e. UV/VIS spectrophotometer for colorimetric and turbimetric analysis
f. Atomic absorption spectrophotometer (AAS) with graphite furnace attachment and background corrector
g. A top loading balance (capable of weighing 1 mg)
h. A microcomputer is an additional option for data handling and manipulation.

A Kjeldahl digestion is used for colorimetric N analysis. B and P also use colorimetric analysis following a dry ashing procedure which can subsequently be used for K, Ca, Mg, Fe, Mn, Cu and Zn analysis by flame AAS.

Separate wet ashing digests are necessary for Co and Mo, which are then solvent-extracted for graphite furnace AAS. Turbimetric sulfate analysis follows a combustion method using a Schoniger oxygen flask assembly.

This laboratory has interfaced a microcomputer to both the AAS and the UV/VIS spectrophotometer. The instruments are operated manually, and data files that have been stored on floppy disc are automatically called and processed with calibrations and reagent blank corrections. On completion of a sample run, the results can be printed out or stored on floppy disc for further statistical analysis.

Hence, by careful selection of analytical techniques all elements shown can be analysed on a sample size of 1600 mg.

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Iron Deficiency in Peanut on Black Calcareous Soils

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BLACK calcareous soils of Thailand (Rendzinas or Calciustolls) occupy 500 000 ha and are located mostly on the highlands of central and northern areas of the country. These soils are considered quite fertile, but leaf chlorosis resembling iron deficiency occurs quite commonly in peanuts, although patchy in distribution.

We have examined the response of peanut cv. Tainan 9 to soil and foliar iron applications on a Takli series soil (pH 7.9, clay 47%, organic matter 2.9%, exchangeable Ca 150 meq/100 g soil, DPTA extractable Fe 2.4 $\mu g/g$). At the same field site, 17 peanut cultivars were screened for iron efficiency in relation to three local cultivars (Tainan 9, Sukothai 38 and Lampang).

Peanut cv. Tainan 9 exhibited severe chlorosis when grown without added iron, and kernel yields were reduced from 930 to 680 kg/ha. The degree of iron deficiency was uneven in this experiment with a decrease in severity along a gradient from replicate 1 to 4. Mean kernel yield increased along this gradient from 750 to 1169 kg/ha.

Foliar iron sprays (0.5% $FeSO_4$ in 0.25% Tween 80), applied every 7 days from 10 days after emergence, increased top yields of peanut cv. Tainan 9 from 975 to 4660 kg/ha and pod yields from 162 to 975 kg/ha. Shelling percentage increased from 30% in unsprayed plants to 49% in plants sprayed every 7 days.

Iron chlorosis was evident in all 20 peanut cultivars examined, although the degree of chlorosis varied. Cultivars with low chlorosis scores tended to produce higher kernel yields. Three Thai peanut cultivars exhibited high chlorosis scores and low kernel yield relative to most other cultivars. Five cultivars (Robut 33-1, RCM 387, Natal Common, KAC 253, KAC 320) were significantly more iron-efficient than Tainan 9 and produced two to three times higher kernel yields.

Iron deficiency on black calcareous soils of the central and northern highlands severely restricts growth and yield of peanut cultivars recommended for use in Thailand. Foliar application of $FeSO_4$ (0.5% w/v with 0.25% Tween 80) at 7–15 day intervals from 10 days after emergence was partially effective in correcting iron deficiency. Some introduced peanut cultivars of Virginia and Valencia types seem to be more adaptable to iron-deficient soils than the recommended Valencia peanut cultivars. Further introduction of iron-efficient peanut germplasm should be undertaken.