

Quantitative Analysis of Heavy Metals in a Hair Sample with the ICP-MS: A Case Report

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Abstract

Background: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) is a type of mass spectrometry that uses an inductively coupled plasma to determine how much of a specific element is in the material analyzed. It is a highly sensitive and specific quantitative analysis, when the concentration of each element is determined by comparing the counts measured for a selected isotope to an external calibration curve that was generated for that element.

Case Report: The aim of the study is to determine the concentration of each chemical element with ICP-MS in a hair sample of a 25-year-old woman (non-smoker, without a previously diagnosed chronic disease). The research was carried out in the UNILAB laboratory at the University “Goce

Delcev”-Stip by the method of ICP-MS, Agilent7500.

Conclusion: We observed low concentration of: Cu, Zn, Ge, Se, B, Fe, Na, K, Rb, Cd, Hg, Tl, Pb, Be, Ag, Sb, Bi and U and high concentration of: Mg, Ca, S, V, Cr, Mo, Mn, Co, Li, Sr, Al Ni As and Ba. The proposed ICP-MS method for analysis of multiple chemical elements is a non-invasive method of investigation and it can be employed in routine analysis, which can extend the use of hair analysis for therapy, occupational, nutritional, and toxicological controls. Therefore, the method itself can help health professionals in identifying and detecting certain toxic elements in the body and perform early diagnosis of certain diseases.

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