ* diffusive gradients in thin films passive sampling (DGT-SSETV-µCCP-OES). (**Oral presentation**)
- **1 participation at the 14th International Conference Processes in Isotopes and Molecules, Cluj-Napoca, Romania, 19-22 September 2023**
  1. **S. Cadar, D. Petreus, T. Patarau, E. Szilagyi, B. Angyus, F. Tiberiu**. Optimization of the electrothermal evaporation process based on intelligent control of the power source. (**Poster**)

- **1 participation at the IEEE 29th International Symposium for Design and Technology in Electronic Packaging (SIITME), Craiova, Romania. 17-21 October 2023**
  1. **S. Cadar, D. Petreus, T. Patarau, E. Szilagyi**. Comparative analysis of two types of filaments with COMSOL for electrothermal process. (**Poster**)
- **1 participation at Agriculture and Food Conference- current and future challenges, AGRIFA, Cluj-**

Napoca, Romania. 20 October 2023

1. **M. Senila, M. Roman, B. Angyus**. Mercury fractionation in soil using Diffusive Gradients in Thin-films coupled with thermal decomposition - atomic absorption spectrometry. (**Poster**)

Published scientific articles

1. **M. Senila**, Metals and metalloids monitoring in water by passive sampling: A review, *Reviews in Analytical Chemistry*, 2023, 42, 20230065 (IF 4.3).
2. **S.B. Angyus, M. Senila, T. Frentiu, M. Ponta, M. Frentiu, E. Covaci**. *In-situ* Diffusive Gradients in thin-films passive sampling coupled with *ex-situ* small-sized electrothermal vaporization capacitively coupled plasma microtorch optical emission spectrometry as green and white method for the simultaneous determination of labile species of toxic elements in surface water. *Talanta*, 2023, 259, 124551 (IF 6.1)
3. **S.B. Angyus, M. Senila, E. Covaci, M. Ponta, M. Frentiu, T. Frentiu**. Simultaneous determination of Cd, Pb, Cu and Zn as total and labile fraction in soil using small-sized electrothermal vaporization capacitively coupled plasma microtorch optical emission spectrometry after diffusive gradients in thin-films passive accumulation. *Journal of Analytical Atomic Spectrometry*, 2024 (publicat online 2023), 39, 141 (IF 3.4)