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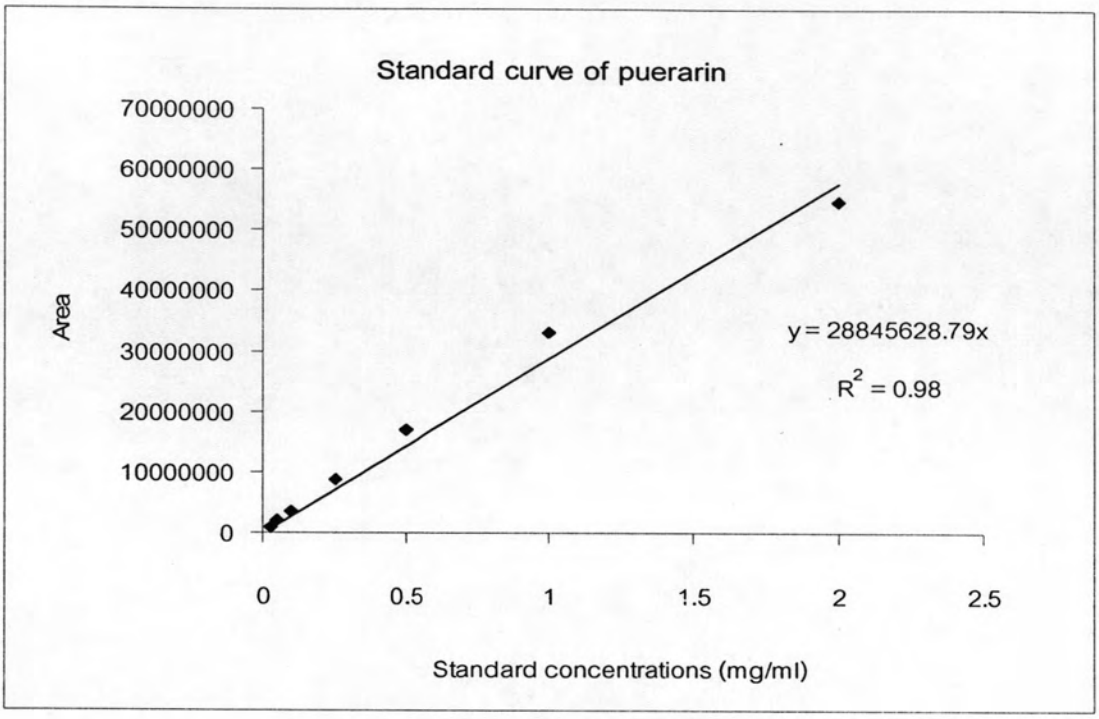
APPENDICES

APPENDIX A


Standard curve of puerarin
70000000
60000000
50000000
40000000
30000000
20000000
10000000
0
Area
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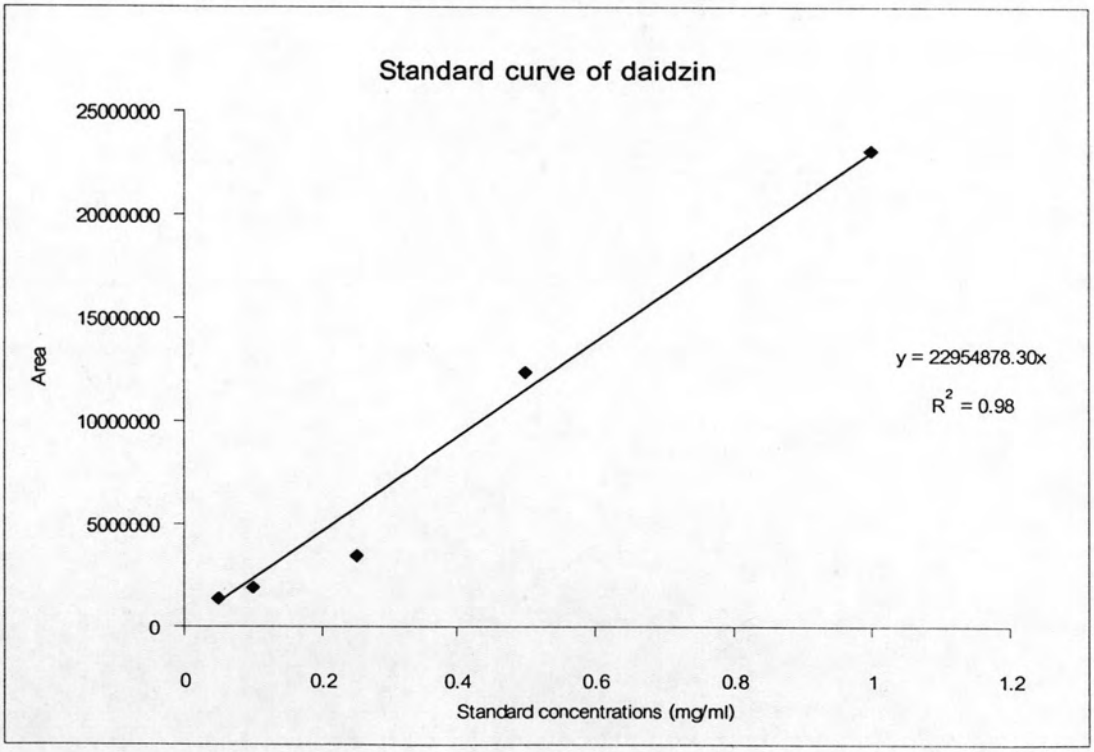
R2 = 0.98
0
0.5
1
1.5
2
2.5
Standard concentrations (mg/ml)


Standard curve of daidzin
25000000
20000000
15000000
10000000
5000000
0
Area
y = 22954878.30x
R2 = 0.98
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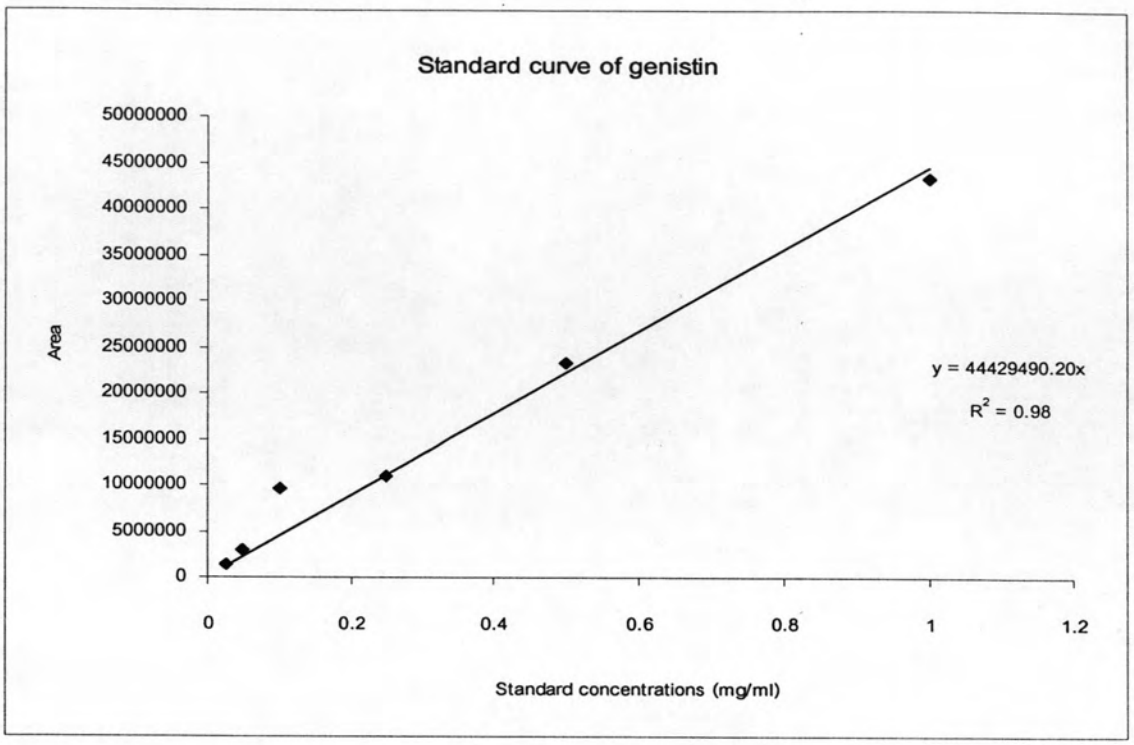
0.2
0.4
0.6
0.8
1
1.2
Standard concentrations (mg/ml)


Standard curve of genistin
Area
50000000
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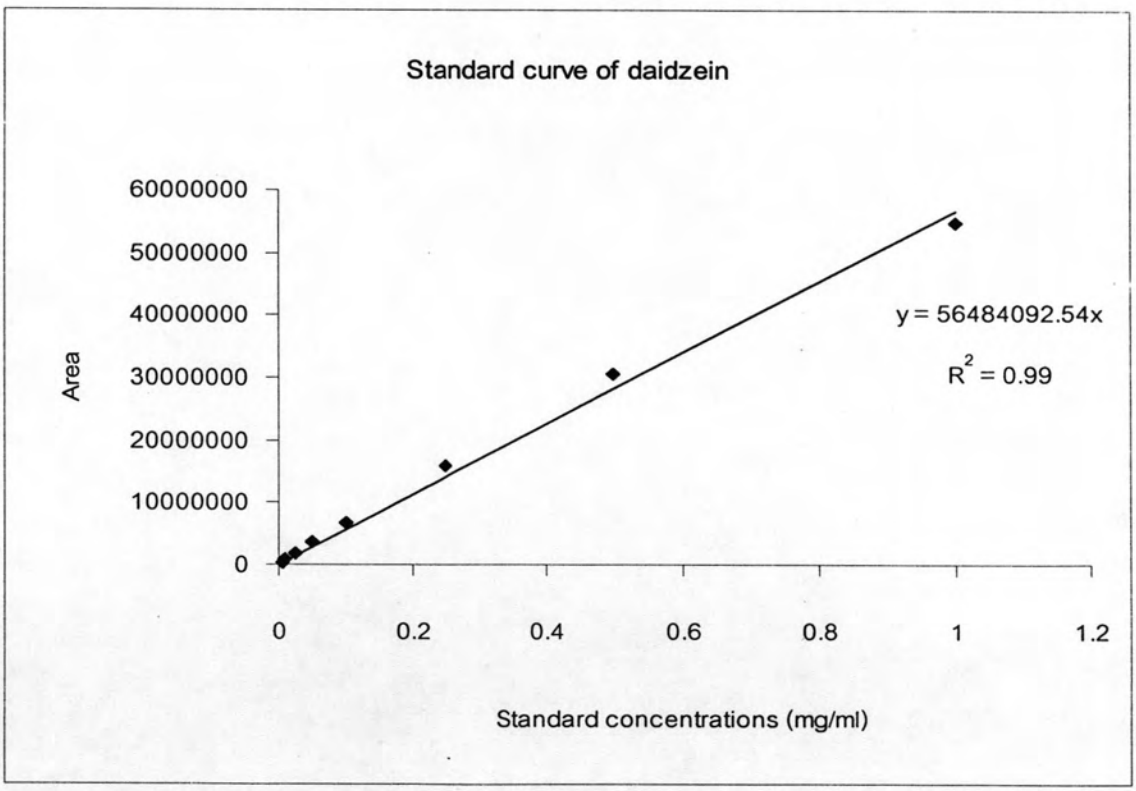
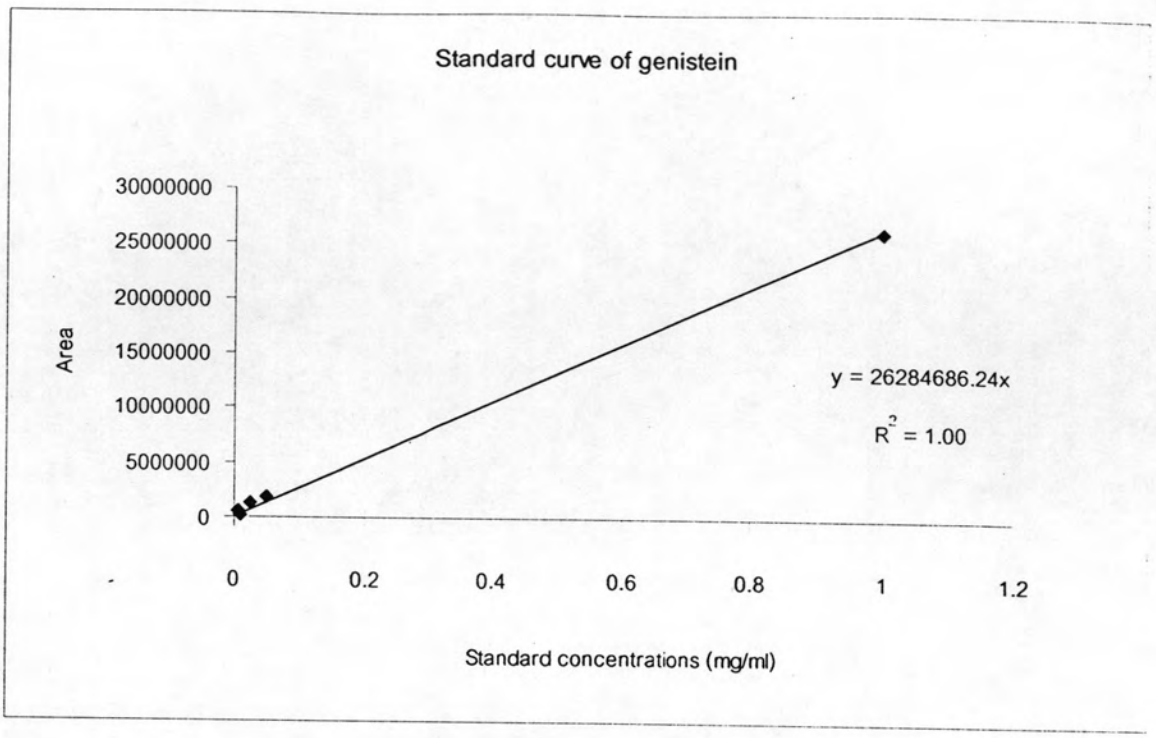
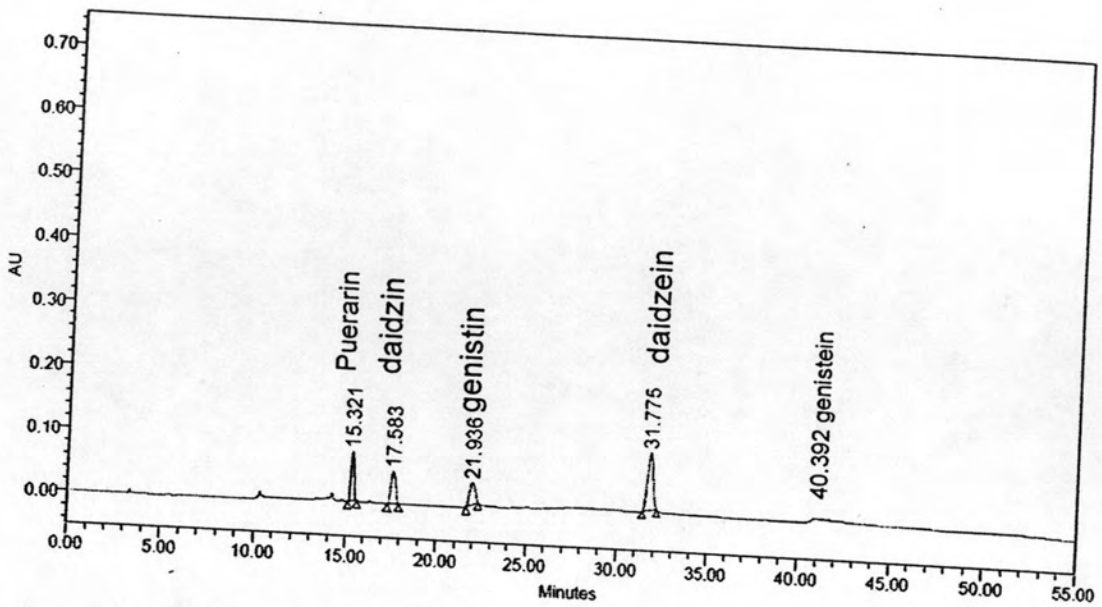
40000000
35000000
30000000
25000000
20000000
15000000
10000000
5000000
0
0
0.2
0.4
0.6
0.8
1
1.2
Standard concentrations (mg/ml)
y = 44429490.20x
R2 = 0.98

