Validation of a horizontal method for trace elements in soil, sludge and biowaste
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Abstract:
Validation of an analytical method is a necessary step in controlling the quality of quantitative analysis. Method validation is an established process, which is the provision of documentary evidence that a system fulfils its pre-defined specification or the process of providing that an analytical method is acceptable for its intended purpose. To implement a validated method for the analysis of 22000 soil samples stemming from 2009 LUCAS Soil Survey as well as from sewage sludge and treated biowaste samples from to FATE-Programme, a validation study was conducted with the following objectives: (i) to validate these methods for the determination of heavy metals by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) and Could Vapour-Atomic Adsorption Spectrometry (CV-AAS) techniques, respectively, according to the ISO 17025 requirement and (ii) to implement these methods for the determination of heavy metals in soil, sludge and compost samples on a routine basis. The two methods were validated using Certified Reference Materials (CRMs): BCR 141R ‘Calcareaous Loam Soil’, BCR 142 ‘Light Sandy Soil’, “San Joaquin Soil” SRM 2709 and LCG 6181 ‘sewage sludge’. The calibration curves, detection and quantification limits, trueness as well as repeatability were determined. The budget uncertainty was also estimated (including a full uncertainty budget and Ishikawa-diagram). The observed expanded uncertainty were establish for Ag (4.0%, Al (6.1%), As(7.6% ), Ba (5.3%), Cd (4.5%), Co(7.4%), Cr (5.8%), Cu (3.5%), Fe (5.4%), Mg (6.5%), Mn (4.1%), Mo (2.5%), Ni (5.4%), Pb (7.0%), Sb (6.8%), Se (3.1%), Ti (8.3%), V (4.3%), Zn (5.9%), P (14.2%), K (20.0%).

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