

OC5. Multicommuted flow system for the standard addition potentiometric determination of fluoride at low concentration levels

Andrea C Galvis-Sánchez^{ab}, João Rodrigo Santos^a, António O. S. S. Rangel^a*

^a CBQF – Centro de Biotecnologia e Química Fina, Escola Superior de Biotecnologia, Centro Regional do Porto da Universidade Católica Portuguesa, Porto, Portugal

^b QOPNA - Universidade de Aveiro, Departamento de Química, Campus Universitário de Santiago, Aveiro, Portugal

*asanchez@porto.ucp.pt

The standard addition (SAM) method is a well accepted calibration method used in instrumental analysis as this procedure helps to overcome potential matrix interferences that might occur during an analytical protocol. On the other hand, SAM procedure is labour intensive as it normally requires the preparation of a set of standards that have to be added to the sample, requiring large amounts of sample and reagents and providing very low sample throughput. For this reason, automation of this procedure relying on flow injection analysis has been described [1, 2]. Additionally, SAM can also be used to perform determinations when the analyte concentration is close to the LOQ, a problem often found in potentiometric measurements with ion-selective electrodes. This is precisely the case of the potentiometric determination of fluoride in different food samples.

To overcome this difficulty, a PC-controlled multicommuted flow system manifold combining three solenoids valves, an electrical injection valve and a peristaltic pump, was optimized. By using this strategy, multiple standard additions were possible based on the in-line mixing of sample and standards by a merging zone approach.

The proposed methodology allowed the determination of the fluoride ion in concentrations down to 5×10^{-6} M in food samples; that included various types of sea salts, coffees and waters. Any off-line sample pre-treatment was required and good precision values (RSD < 5%) were achieved. The proposed methodology can be a good alternative compared with other available analytical methodologies [3] for routine analysis of fluoride ion in food matrices with low fluoride ion concentrations.

[1] P Kościelniak, J Kozak, *Crit Rev Anal Chem*, 2006, 36, 27-40

[2] JR Santos, MA Segundo, JLFC Lima and M Korn, *Microchem J*, 2009, 92, 180-185

[3] B Prusisz, K Grymuza, P Pohl, *Talanta*, 2007, 71, 1364-68

Acknowledgements: AC Galvis-Sánchez and JR Santos acknowledge Fundação para a Ciência e Tecnologia (FCT, Portugal) and Fundo Social Europeu (FSE) for the financial support through the POPH-QREN program via the grants with Ref. SFRH/BPD/37890/2007 and SFRH/ BPD/ 63492/ 2009, respectively. This work was supported by National Funds from FCT – Fundação para a Ciência e a Tecnologia through project PEst-OE/EQB/LA0016/2011.

18th Meeting of the Portuguese Electrochemical Society



Sociedade Portuguesa de Electroquímica

25th-27th March 2013

Porto, Portugal