Department of Chemistry

Departmental Seminar:
Analytical Chemistry Month

You are cordially invited to a virtual lecture presented by

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Supervised by Dr Yvette Naudé and Prof Egmont Rohwer

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Date: Friday, 26 November 2021
Time: 10:30 – 11:20
Venue: Google Meet
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Chemical profiling of the human skin surface for malaria vector control using a non-invasive sorptive sampler with GC×GC-TOFMS and UPLC-IMS-HRMS

Odour mosquito lures are currently being used as part of integrated vector control strategies in the fight against malaria. Variation in inter-human attractiveness to mosquitoes, and the preference of mosquitoes to bite certain regions on the human host, are possible avenues for identifying potential mosquito attractants and repellants. The chemical complexity of the human skin surface and ethical considerations when sampling humans call for non-intrusive sampling solutions that enables the detection of a wide range of chemical compounds, whilst not impeding on the dignity of the individual sampled, and as well as for sophisticated analytical techniques that enable the detection of low concentration chemicals in a complex matrix. To address challenges associated with human skin sampling, a practical non-invasive sampling approach was investigated to sample the wrist and ankle skin surface area of human volunteers. In-house developed polydimethylsiloxane (PDMS) sorptive samplers were

fashioned into anklets and bracelets and placed in direct contact with the skin surface for ease of sampling.

Sampling was followed by analyses with comprehensive gas chromatography – time of flight mass spectrometry (GC×GC-TOFMS) and ultra-performance liquid chromatography – ion-mobility spectrometry – high resolution mass spectrometry (UPLC-IMS-HRMS). The sampler was thermally desorbed directly in the inlet liner of a GC system, while for LC analyses the PDMS sampler was solvent back-extracted prior to analyses. These complementary approaches enabled the detection and tentative or unequivocal identification of compounds from a broad range of chemical classes that contributes to the differences in human skin surface chemical profiles. These biological lead compounds are potential attractants or repellants in future vector control strategies.