5. RESULTS

5.1. Soil Samples

5.1.1. Soil pH

Table 5.1 shows the pH, soil moisture, percentage of fine particles in soil samples collected from 18 study sites. Soil pH at all sites was high (from 6.5 to 7.0), soil moisture different due to rain. percentage of fine particles in soil vary depend on soil texture.

5.1.2. Major elements

Calibration curves and major elements (Al, Ca, Fe, Mg) contents of soil samples were analyzed by AAS are presented in Figures 5.1-5.4. Concentrations of major elements in Mae Moh soils are in the normal range of those in soil as reported. Aluminum concentrations in soils were from 0.5 percent (site 4) to 7 percent (site 13). Calcium contents were from 0.1 percent (site 4) to 0.76 percent (sites 3 and 12). Iron contents of soils were from 1.2 percent (site 8) to 8.2 percent (site13).

5.1.3. Trace elements

Figures 5.5-5.10 show calibration curves and trace element content (Cr, Cu, Mn, Ni, Pb, Zn) of soil samples. Maximum chromium concentration in soil sample at site 11 was 32.4 ppm. Copper concentration ranges from 3.4 ppm (site 4) to 45.8 ppm (site 5, gully). Maximum manganese content in soils was 2500 ppm (site 6). Nikel content was lowest in soil at site 16 which can't detect. Maximum nikel content was 31.6 ppm at site 11. Lead content which was low in Mae Moh lignite and fly ash also was very low as compared to others eleements. Lead content was lower than dectection

limit atsites 10, 13, 14, and 16. Maximum content of lead 55 ppm was found in soil at site 6. Zinc content varies from 7.2 ppm (site 10) to 67 ppm (sites 1, 3, 5, 6 , and 8).

Table 5.1. Soil pH, soil moisture and percentage of fine particles

Site	pH		Soil moisture		Percentage of fine particles	
Sample	0-2 cm	2-5 cm	0-2 cm	2-5 cm	0-2 cm	2-5 cm
1	7.0	7.0	16.8	14.5	35.3	30.5
1'	6.9	7.0	14.5	15.9	21.9	22.4
2	6.9	6.9	25.9	18.9	56.5	32.3
3	7.0	7.1	17.5	10.1	47.8	40.2
4	7.0	7.1	10.4	17.7	56.8	53.7
5	6.8	6.9	21.8	25.6	48.9	52.1
5'	7.1	7.1	23.5	20.4	48.5	35.2
6	7.0	6.9	12.3	13.5	30.1	39.1
7	6.8	7.1	23.8	19.2	59.1	49.1
8	6.6	7.1	13.8	11.4	26.6	30.8
9	6.7	6.8	5.0	6.0	64.9	70.9
10	6.7	6.6	1.7	5.2	79.4	87.0
11	6.7	6.7	5.9	11.7	59.7	45.6
12	6.8	6.7	8.8	9.6	59.6	48.2
13	6.5	6.7	1.2	1.4	75.0	70.0
14	6.8	6.8	2.7	4.4	54.9	48.5
15	6.7	6.5	1.6	2.4	84.5	89.2
16	6.8	6.8	2.9	4.0	21.6	28.6
17	6.7	6.7	5.3	5.2	39.0	33.7
18	6.6	6.6	7.2	10.5	40.0	48.4

Note: 1',5' are samples collected in gullies at sites 1 and 5

5.1.4. Arsenic

Figure 5.11 shows a diagram of peak areas of standard solutions and figure 5.12 presents peak area of soil sample (site , peak area, concentration) with reaction time 20 seconds. Table 5.2 shows peak area for calibration curve. A calibration curve for arsenic and arsenic content of soil samples are presented in Figure 5.13.

Table 5.2 Peak area for calibration curve

Amount of As (ng)	Peak area
0	0.904
10	1.480
20	1.742
40	2.865
80	4.684
100	5.497

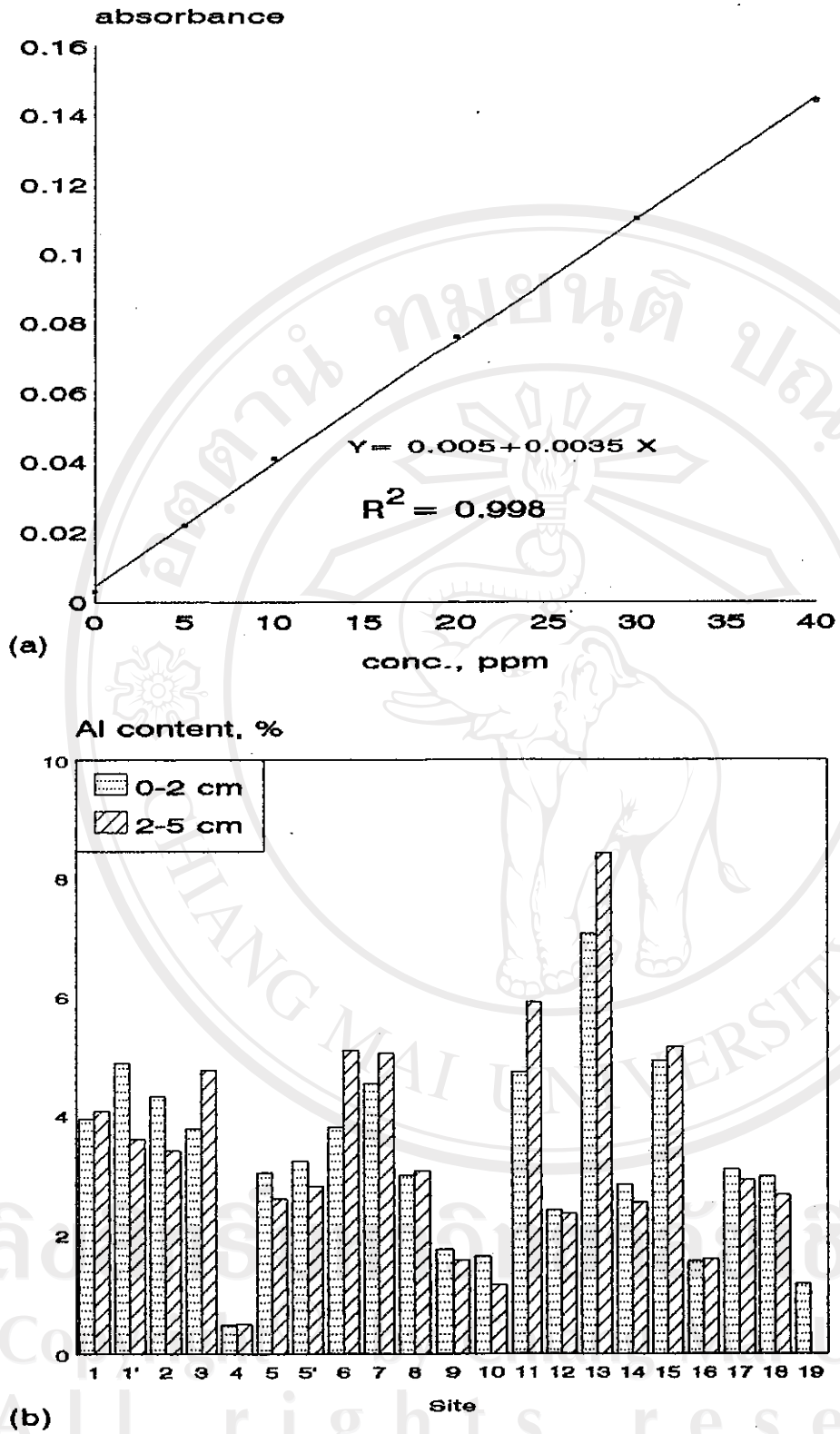


Figure 5.1. Aluminum content of soil samples
a: Calibration curve
b: Aluminum content

