

Quantitative Analysis of Untreated Bio-samples for Monitoring Human Exposure to Heavy Metals –

Application of a Standard-free Method to Quantitative Analysis of Urine Samples

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Abstract

A standard-free method of quantitative analysis, which is based on the fact that the total yield of continuous x-rays from the sample approximately corresponds to effective weight of the sample, was developed and has been applied to some typical bio-samples such as serum, whole blood, hair and untreated bone. In this work, the standard-free method was applied to untreated urine samples. This method allows us to perform sample preparation only by dropping 5 μ l of urine sample onto a backing film. It requires neither a large amount of urine nor the internal standard. As the results, values of concentration of potassium for 4 samples agree well with the value obtained by the internal standard method within an error of 10%. The present method was also applied to 21 urine samples containing excess amount of urinary protein and/or sugar, and it is found that the present method is applicable to such abnormal urines. Owing to this method, target preparation can be performed at the place and time of sampling. It is quite convenient to environmental studies.

Keywords: PIXE, urine, standard-free, quantitative analysis, exposure, toxic element