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**SECTOR FOR PETROLEUM TECHNOLOGY**  
**Geological laboratories**

Grading

<b>Title</b> AN APPRAISAL OF POSSIBLE OIL STAINING IN THE CRETACEOUS SAND INTERVAL, 2433.5-2459.5mRKB, WELL 6407/6-4		
<b>Requested by</b> ARNFINN JOHANSEN, STKSU	<b>Project</b>	
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**Abstract**

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**REGISTRERT**

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TABLE 1. LITHOLOGICAL DESCRIPTION FOR SAMPLES FOR WELL 6407/6-4 (125um-1mm FRACTION)

SAMPLE NO.	DEPTH mRKB	LITHOLOGY. Rock name, mod lith, colour, gr. size, sorting, roundness matrix, cementation, hardness, accessories, fossils, porosity, contamination.
S5950	2430	100% Clyst, medium grey to light grey, occasionally redbrown, soft, very calcareous TR Lignite, limestone, glauconite, quartz
S5951	2433	AA
S5952	2436	AA
S5953	2439	75% Clyst, AA 25% Sst, loose quartz, colourless to off white, fine to medium, occasionally coarse grained TR AA
S5954	2442	80% Clyst, AA 20% Sst, AA TR AA
S5955	2445	90% Clyst, AA 10% Sst, AA
S5956	2448	AA
S5957	2451	100% Clyst, AA TR Sst, else AA
S5958	2454	65% Clyst, AA but occasionally green grey 35% Sst, AA TR Lignite, limestone, glauconite, pyrite
S5959	2457	75% Clyst, AA 25% Sst, AA TR AA
S5960	2460	80% Clyst, AA 29% Sst, AA TR AA

TABLE 2. PYROLYSIS AND THERMAL EXTRACTION DATA FROM ROCK EVAL FOR SAMPLES FROM WELL 6407/6-4

DEPTH mRKB	SAMPLE NO.	SAMPLE TYPE	S1	S2	PP	PI	TMAX
2430	S5950	wh.rock	0.07	0.5	0.6	0.1	417
2433	S5951	"	0.1	1.2	1.3	0.08	429
2436	S5952	"	0.07	0.9	0.9	0.08	431
2439	S5953	"	0.2	6.8	7.0	0.02	429
"	"	clyst.	0.05	0.3	0.3	0.2	425
2442	S5954	wh.rock	0.1	6.4	6.5	0.02	432
"	"	clyst.	0.04	0.2	0.3	0.2	445
2445	S5955	wh.rock	0.1	3.7	3.8	0.03	431
"	"	clyst.	0.05	0.3	0.4	0.1	432
2448	S5956	wh.rock	0.1	4.3	4.4	0.03	432
"	"	clyst.	0.05	0.4	0.4	0.1	426
2451	S5957	wh.rock	0.1	3.0	3.1	0.05	430
"	"	clyst.	0.09	0.5	0.6	0.2	426
2454	S5958	wh.rock	0.1	3.0	3.1	0.04	431
"	"	clyst.	0.06	0.2	0.3	0.2	415
2457	S5959	wh.rock	0.08	1.6	1.7	0.05	432
"	"	clyst.	0.05	0.3	0.4	0.1	426
2460	S5960	wh.rock	0.3	12.8	13.1	0.02	433
"	"	clyst.	0.05	0.2	0.3	0.2	421
		Lignite	0.4	19.4	19.8	0.02	428

S1 = thermally volatile material  
S2 = involatile/pyrolysable material  
PP = S1+S2  
PI = production index = S1/(S1+S2)  
Tmax = temperature at peak S2 (°C)

TABLE 3. EXTRACTABLE ORGANIC MATTER (EOM) FROM BULK CUTTINGS AND GAS CHROMATOGRAPHIC DATA FOR WHOLE EXTRACTS, WELL 6407/6-4

SAMPLE NO.	DEPTH (mRKB)	EOM (ppm)	$\frac{\text{Pr}}{\text{nC17 (A)}}$	$\frac{\text{Ph}}{\text{nC18 (B)}}$	$\frac{\text{A}}{\text{B}}$	$\frac{\text{Pr}}{\text{Ph}}$
S5951	2433	4275	0.97	1.49	0.65	0.81
S5953	2439	13022	1.31	2.28	0.58	1.22
S5958	2454	1673	0.87	0.96	0.91	1.07