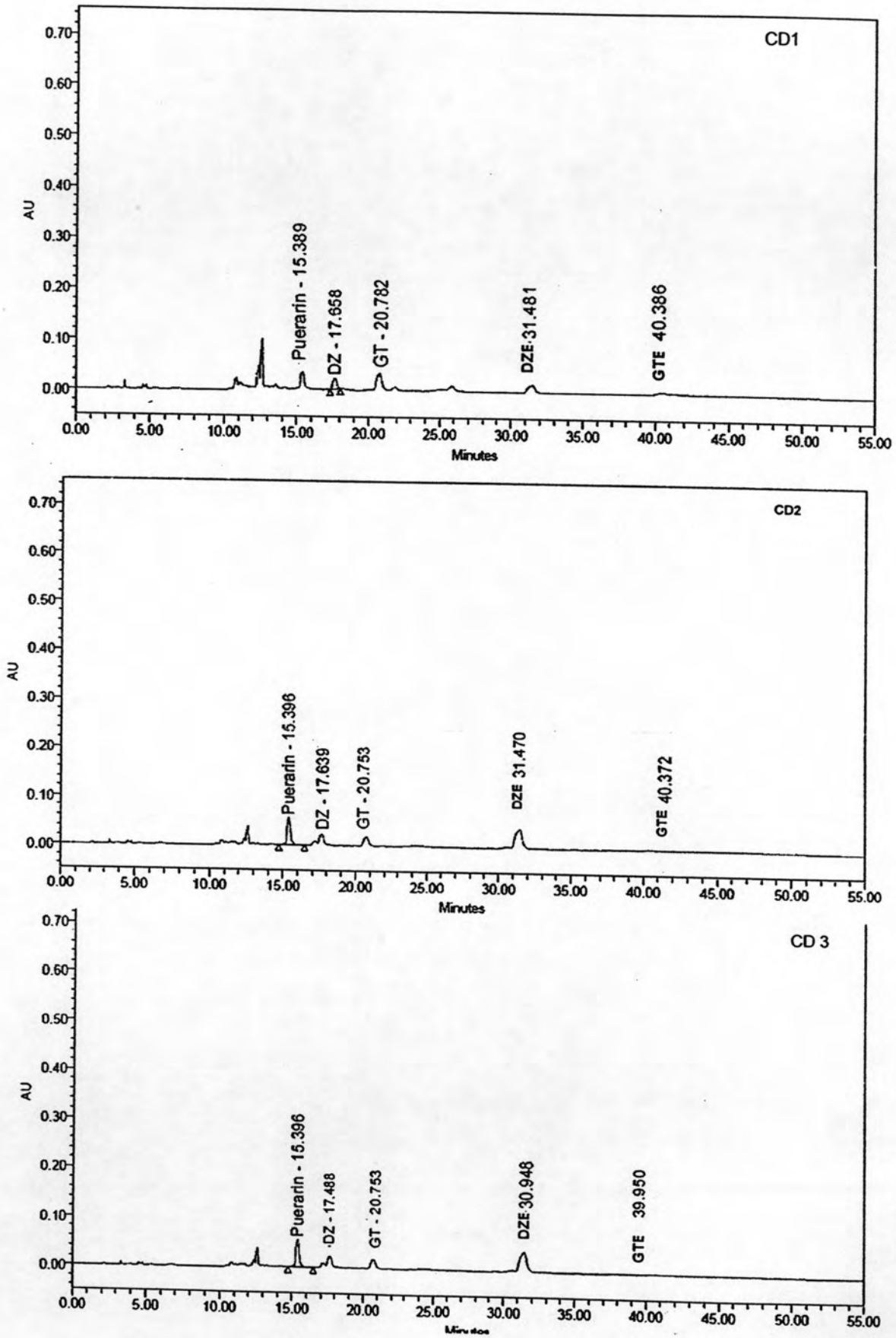

Standard curve of daidzein
Area
60000000
50000000
40000000
30000000
20000000
10000000
0
0
0.2
0.4
0.6
0.8
1
1.2
Standard concentrations (mg/ml)
y = 56484092.54x
R2 = 0.99



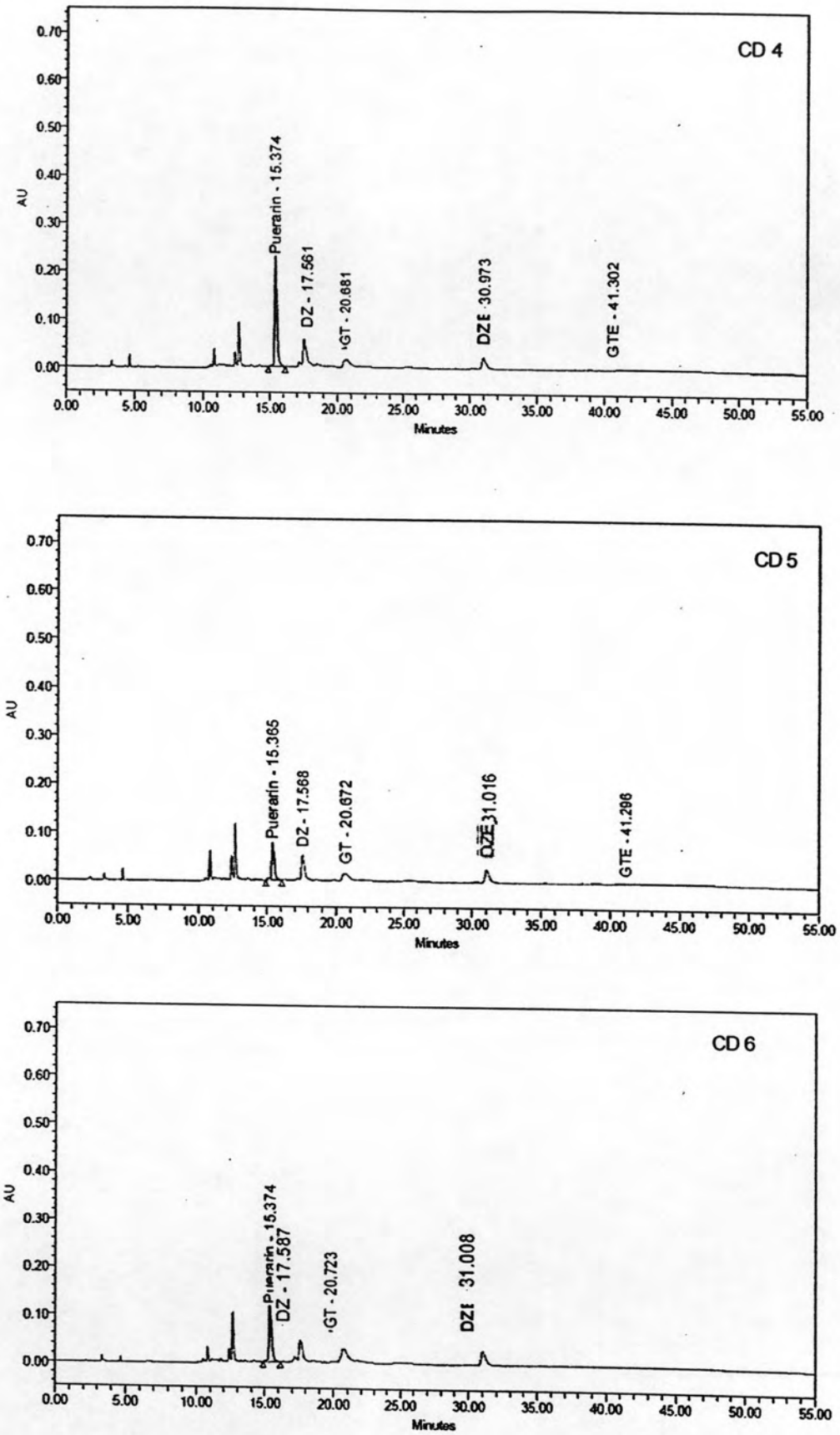
Isoflavonoid contents were calculated from equations of standard curve of individual isoflavonoids by input y value (area) then calculated x value (isoflavonoid contents).



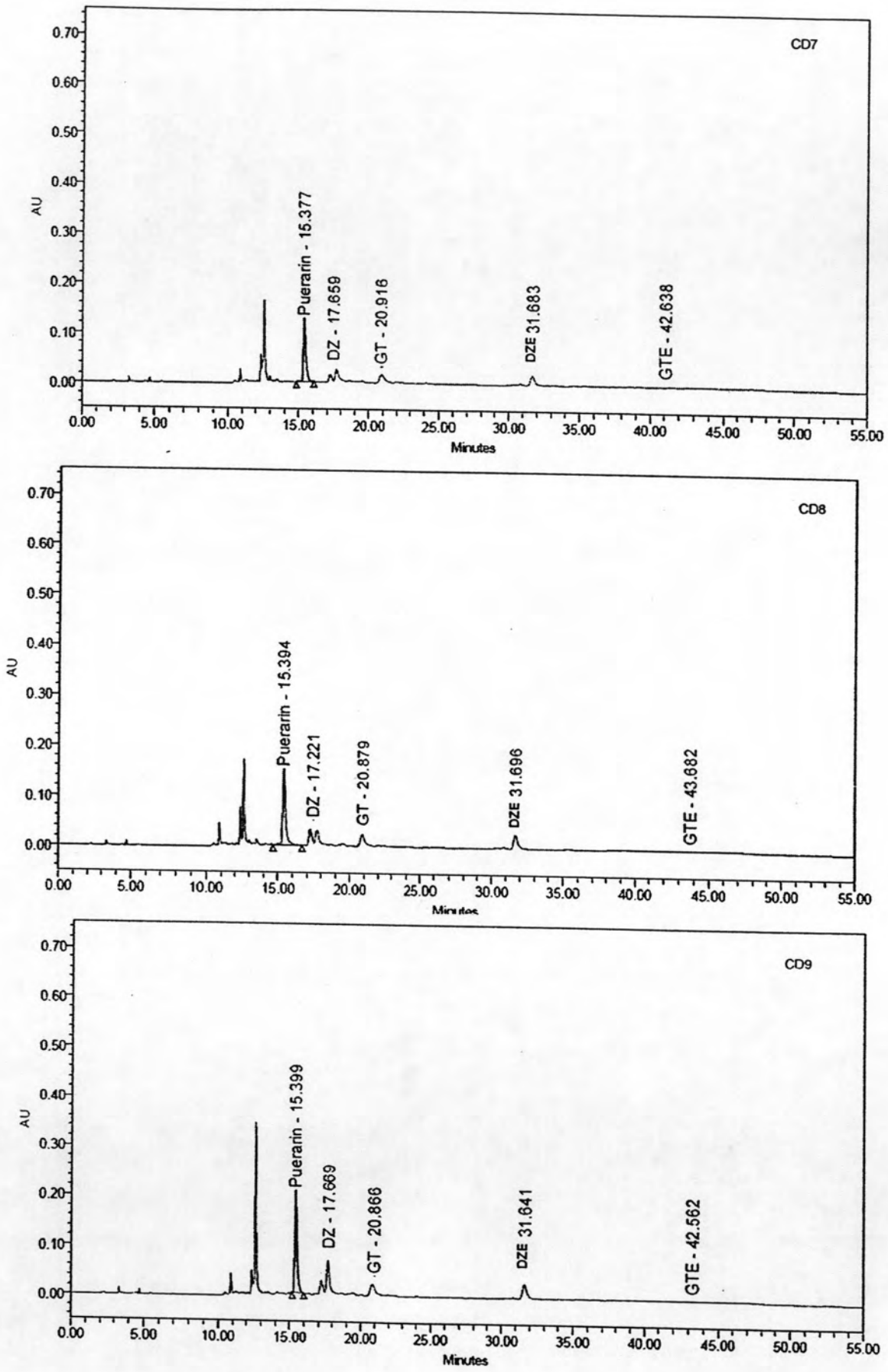
The retention time of individual isoflavonoid including, puerarin, daidzin, genistin, daidzein and genistein



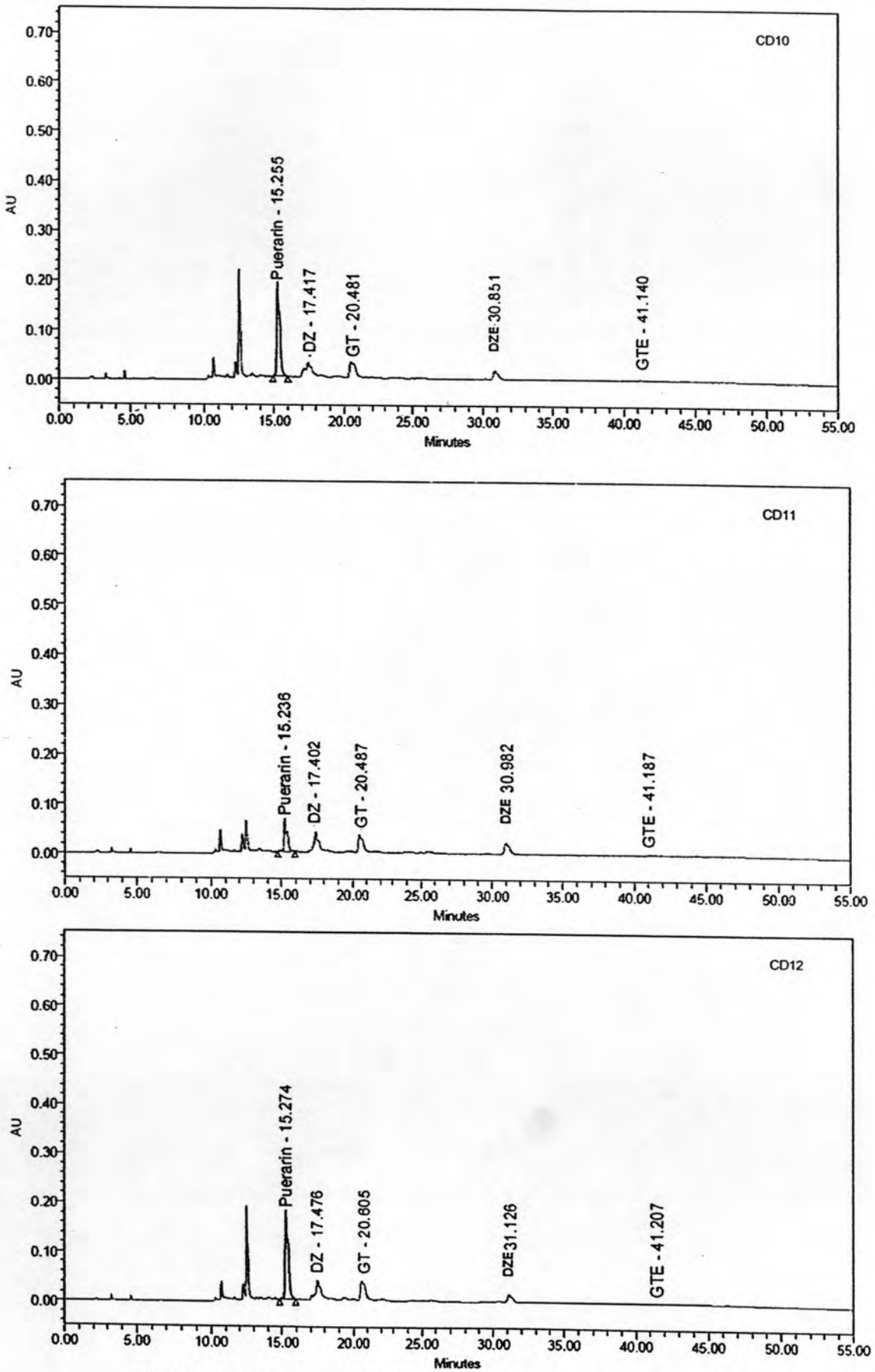
HPLC analysis of PM-III from 3 plants collected in March 2005



