



Canadian Association  
of Physicists

Association canadienne  
des physiciens et physiciennes

Contribution ID: 3609

Type: Oral (Non-Student) / Orale (non-étudiant(e))

## Portable X-ray fluorescence measurement of zinc and selenium in toenail clippings from a New Zealand population

Wednesday 21 June 2023 11:30 (15 minutes)

The analysis of human nail clippings to determine the concentration of certain elements is often used to assess exposure to elements and their absorption into the body. When nail clippings are used as a biomarker, they are usually analyzed by a “gold standard” method such as inductively coupled plasma-mass spectrometry (ICP-MS). Our group has investigated the use of a novel portable X-ray fluorescence (pXRF) technique as an alternative approach to assessing elements in nail clippings. The pXRF method allows for rapid and low-cost measurements using a single nail clipping or a series of nail clippings from an individual. Here, we report on results from the toenail clippings of mothers and infants living in New Zealand. Toenail clippings were obtained from participants in the Mother and Infant Nutrition Investigation (MINI). Energy spectra resulting from irradiation of the clippings were analyzed for characteristic X-rays from zinc and selenium. The MINI protocol involved the collection of toenail clippings from mother and infant pairings at three separate time points. Results of elemental analysis from two of these three time points are now available. Following non-destructive assessment of the toenail clippings by pXRF, they were then measured for elemental concentrations using ICP-MS. Results will be presented from both methods, and from both of the available time points. Dietary and environmental indications for the study population will be described. As well, the implications of the results for the use of pXRF to detect different elements in nail clippings will be considered.

### Keyword-1

X-ray fluorescence

### Keyword-2

zinc

### Keyword-3

selenium

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**Session Classification:** (DPMB/DAMOPC) W1-3 Bioimaging | Bioimagerie (DPMB / DPAMPC)

**Track Classification:** Technical Sessions / Sessions techniques: Physics in Medicine and Biology / Physique en médecine et en biologie (DPMB-DPMB)