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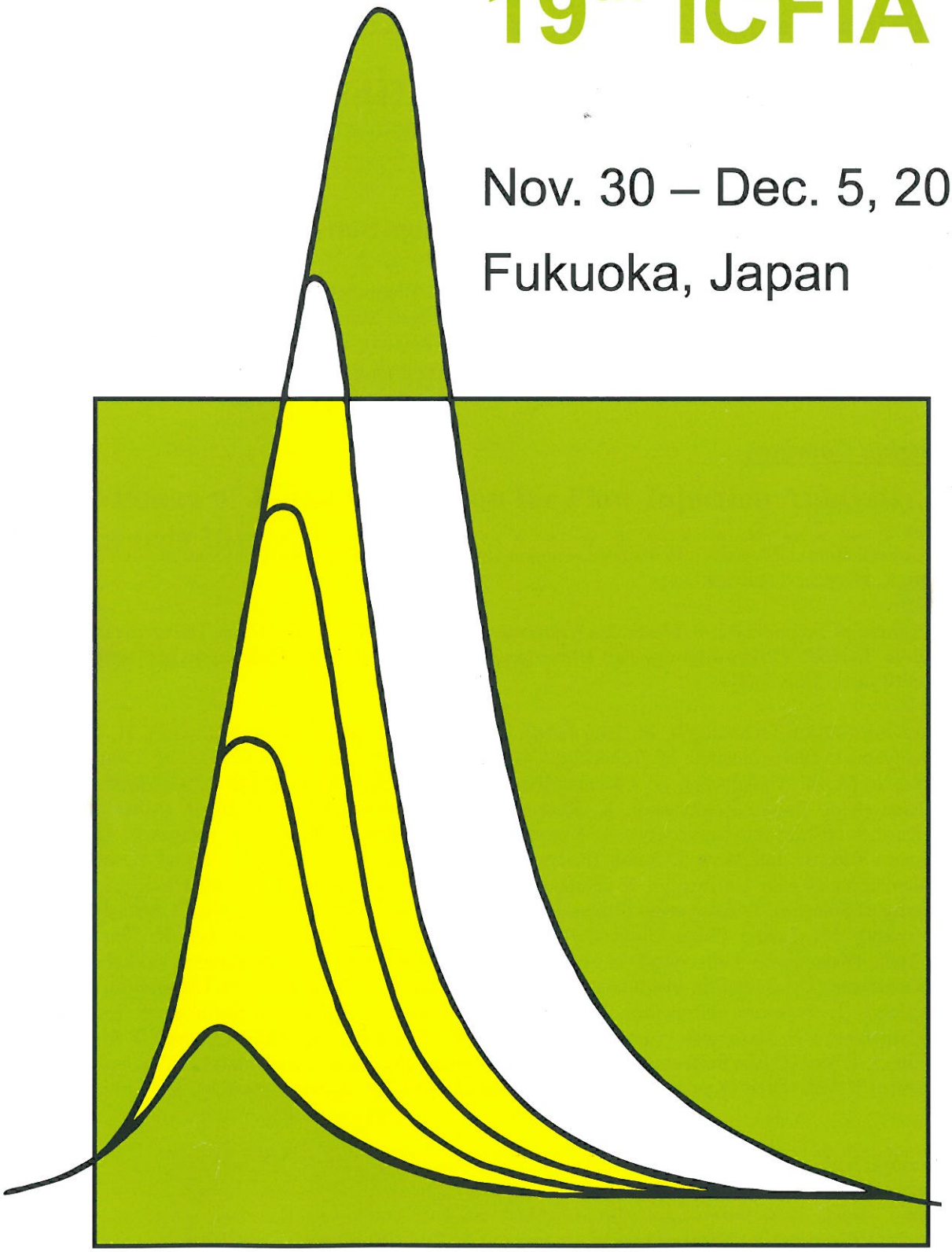

The 19th International Conference on Flow Injection Analysis (19th ICFIA)

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Exploring 3-hydroxy-4-pyridinone chelators as low toxicity chromogenic reagents for iron determination in natural waters

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Considering the recognized importance of the role of iron in aquatic systems together with the presence of both ferric and ferrous forms, reliable, real-time methods for iron speciation in natural waters are essential. Therefore, alternatives to the highly toxic colorimetric reagents, commonly used in the spectrophotometric determination of iron were explored.

The ligands of the 3-hydroxy-4-pyridinone (3,4-HPO) class are synthetically versatile and used in the biomedical field due to its low toxicity. The 3,4-HPO ligands bear two oxygen coordinating atoms and consequently show a high capacity to trap iron(III) in the form of FeL_3 complexes and a significantly lower affinity for iron(II), a key feature to attain iron speciation. Furthermore, the 3,4-HPO ligands structure enables tailoring of their hydrophilic/lipophilic balance by simply introducing appropriate substituents on the endocyclic nitrogen atom of the pyridinone ring without significantly changing its chelating properties. Although the 3,4-HPO ligands are bidentate, with the appropriated substituents on the endocyclic nitrogen atom and the use of a tripodal anchor an hexadentate 3,4-HPO ligand can be attained providing the advantages of a 1:1 stoichiometry.

To develop new, reliable, real-time and automatic methods, flow analysis was used as an analytical tool. Among different available flow techniques, sequential injection analysis was chosen due to its characteristics and proven efficiency in water monitoring [1]. In this communication, sequential injection spectrophotometric methodologies based on the use of a set of 3,4-HPO chelators as chromogenic species for iron will be discussed.

References:

[1] R. B. R. Mesquita, A. O. S. S. Rangel, Anal. Chim. Acta, 2009, 648, 7-22.

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