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SUMONTHA NOOKABKAEW : EVALUATION OF A FLOW SYSTEM
FOR CHEMICAL SPECIATION OF METALS BY SEQUENTIAL EXTRACTION.

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This study examined a flow method for sequential extraction of metals. Conventional batch methods are tedious and slow. A three-step sequential extraction scheme was used to evaluate a novel flow extraction system by analyzing calcium (Ca), iron (Fe), manganese (Mn), copper (Cu) and zinc (Zn) in certified reference materials. The flow extraction system was performed in a closed chamber through which three extractants were passed sequentially to extract acid soluble, reducible and oxidizable phases. The extracts were collected in a number of fractions for subsequent flame atomic absorption measurement.

Effects of extracting conditions were studied. Results of pH change of extracts during extraction indicated that flow system ensured extraction being performed at designated pH values without any need of adjustment. In the extraction of the acid soluble fraction, varying concentrations of acetic acid in the range 0.11 to 0.52 M had no significant effect on the amounts of elements extracted except for Fe. Increasing the concentration of hydroxylamine hydrochloride in the reducible fraction step from 0.04 M to 1.0 M affected the extraction efficiency for Fe, Mn and Zn.

The flow method was compared with the conventional batch method for the amounts of metal extracted and analytical repeatability. The overall recovery rates from both batch and flow methods for soil reference material SRM 2710 were in the range 81-111% for all 5 elements determined. The results also showed that larger amounts of metals were extracted in acid soluble fraction in the flow than the batch system. Reducible and oxidizable fractions showed slight different results between the two systems for some elements. The use of extractograms from the flow method to evaluate the association between elements in samples was demonstrated.