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Biological Monitoring of Air Pollution with Plants: results from a pilot study in the Western Cape, South Africa

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Abstract content
   (Max 300 words)

Biological monitoring with plants is a low-cost, effective method to estimate levels of air pollutants and their impact on humans and animals. Plants show an integrated response to air pollution. Plants such as lichens and mosses possess efficient accumulation capacity for many air pollutants (Markert et al., 2008; Steinnes, 2011). Lichens and mosses do not possess roots and therefore their primary sources of nutrients are directly from atmospheric deposition. The processes by which atmospheric deposition occurs include wet/dry deposition and gaseous absorption. The results from biomonitoring complement traditional air quality data obtained using, for example, air filters and pumps. In our pilot study in the Western Cape area, about 30 samples of lichens and mosses were collected during March-April 2012. Fourteen of these were subjected to ion-coupled mass spectrometry (ICP-MS) in the Central Analytical Facility of Stellenbosch University (SU). The concentrations of major, minor and trace elements were determined. Descriptive Statistics and correlation analysis allowed revealing geochemically bound elements as well identifying the sampling sites with elevated elemental concentrations. Multi-element non-destructive instrumental neutron activation analysis (INAA) at JINR, Dubna (Frontasyeva, 2011), will be performed for the whole set of collected samples thus facilitating an intercomparison of the results obtained by ICP-MS and INAA.

This study was undertaken in the framework of a JINR-South Africa co-operative program with SU.

References

B. Markert, S. Wuenschmann, S. Fraenzle et al. On the road from environmental biomonitoring to human health aspects: monitoring atmospheric heavy metal deposition by epiphytic/epigeic plants: present status and future needs. Int. J. Environment and Pollution, Vol. 32, No. 4, 2008, p. 486-498.

E. Steinnes, T. Berg, H.T. Uggerud. Three decades of atmospheric metal deposition in Norway as evident from analysis of moss samples. Science of the Total Environment, Vol. 412-413, 2011, p. 351–358.

M.V. Frontasyeva. Neutron activation analysis for the Life Sciences. A review. "Physics of Particles and Nuclei", 2011, Vol. 42, No. 2, p. 332-378.

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