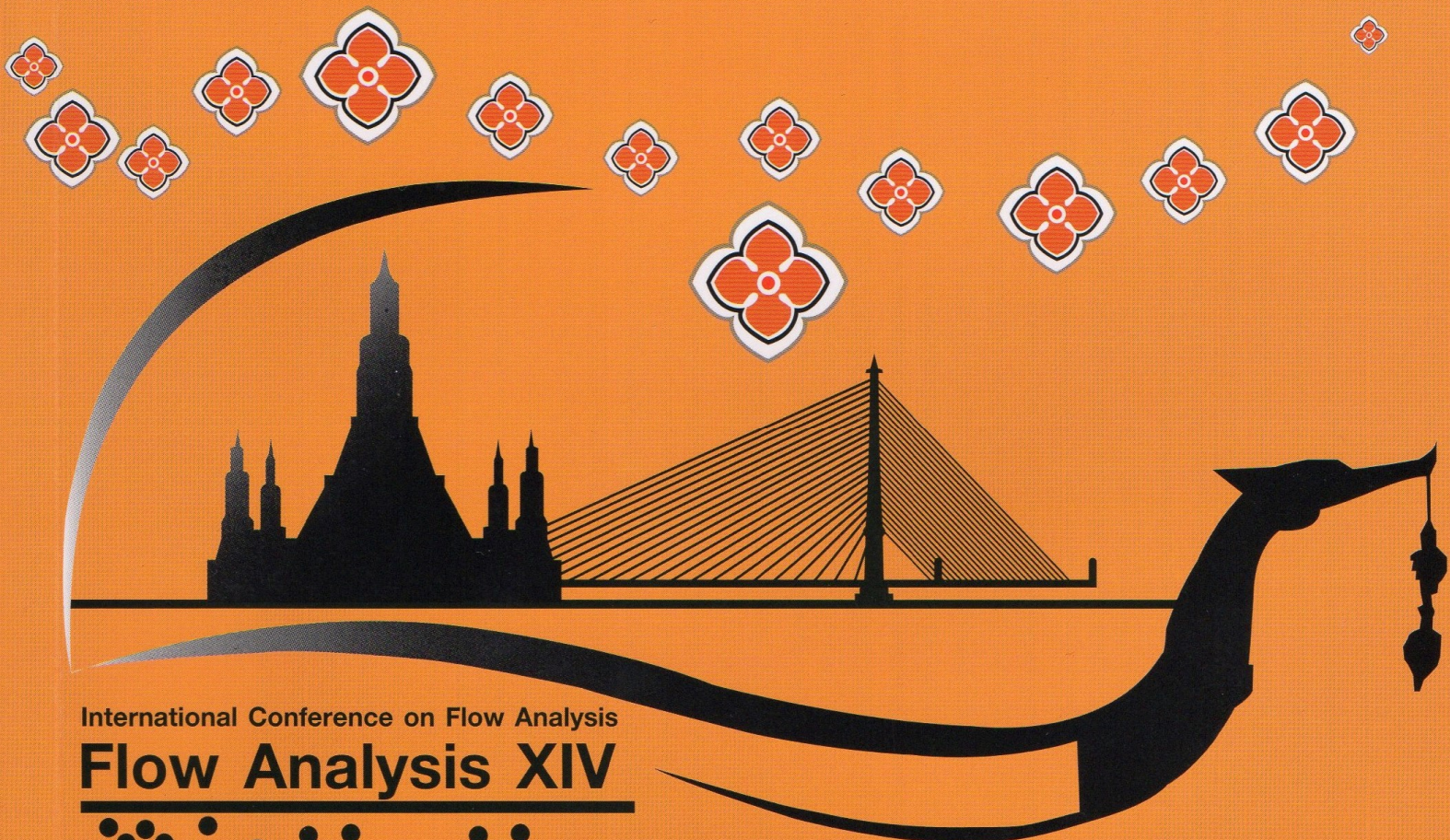


Abstract book

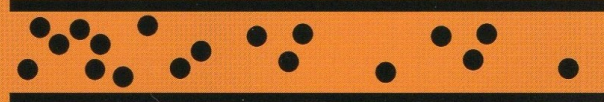
วิธีวิเคราะห์สมัยใหม่ biological 2018 Excursion Gas diffusion
FIA MPAD อาหาร 2018 GC MBLVP
CE 14th การวิเคราะห์
SIA การเตรียมตัวอย่าง quantitative Solid phase extraction
SIEMA ตัวอย่าง analysis
MSFIA 2018 ๑๔
Sample สเปกโทรสโกปี SIA CIA spectroscopy
Electrochemistry ๒๐๑๘ สิ่งแวดล้อม เคมีไฟฟ้า

Flow Analysis 2018



International Conference on Flow Analysis

Flow Analysis XIV



Bangkok, Thailand 2018

Microfluidic Paper-based Analytical Devices (μ PADs) for the Determination of Total Ammonia Nitrogen in Saliva

Yanisa Thepchuay¹, Raquel B. R. Mesquita^{2*}, Duangjai Nacapricha¹,
António O. S. S. Rangel²

¹Faculty of Science, Mahidol University, Rama 6 Road, Thungpayathai, Rachathewi, Bangkok, Thailand 10400

²Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina - Laboratório Associado, Escola Superior de Biotecnologia, Rua Arquiteto Lobão Vital 172, 4200-374 Porto, Portugal

*rmesquita@porto.ucp.pt

Abstract

A low cost, simple and disposable microfluidic paper-based analytical device (μ PAD) was designed for determination of total ammonia nitrogen in saliva since ammonia content in saliva is an indication of some oral diseases. The idea was to explore bromothymol blue (BTB) as an acid-base indicator together with the volatility of molecular ammonia. So, μ PADs were assembled in a sandwich approach with a hydrophobic membrane (PTFE) being sandwiched between two layers of hydrophilic filter paper. The sample was loaded on the top hydrophilic layer, containing hydroxide to promote the conversion of ammonium to molecular ammonia, which would then diffuse through the PTFE membrane into the bottom hydrophilic layer, impregnated with BTB. The color change was assessed after 5 minutes by scanning of the BTB impregnated zone of the bottom layer. Linear relationship was established between the absorbance signal and the concentration of ammonium/ammonia (12.5 – 150 mg/L). Under optimal conditions, the detection limit was 3.7 mg/L with a repeatability of 2.8% RSD (n=10, 92.4 mg/L). The developed method was applied to the determination of total ammonia nitrogen in saliva samples directly, without sample preparation step. Analytical recoveries were performed and a good average recovery was obtained (103±7%).

Keywords: Saliva, Total ammonia nitrogen, Gas-diffusion separation, Bromothymol blue, Microfluidic Paper-based Analytical Device (μ PAD)

Acknowledgements

R.B.R. Mesquita thanks FCT for the grant SFRH/BDP/112032/2015. This work was supported by National Funds from FCT - Fundação para a Ciência e Tecnologia through project UID/Multi/50016/2013.