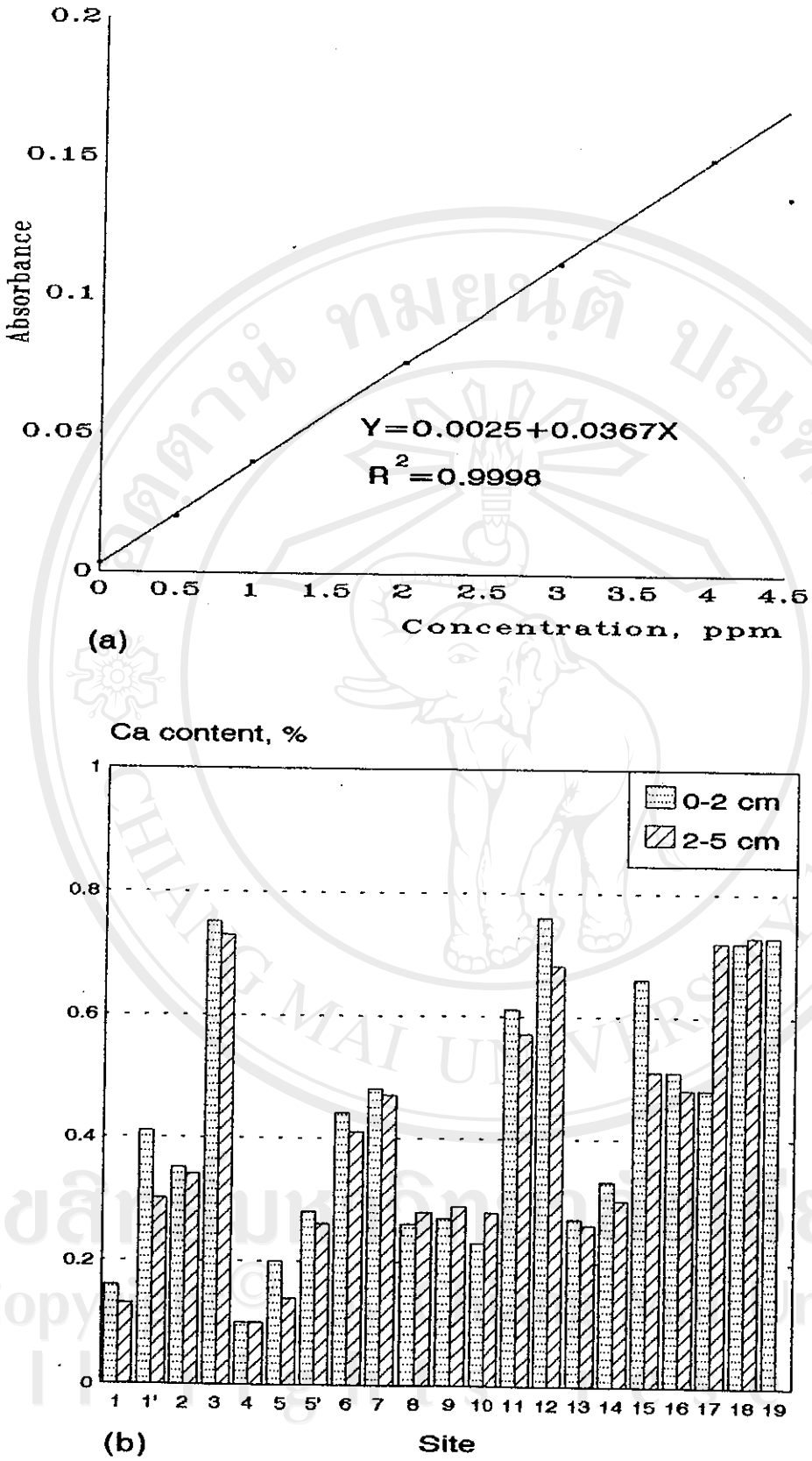


Figure 5.2. Calcium content of soil sample
a. Calibration curve
b. Calcium content

