



Saint Petersburg State University
Russian Foundation for Basic Research
Scientific Council of Analytical Chemistry of the Russian Academy of Sciences
Japanese Association for Flow Injection Analysis



Book of Abstracts

21st International Conference on Flow Injection Analysis and Related Techniques

*In Honor of the 80th Birthday of
Prof. G. Christian*

September 3–8, 2017
Saint Petersburg, Russia



Soil/water interface assessment using sequential injection for multiparametric analysis

Raquel B. R. Mesquita^{a,b*}, Carolina F. F. A. Costa^a, Leticia S. Mesquita^a, António O. S.S. Rangel^a

^a *Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal*

^b *ICBAS/UP - Instituto de Ciências Biomédicas Abel Salazar, Universidade do Porto, Portugal*

E-mail*: rmesquita@porto.ucp.pt

Soil composition has a huge impact on the quality of surface and ground waters, due to run-off and leaching of nutrients and contaminants, respectively. In this scenario, this is also a major issue affecting the health and wellbeing of the citizens, with a major social and economic impact. Conventional soil testing can hardly keep up with the ever-increasing demand of sample analysis. Additionally, the conventional soil testing is based on manual or mechanical soil sampling and atomic absorption/emission spectroscopy, leading to costly and time consuming assays. This cost limits the number of samples analyzed per field, making it difficult to characterize spatial or temporal variability in soil nutrient or contaminant concentrations. Additionally, the commonly used spectroscopic techniques only provide information on total elements content, and do not enable chemical speciation. The morosity of these analytical tools also impairs an efficient study of the extension and the kinetics of chemicals leaching to ground waters.

In this work, an automatic, low cost sequential injection method, capable of real-time monitoring of the soil leaching processes was developed using spectrophotometric detection to attain a multiparametric determination. The SI method was applied to the monitoring of laboratory scale soil columns (LSSC) and enabled to carry out leachates testing using rain simulations with different loads of micronutrients supplements. The assessed parameters, within a single manifold, include: calcium, magnesium, and alkalinity, adapted from earlier work [1]; as well as iron and iron complexes; and the obtained results proved to be comparable to the reference procedures.

Acknowledgements:

R. B. R. Mesquita and L. S. Mesquita thank to Fundação para a Ciência e a Tecnologia (FCT) and POCH of FSE for the grants SFRH/BPD/112032/2015 and PTDC/AAG-MAA/5887/2014_BI_2, respectively. This work was also supported by National Funds from FCT through projects PTDC/AAG-MAA/5887/2014 and UID/Multi/50016/2013.

References:

1. R. B. R. Mesquita, A. O. S. S. Rangel, *Anal. Sci.* 20 (2004) 1205-1210.