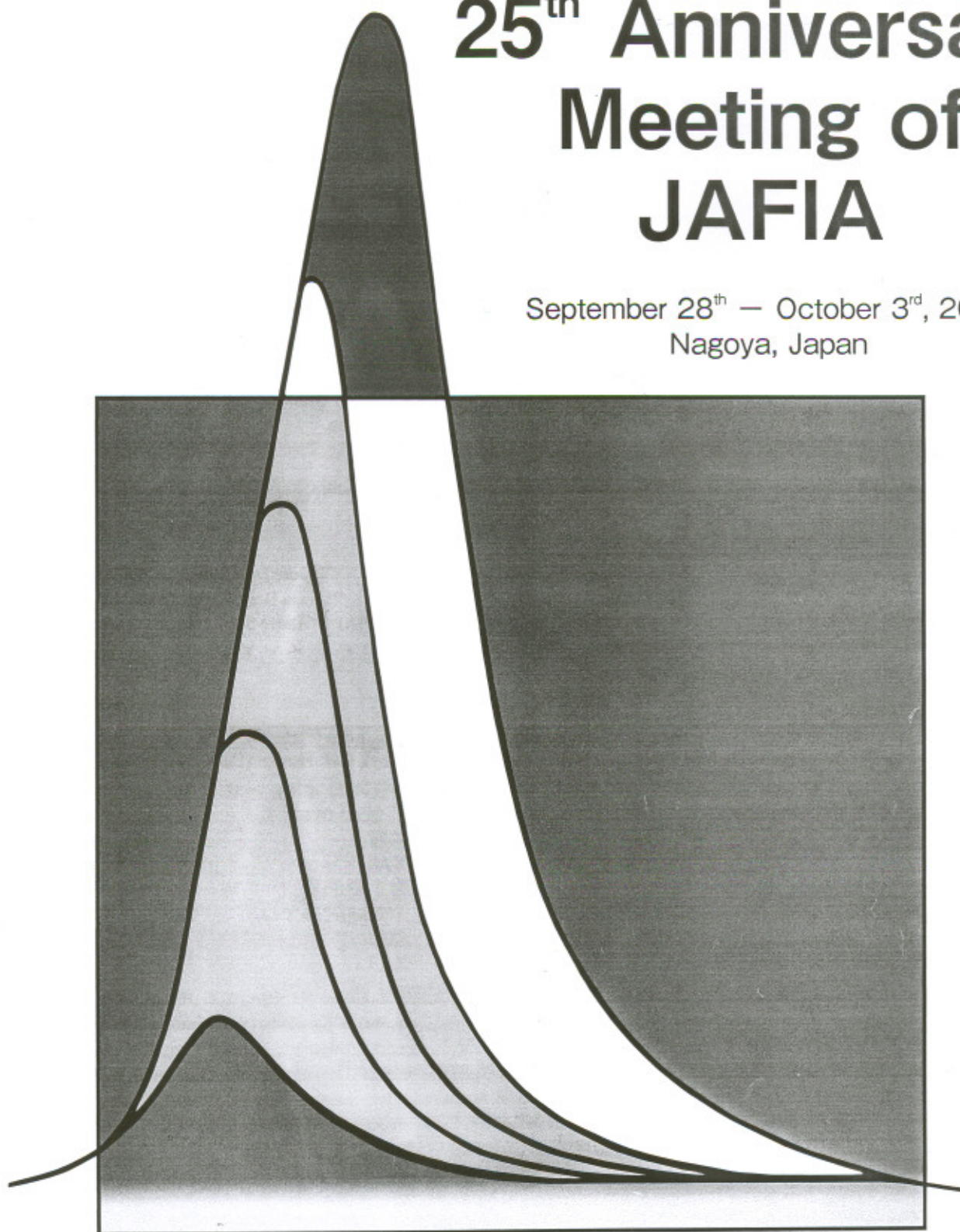


Program &
Book of Abstracts

**15th ICFIA
&**

**25th Anniversary
Meeting of
JAFIA**

September 28th — October 3rd, 2008
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Fifteenth International Conference on Flow Injection Analysis
including related techniques (ICFIA 2008)

&

Twenty-Fifth Anniversary Meeting of Japanese Association for Flow Injection Analysis

Development of a sequential injection system for the determination of nitrite and nitrate in estuarine waters

Raquel B. R. Mesquita, M. Teresa S. O. B. Ferreira, and António O. S. S. Rangel

Escola Superior de Biotecnologia, Universidade Católica Portuguesa,

R. Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal

Considering the growing global awareness about the importance of monitoring water bodies in order to protect water quality, methods of fast, reliable and in situ determinations are essential. Developing flow systems provides such a solution, and choosing sequential injection among such methodologies adds the advantage of robustness and potential for multi determination. Therefore the aim of this work was to develop a methodology for monitoring nitrite and nitrate in estuarine waters using a sequential injection system. Although nitrogen is among the macronutrients required for metabolism and growth of organisms, it can not be directly taken up, it must first be bound and converted to nitrate (nitrification process): For this is reason, nitrogen fertilizers are so commonly used. The extensive use of these fertilizers leads to an increase of nitrogen in the environment as the crops take up a relatively small part of all the fertilizers used namely 25-30%. This excess of nitrogen, as nitrate, leaches into groundwater and surface water through soils due to nitrate solubility. The increase of nitrate in water bodies such as river and lakes can lead to eutrophication, meaning excess of nutrients followed by algal bloom, oxygen deprivation and fish deaths. Taking also into account that seawater contains approximately 0.5 ppm of nitrogen, with 0.1 ppb at the surface, estuarine waters have values that vary strongly.

The developed system was applied to the determination of nitrite and nitrate in estuarine waters of three rivers in Portugal, allowing an automatic, fast ($\sim 60 \text{ det. h}^{-1}$) and reliable method (relative deviation to the reference procedure $\sim 5\%$). The determination is based on the reaction between nitrite, sulphanilamide and NINED, and the determination of nitrate results from its reduction to nitrite followed by the same reaction. The samples were directly introduced in the system, with no previous treatment. There were three sampling locations for each river: one close to the sea and then two other points upstream: Despite different levels of salinity, there was no interference in the determinations. All samples evaluated by the developed method were also analysed by the reference procedure, which uses the same reaction, and the results proved to be comparable.