

Rapid multielement determination of trace elements in common salts by ICP-AES after coprecipitation preconcentration with magnesium in the salt

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Summary

Rapid multielement determination method for trace elements in common salts has been examined by ICP-AES (inductively coupled plasma atomic emission spectrometry) after coprecipitation preconcentration with magnesium in the salt. Optimum pH condition and other experiment procedures for coprecipitation were investigated in order that the method for multielement determination was evaluated.

In this experiment procedure, trace elements in the salt sample were coprecipitated with magnesium derived from magnesium in salt itself. The salt sample was diluted with 50 ml of 0.1 M HNO₃, and then the pH of the salt solution was adjusted to 12 with 3 M NaOH. After the solution was centrifuged for 5 min, the precipitate was washed by 3 times decantation. The precipitate was dissolved with 10 ml of 2 M HNO₃. This solution was used as the analysis solution to the ICP-AES measurements.

The recoveries of 7 trace elements (Fe, Zn, Ni, Cu, Pb, Co, Cd,) were in the range of 75-100 %, and major constituents of common salt such as Na, Mg, K, and Ca were significantly reduced in the concentrated solutions. The spectral interference caused by magnesium ion in analytical solution after coprecipitation was negligible from 1 to 10000 µg ml⁻¹ for magnesium. It was confirmed that the increase of signal intensity of some analytes was observed when high contents of magnesium solution was introduced into plasma. However, the interference correction of signal has not been established yet. Using magnesium in the analytical salts as coprecipitant, the blank values of analyte were lower than the analytical detection limits. Therefore, it has been found that the contamination from coprecipitant reagents could be significantly reduced.