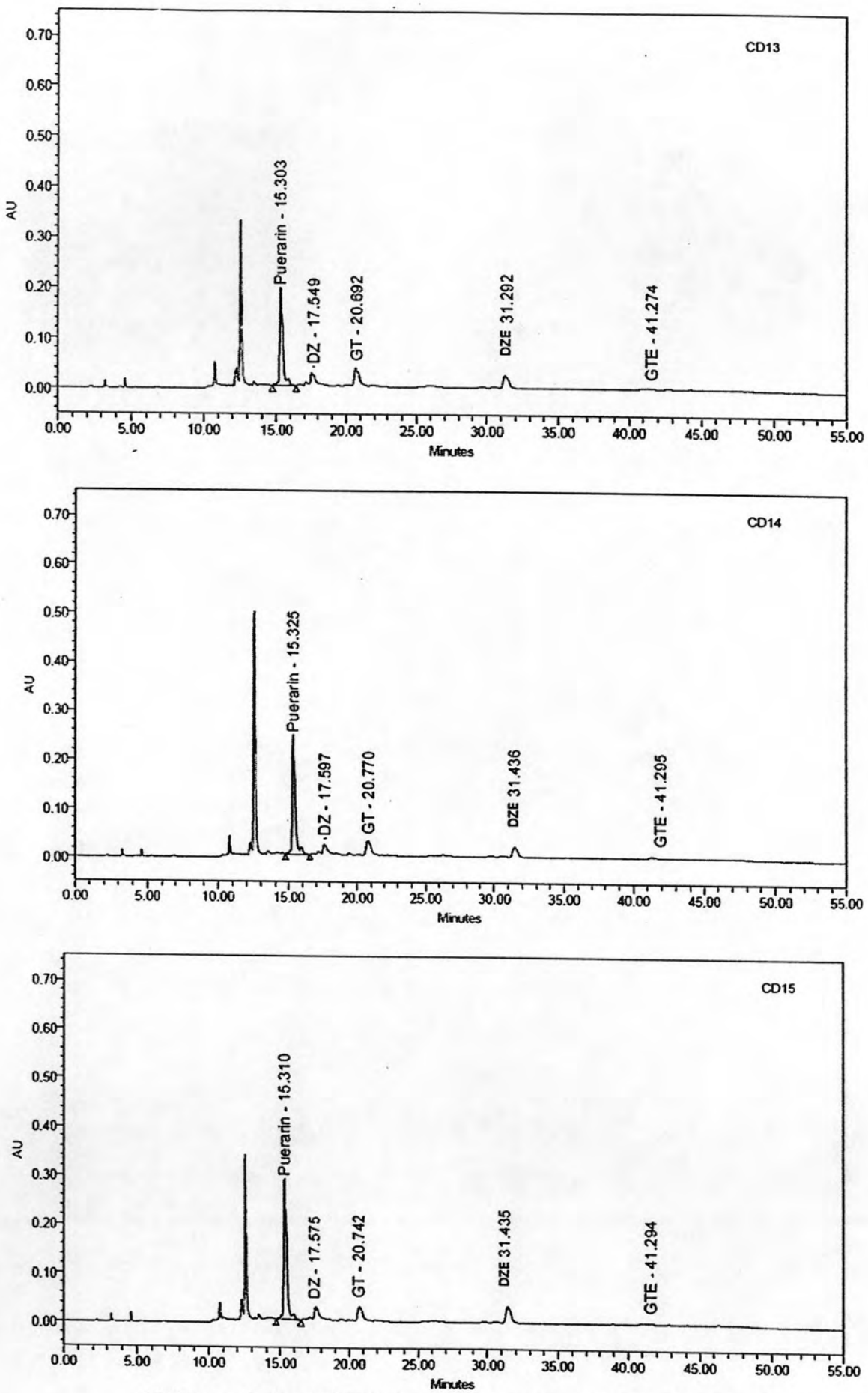
HPLC analysis of PM-III from 3 plants collected in April 2005



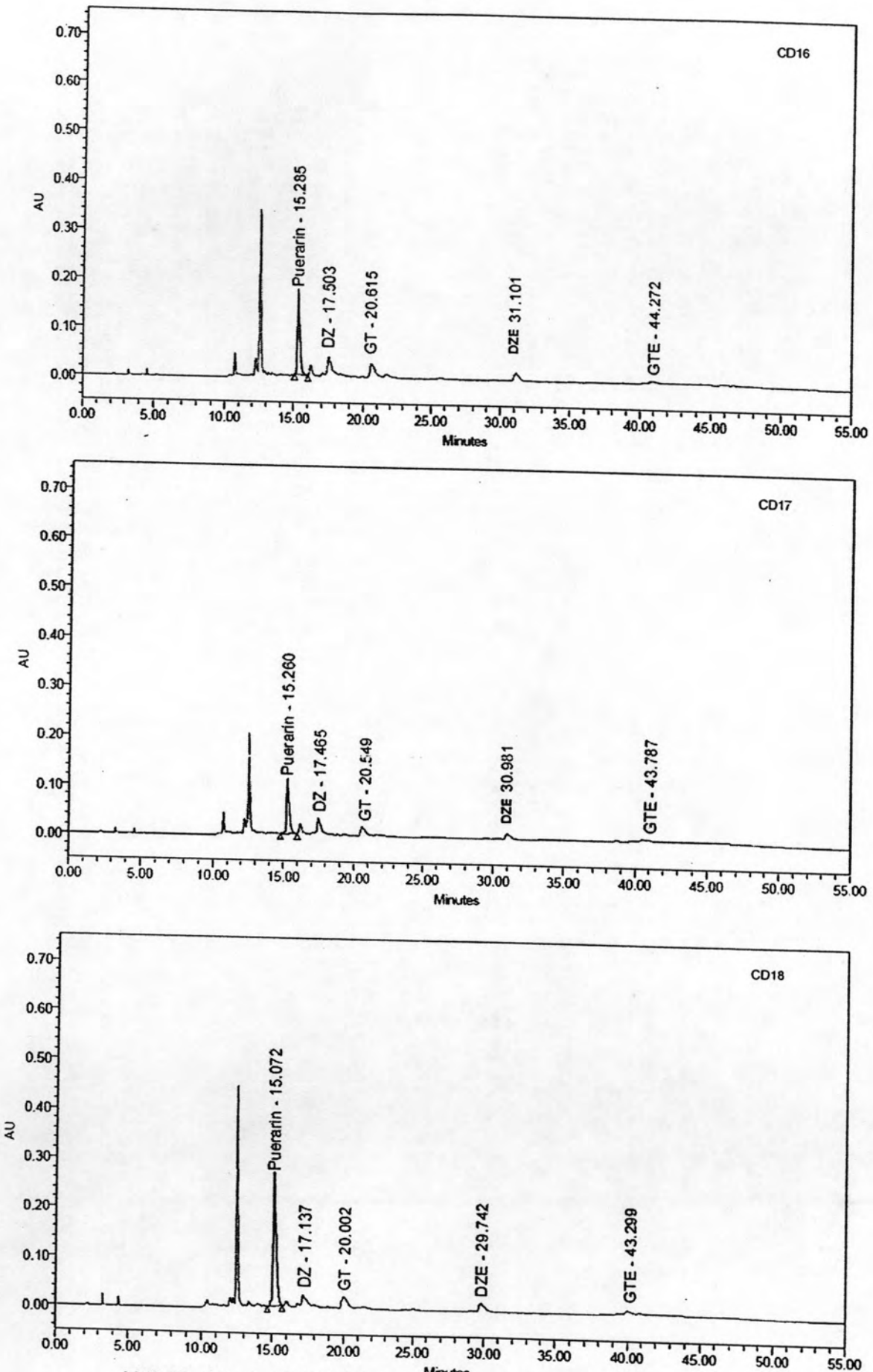
HPLC analysis of PM-III from 3 plants collected in May 2005



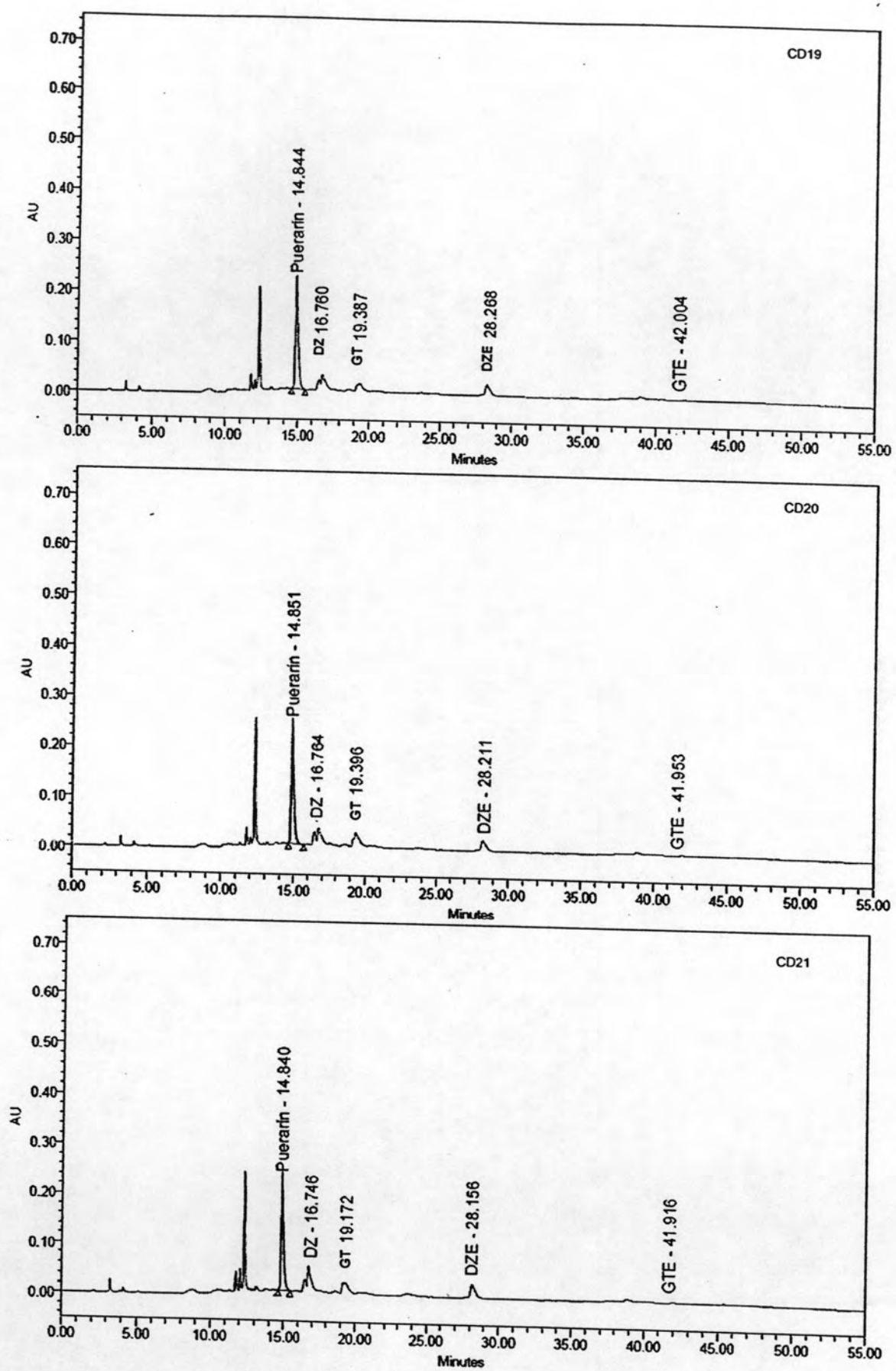
HPLC analysis of PM-III from 3 plants collected in June 2005



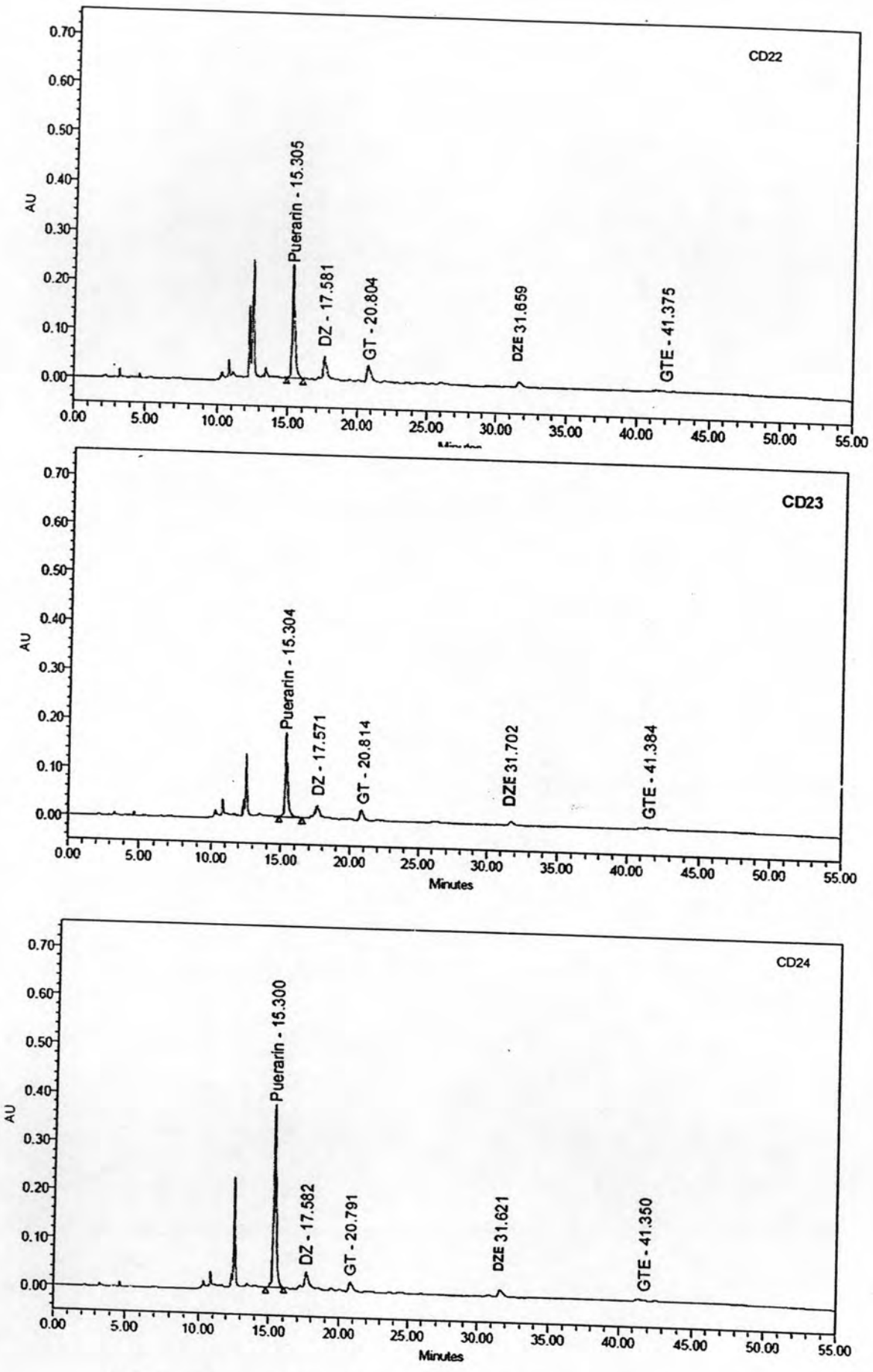
HPLC analysis of PM-III from 3 plants collected in July 2005



