

عنوان مقاله:

Chemometrics-enhanced Kinetic Spectrophotometric Method for Simultaneous Determination of Ag⁺, Cu²⁺ and Ni²⁺ (Ions in Some Medicinal Plants by Dimethyl ۲,۲'-(ethan-۱,۲-diybis)bis(cyclopent-۱-ene-۱-carbodithioate

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خلاصه مقاله:

The metal ions constituents in plants reliable for determination of their medicinal, nutritional and toxicity properties. A novel, simple and accurate spectrophotometric method was developed for the simultaneous determination of Ag⁺, Cu²⁺ and Ni²⁺ ions in different medicinal plants without prior separation steps. This method was based on the different kinetic characteristics between the reactions of analytes with newly synthesized Schiff base as dimethyl ۲,۲'-(ethan-۱,۲-diybis)bis(cyclopent-۱-ene-۱-carbodithioate (DEBC). All experimental conditions include, DEBC concentration, effects of pH and temperature was optimized. Also, orthogonal array design was applied for the construction of concentration. The differential kinetic spectra were monitored and recorded at ۳۹۷ nm. The reaction orders were estimated with respect to complex mixture of analytes with DEBC. Limit of detections values were ۰.۰۱۳, ۰.۰۷۸ and ۰.۰۰۳ mg L^{-۱} and limit of quantifications values were ۰.۰۴۳, ۰.۲۵۰ and ۰.۰۱۱ for, Cu²⁺, Ni²⁺ and Ag⁺, respectively. The recorded data were processed by principal component analysis- back propagation neural networks (PCBPNNs). A set of synthetic mixtures of metal ions was evaluated and the obtained results by PCBPNNs were discussed. The simultaneous analysis was also performed without compressed data and was compared with those obtained by PCBPNNs. The proposed method was successfully applied to the simultaneous determination of metal ions in medicinal plants samples. The results of proposed method were compared by those obtained on the same samples by Graphite furnace atomic absorption spectrometry.

کلمات کلیدی:

+Kinetic, medicinal plants, Schiff base, Cu²⁺, Ni²⁺, Ag

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