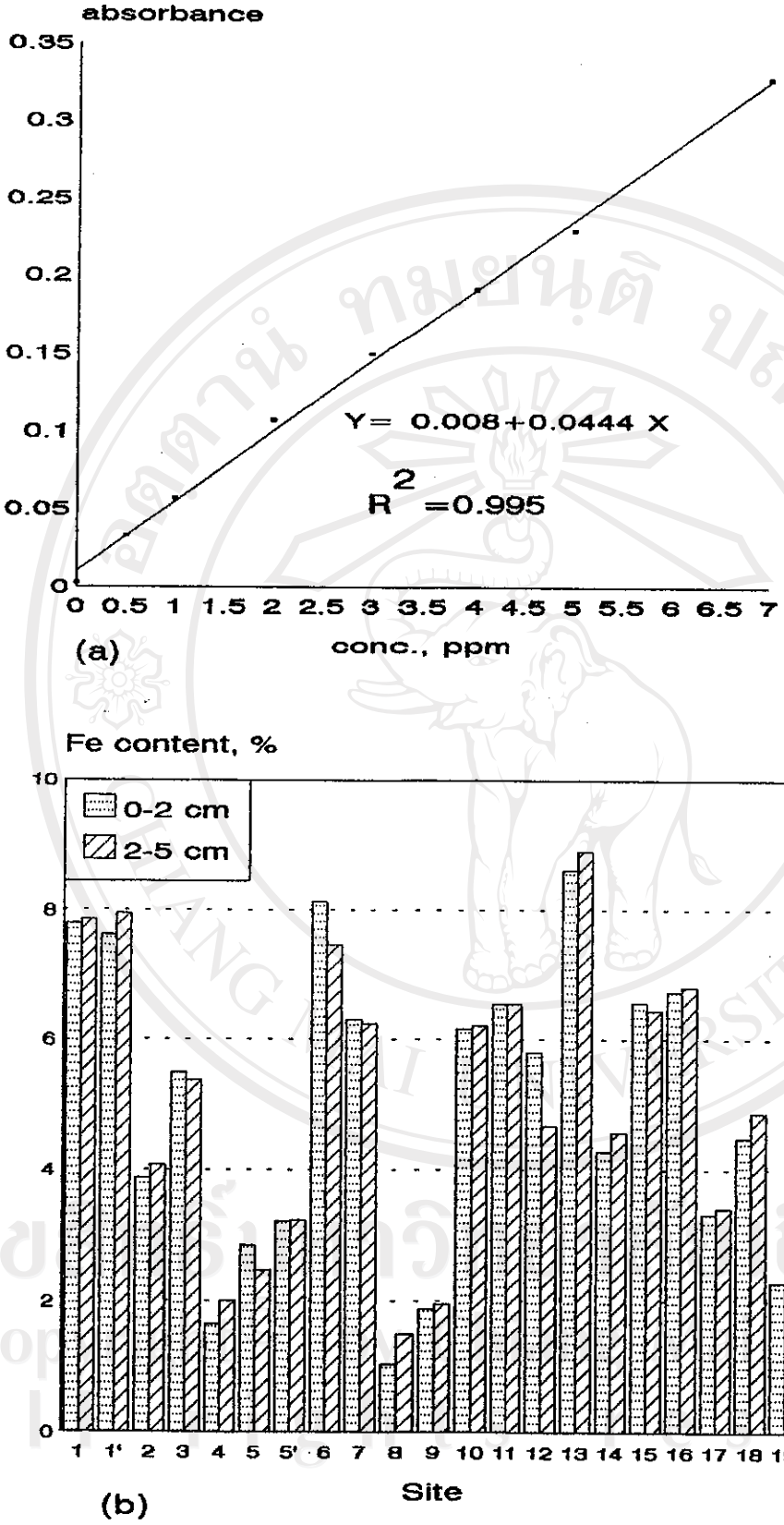


Figure 5.3. Iron content of soil samples
a. Calibration curves
b. Iron content

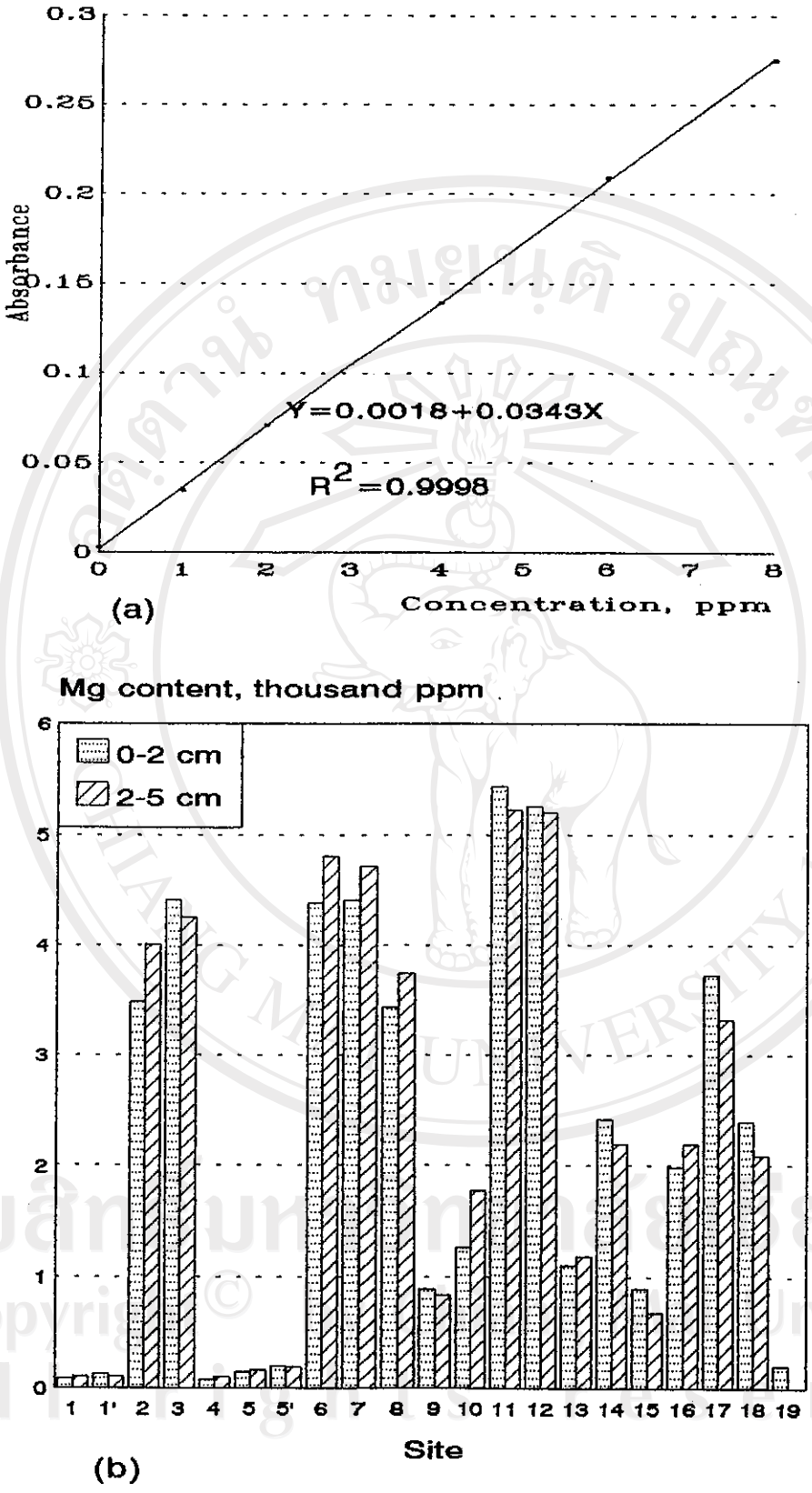


Figure 5.4. Magnesium content of soil samples
a. Calibration curve
b. Magnesium content

