



Porto

Portugal

3 to 8

September

2006



flow analysis
10th International Conference



A MULTICOMMUTED FLOW INJECTION SYSTEM WITH A MULTI-CHANNEL PROPULSION UNIT: SPECTROPHOTOMETRIC DETERMINATION OF N-NH_4^+

Sara M. Oliveira, Teresa I. M. S. Lopes, Ildikó V. Tóth and António O. S. S. Rangel

Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Rua Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal
email: aorangel@esb.ucp.pt

Multicommuted flow injection systems may be characterised by the use of individual commutation devices (typically solenoid valves), which can be arranged as a flow network, where solutions can be accessed randomly. The introduction of solutions into the analytical path is usually obtained by aspiration through a single pump channel placed after the detection system, and by selecting the positions of the respective valves. Although this strategy presents several advantages, like providing a good mixing of solutions by using binary sampling, and reduced reagents consumption, it sometimes produces the formation of unwanted air bubbles, and it conditions the use of devices for separation processes (gas-diffusion, dialysis or ion-exchange). These limitations can be overcome if the introduction of solutions in the flow manifold is accomplished by placing the pumping device before the commutating valves; in this configuration, a multi-channel pump is required and solutions are propelled into the flow network or re-circulate to their own vessel, according to the position of the respective solenoid valve. In fact, this approach is used in multi-syringe flow injection systems. In this work, a flow network with a multi-channel peristaltic pump placed before the solenoid valves, and incorporating a gas-diffusion device, is proposed for the colorimetric determination of N-NH_4^+ . A stopped flow approach in the acceptor stream (bromothymol blue solution) was adopted to attain a low quantification limit ($45 \mu\text{g/L}$) and a linear dynamic range of $50\text{-}1000 \mu\text{g/L}$; a determination rate of 20 h^{-1} was achieved.

Acknowledgements:

Sara Oliveira and Ildikó Tóth thank Fundação para a Ciência e a Tecnologia (FCT) and FSE (III Quadro Comunitário) for the grants SFRH/BD/23782/2005 and SFRH/BPD/5631/2001, respectively.