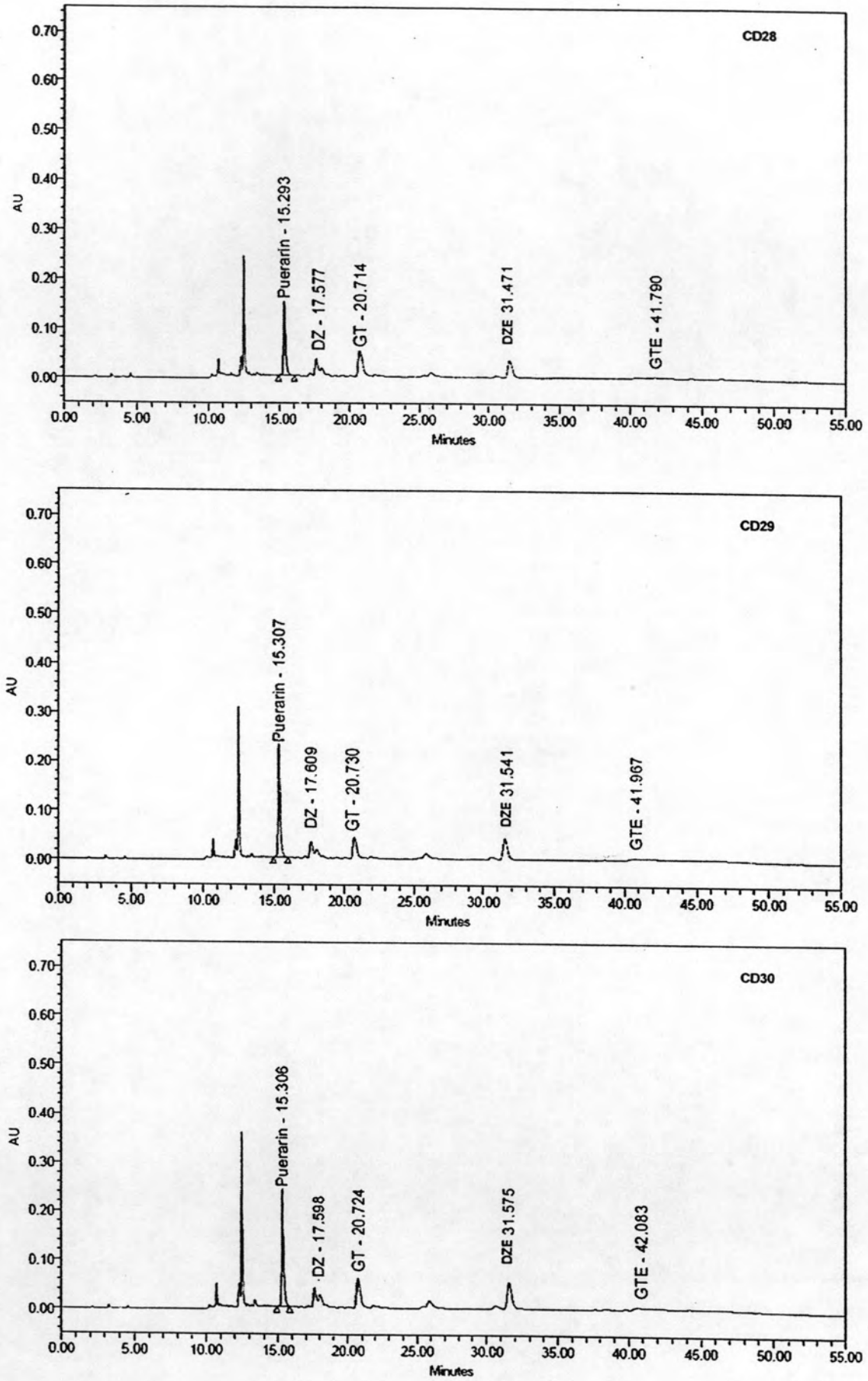
HPLC analysis of PM-III from 3 plants collected in August 2005



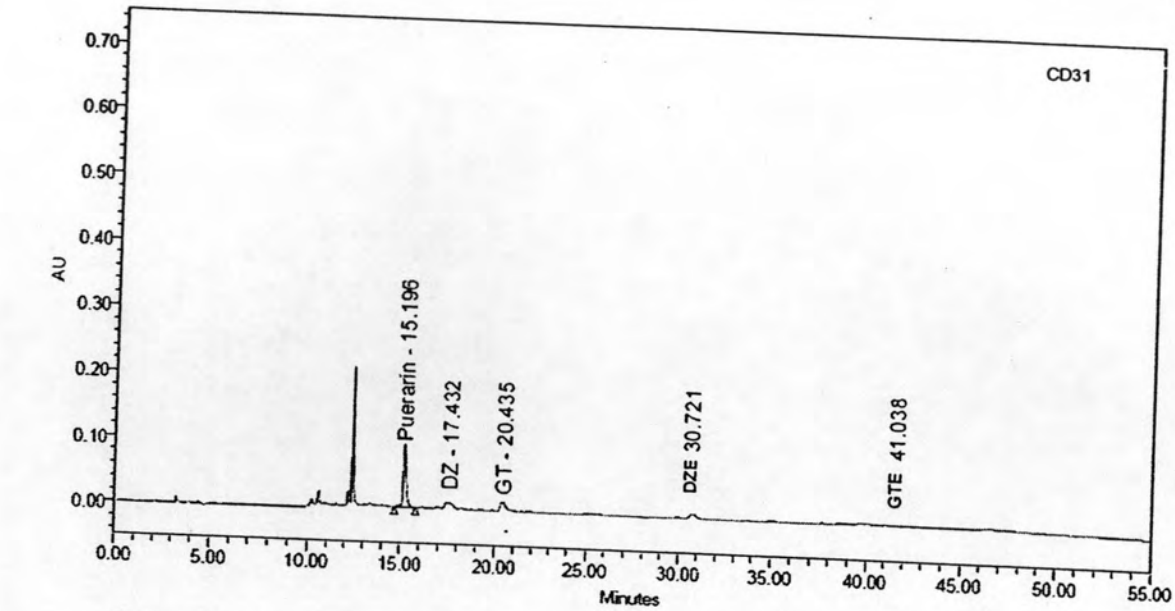
HPLC analysis of PM-III from 3 plants collected in September 2005

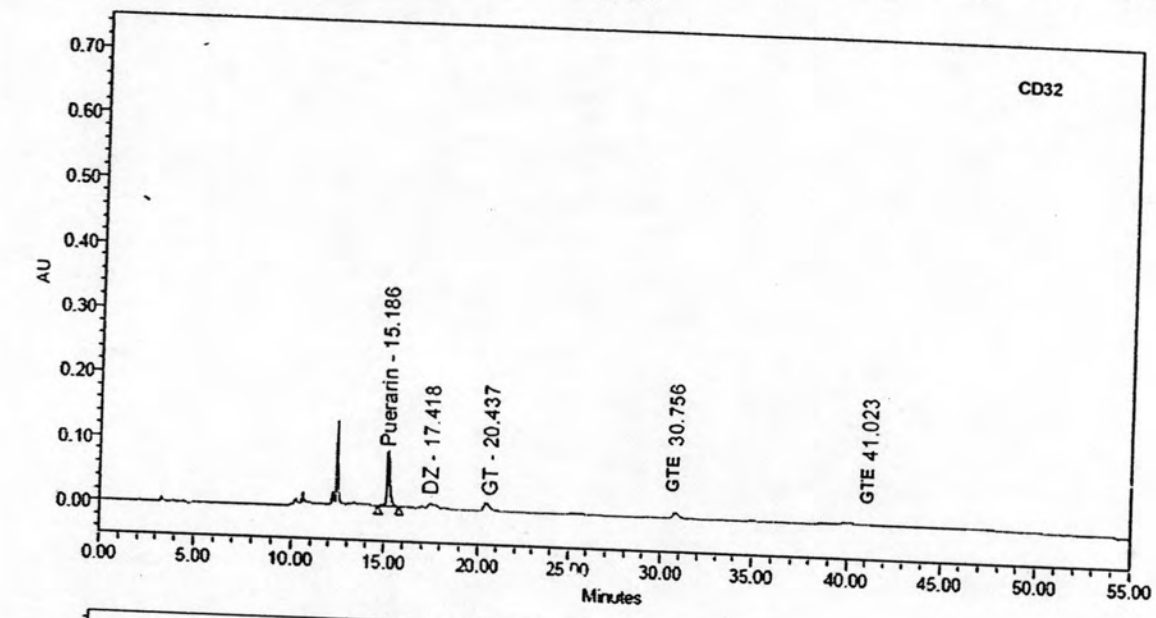


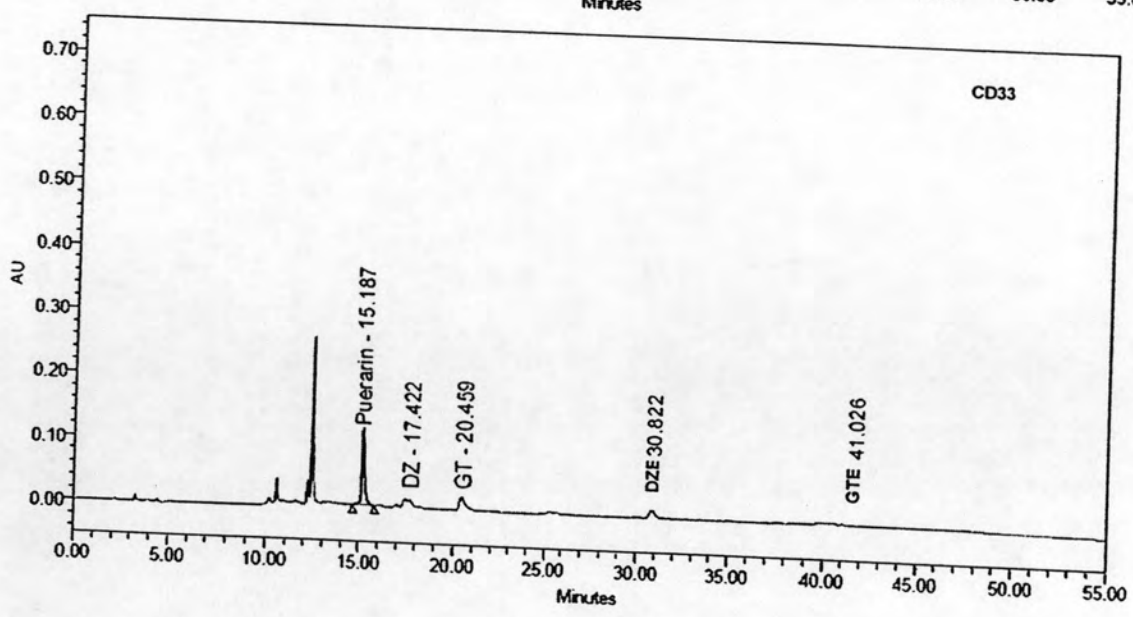
HPLC analysis of PM-III from 3 plants collected in October 2005



HPLC analysis of PM-III from 3 plants collected in December 2005







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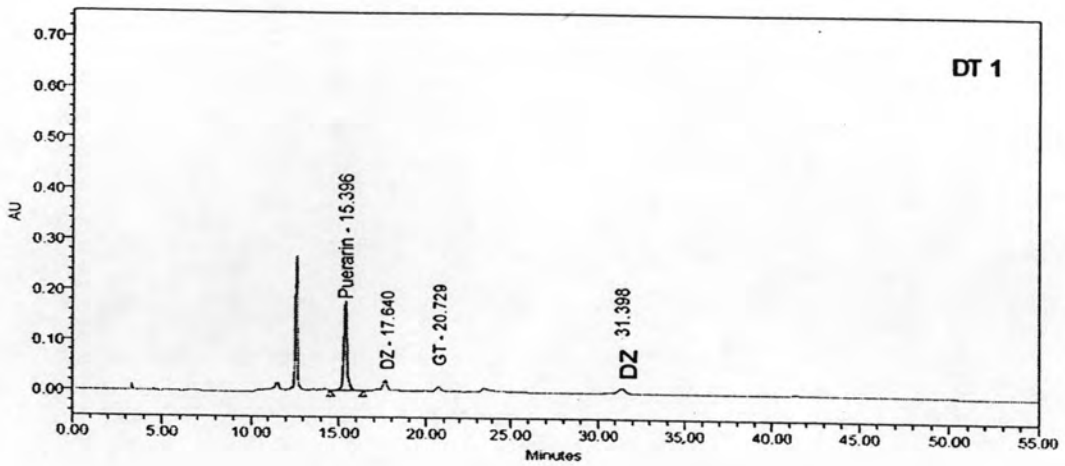
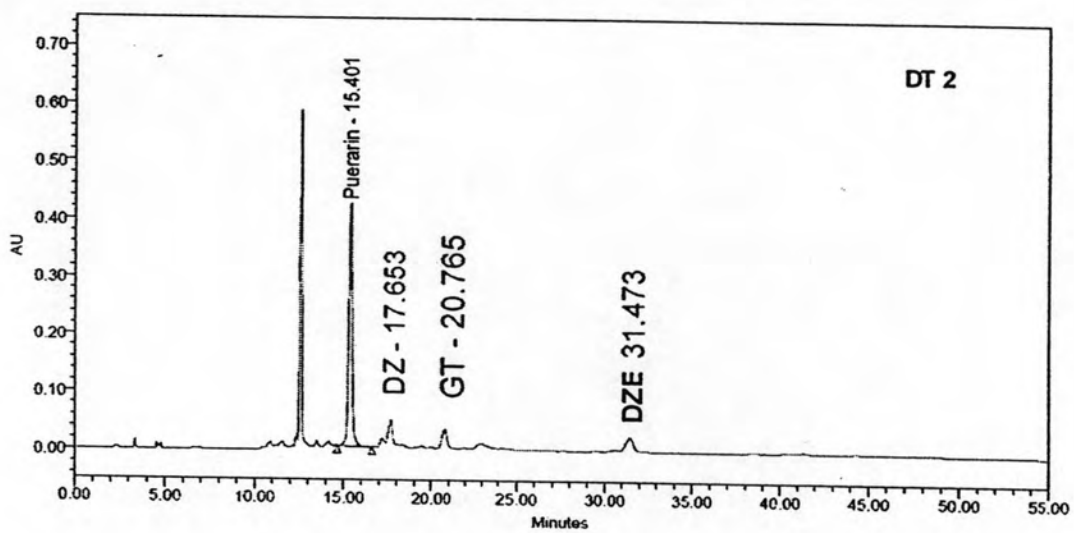
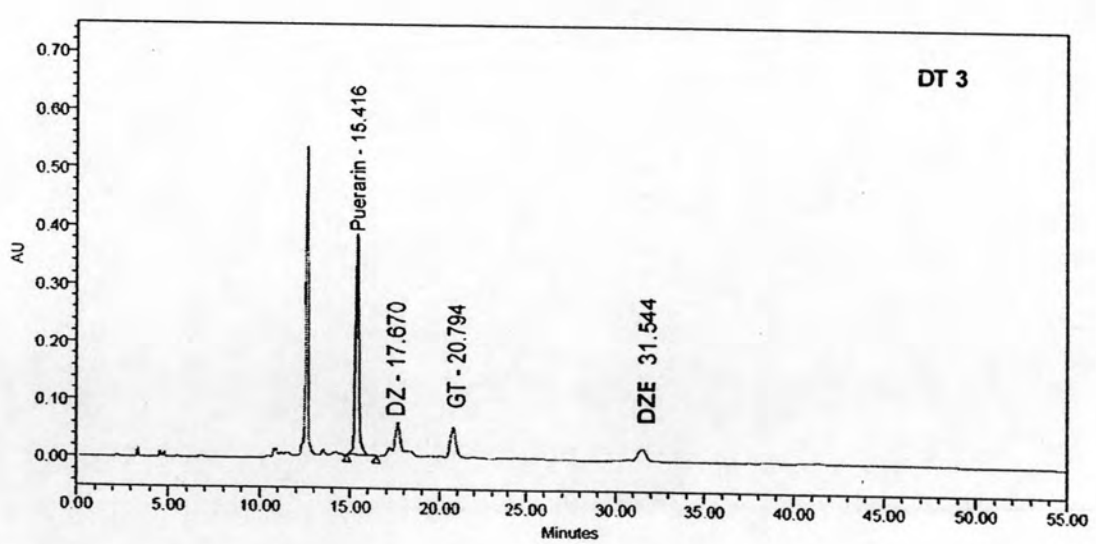
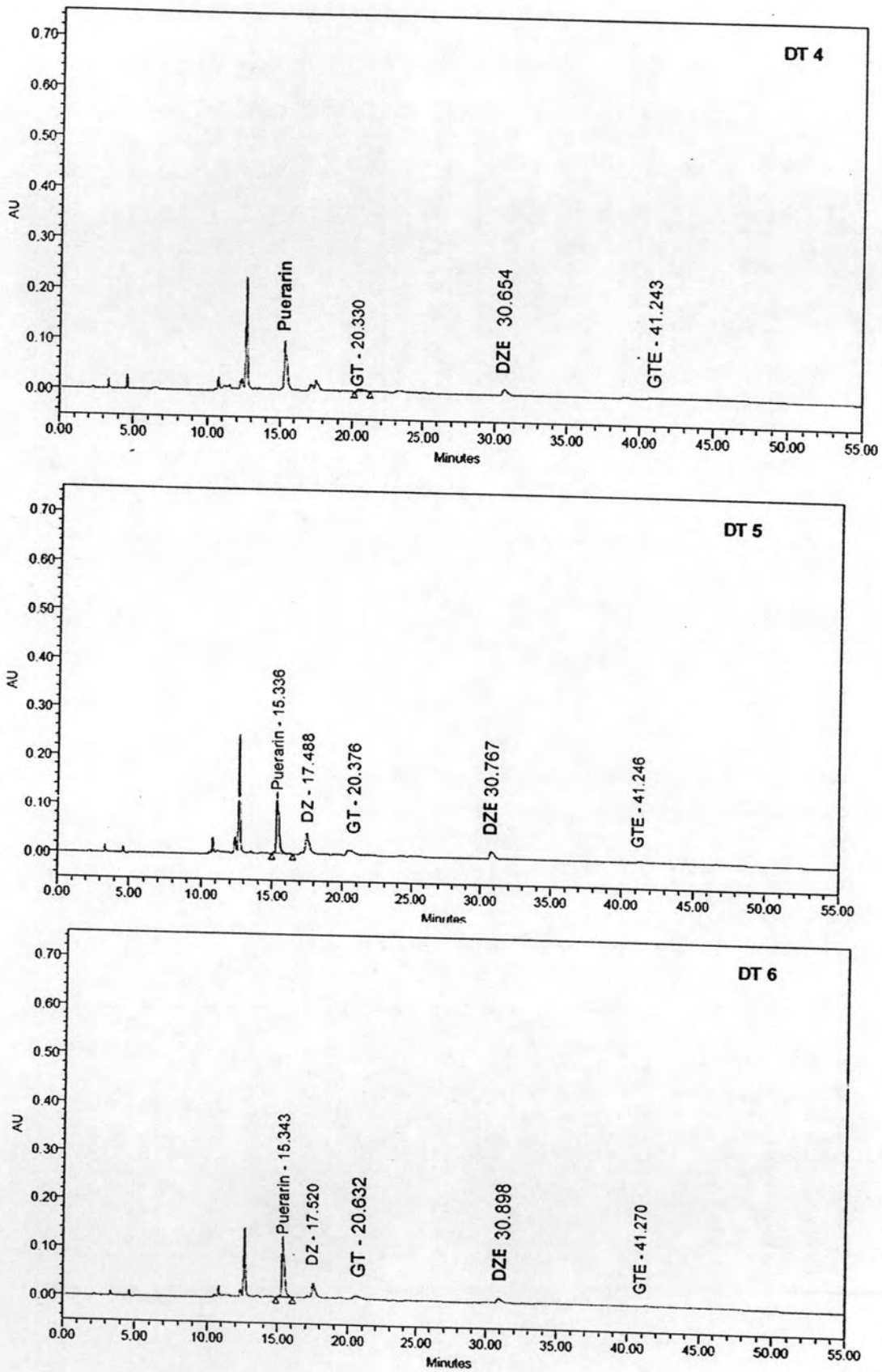