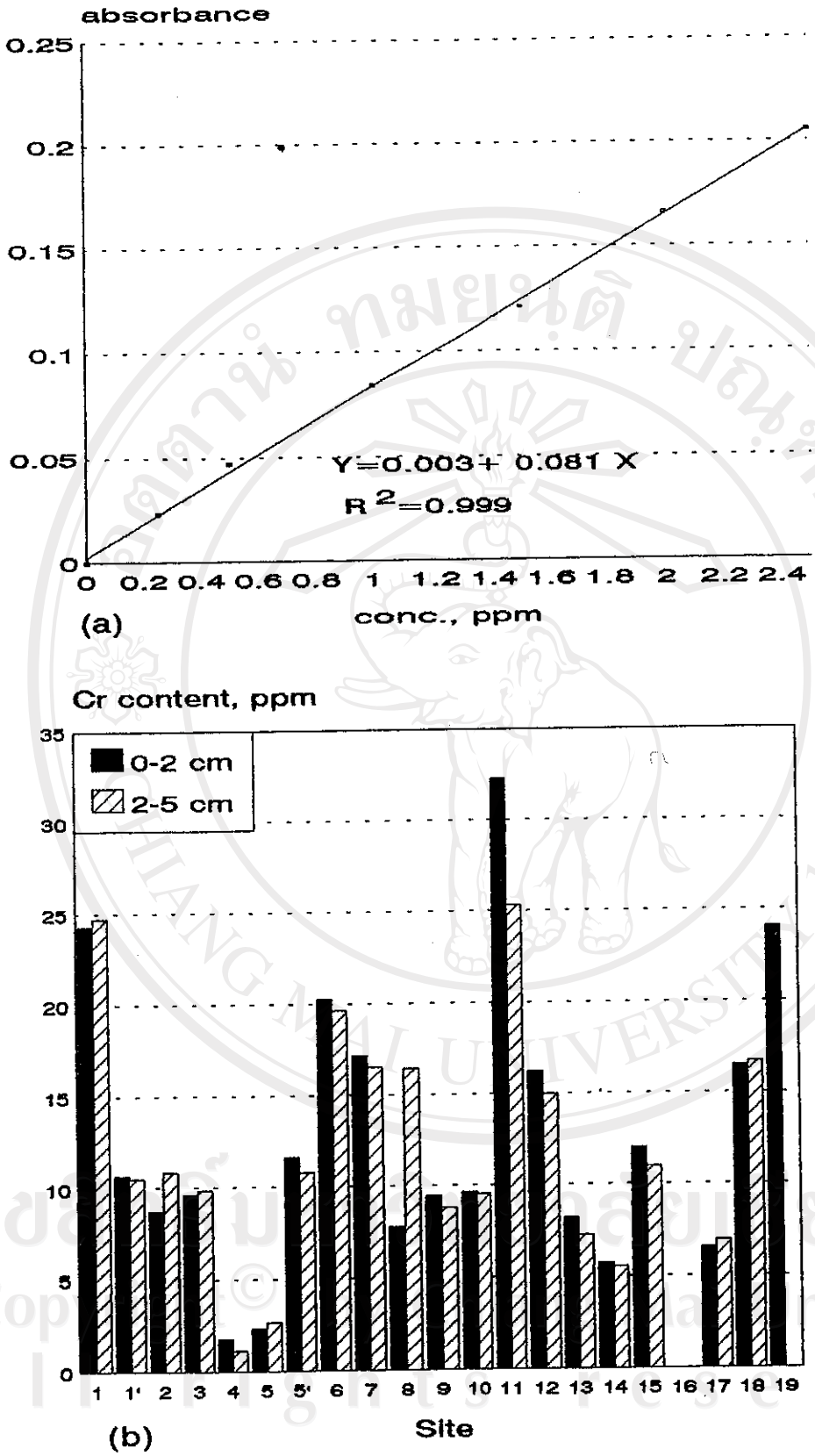
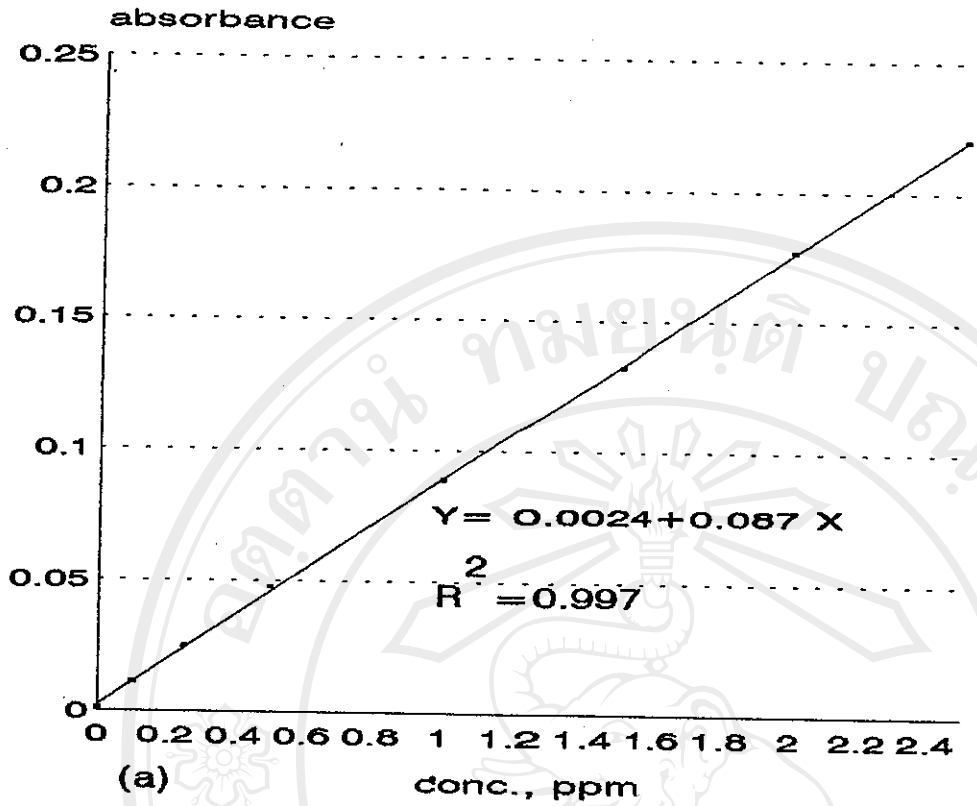


Figure 5.5. Chromium content of soil samples
a. Calibration curve
b. Chromium content



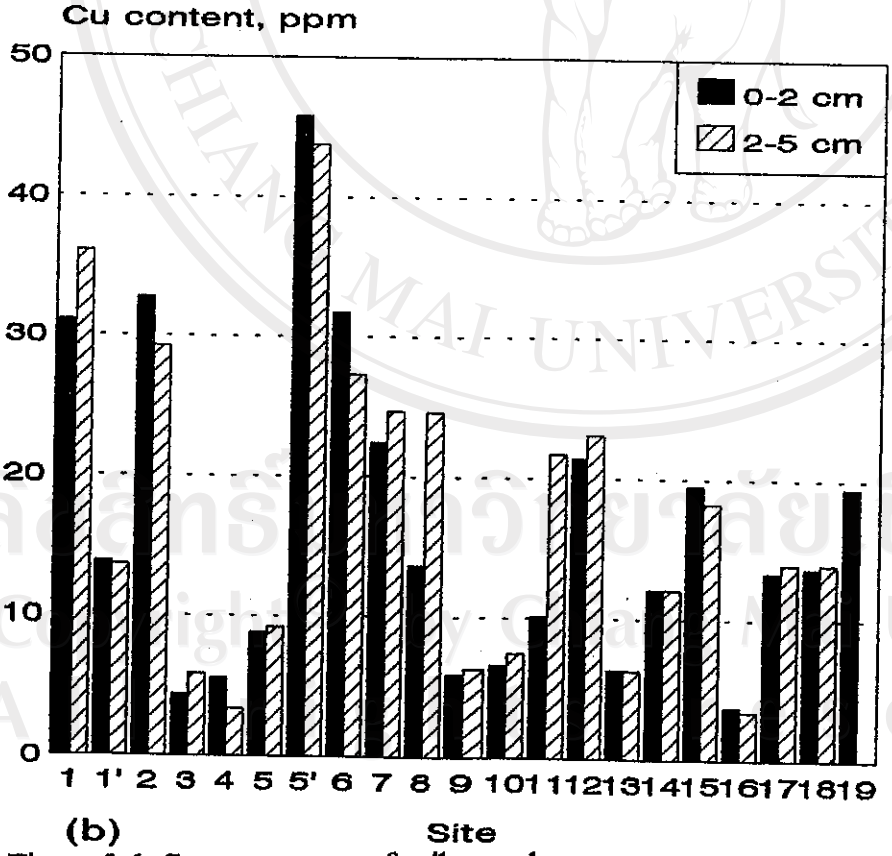
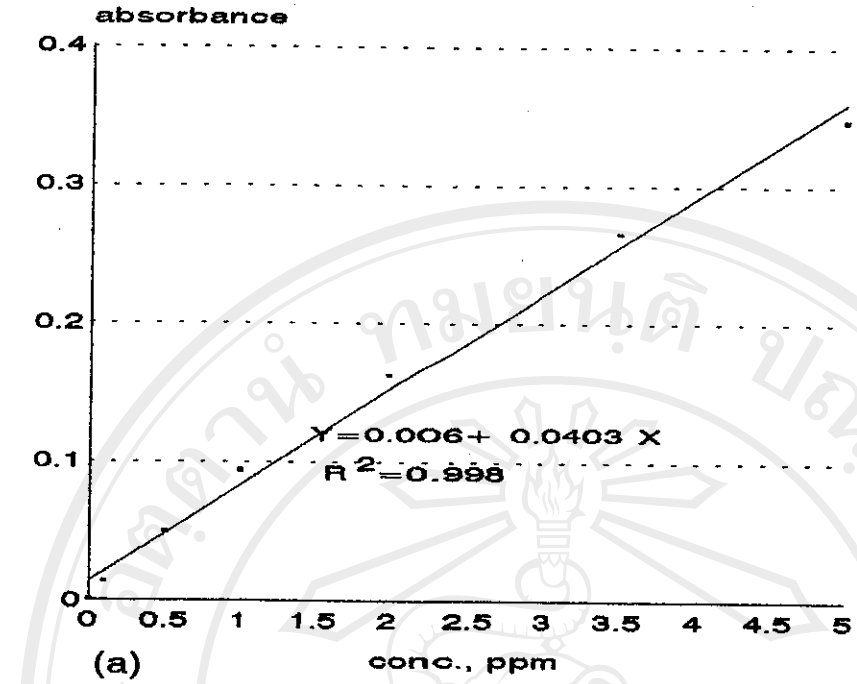
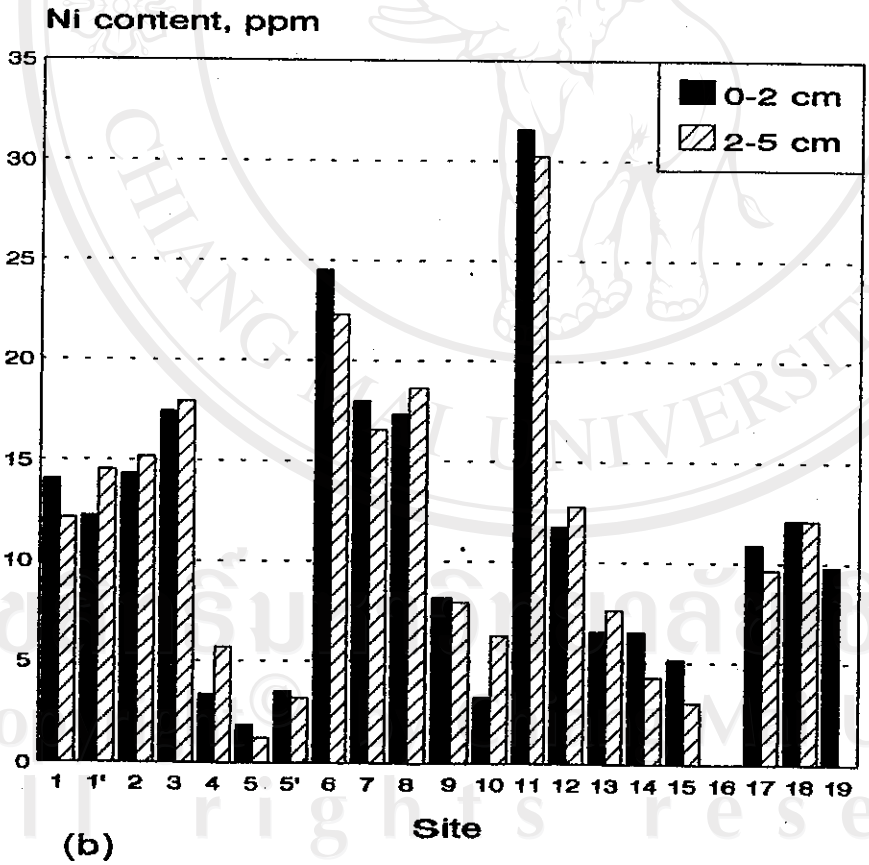


