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Analysis of human hair cross sections from two different population groups by Nuclear Microscopy

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Abstract

Trace element analysis of hair is used as a screening technique to assess body-nutrient levels and/or toxicity due to environmental pollutants. With the aim to compare element content and spatial distribution within scalp hair-shaft cross sections of two distinct human population groups, and to assess possible similarities and/or differences, hair samples from Sudan and South Africa were collected. Proton backscattering and Micro-PIXE were used to determine the matrix composition and content of light and middle transition elements, with beam energies of 1.5 and 3.0 MeV. Mapping analysis showed a relatively similar content distribution for S, Cl, K and Ca within each group. However significant differences, particularly for heavier metals, such as Fe and Zn were also found. Correspondence Analysis of the data showed a clear separation between the two groups when the total content over the hair cross section was considered.

Keywords

Nuclear Microprobe, Hair analysis, PIXE