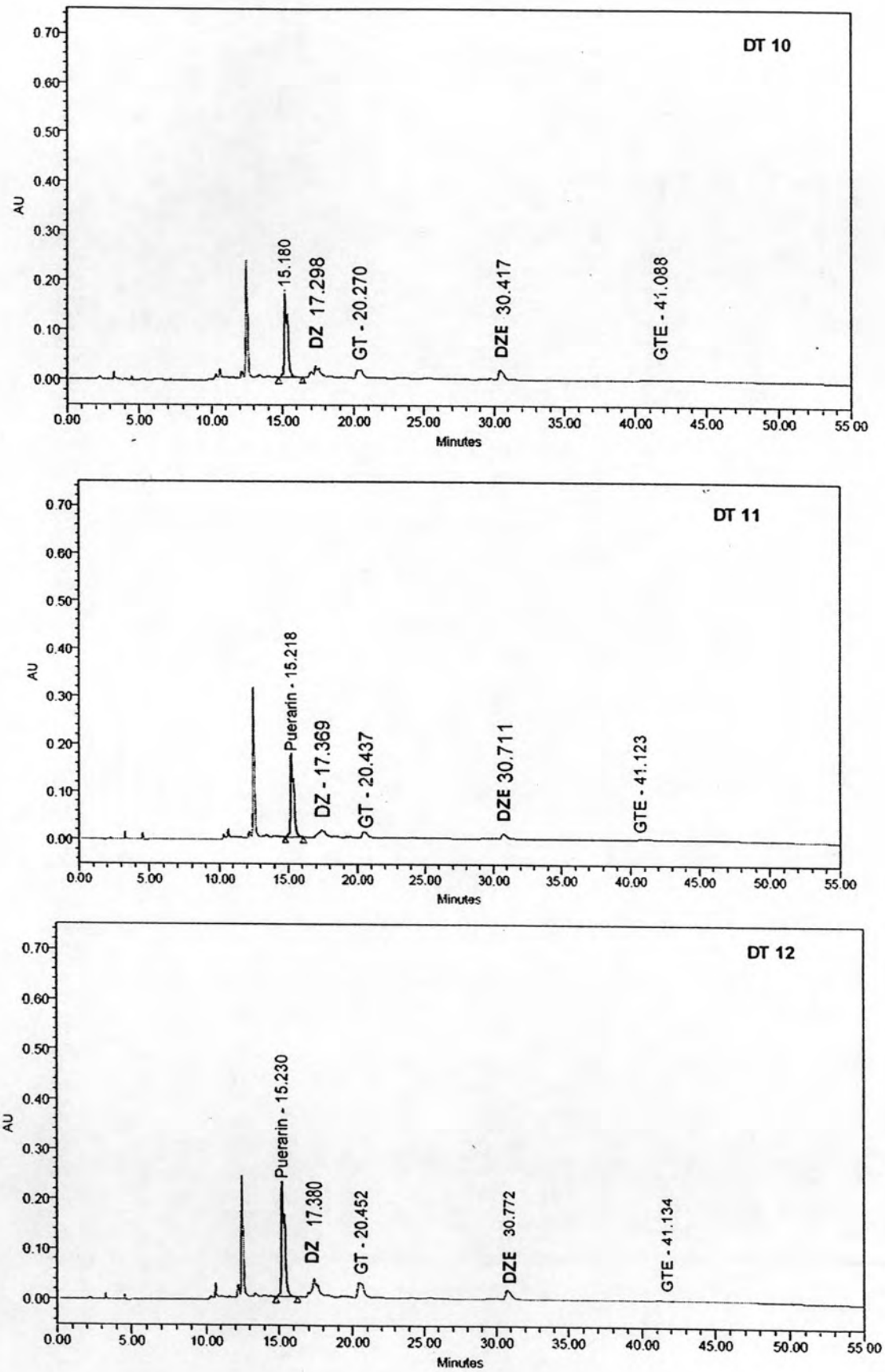




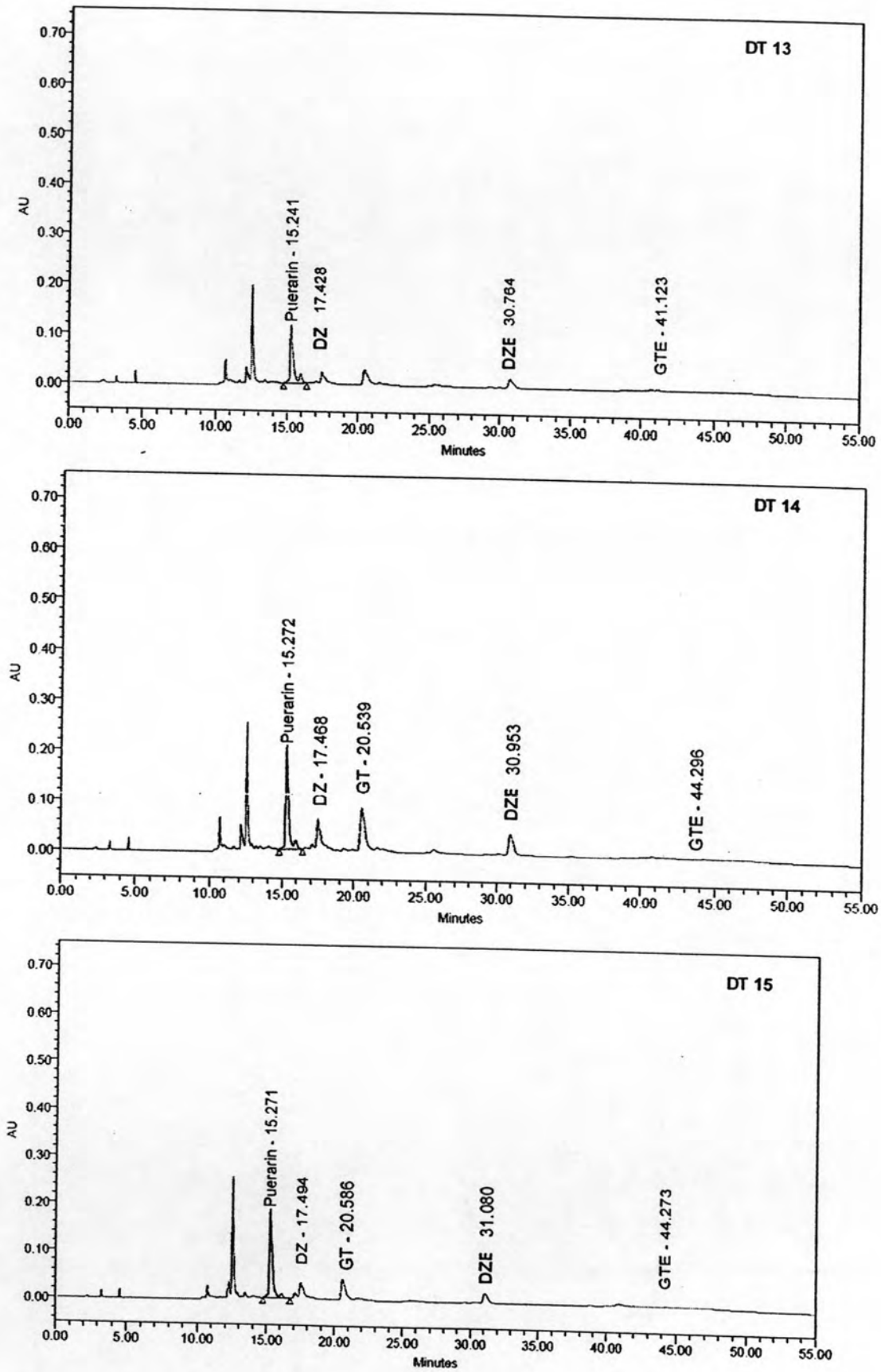
HPLC analysis of PM-IV from 3 plants collected in March 2005



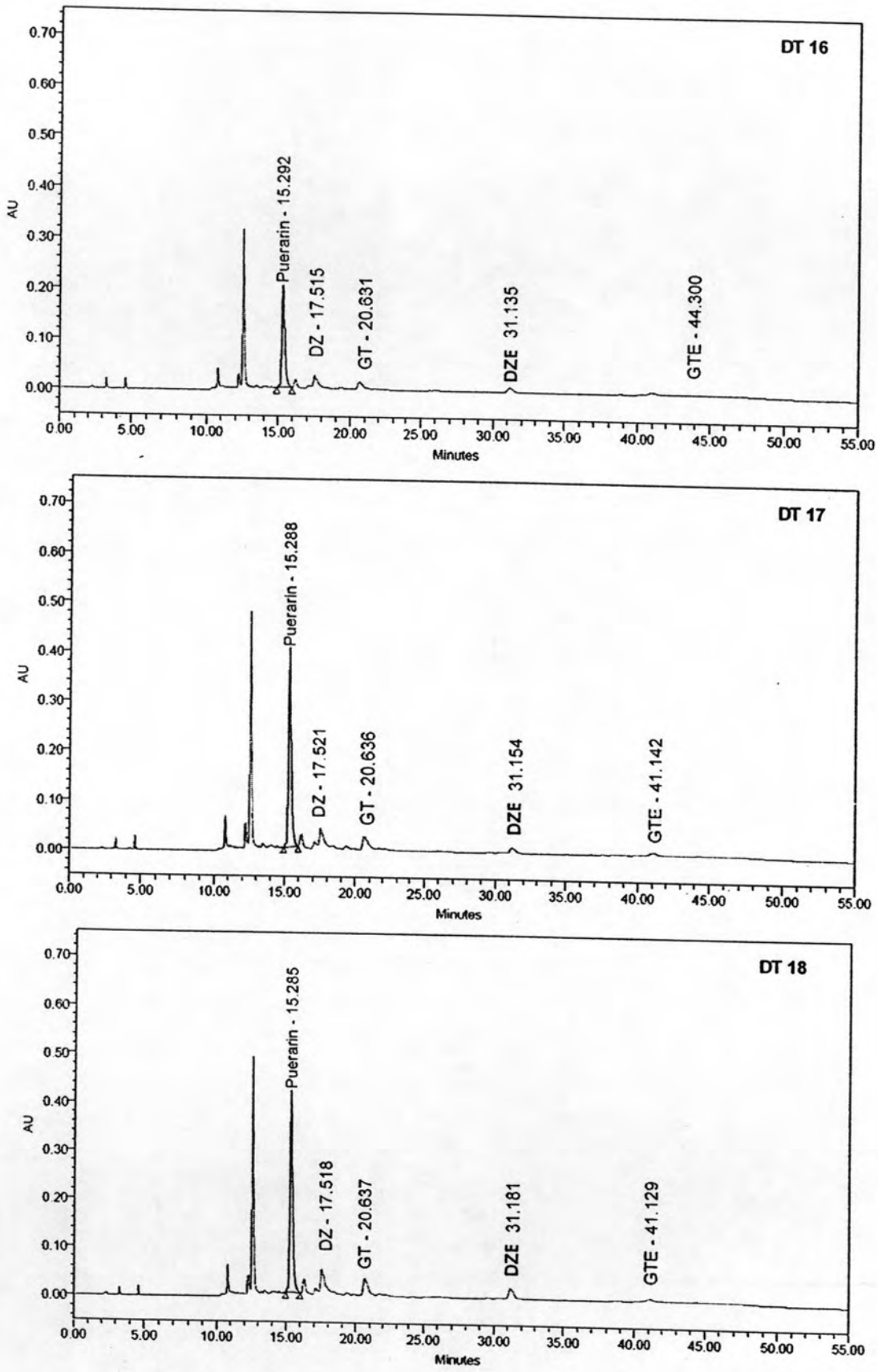
HPLC analysis of PM-IV from 3 plants collected in April 2005