Figure 5.6. Copper content of soil sample
a. Calibration curve
b. Copper content



(a)



(b)

Figure 5.7. Nikel content of soil samples
a. Calibration curve
b. Nikel content

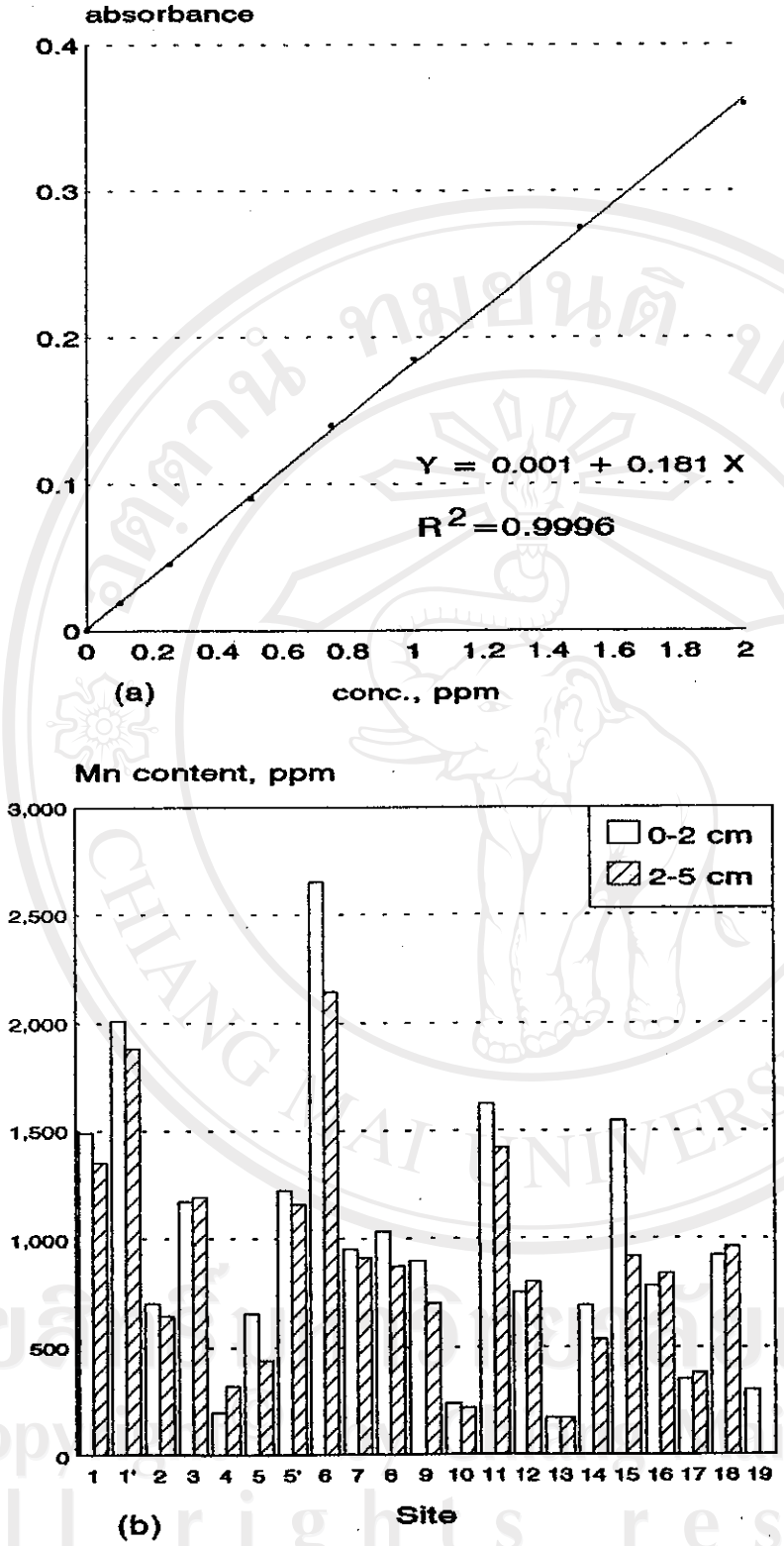
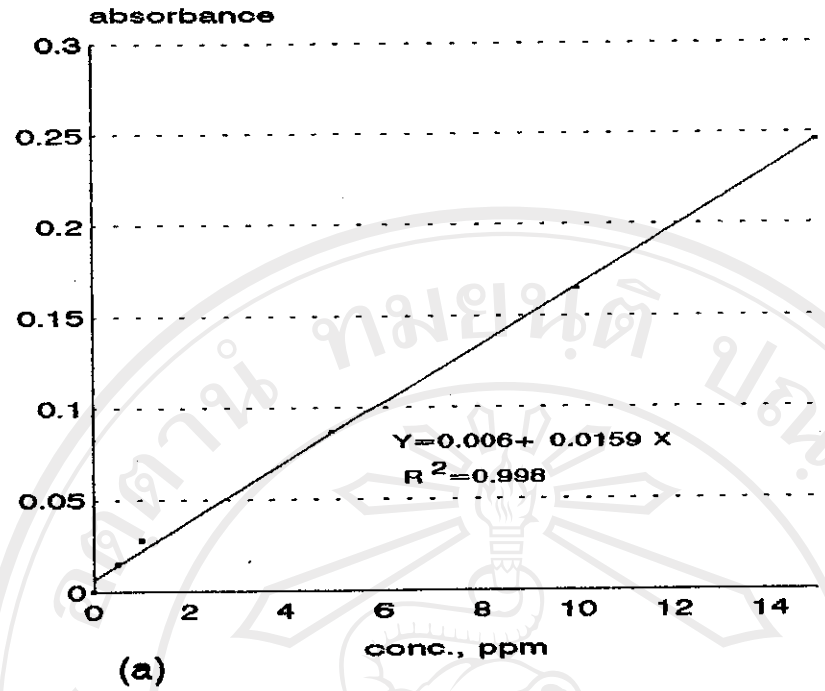
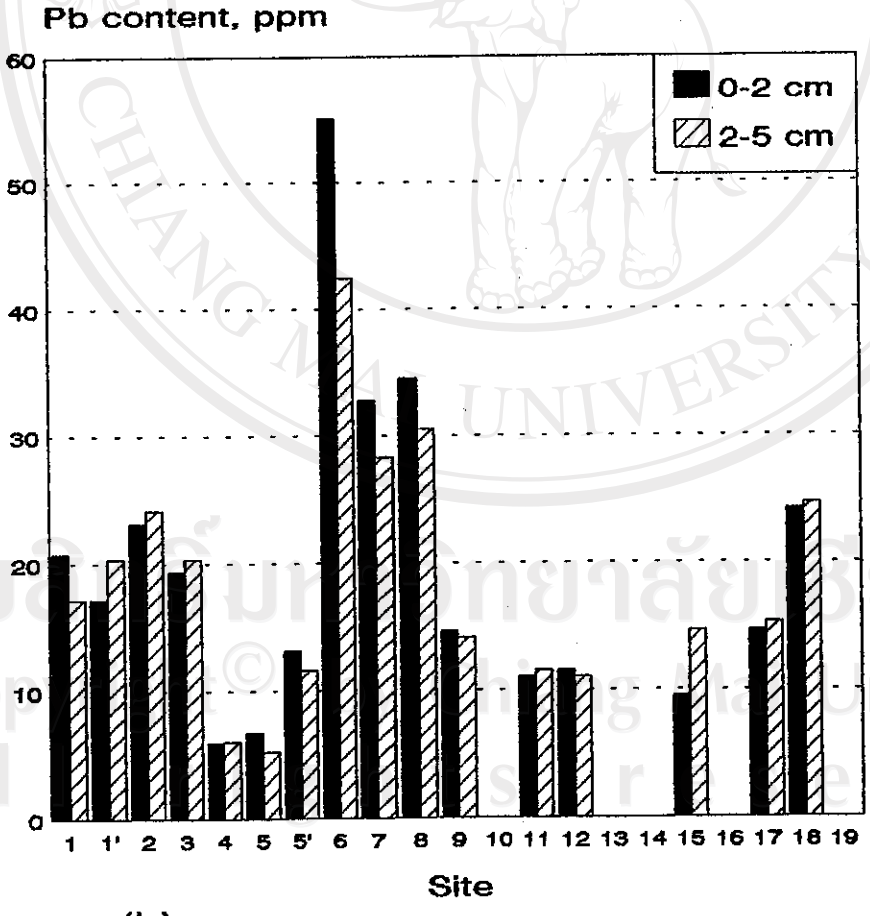


