CHAPTER 4
CONCLUSIONS

Arsenic determination in contaminated soil samples from Ampur Ronpibul, Changwat Nakornsrithammarat was studied nondestructively by instrumental neutron activation analysis (INAA) with thermal and epithermal neutrons. The difficulties for determination of arsenic in soil by neutron activation analysis arise from the sodium-24 Compton continuum because of high sodium matrix activity, and a neutron flux gradient in the vertical direction of a TRICA type reactor.

In this work, sodium matrix was resolved by varying irradiation and decay times and epithermal neutron was used to reduce the sodium-24 Compton continuum. The neutron flux gradient was resolved by normalized flux with the sample position in rabbit.

It was found, from the results, that suitable conditions for the determination of arsenic by thermal neutron activation were 30 min for irradiated times and 1 day for cooling times. Under these conditions, effects could be minimized the time of analysis and minimized interference, as to maximize the ratio of the signal to background for the arsenic photopeak.

The suitable conditions for epithermal neutron were 1 hour for irradiation time and 1 day for cooling time. In using epithermal neutrons, one can significantly reduces the contribution of the sodium radionuclide to the background continuum since it provides low I_o/σ_{th} value.

Neutron flux gradient was also found in this experiment. The flux variations can cause serious bias and lack of reproducibility in activation analysis if background correction is not performed. In this experiment, it was found that neutron gradients should be measured in vertical rabbit axes by the use of copper wire flux monitors. A plot between the relative neutron fluxes and distance from the bottom of the rabbit showed a linear vertical drop-off in flux. Because a linear relationship was found in vertical flux drop-off, an accurate correction was made for sample position.

The sandwich position between sample vials and standard vials could normalize flux distribution.

Table 4.1 Arsenic concentrations in five candidate's sample by TNAA and ENAA

Sample No.	Arsenic concentrations (ppm)		
	Thermal neutron (% SD)	**Epithermal neutron (% SD)**	**Averages (% SD)**
S1	2450 (1.31)	2405 (2.26)	2428 (1.92)
S2	1810 (2.61)	1740 (6.64)	1770 (4.97)
S3	115 (7.87)	117 (4.23)	116 (5.72)
S4	283 (1.96)	283 (7.04)	283 (4.62)
S5	669 (4.21)	572 (5.18)	621 (9.52)