

Activities in Phase 1

Activities, responsibilities of partners and obtained results

<p>Phase I. (Experimental development A3, Industrial research A2, Dissemination D) Optimization of the combustion assisted digestion and μ-SPE with C18 silica-based sorbents or with silica functionalized mesoporous sorbents for the extraction/ preconcentration of elements and analytical applicability testing of the SSETV-μCCP-OES demonstrator at TRL3 level for <i>ex-situ</i> and <i>on-site</i> analytical procedures (final completion). Validation, characterization and improvement of analytical performances for the SSETV-μCCP-OES-based methods with and without μ-SPE <i>ex-situ</i> and <i>on-site</i> preconcentration for foodstuffs and environmental samples quality control through monoelemental or simultaneous multielemental determinations. (partial completion)</p>	
<p>Activity 1.1. Optimization of sample digestion using the oxygen flask combustion method.</p>	
<p>CO-UBB Optimization of sample digestion using the oxygen flask combustion method.</p>	<p>Results: Report on the optimization conditions for sample digestion assisted by oxygen-bomb combustion for the determination of Cd, Pb, Cu, Zn, Hg, and Se by SSETV-μCCP-OES.</p>
<p>Activity 1.2. Testing and optimization of single element/multielement <i>ex-situ</i> preconcentration using the new μ-SPE C18 silica-based cartridges, followed by a one-step chelation with functionalized silica sorbents.</p>	
<p>CO-UBB Testing and optimization of single element/multielement <i>ex-situ</i> preconcentration using the new μ-SPE C18 silica-based cartridges, followed by a one-step chelation by silica functionalized sorbents.</p>	<p>Results: <i>Ex-situ</i> (laboratory) optimized method for the multielement preconcentration of Cu^{2+}, Cd^{2+}, Zn^{2+}, and Pb^{2+} by μ-SPE on C18 cartridges functionalized with dithizone, applicable for determinations by (μ-SPE)-SSETV-μCCP-OES</p>
<p>Activity 1.3. <i>On-site</i> implementation and testing of the single element/multielement preconcentration from surface waters using C18 silica-based μ-SPE cartridges and/ or functionalized silica sorbents.</p>	
<p>CO-UBB <i>On-site</i> implementation and testing of the single element/multielement preconcentration from surface waters using C18 silica-based μ-SPE cartridges and/ or functionalized silica sorbents</p>	<p>Results: <i>On-site</i> implementation of a portable autonomous device for the multielement preconcentration of Cd^{2+}, Cu^{2+}, Pb^{2+}, and Zn^{2+} from surface water samples on μ-SPE cartridges functionalized with dithizone.</p>
<p>P1-Fotometric Instruments S.R.L. <i>On-site</i> implementation and testing of the single element/multielement preconcentration from surface waters using C18 silica-based μ-SPE cartridges and/ or functionalized silica sorbents</p>	
<p>Activity 1.4. Optimization of the power supply – miniaturized electrothermal vaporizer – microplasma tandem through rigorous temperature control for introduction of the liquid microsamples in μCCP. (final completion)</p>	
<p>CO-UBB Optimization of the power supply – miniaturized electrothermal vaporizer – microplasma tandem through rigorous temperature</p>	<p>Results: Optimized power supply – miniaturized electrothermal vaporizer</p>

control for introduction of the liquid microsamples in μ CCP. (final completion)	tandem for the simultaneous determination of Cd, Cu, Zn, Hg, Pb, Se și As by SSETV- μ CCP-OES from food and environmental samples
Activity 1.5. Improvement of the analytical performances (limits of detection, non-spectral matrix effects) of the single element/multielement SSETV- μ CCP-OES methods for environmental and foodstuffs samples after <i>ex-situ/ on-site</i> μ -SPE preconcentration. (final completion)	
CO-UBB Improvement of the analytical performances (limits of detection, non-spectral matrix effects) of the single element/multielement SSETV- μ CCP-OES methods for environmental and foodstuffs samples after <i>ex-situ/ on-site</i> μ -SPE preconcentration. (final completion)	Results: Improved analytical performance for the SSETV- μ CCP-OES method with and without multielement <i>ex-situ/in-situ</i> preconcentration on μ -SPE cartridges functionalized with dithizone.
P1-Fotometric Instruments S.R.L. Improvement of the analytical performances (limits of detection, non-spectral matrix effects) of the single element/multielement SSETV- μ CCP-OES methods for environmental and foodstuffs samples after <i>ex-situ/ on-site</i> μ -SPE preconcentration. (final completion)	
Activity 1.6. Validation of the SSETV- μ CCP-OES single element and multielement methods for environmental and foodstuffs samples with or without <i>ex-situ/in-situ</i> μ -SPE preconcentration. (partial completion)	
CO-UBB Validation of the SSETV- μ CCP-OES single element and multielement methods for environmental and foodstuffs samples with or without <i>ex-situ/in-situ</i> μ -SPE preconcentration. (partial completion)	Results: Validated multielement (OFC)-SSETV- μ CCP-OES method for the determination of Cu, Zn, Cd, Pb, Hg, Se, and As in foods without μ -SPE preconcentration.
P1-Fotometric Instruments S.R.L. Validation of the SSETV- μ CCP-OES single element and multielement methods for environmental and foodstuffs samples with or without <i>ex-situ/in-situ</i> μ -SPE preconcentration. (partial completion)	
Activity 1.7. Validation of the (μ -SPE)-SSETV- μ CCP-OES by comparison with ICP-OES and GFAAS methods. (partial completion)	
CO-UBB Validation of the (μ -SPE)-SSETV- μ CCP-OES by comparison with ICP-OES and GFAAS methods. (partial completion)	Results: Validated (OFC)-SSETV- μ CCP-OES method for food samples by comparison with (HP-MAWD)-ICP-OES, and (μ -SPE)-SSETV- μ CCP-OES method for surface waters by comparison with GFAAS
P1-Fotometric Instruments S.R.L. Validation of the (μ -SPE)-SSETV- μ CCP-OES by comparison with ICP-OES and GFAAS methods. (partial completion)	
Activity 1.8. Dissemination of results through participation in national and international conferences (2 conferences), and publication in WoS indexed journals (1 paper)	
CO-UBB Dissemination of results through participation in national and international conferences (2 conferences), and publication in WoS indexed journals (1 paper)	Results: 1 article published in the <i>Journal of Analytical Atomic Spectrometry</i> , DOI: 10.1039/D5JA00297D (IF = 3.1)

	<p>4 mobilities at 2 international conferences (1 oral presentation and 3 posters at The 51st International Conference of the Slovak Society of Chemical Engineering SSCHE 2025, Demanovska Dolina, 27-30 May 2025; 1 oral presentation at The XXXIth International Conference on Chemistry, Sibiu, Romania, 23-25 October 2025)</p>
--	--