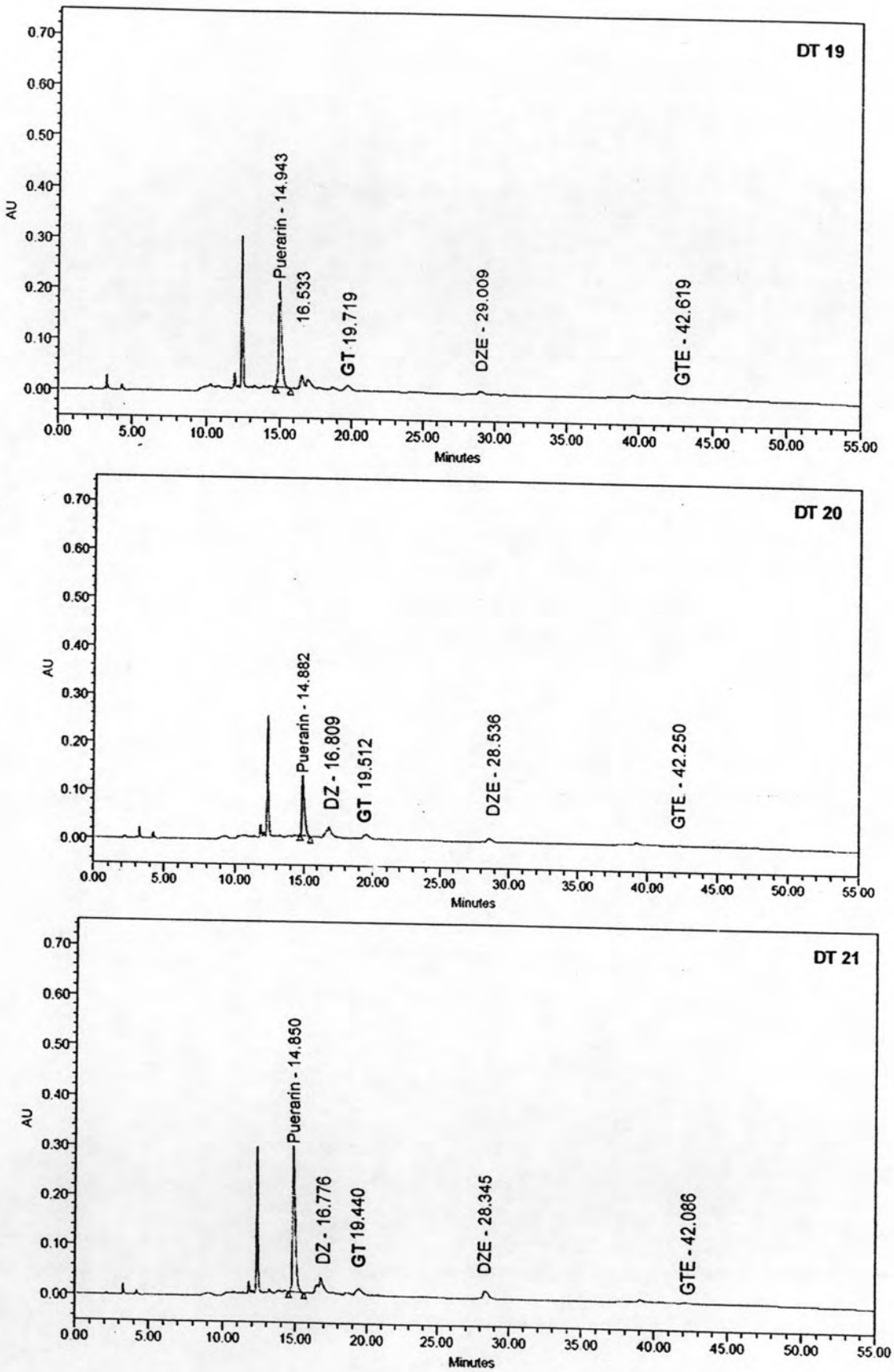
HPLC analysis of PM-IV from 3 plants collected in June 2005



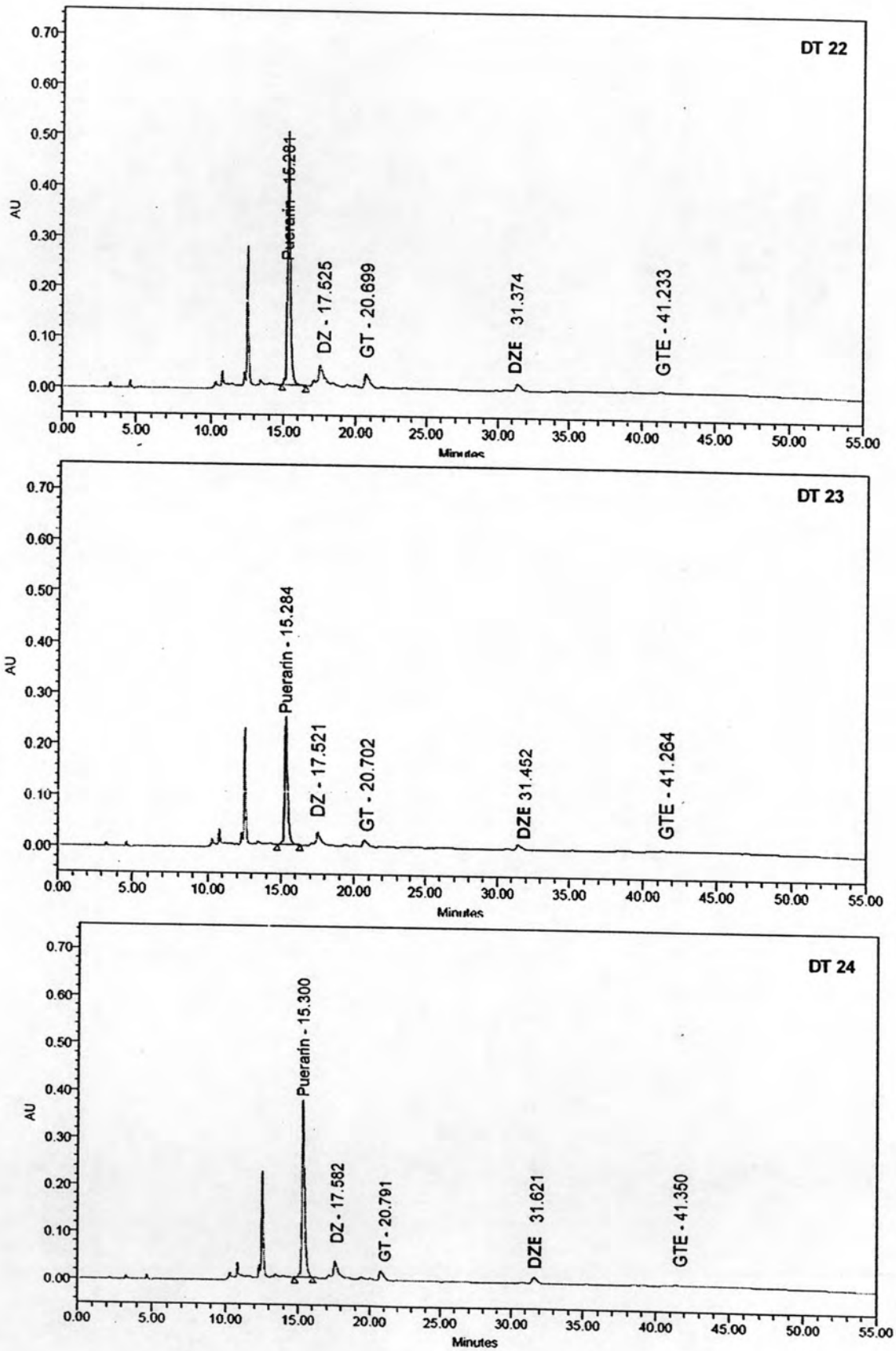
HPLC analysis of PM-IV from 3 plants collected in July 2005



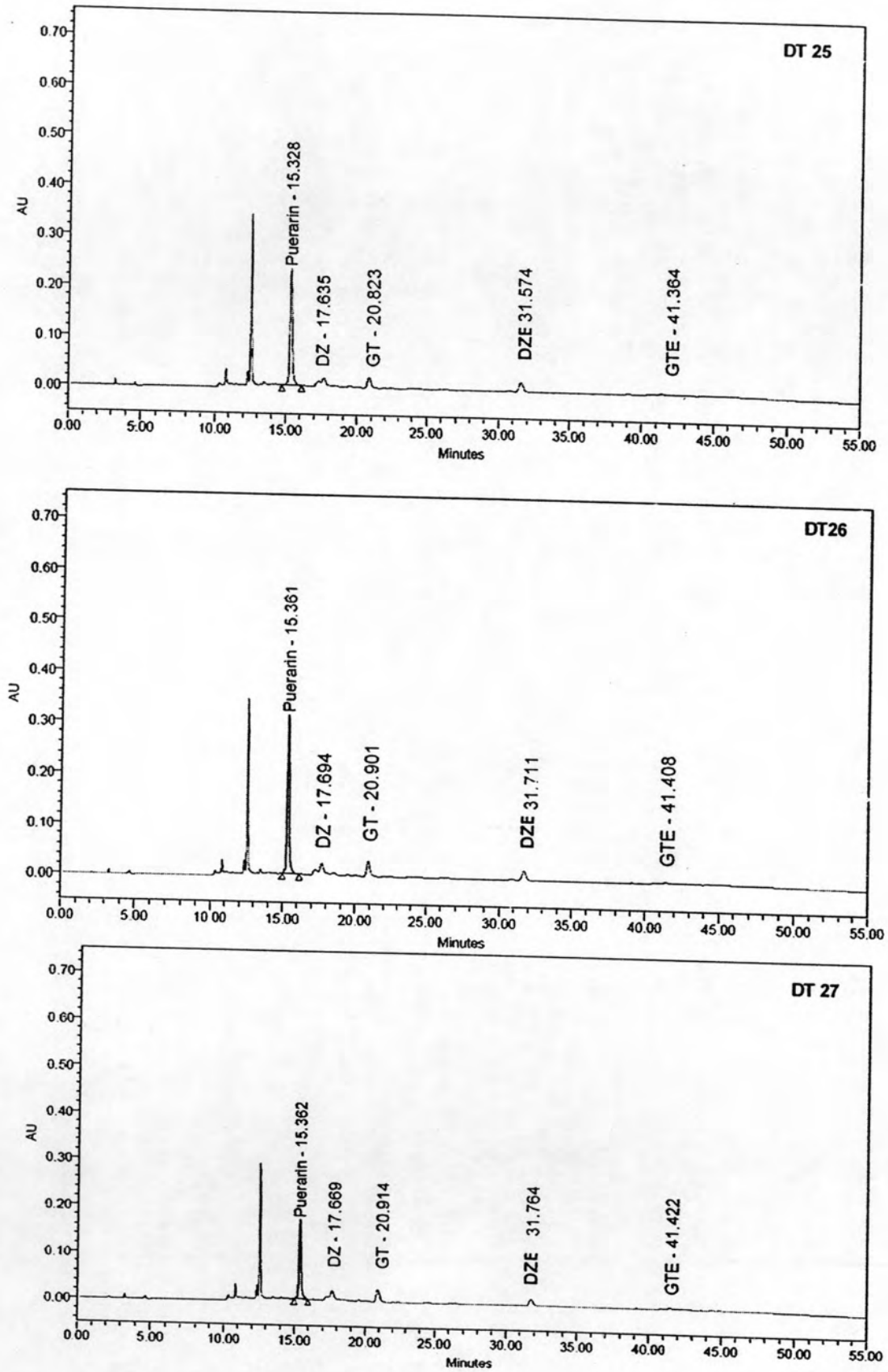
HPLC analysis of PM-IV from 3 plants collected in August 2005



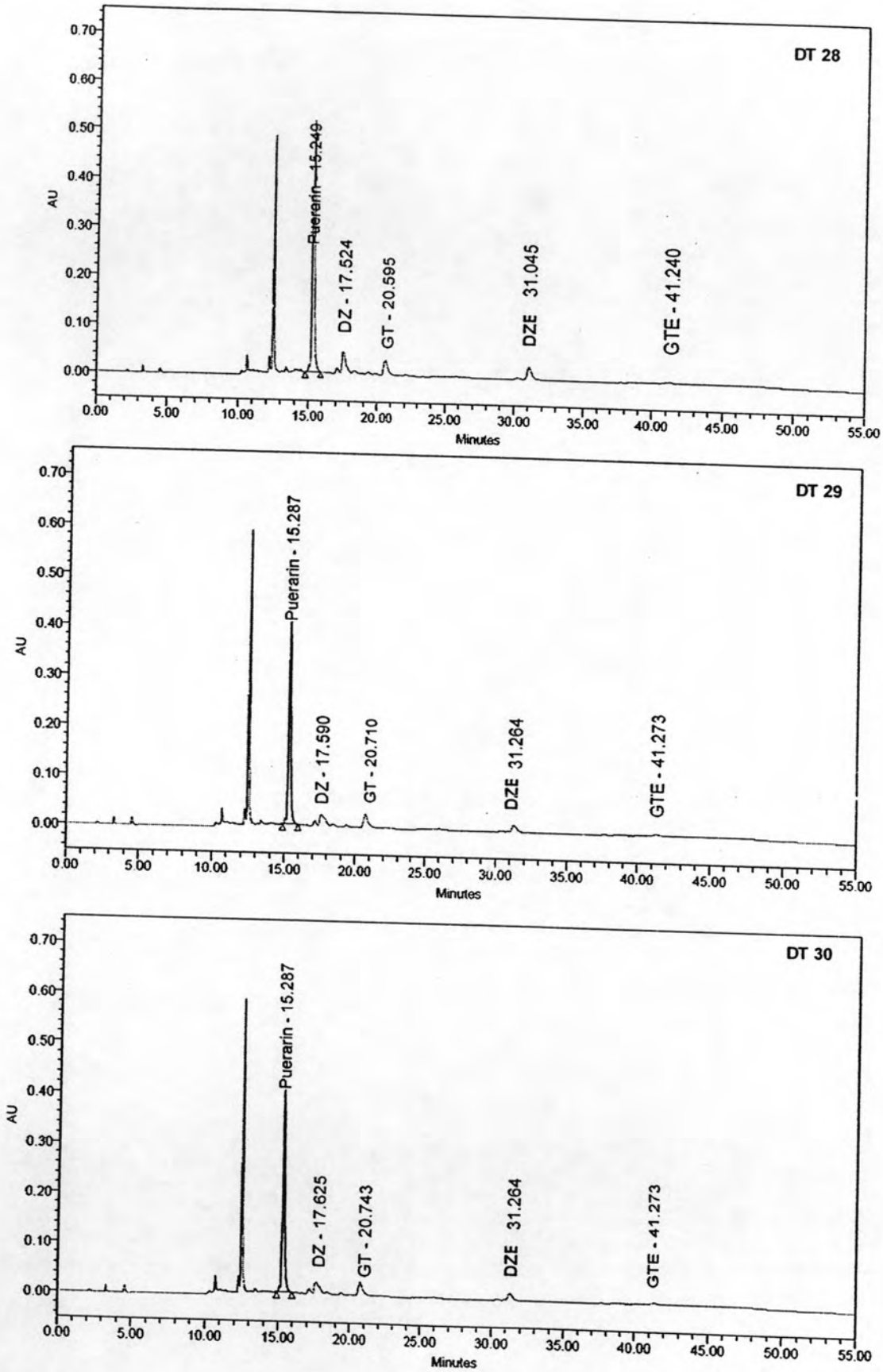
HPLC analysis of PM-IV from 3 plants collected in September 2005