Figure 5.8. Manganese content of soil samples
a. Calibration curve
b. Manganese content

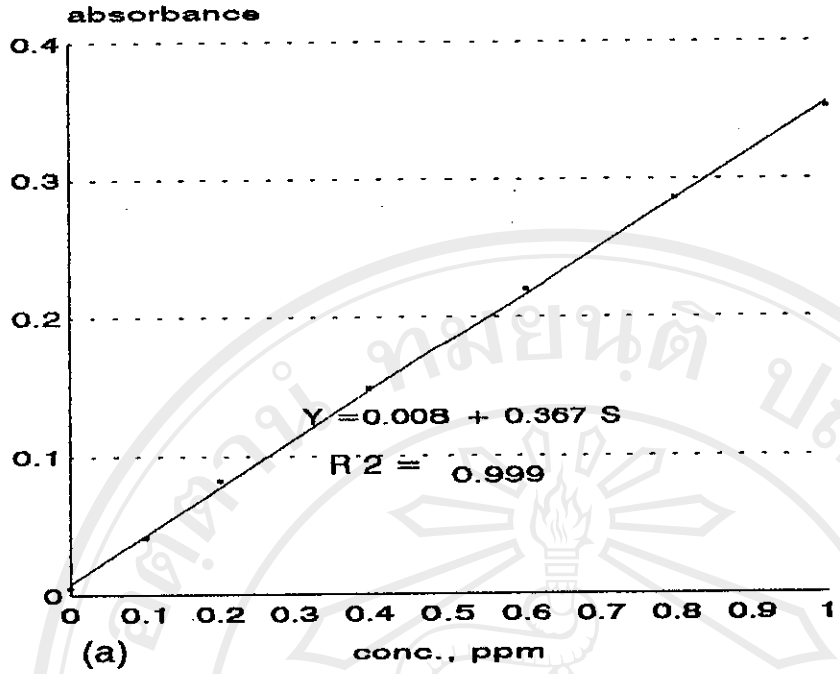


(a)



(b)

