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# ABSTRACT BOOK

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## **COMBINATION OF SPE AND pH ADJUSTMENT FOR THE SIMULTANEOUS SPECTROPHOTOMETRIC DETERMINATION OF COPPER, ZINC AND MANGANESE IN WATER**

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Copper, zinc, and manganese are commonly found in both natural and treated water sources. Although these metals are essential micronutrients, their accumulation, even at low concentrations, can lead to serious health issues. Therefore, continuous and accurate monitoring of these elements in environmental and drinking water is crucial to ensure public safety.

Solid Phase Extraction (SPE) is a widely used sample preparation technique that relies on sorbent materials to separate and concentrate specific analytes from complex matrices. In heavy metal analysis, SPE offers several advantages, such as enhanced sensitivity, selectivity, and compatibility with automated systems. Ion-exchange resins selectively bind to ions based on their charge and therefore are one of the most effective sorbents for metal ion separation. While cation-exchange resins retain positively charged metal ions like  $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$ , and  $\text{Mn}^{2+}$ , anion-exchange resins bind to negatively charged species. This selectivity allows for cleaner separation and more accurate quantification in multi-parametric analysis.

The objective of this work was to develop an automatic sequential injection analysis (SIA) system integrated with an in-line cation-exchange resin column (Toyopearl) for the simultaneous determination of copper (II), zinc, and manganese in water samples. This system employs a cationic resin coupled with a colorimetric reagent (Zincon) whose selectivity varies with pH, enabling the separation of target metal ions and consequent individual quantification. This method presents a reliable and reagent-efficient alternative to conventional techniques, with strong potential for real-time or on-site monitoring applications.

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