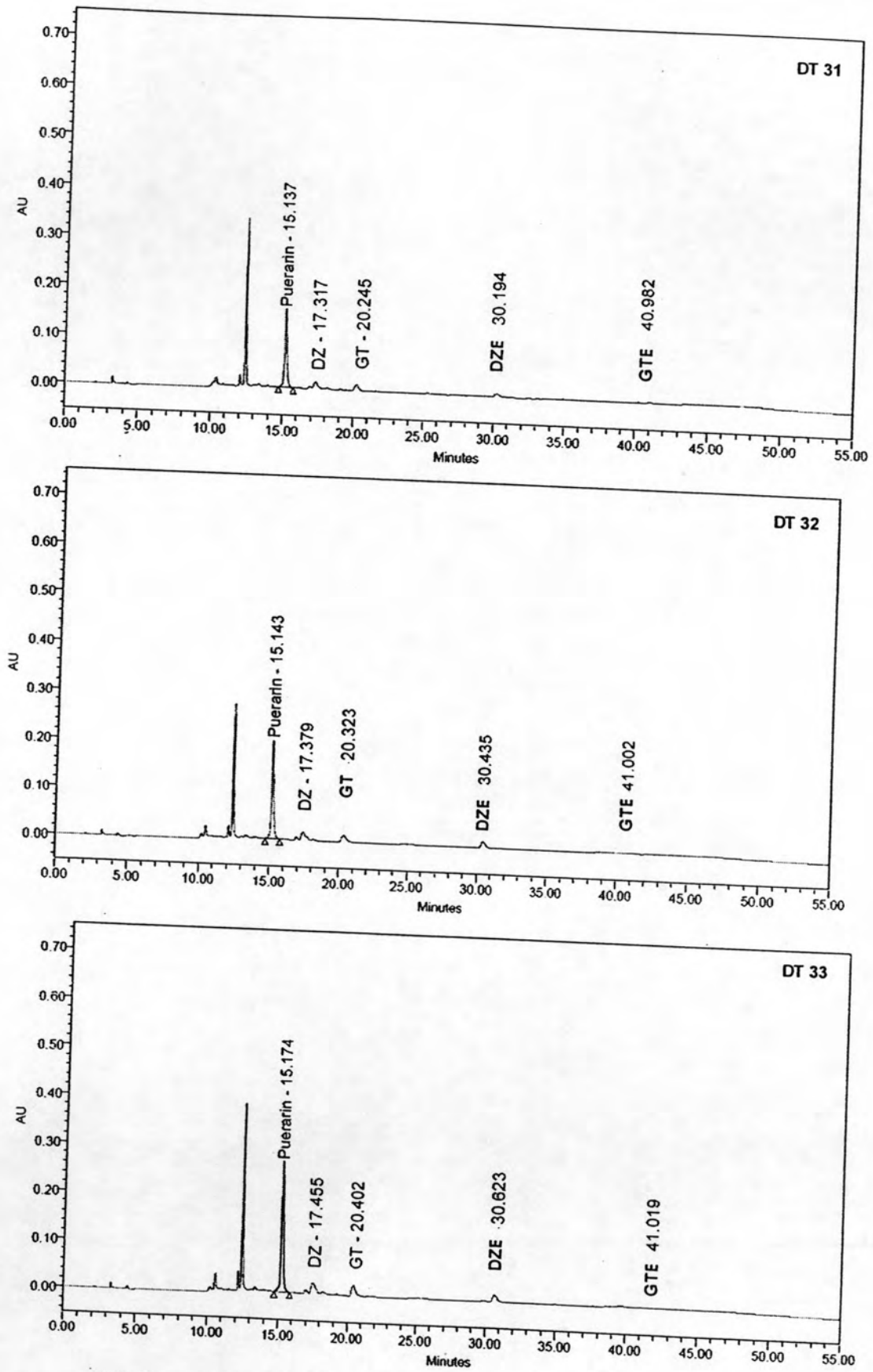
HPLC analysis of PM-IV from 3 plants collected in October 2005



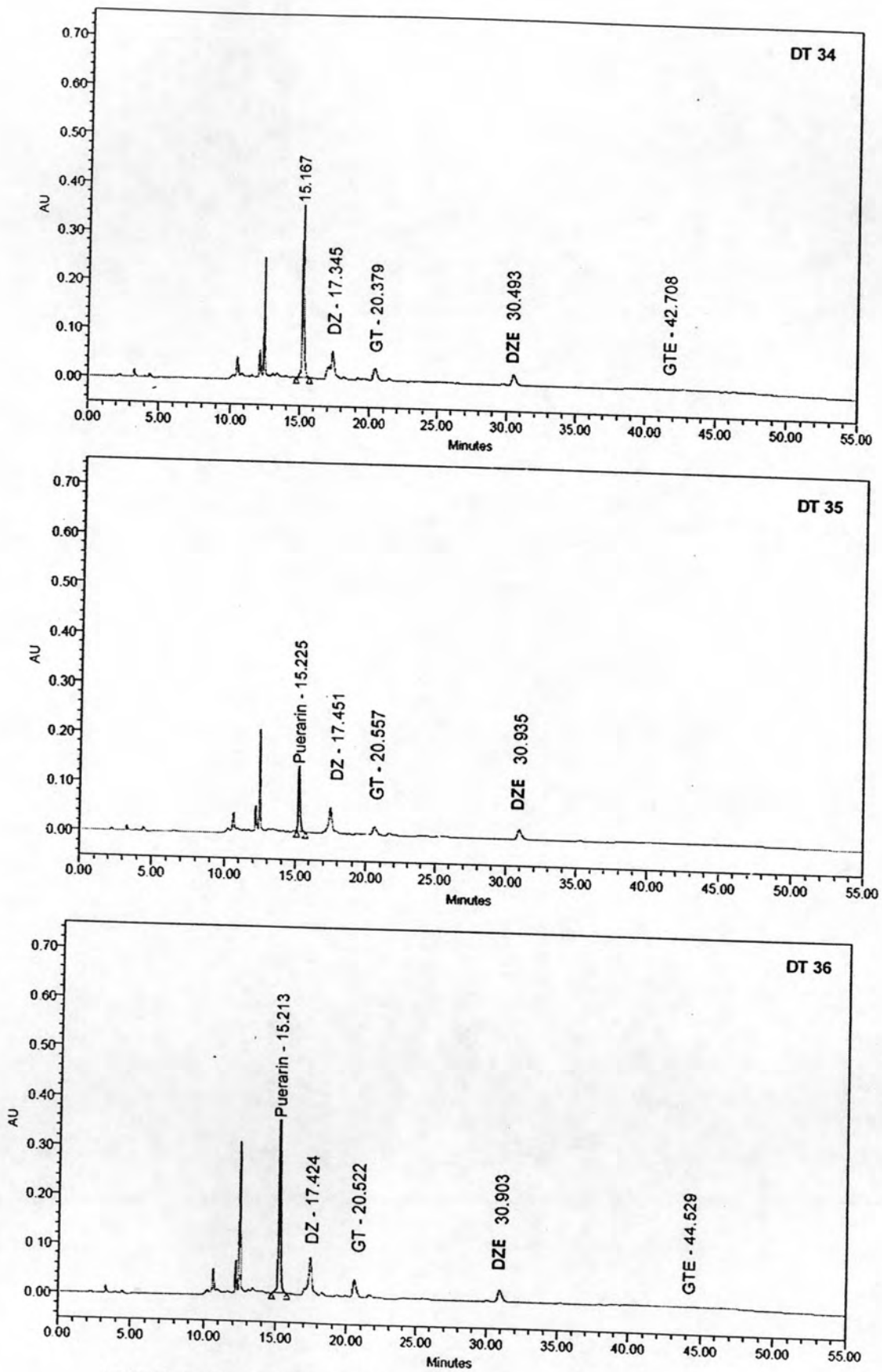
HPLC analysis of PM-IV from 3 plants collected in November 2005



HPLC analysis of PM-IV from 3 plants collected in December 2005



HPLC analysis of PM-IV from 3 plants collected in January 2006



HPLC analysis of PM-IV from 3 plants collected in February 2006

APPENDIX B

MEM Medium

MEM powder medium (Biowitaker)	19.15 g
HEPES	2 ml
$NaHCO_3$	2 g
Penicillin G/Streptomycin stock solution	2 ml
Sterile water	2 L

Weight and mix all ingredients in sterile water. Adjust pH to 7.0. Filtrate with 0.22 μm membrane (Whatman). Dispense the filtrate into bottles. All bottled mediums are kept in 37 °C incubator for 24 hours for sterility test.

0.25% Trypsin (in HEPES-Buffer Saline)

HEPES-buffer saline

NaCl	8 g
KCl	0.4 g
Na_2HPO_4	0.1 g
Dextrose	1.0 g
HEPES	2.38 g
Distilled water	1 L

All ingredients are mixed in 1 L volumetric flask and stir with magnetic stirrer until all ingredients are completely dissolved. The 2.5 g trypsin powder (Gibco) is added. The solution is stirred until trypsin is completely dissolved. The solution is adjusted to pH 7.0 with 7.5% $NaHCO_3$ and 1% HCl. The solution is filtrated through 0.22 μm membrane and dispensed into bottles.

The trypsin bottles are stored in 37 °C incubator for 24 hours for sterility test.

0.4% Trypan blue dye

Trypan blue	1.6 g
NaCl	3.24 g
KH_2PO_4	0.24 g
Distilled water	400 ml

All ingredients are mixed altogether, heated and stirred with magnetic stirrer until completely dissolved. The solution is adjusted to pH 7.2-7.3 with 7.5% $NaHCO_3$ and 1% HCl then dispense into light protecting bottles.

MTT solution

MTT: 3-(4,5-dimethylthiazol-2-yl)-2,5- diphenlytetrazolium bromide (Sigma)	0.5 mg
DMEM	1 ml

Freshly prepared, dissolve 0.5 mg MTT into 1 ml DMEM. All ingredients are mixed and sterilized by filter and dispensed into light protecting bottles.

Sodium phosphate buffer, 0.1 mM, pH 7.4

Use: for testing chemicals in the absence of metabolic activation

Mix sodium phosphate, monobasic (0.1 M) and sodium phosphate, dibasic (0.1 M). Adjust pH to 7.4 using 0.1 M dibasic sodium phosphate solution. Dispense 100 ml aliquots in 250 ml screw-cap bottles and label as "Buffer, 0.1 M, pH 7.4" with date. Autoclave for 30 min at 121°C. Make sure the caps fit loosely during autoclaving. When cooled, tighten the caps and store the bottles at room temperature in the dark.

Co-factors for S9 mix

Use: to provide the NADH regenerating system

Ingredients Per liter

Distilled water	32.35 ml
0.1 M d-Glucose-6-phosphate	2 ml (56.40 mg)
Nicotinamide adenine dinucleotide phosphate (NADP)	1.6 ml (351.6 mg)
0.16 M Magnesium chloride ($MgCl_2$)	2 ml
1 M Potassium chloride (KCl)	2.5 ml
Sodium phosphate, pH 7.4	15.15 ml

Add each ingredient sequentially into 32.35 ml water, making sure that each ingredient is dissolved before adding the next one. This process may take up to 1 hour. When all ingredients are dissolved, filter sterile the co-factors with 0.45 μm filter.

Kwao Krua preparation

Stock concentration: 200,000 μg/ml

Prepare: Dissolve Kwao Krua extract 100 mg/500 μl

S9 mix 990 μl mix with sample 10 μl. S9 reaction were incubated at 37 °C in incubator for 4 hour. The reaction were kept at -80°C. 4 μl S9 reaction were thaw then treated to MCF-7 in 96 multi-well plates.

APPENDIX C

Tuberous size

The tuberous size of PM-III and PM-IV is shown in Table 1.

Table 1 The annual average tuberous size of PM-III and PM-IV with parameters of circumference, height and width recorded of the largest size tuber.

NO.	PM-III			PM-IV		
	circum ference (cm)	height (cm)	width (cm)	circum ference (cm)	height (cm)	width (cm)
1	19.50	17.00	7.00	50.50	18.00	17.00
2	27.00	19.50	9.00	37.00	8.00	12.50
3	21.00	15.00	8.50	36.00	7.00	11.50
4	24.00	18.00	6.00	23.50	10.00	7.50
5	30.00	16.00	3.50	55.00	17.00	17.50
6	41.00	40.00	13.00	25.50	12.00	8.50
7	27.00	15.50	8.50	27.50	11.50	12.00
8	31.00	16.00	10.00	28.50	8.00	15.00
9	25.00	20.00	13.00	35.00	9.00	15.00
10	16.50	16.00	10.00	55.00	17.00	20.50
11	20.00	25.00	10.50	45.00	12.00	16.00
12	24.00	22.00	9.00	39.00	8.00	15.50
mean	25.50	20.00	9.00	38.13	11.46	14.04
S.E.M	25.50	20.00	9.00	38.12	11.45	14.18

Tuberous weight

The tuberous wet weight and percentage of water content in the tuber of PM-III and PM-IV is shown in Table 2.

Table 2 The annual tuberous wet weight, dry weight, and percentage of water content in tuber (Mean ± S.E.M.).

Month	PM-III			PM-IV		
	wet weight (g)	dry weight (g)	% water in tuber	wet weight (g)	dry weight (g)	% water in tuber
March	4200.00	287.92	93.14	2400.00	193.89	91.92
	2200.00	207.10	90.49	3200.00	301.10	90.53
	1900.00	153.95	91.90	1300.00	122.83	90.55
Mean±S.E.M.	2766.67±721.88	216.32±38.95	91.88±0.77	2300.00±550.76	206.61±51.81	91.00±0.46
April	2732.00	352.00	87.12	7583.00	625.00	91.76
	2928.00	304.00	89.62	3220.00	323.00	89.97
	4088.00	446.00	89.09	5480.00	516.00	90.58
Mean±S.E.M.	3249.33±423.13	367.33±41.70	88.61±0.76	5427.67±1259.76	488.00±88.30	90. 77±0.53
May	7961.00	713.00	91.04	2874.00	277.00	90.36
	2307.00	241.00	89.55	1778.00	177.00	90.04
	2182.00	270.00	87.63	4351.00	452.00	89.61
Mean±S.E.M.	4150.00±1905.84	408.00±152.73	89.41±0.99	3001.00±745.47	302.00±80.36	90.01±0.22
June	741.00	76.00	89.74	2643.00	217.00	91.79
	3155.00	307.00	90.27	2229.00	236.00	89.41
	1084.00	101.00	90.68	841.00	85.00	89.89
Mean±S.E.M.	1660.00±754.03	161.33±73.19	90.23±0.27	1904.33±544.93	179.33±47.48	90.36±0.73

Table 2 The annual tuberous wet weight, dry weight, and percentage of water content in tuber (Mean ± S.E.M.). (continued)

Month	PM-III			PM-IV		
	wet weight (g)	dry weight (g)	% water in tuber	wet weight (g)	dry weight (g)	% water in tuber
July	1359.00	101.00	92.57	1986.00	170.00	91.44
	755.00	66.00	91.26	2083.00	163.00	92.17
	1492.00	134.00	91.02	2553.00	219.00	91.42
Mean±S.E.M.	1202.00±226.77	100.33±19.63	91.62±0.48	2207.33±175.09	184.00±17.62	91.68±0.25
August	3025.00	352.00	88.36	4600.00	465.00	89.89
	1180.00	96.00	91.86	3250.00	353.00	89.14
	720.00	59.00	91.81	3880.00	350.00	90.98
Mean±S.E.M.	1641.67±704.30	169.00±92.12	90.68±1.16	3910.00±390.00	389.33±37.84	90.00±0.53
September	1900.00	127.00	93.32	4000.00	278.00	93.05
	800.00	79.00	90.13	3700.00	365.00	90.14
	600.00	63.00	89.50	4200.00	431.00	89.74
Mean±S.E.M.	1100.00±404.15	89.67±19.23	90.98±1.18	3966.67±145.30	358.00±44.31	90.97±1.04
October	334.00	19.00	94.31	3500.00	341.00	90.26
	1900.00	248.00	86.95	1300.00	134.00	89.69
	700.00	73.00	89.57	1500.00	174.00	88.40
Mean±S.E.M.	978.00±472.95	113.33±69.11	90.28±2.15	2100.00±702.38	216.33±63.39	89.45±0.55

Table 2 The annual tuberous wet weight, dry weight, and percentage of water content in tuber (Mean ± S.E.M.). (continued)

Month	PM-III			PM-IV		
	wet weight (g)	dry weight (g)	% water in tuber	wet weight (g)	dry weight (g)	% water in tuber
November	7800.00	605.00	92.24	900.00	95.00	89.44
	600.00	37.00	93.83	2200.00	37.00	98.32
	400.00	50.00	87.50	2500.00	231.00	90.76
Mean±S.E.M.	2933.33±2434.02	230.67±187.20	91.19±1.90	1866.67±491.03	121.00±57.49	92.84±2.77
December	1854.00	109.00	94.12	1380.00	195.00	85.87
	1645.00	250.00	84.80	5379.00	410.00	92.38
	1003.00	140.00	86.04	2000.00	223.00	88.85
Mean±S.E.M.	1500.67±256.04	166.33±42.78	88.32±2.92	2919.67±1242.62	276.00±67.49	89.03±1.88
January	1100.00	96.00	91.27	1200.00	166.00	86.17
	1200.00	201.00	83.25	3100.00	372.00	88.00
	1800.00	145.00	91.94	1300.00	135.00	89.62
Mean±S.E.M.	1366.67±218.58	147.33±30.33	88.82±2.79	1866.67±617.34	224.33±74.37	87.93±1.00
February	2200.00	207.00	90.59	2400.00	194.00	91.92
	1900.00	154.00	91.89	1300.00	123.00	90.54
	2050.00	180.50	91.20	1850.00	158.50	91.43
Mean±S.E.M.	2050.00±86.60	180.50±15.30	91.23±0.38	1850.00±317.54	158.5±20.50	91.30 0.40

Leaf morphometry

The leaf morphometry of PM-III and PM-IV is shown in Table 3.