Figure 5.9. Lead content of soil samples
a. Calibration curve
b. Lead content



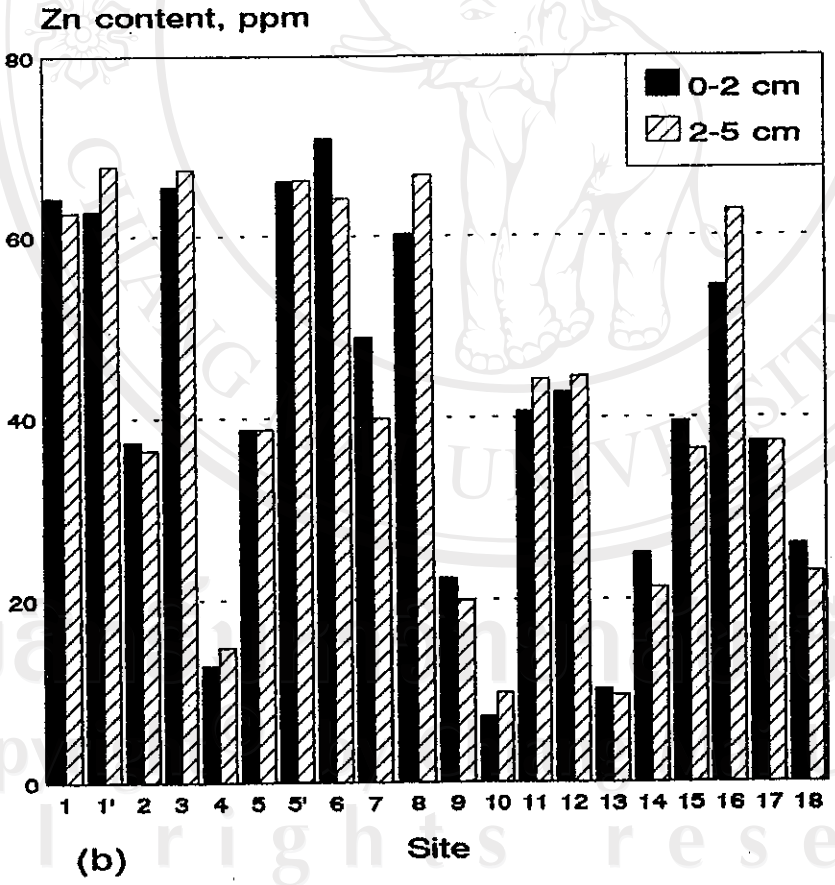


Figure 5.10. Zinc content of soil samples
a. Calibration curve
b. Zinc content

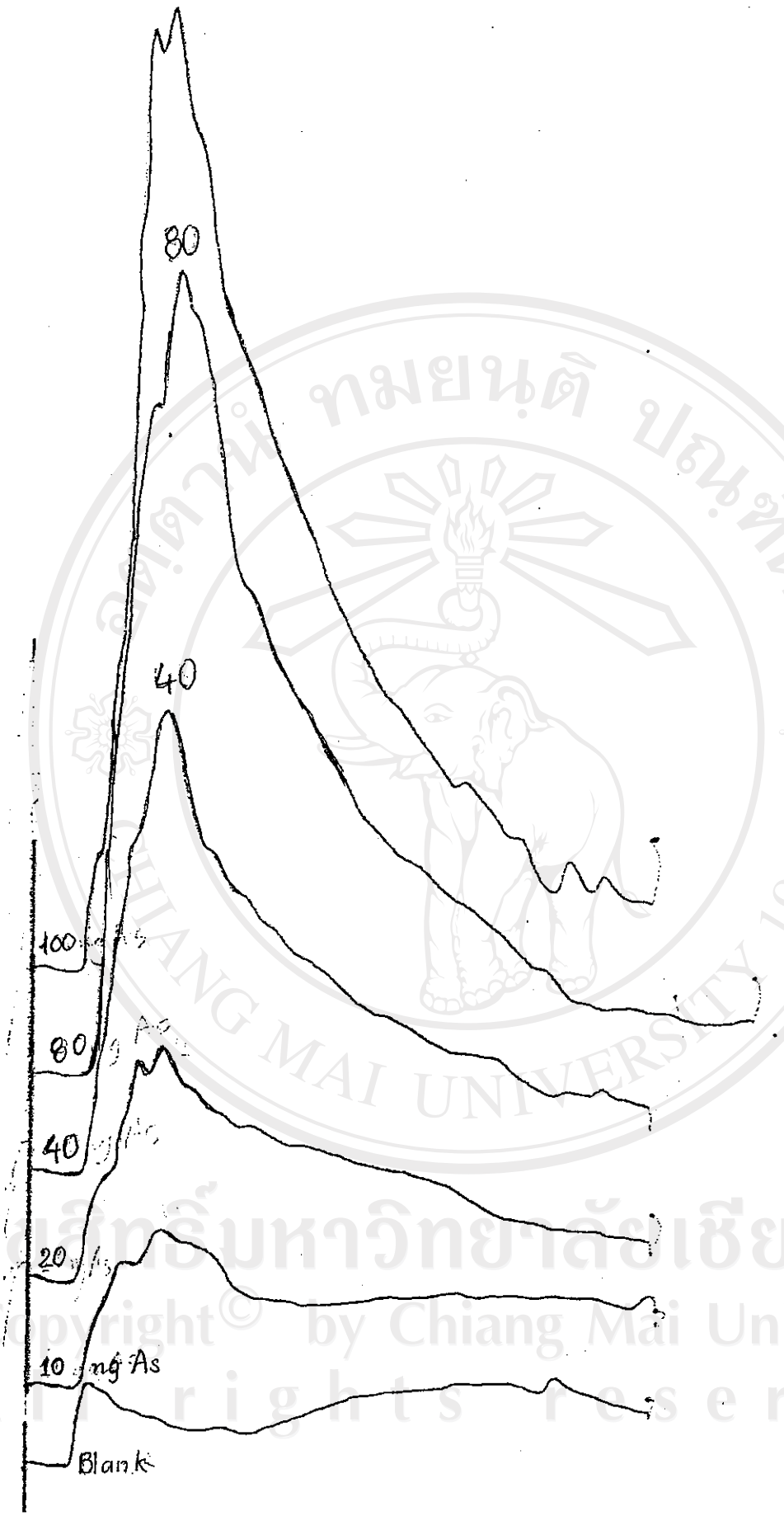


Figure 5.11. Arsenic peaks by hydride generation

λ= 193.7, standards contain 10, 20, 40, 80, 100 ng As

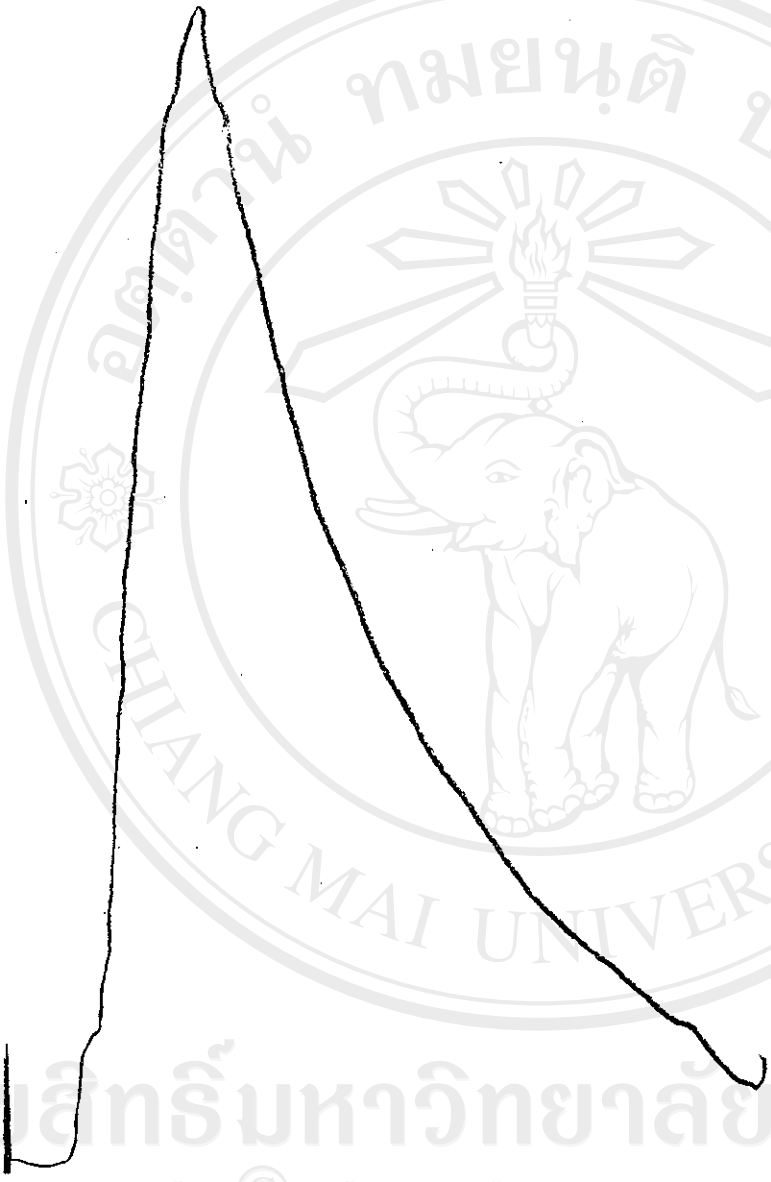


Figure 5.12. Arsenic peak for sample (site 2)

