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A comprehensive insight into sampling and sample preparation steps for trace element determinations in plant material

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Environmental monitoring is a process which consists of many interdependent steps. Each step ranging from selection of sampling sites through sampling of plant material to chemical analysis and data interpretation has to be thought over and all errors that come out of each stage should be identified because they can be a source of partial uncertainty. The quality of measurement describes total uncertainty that involves sampling, which is the main source of uncertainty (even up to 100%), sample preparation and to a lesser extent chemical analysis. Like sampling, sample preparation has also a notable impact on the measurement uncertainty. To provide further insight into the impact of sampling and sample preparation steps on the quality of measurement and the level of uncertainty chemical analysis of *Pleurozium schreberi* (Brid.) Mitt moss samples for selected trace elements (Cu, Fe, Mn, Zn) and rare earth elements (La-Lu) were done. All combined and duplicate samples were collected within three forested areas and prepared for analysis using two different treatment method, i.e., manually cleaning and triple rinsing with deionized water. The following statistical methods: ANOVA, RANOVA, modified RANOVA and range statistics were harnessed to calculate uncertainty of sampling, sample preparation and analysis. In all cases analytical uncertainty was below 3%. Sampling and sample preparation uncertainty varied from 3.8 to 12.8% and from 3.4 to 29.7%, respectively. The level of uncertainty was dependent on type of element, its intra- or extracellular distribution, specificity of sampling area and statistical method used for calculation.

Biography

Sabina Dołęgowska is an Assistant Professor at the Institute of Chemistry, Jan Kochanowski University in Kielce, Poland. She has graduated from the Institute of Chemistry in 2006, Jan Kochanowski University in Kielce and received her PhD degree from Gdańsk University of Technology in 2010. Her key interest is quality control of environmental studies, environmental chemistry and biogeochemistry, trace element and stable isotope geochemistry.

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