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Use of 3,4 HPO chelators as nontoxic reagents for the determination of iron

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Considering the recognised importance of the role of iron in aquatic systems, reliable, real-time methods for iron determination in natural waters are essential. So, 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 exhibit very high affinity for iron(III). The latter properties make them suitable to be explored as chromogenic species for iron. The structure of 3,4-HPO 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. The 3,4-HPO ligands bear two oxygen coordinating atoms and consequently show a high capacity to trap iron(III) in the form of FeL₃ complexes and a significantly lower affinity for iron(II), a key feature to attain iron speciation.

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 will be discussed.

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

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