Departmental Seminar Series

You are cordially invited to a PhD public lecture presented by:

Eve Kroukamp

Optimization of analytical methods for metal(loid)s in a lichen biomonitor

Air pollution by metal(loid)s has become of global concern within the last few decades, where the presence and high abundance of certain metals in air have been directly linked to a number of adverse health effects. Consequently, metal air pollution needs to be monitored. Where conventional methods such as air filters are often expensive and difficult to implement, the use of lichens as biomonitors of air pollution offer an affordable and attractive option. Since total metals are only able to provide a snapshot of toxicity, speciation and fractionation studies are extremely valuable as they are able to provide a wealth of information about potential site specific impacts and the general air quality. In this study, the use of the lichen, *Parmotrema austrosinense*, as a biomonitor of air pollution was evaluated at a number of different sites in South Africa, which will serve as a baseline for future evaluations of this type. The study focussed on method development, addressing a number of different issues such as the suitability of this particular lichen species for such studies, the role which sample preparation and storage have on the total and fractionated metals in the sample, and the optimized extraction and method development of an isocratic HPLC-ICP-MS method which allows for the separation of five common, toxicologically relevant As species in this lichen biomonitor. Thereafter, the study drew together the strengths of the two different techniques employed, namely As speciation using HPLC-ICP-MS and fractionation patterns achieved through sequential extractions. The findings from the study were able to link the different sources of As in air from each site when combined with meteorological and geological data. Moreover, the findings provided a plausible explanation for the increase in As V concentrations over time, as has been observed by some researchers. The study concluded that the developed methods and lichen species used are fit for their use in air quality monitoring initiatives, where baseline information for three sites in South Africa were established for a number of different metal(loid)s. Due to the ability of this lichen species to metabolize and methylate As, it can serve as a selective detector by providing information about the source, magnitude and timeline for As exposure events.

Date: **31 July 2019**
Time: **14h00**
Venue: **Room 4-36, Library Research Commons**
Enquiries: **Prof Patricia Forbes, patricia.forbes@up.ac.za**