Table 3 Leaf morphometry of PM-III with parameter of leaf including, petiole length (PL), petiole diameter (PD), rachis length (RL), petiolet length (PLL), terminal leaflet length (TLL), trminal feaflet breadth (TLB), stipule length (SPL), angle of first leaf border (A^B)° and number of pairs of primary veins (NPV).

NO.	PL (cm)	PD (cm)	RL (cm)	PLL (cm)	TLL (cm)	TLB (cm)	SPL (cm)	A^B (°)	NPV (cm)
1	28.80	0.48	6.50	0.97	23.00	18.20	0.37	23.0	7.50
2	44.80	0.43	7.60	0.74	25.00	18.00	0.48	30.0	8.00
3	17.80	0.3	4.90	1.34	19.30	13.80	0.35	29.0	6.50
4	21.00	0.34	5.70	1.35	21.60	16.40	0.41	22.0	8.00
5	26.00	0.35	5.60	1.24	18.00	13.80	0.34	19.0	7.50
6	27.50	0.32	6.50	1.00	23.50	16.50	0.40	19.0	6.00
7	29.00	0.34	5.20	1.14	24.20	18.00	0.40	27.0	7.50
8	18.50	0.33	3.50	1.13	19.50	12.80	0.39	21.0	6.00
9	20.30	0.39	7.00	1.22	21.80	16.60	0.44	29.0	6.50
10	17.50	0.27	3.40	0.70	18.50	11.50	0.33	42.0	6.00
11	17.30	0.3	3.80	0.96	18.50	11.00	0.30	41.0	6.00
12	22.60	0.27	5.10	0.74	19.20	14.00	0.33	33.0	8.00
13	19.30	0.27	5.00	0.83	19.80	14.70	0.30	32.0	7.00
14	36.70	0.42	7.70	0.91	21.70	17.20	0.40	21.0	6.00
15	21.70	0.27	4.10	0.98	19.90	14.70	0.33	42.0	7.50
16	22.50	0.33	4.70	0.94	18.60	12.70	0.38	37.0	6.00
17	15.70	0.33	5.00	0.88	25.80	18.90	0.44	27.0	7.00
18	26.60	0.33	6.60	0.77	24.30	18.20	0.40	28.0	7.00
19	34.20	0.44	8.00	0.74	24.00	22.50	0.46	13.0	7.00
20	28.30	0.35	5.90	1.05	23.30	19.70	0.39	26.0	6.50
21	14.60	0.27	4.30	0.85	26.00	18.40	0.46	30.0	6.00
22	27.50	0.33	4.70	0.94	26.50	18.20	0.44	31.0	6.50
23	18.50	0.36	6.00	1.10	28.50	19.80	0.44	41.0	6.00
24	27.90	0.33	4.80	0.88	21.60	16.40	0.36	21.0	6.50

Table 3 Leaf morphometry of PM-III (continued)

NO.	PL (cm)	PD (cm)	RL (cm)	PLL (cm)	TLL (cm)	TLB (cm)	SPL (cm)	A^B (°)	NPV (cm)
25	28.30	0.31	6.50	0.85	20.00	16.00	0.30	20.0	6.00
26	22.70	0.41	5.50	0.91	19.50	16.00	0.46	24.0	6.50
27	32.20	0.33	5.50	0.85	21.70	15.30	0.34	33.0	6.50
28	17.70	0.26	3.50	0.95	17.90	11.60	0.32	39.5	5.50
29	17.30	0.28	4.30	0.94	22.30	14.00	0.37	40.0	6.00
30	16.70	0.29	3.20	0.83	22.00	14.80	0.36	41.0	6.50
31	18.40	0.40	4.20	1.30	20.50	16.00	0.44	26.0	6.00
32	29.50	0.36	5.40	1.05	19.00	16.50	0.36	30.0	5.50
33	21.20	0.36	5.50	1.13	22.00	16.20	0.44	31.0	7.00
34	32.90	0.36	5.00	1.13	21.00	15.10	0.41	33.0	6.00
35	17.70	0.34	4.30	1.05	23.20	17.20	0.42	22.0	6.00
36	35.80	0.31	6.50	1.16	21.00	14.50	0.35	28.0	6.00
37	26.50	0.34	5.20	1.07	21.50	16.40	0.43	24.0	7.50
38	23.30	0.42	5.00	1.27	19.70	16.20	0.39	24.0	6.50
39	25.40	0.26	5.10	0.76	20.70	15.90	0.33	30.0	7.00
40	18.50	0.24	4.00	0.99	19.30	13.50	0.33	40.0	7.00
41	16.50	0.30	3.40	0.97	25.00	18.30	0.40	20.0	7.00
42	44.50	0.36	6.80	1.16	21.60	14.60	0.34	24.0	7.50
43	13.80	0.24	4.10	0.60	15.70	9.50	0.30	53.0	6.00
44	37.70	0.35	5.40	0.72	20.90	15.10	0.30	25.0	7.50
45	31.30	0.36	5.40	1.72	22.00	16.60	0.40	34.0	6.00
46	32.50	0.40	6.65	0.95	21.20	16.25	0.25	33.0	8.50
47	44.55	0.45	8.95	0.85	21.30	17.85	0.25	35.0	9.50
48	40.80	0.55	8.75	0.95	21.30	18.70	0.20	35.0	10.00
49	26.00	0.45	6.55	1.05	25.10	22.05	0.53	23.5	6.50
50	31.00	0.35	6.05	0.90	19.05	13.60	0.15	39.5	8.00
Mean	25.75	0.35	5.45	1.00	21.53	15.99	0.37	29.8	6.81
S.E.M.	1.16	0.01	0.19	0.03	0.36	0.37	0.01	1.1	0.13

Table 4 Leaf morphometry of PM-IV with parameter of leaf including, petiole length (PL), petiole diameter (PD), rachis length (RL), petiolet length (PLL), terminal leaflet length (TLL), trminal feaflet breadth (TLB), stipule length (SPL), angle of first leaf border (A^B)° and number of pairs of primary veins (NPV).

NO.	PL (cm)	PD (cm)	RL (cm)	PLL (cm)	TLL (cm)	TLB (cm)	SPL (cm)	A^B (°)	NPV (cm)
1	38.50	0.56	8.60	1.06	30.40	27.60	0.28	7.0	7.00
2	35.10	0.43	7.10	0.96	22.00	18.30	0.29	19.0	8.00
3	42.60	0.44	8.30	0.98	24.20	19.70	0.37	18.0	9.00
4	32.80	0.43	7.70	0.95	22.60	17.60	0.38	17.0	9.50
5	31.00	0.46	7.70	0.98	24.20	19.30	0.36	23.0	7.50
6	27.20	0.38	7.10	0.90	23.40	18.70	0.42	30.0	8.50
7	33.30	0.37	7.00	0.98	21.60	18.40	0.44	27.0	8.00
8	38.10	0.38	7.10	0.89	20.70	17.30	0.46	26.0	8.00
9	31.70	0.48	6.40	0.79	25.50	20.40	0.28	32.0	8.00
10	33.20	0.47	7.40	1.05	27.40	21.60	0.45	30.0	8.00
11	25.10	0.42	7.30	1.04	26.80	19.80	0.51	27.0	7.00
12	30.30	0.4	9.60	1.04	29.10	19.00	0.45	31.0	7.00
13	36.70	0.4	7.60	1.02	30.00	22.40	0.36	24.0	7.50
14	32.20	0.41	6.20	0.95	25.10	24.20	0.32	13.0	7.50
15	26.80	0.39	9.00	0.95	32.20	20.70	0.32	18.0	8.50
16	32.70	0.43	8.60	1.20	29.00	25.70	0.3	10.0	8.50
17	28.20	0.5	10.50	1.15	24.20	21.50	0.41	17.0	8.00
18	36.00	0.45	9.30	1.10	28.40	20.80	0.35	23.0	8.00
19	25.20	0.49	9.40	1.02	23.00	22.00	0.45	23.0	9.00
20	32.10	0.43	8.70	0.97	24.20	21.50	0.48	20.0	8.00
21	33.50	0.49	9.10	0.88	27.40	22.30	0.47	24.0	8.00
22	29.50	0.51	7.70	0.87	26.10	27.40	0.42	20.0	11.00
23	27.40	0.4	7.00	0.98	25.80	19.50	0.41	32.0	8.00
24	30.62	0.45	6.90	0.96	27.00	24.80	0.37	18.0	8.00

Table 4 Leaf morphometry of PM-IV (continued)

NO.	PL (cm)	PD (cm)	RL (cm)	PLL (cm)	TLL (cm)	TLB (cm)	SPL (cm)	A^B (°)	NPV (cm)
25	30.24	0.52	6.80	0.95	23.80	26.00	0.32	22.0	8.00
26	36.50	0.47	7.20	1.21	25.60	23.50	0.45	14.0	8.00
27	31.60	0.50	6.90	1.05	24.80	27.10	0.53	12.0	8.00
28	34.40	0.39	6.80	0.92	24.60	23.40	0.38	24.0	8.00
29	27.10	0.44	8.60	0.89	22.00	16.10	0.49	34.0	8.00
30	33.70	0.46	6.10	0.89	21.00	18.70	0.52	32.0	9.00
31	29.80	0.41	7.20	0.65	22.50	19.60	0.48	25.0	7.00
32	28.50	0.44	8.30	0.79	25.80	20.50	0.49	31.0	7.50
33	25.50	0.43	6.50	0.92	25.30	22.80	0.58	27.0	7.50
34	33.60	0.43	7.00	0.89	21.70	17.10	0.40	32.0	8.00
35	41.10	0.39	6.80	0.86	21.50	18.90	0.48	28.0	7.50
36	39.20	0.42	5.30	0.85	21.60	20.00	0.52	27.0	7.50
37	21.20	0.39	7.50	0.85	23.10	19.90	0.39	24.0	8.50
38	21.60	0.42	7.10	0.92	21.00	18.10	0.41	30.0	6.50
39	25.80	0.41	7.60	0.92	26.20	22.80	0.38	25.0	8.00
40	31.20	0.47	7.60	0.93	22.60	17.80	0.41	27.0	8.00
41	35.10	0.49	6.50	0.87	23.40	17.70	0.32	25.0	8.50
42	27.70	0.52	6.90	0.90	23.10	19.70	0.41	25.0	8.00
43	33.20	0.42	8.10	0.82	23.20	19.60	0.48	22.0	8.00
44	30.10	0.38	6.50	0.79	22.60	20.10	0.41	27.0	8.00
45	52.70	0.46	8.20	0.89	21.20	17.60	0.48	20.0	6.50
46	38.10	0.43	7.10	0.80	21.80	16.90	0.55	23.0	6.00
47	40.70	0.48	9.20	0.81	21.80	17.90	0.52	24.0	6.00
48	39.70	0.50	9.40	0.75	20.40	17.60	0.42	24.0	6.50
49	30.20	0.40	8.80	0.80	23.60	20.60	0.40	26.0	7.00
50	33.50	0.44	8.70	0.82	22.40	19.10	0.44	29.0	7.00
Mean	32.44	0.44	7.68	0.93	24.34	20.59	0.42	23.76	7.84
S.E.M.	0.80	0.01	0.15	0.02	0.40	0.41	0.01	0.86	0.12

Pod morphometry

Pod morphometry of PM-III and PM-IV were shown in table 5

Table 5 Pod morphometry of PM-III with a parameter of length, width, and number of seed per pod.

No.	PM-III			PM-IV		
	length(cm)	width(cm)	seed/pod	length(cm)	width(cm)	seed/pod
1	7.40	0.70	8.00	4.46	0.93	3
2	7.20	0.80	6.00	4.59	0.86	2
3	7.00	0.75	7.00	3.93	0.48	5
4	7.20	0.80	7.00	4.48	1.17	3
5	5.90	0.80	5.00	5.49	0.79	4
6	5.30	1.00	4.00	3.93	0.76	3
7	5.90	0.75	6.00	4.16	0.68	4
8	5.90	0.80	6.00	4.09	0.75	4
9	6.00	0.85	5.00	4.55	0.76	3
10	5.60	0.85	5.00	3.56	0.87	2
11	6.10	0.90	6.00	4.19	0.69	4
12	5.60	1.00	6.00	3.79	0.9	2
13	6.50	0.90	7.00	4.86	0.66	3
14	6.80	0.90	7.00	3.70	0.70	3
15	7.10	1.00	8.00	4.63	0.63	3
16	7.50	0.90	8.00	5.27	0.79	4
17	8.60	1.00	6.00	4.07	0.63	4
18	5.70	0.85	6.00	3.75	0.81	2
19	6.00	0.95	6.00	6.09	0.94	5
20	7.40	1.00	8.00	4.87	0.80	4
21	6.50	0.90	7.00	7.47	0.89	5
22	5.50	1.00	6.00	4.35	1.18	3
23	5.90	0.90	5.00	4.29	0.96	3
24	6.70	0.90	7.00	4.65	0.77	4
25	5.20	0.80	6.00	5.27	0.70	3

Table 5 Pod morphometry of PM-III and PM-IV (continued)

No.	PM-III			PM-IV		
	length(cm)	width(cm)	seed/pod	length(cm)	width(cm)	seed/pod
26	5.60	0.90	6.00	3.46	0.79	2
27	6.20	0.95	7.00	5.18	0.85	4
28	6.30	1.10	6.00	5.25	0.85	3
29	5.60	0.80	5.00	3.68	1.04	1
30	5.50	0.80	5.00	3.88	0.85	2
31	5.80	0.85	4.00	3.96	1.16	2
32	5.80	1.10	7.00	3.24	0.86	2
33	5.50	1.00	5.00	3.45	0.81	2
34	5.80	0.90	4.00	3.42	0.74	1
35	5.10	0.80	4.00	3.63	0.79	2
36	6.40	0.60	6.00	4.07	0.63	4
37	6.20	0.80	6.00	3.75	0.81	2
38	5.00	0.80	5.00	6.09	0.94	5
39	7.20	0.90	5.00	4.87	0.8	4
40	5.30	0.80	5.00	7.47	0.89	5
41	5.10	0.80	5.00	4.35	1.18	3
42	5.90	0.90	6.00	4.29	0.96	3
43	5.70	0.85	6.00	4.65	0.77	4
44	5.70	0.80	5.00	5.27	0.70	3
45	6.00	0.90	7.00	4.46	0.93	3
46	7.00	0.80	7.00	4.59	0.86	2
47	5.20	1.00	6.00	3.93	0.48	5
48	5.50	1.00	6.00	4.48	1.17	3
49	5.60	0.90	4.00	5.49	0.79	4
50	5.40	1.00	5.00	3.93	0.76	3
mean	6.10	0.88	5.90	4.51	0.83	3.18
S.E.M.	0.11	0.01	0.15	0.13	0.02	0.15

BIOGRAPHY

Miss Matchima Nimpao was born on November 27, 1981 in Suphanburi province, Thailand. She received her Bachelor of Science in Environmental Science, Faculty of Science, Chulalongkorn University in 2004. She has studied for Program of Biotechnology, Faculty of Science Chulalongkorn University since 2004.