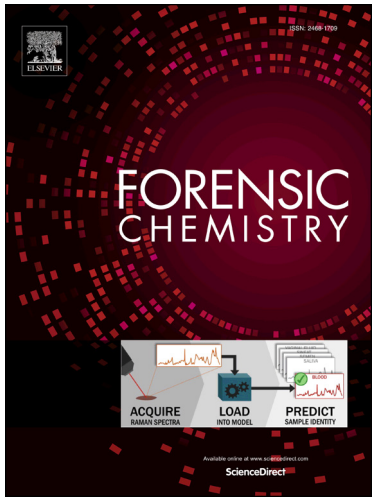
Accepted Manuscript



Large sample neutron activation analysis avoids representative sub-sampling and sample preparation difficulties: an added value for forensic analysis.

Peter Bode, Sabrina Romanò, Francesco Saverio Romolo

PII: S2468-1709(17)30100-5
DOI: https://doi.org/10.1016/j.forc.2017.10.002
Reference: FORC 69

To appear in: *Forensic Chemistry*

Received Date: 17 August 2017
Revised Date: 21 September 2017
Accepted Date: 11 October 2017

Please cite this article as: P. Bode, S. Romanò, F.S. Romolo, Large sample neutron activation analysis avoids representative sub-sampling and sample preparation difficulties: an added value for forensic analysis., *Forensic Chemistry* (2017), doi: https://doi.org/10.1016/j.forc.2017.10.002

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Large sample neutron activation analysis avoids representative sub-sampling and sample preparation difficulties: an added value for forensic analysis.

Peter Bode[a,*], Sabrina Romanò[b] and Francesco Saverio ROMOLO[b].

[a] Delft University of Technology, Reactor Institute Delft, The Netherlands[1].
[*] Corresponding author: p.bode@tudelft.nl; peter.bode@ymail.com.

[b] SAPIENZA University of Rome, Rome, Italy.

Abstract

A crucial part of any chemical analysis is the degree of representativeness of the measurand(s) in the test portion for the same measurands in the object, originally collected for investigation. Such an object usually may have either to be homogenized and sub-sampled, or digested/dissolved. Any of these steps introduce sampling errors, risk of contamination or loss of the measurand(s). Neutron (and photon) activation analysis and prompt gamma analysis have the capabilities of analyzing large objects or samples without the need of any pre-treatment, i.e., intact 'as received', with masses varying from tens of grams to tens of kilograms, and with any type of (irregular) shape.
The basic concept of neutron activation analysis and prompt gamma analysis are shortly revisited and the scope of application of the large sample analysis with these technique are elaborated on with an outlook for use in forensic studies, including the analysis of medicinal products and drugs of abuse.

Keywords
Homogenization, representativeness, neutron activation analysis, large samples, prompt gamma analysis, medicinal products, drugs of abuse.

1. Introduction

The interpretation of measurement results requires knowledge of the degree of representativeness of the measurand in the test portion for the corresponding measurand in the originally collected material. A sample is denoted to be 'representative' when it can be expected to exhibit the average properties of the material, environment or population it was taken from [1]. This is a common and recognized issue in both analytical chemistry and forensic science. A good example is any large amount of drug of abuse seized by Law Enforcement Agencies [2]. Drugs of abuse can be analyzed to measure the percentage of the active ingredient or to obtain the elemental profile with the aim to infer about a possible common source of seized samples [3].

Whenever the analysis of large samples is possible, it is much easier to get representative sampling results e.g., for the analysis of large batches of drugs of abuse. The trace elements of such samples would be very useful to infer about their possible common source.

[1] Retired Associate Professor; Currently: NUQAM Consultancy, Zuid-Beijerland, The Netherlands (www.nuqam.com).

Download English Version:

https://daneshyari.com/en/article/6550607

Download Persian Version:

https://daneshyari.com/article/6550607

Daneshyari.com