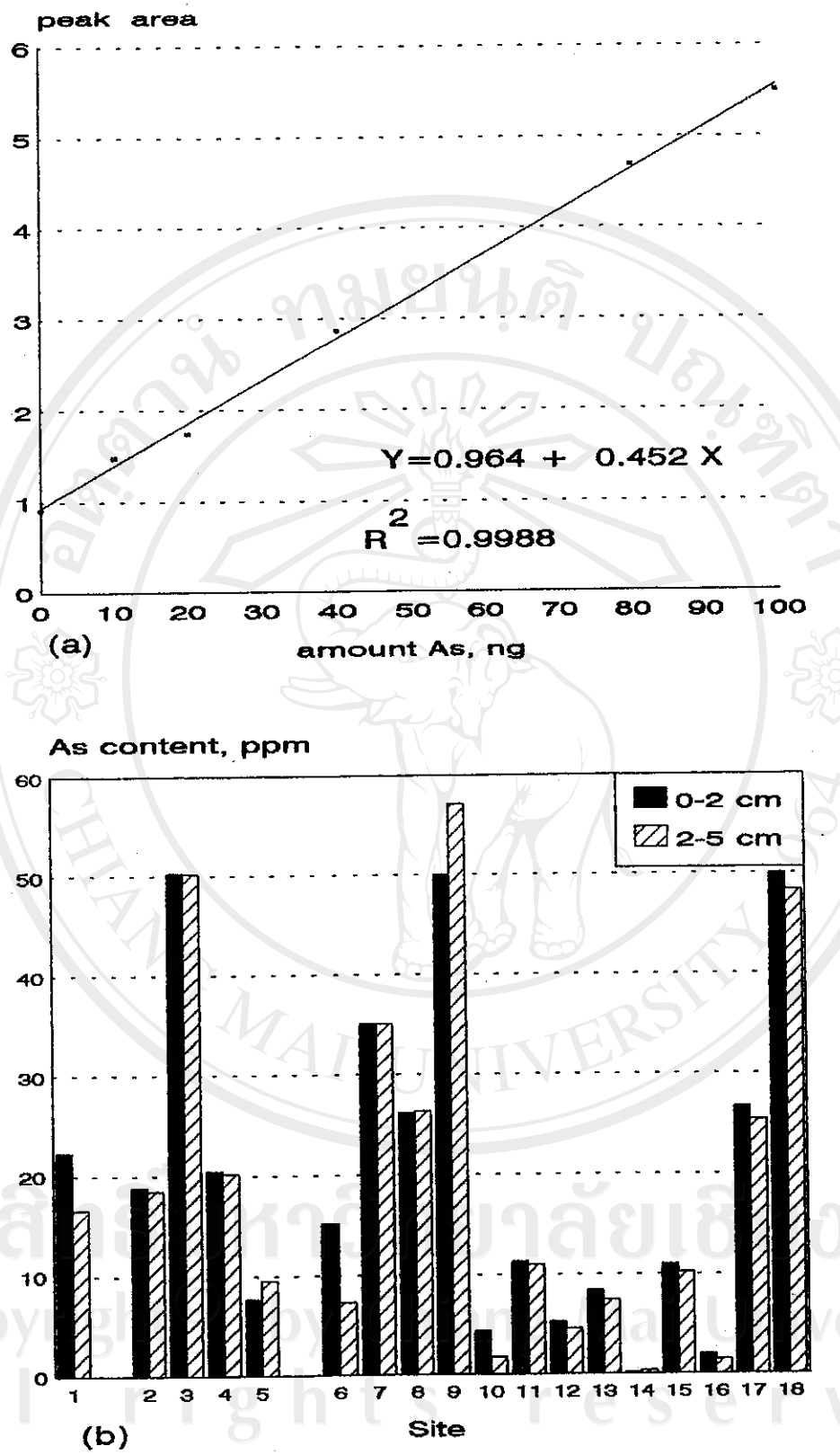


Figure 5.13. Arsenic content of soil samples
a: calibration curve
b: arsenic content

5.2 Dust samples

Table 5.3 presents weight of dust samples collected by washing deposits from surface bamboo leaves. Because of heavy rain, there were only a little amount of dust remained on surface leaves.

Table 5.3. Dust samples: amount

Site	Weight (g)
9	0.3133
10	0.0285
11	0.0548
12	0.7667
13	0.0284
14	0.0959
15	0.423
16	0.6017
17	0.6758
18	0.7812

5.3 Vegetation and forest in the area.

Table 5.3 presents results of a vegetation survey in the area. Forest type, vagetation and ground flora at all sites.

Table 5.4. Forest type and vegetation's condition in each study site

Site	Forest type	vegetation	ground flora	note
1	open, fire-prone, very degraded deciduous dipterocarp-oak scrub	trees are small, dense	abundant herbs, grasses	site near reservoir, behind mountain
2	open, fire-disturbed, deciduous thicket with deciduous secondary growth	trees are very sparse	bamboo, shrubs are abundant	near power plant
3	very degraded, disturbed, fire-prone, deciduous scrub and secondary growth	trees are small, sparse teaks were cut, many dead trees	bamboo and grasses are abundant	near power plant, in wind direction, fires are frequent, strong odour of SO2 ...
4	open, very degraded, fire prone deciduous forest	teak was cut, trees are big	bamboo and herbs are abundant	logging destroyed forest
5	open, fire-prone, degraded deciduous dipterocarp-oak forest	dense, small trees	bamboo and herbs are abundant	near pineapple field, near stream
6	open, fire-prone, deciduous scrub with bamboo, very degraded area	few trees, big teaks and some new planted teak	bamboo abundant	logging and fires destroyed forest
7	open, fire-damaged, deciduous scrub forest with much bamboo degraded area	spare, few trees	bamboo is abundant	logging and fires destroyed forest
8	open, fire-prone, deciduous scrub and bamboo forest, very degraded area	dense, small trees	poor in ground flora	teak plantation
9	very degraded deciduous forest wit much bamboo and secondary growth	trees are sparse, small	poor in ground flora	cutting trees, livestock and near village

Table 5.4. Continue

Site	Forest type	vegetation	ground flora	note
10	very degraded, cut teak forest, secondary growth with much bamboo	trees are small, dense	abundant herbs, grasses	site near village
11	open, degraded, deciduous disturbed area and scrub forest very eroded area	trees are very sparse	bamboo, shrubs are abundant	near village
12	very degraded, bamboo/ deciduous scrub forest	trees are small, sparse	bamboo and grasses are abundant	near village
13	degraded, deciduous -oak scrub forest	trees are small, sparse	bamboo and grasses are abundant	near reservoir
14	open bamboo- deciduous scrub forest merging with very degraded deciduous dipterocarp-oak scrub forest	small trees	bamboo is abundant	near Mae Moh new town
15	open bulldozed, very degraded and eroded, deciduous scrub with bamboo	few trees	bamboo abundant	
16	degraded deciduous dipterocarp-oak forest	trees are small	grasses, herbs is abundant	near reservoir
17	open, degraded, much bulldozed area with very sparse deciduous dipterocarp-oak and deciduous scrub with much bamboo	small trees	ground flora is abundant	near mining area (new pit)
18	plantation inside power plant	trees are sparse, small	poor in ground flora	just nearby the stack of power plant