

Comparison of Concentration of Heavy Metals in PM2.5 Analyzed in Three Different Global Research Institutions Using X-Ray Fluorescence

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Abstract : This study was conducted by comparing the concentrations of heavy metals analyzed from the same samples with three X-Ray fluorescence (XRF) spectrometer in three different global research institutions, including PAN (A Branch of Malvern Panalytical, Seoul, South Korea), RTI (Research Triangle Institute, NC, U.S.A), and aerosol laboratory in Harvard University, Boston, U.S.A. To achieve our research objectives, the indoor air filter samples were collected at homes (n=24) of adults or child asthmatics then analyzed in PAN followed by Harvard University and RTI consecutively. Descriptive statistics were conducted for data comparison as well as correlation and simple regression analysis using R version 4.0.3. As a result, detection rates of most heavy metals analyzed in three institutions were about 90%. Of the 25 elements commonly analyzed among those institutions, 16 elements showed an R^2 (coefficient of determination) of 0.7 or higher (10 components were 0.9 or higher). The findings of this study demonstrated that XRF was a useful device ensuring reproducibility and compatibility for measuring heavy metals in PM2.5 collected from indoor air of asthmatics' home.

Keywords : heavy metals, indoor air quality, PM2.5, X-ray fluorescence

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