ISSN 2344-3898
ISSN-L 2344-3898

"THE ENVIRONMENT AND THE INDUSTRY" – SIMI 2015 ABSTRACTS

National Research and Development Institute for Industrial Ecology

INCD ECOIND

International Symposion

"The Environment & The Industry"

ABSTRACTS

SIMI 2015

Bucharest

2015 October 29-30

INTERNATIONAL SYMPOSIUM "THE ENVIRONMENT AND THE INDUSTRY" – SIMI 2015

Bucharest
October 29-30
is organized under the patronage of:

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INCD ECOIND – INTERNATIONAL SYMPOSIUM – SIMI 2015
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III-O-5. ULTRASONIC NEBULISER, A USEFUL TOOL FOR IMPROVING THE SENSIBILITY OF TRACE ELEMENT DETECTION IN SURFACE WATER WITH AXIAL VIEWING ICP-EOS SPECTROMETER

Gabriela Geanina Vasile[1], Nicoleta Mirela Marin[1,2], Jana Petre[1], Liliana Valeria Cruceru

[1] *National Research and Development Institute for Industrial Ecology – Bucharest, 71-73 Podul Dambovitei Street, 060650, Bucharest, e-mail: gabriela.vasile@incdecoind.ro Romania*

[2] *Department of Analytical Chemistry, Faculty of Chemistry, University of Bucharest, 2-14 Blvd. Regina Elisabeta, 030018, Bucharest, Romania,*

Abstract

In order to analyze trace elements from surface water, drinking water and waste water an analytical method using Ultrasonic Nebulizer USN U5000AT+ equipment coupled with ICP-EOS Optima 5300 DV Perkin Elmer Spectrometer has been developed. Quality parameters (LOD, LOQ) allow the detection on sensitivity level imposed by European Legislation. Optimized parameters for simultaneous determination of Cd, Cr, Cu, Co, Ni and Pb in the range 1 to 5 µg/L were: power setting of 1400 W; auxiliary gas of 0.2 L/min; nebulizer gas of 0.75 L/min; sample uptake rate of 1.9 mL/min; plasma gas rate 15 L/min. Quantification limits obtained using fortified blanks indicated low values such as: 0.075 µg/L (Cd, Co); 0.10 µg/L for (Ni, Pb); 0.15 µg/L (Cr, Cu). The use of an USN as sample introduction system instead of Meinhardt Classic Nebulizer improves LOQ more than 10 times.

Keywords: *ICP-EOS, metals, simultaneous determination, ultrasonic nebulizer, water quality*

Acknowledgements

The experiments presented in this paper were done at the National Research and Development Institute for Industrial Ecology, in Pollution Control Department, Bucharest, Romania. The authors are grateful for the financial support from UEFISCDI project ID PN-II-PT-PCCA-2013-4-2151, contract nr. 236/2014.

III-O-6. NEW LC-MS/MS METHOD FOR DETERMINATION OF EIGHT NITROSAMINES IN DRINKING WATER

Toma Galaon, Liliana Cruceru, Jana Petre, Luoana Florentina Pascu, Vasile Ion Iancu, Marcela Niculescu

National Research and Development Institute for Industrial Ecology-ECOIND, 71-73 Drumul Podu Dambovitei St., Sector 6, Bucharest, Romania, e-mail: tomagalaon@yahoo.com,

Abstract

A new sensitive, selective and accurate LC-MS/MS method with positive electrospray ionization was developed to detect eight nitrosamines from drinking water. The method separates all nitrosamines using a Zorbax Eclipse Plus C18 column (100 x 2.1 mm, 3.5 µm) kept at 15°C and a mobile phase consisting of aq. 0.005% formic acid and acetonitrile in the ratio 90/10 (v/v). A strong gradient applied in 8 minutes up to 90% ACN allowed analyte separation. A low mobile phase flow-rate of 0.2 mL/min was used to enhance ESI ionization. Collision energy, fragmentor and capillary voltages were optimized to enhance analyte S/N ratio. Optimization of LC-MS parameters generated low instrumental LOQ values between 0.05 – 1.84 µg/L. Detector response was linear in the range 1 – 100 µg/L (R^2 > 0.99) for all nitrosamines. SPE using activated charcoal cartridges was used to concentrate nitrosamines from drinking water. Overall method LOQs were situated in the range 1.23 – 4.12 ng/L. LC-MS/MS method was fully validated with respect to specificity, linearity, precision, accuracy and LOQ, and provided good results. The method was tested on six tap water samples collected from different regions of Bucharest and the determined nitrosamine total content ranged between 2.8 and 14.8 ng/L.

Keywords: *drinking water, electrospray, LC-MS/MS, nitrosamines, solid-phase extraction*