

Thesis Title Effect of Matrices on Trace Element Analysis in Soil Samples by Isotope X - ray
Fluorescence Method

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Abstract

Effect of matrices on trace element analysis in soil samples by isotope X-ray fluorescence method was studied by mixing different quantities of standard substances of metallic oxide of iron, copper, zinc and manganese with tapioca starch. Different mixtures were then pressed into thin pellets which could not be easily broken and had their domain matrix in light element. Soil samples were also prepared from the mixture of soil with tapioca starch with a mixture ratio of 30 to 70. Results from the experiment showed nonlinear relationship between the intensities of X-ray of each substance in the standard mixtures with its quantities, due to the certain absorption of X-ray by other substances in the mixture samples. Results of quantitative analysis indicated that there was a high level of error. In order to achieve a correct analysis, X-ray absorption correction was done by using an absorption correction factor (F). This factor (F) can be determined from its good relationship with the total mass absorption coefficient (χ), which also varied with different composition of each sample. Since the composition of each sample was unknown, the Emission-Transmission (E-T method) was applied to determine the total mass absorption coefficient. The results showed linear relationship as the corrected intensities were plotted with their corresponding quantities, which enabled the correction of the disturbance of other substances contained in the sample. The same procedures were later applied to analyze the total quantity of iron, copper, zinc and manganese contained in soil samples from Amphoe Sansai and Amphoe Hangdong, Chiangmai. It was found that the contents of those metals in the samples were in the normal ranges.