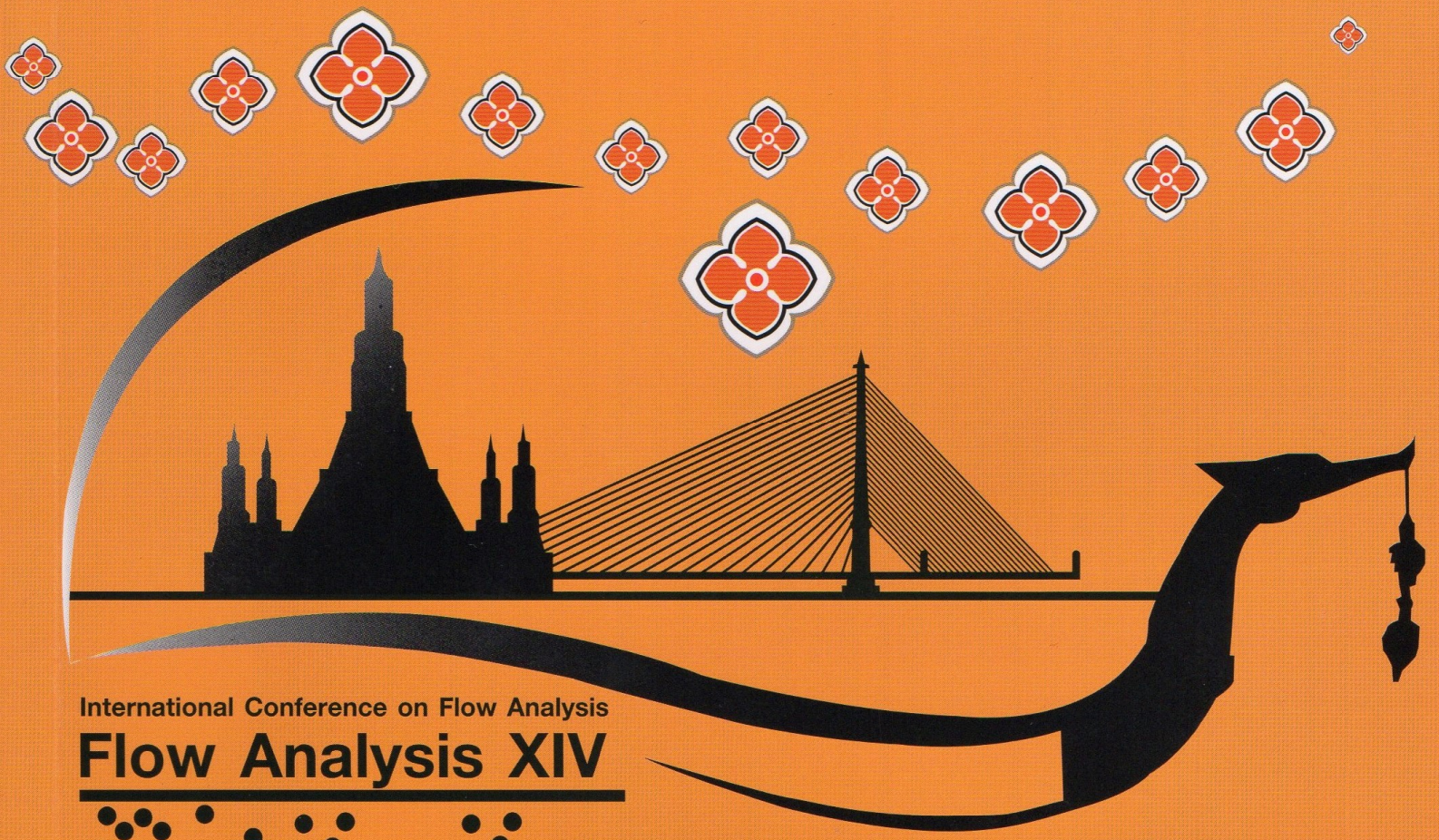
Abstract book



International Conference on Flow Analysis

Flow Analysis XIV

Bangkok, Thailand 2018

P-014

Spectrofluorimetric determination of iodide in urine samples without pretreatment using a miniaturized analyzer chip in a multi-syringe flow system

Joana L. A. Miranda[1], Edwin Palacio[2], Raquel B. R. Mesquita[1,3], José M. Estela[2], Víctor Cerdà[2], António O. S. S. Rangel[1]*

[1] *Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal*

[2] *Group of Analytical Chemistry, Automation and Environment, Department of Chemistry, University of the Balearic Islands, E-07122, Palma de Mallorca, Spain*

[3] *Laboratory of Hydrobiology, Institute of Biomedical Sciences Abel Salazar (ICBAS) and Institute of Marine Research (CIIMAR), Universidade do Porto, Portugal*

**arangel@porto.ucp.pt*

Abstract

Iodine is a nutrient and a component of the thyroid hormones essential for human growth and development [1]. Iodine status is based on the concentration of iodine excreted in urine [2]. Several detection systems are used to quantify iodine in urine, namely spectrophotometric, potentiometric, and ICP-MS. Most of these methods for urinary iodine concentration measurement are based on the Sandell-Kolthoff reaction [3]. The method proposed in this study consists in a fluorometric detection of the catalytic effect of the redox reaction between Ce(IV) and As(III), using the Sandell-Kolthoff reaction, in a miniaturized chip-based flow manifold. This method was based on a previous work using an advanced three-dimensional (3D) printing features as a chip for the reaction, and direct spectrofluorimetric quantification of iodide in sea water [4]. The urine samples were analyzed in the developed system without any pre-treatment, except dilution. The lack of need of a digestion or other pre-treatment of the sample and the fluorometric reaction makes this method simpler, faster and more sensitive than the classic approach of the Sandell-Kolthoff reaction method. The method was validated with samples provided by the Center for Disease Control, USA.

Keywords: Iodine, Urine samples, Spectrofluorimetry, Chip-based manifold, Sandell-Kolthoff reaction.

References

[1] M. B. Zimmermann, Iodine Deficiency. Endocr Rev. 30 (2009) 376-408.

[2] World Health Organization/United Nations Children's Fund/International Council for control of Iodine Deficiency Disorders, Assessment of iodine deficiency disorders and monitoring their elimination. A Guide for Programme Managers, 3rd ed., WHO, Geneva (2007).

[3] Machado, L. Lima, R. B.R. Mesquita, A. A. Bordalo, Clin Chem Lab Med (9) 55 (2017) e206-e208.

[4] R. M. Frizzarin, E. Aguado, L. A. Portugal, D. Moreno, J. M. Estela, F. R. P. Rocha, V. Cerdà, Talanta 144 (2015) 1155-1162.

Acknowledgements

J. L. A. Miranda thanks for the grant NORTE-08-5369-FSE-000007_BD_1; R. B. R. Mesquita thanks to Fundação para a Ciência e a Tecnologia (FCT) and POCH of FSE for the grant SFRH/BPD/112032/2015. This work has also been funded by the National Founds from FCT through the project PTDC/AAG-MAA/5887/2014 and MINECO and FEDER funds (project CTQ2016-77155-R).