Pr = pristane

Ph = phytane

nC17 = n-heptadecane ( $\text{n-C}_{17}\text{H}_{36}$ )

nC18 = n-octadecane ( $\text{n-C}_{18}\text{H}_{38}$ )

TABLE 4. BIOMARKER DATA FOR EXTRACT FROM 2454m, WELL 6407/6-4

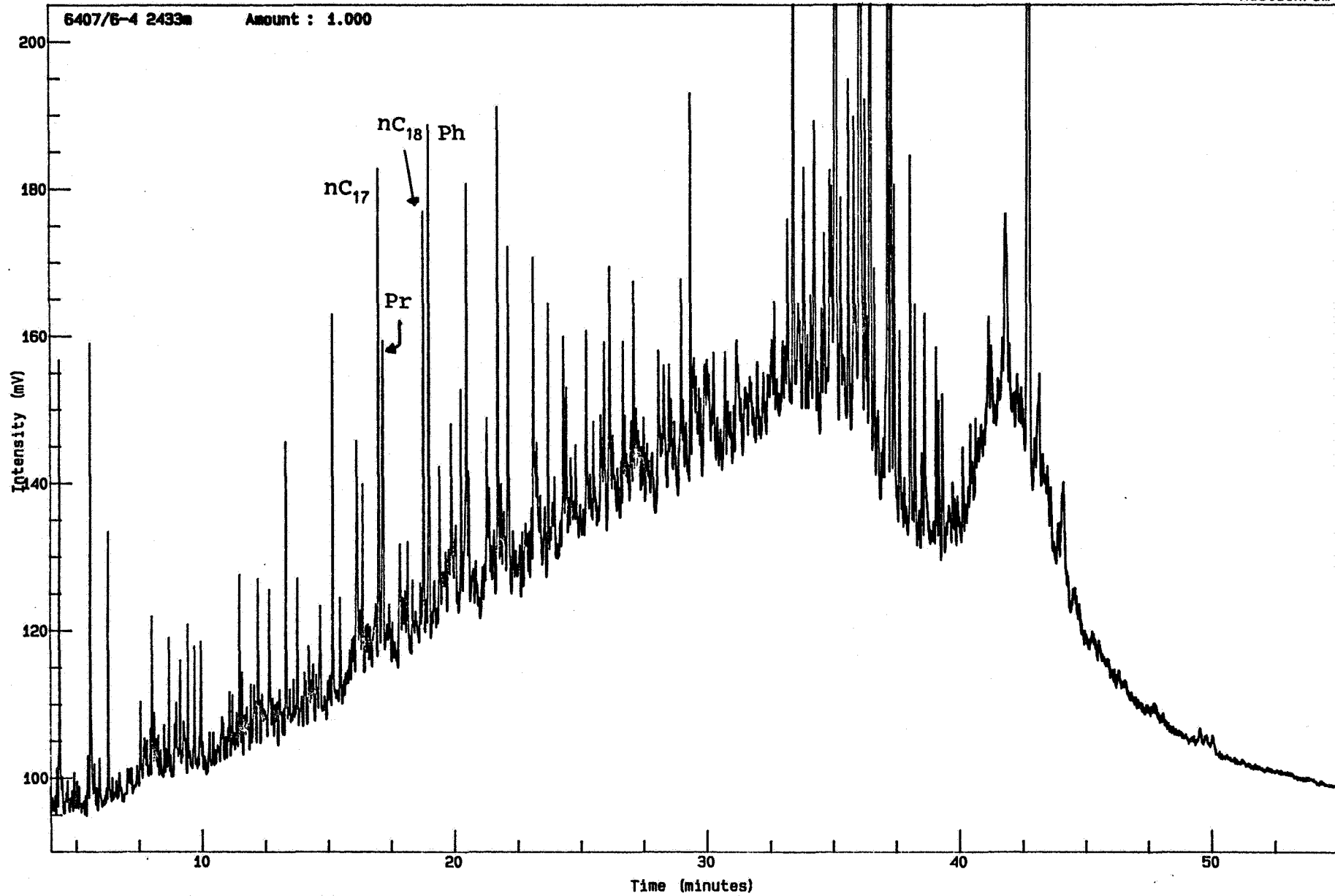
SAMPLE NO.	S5958
%20S <sup>1</sup>	41
% $\alpha\beta\beta$ <sup>2</sup>	27
DIA27 <sup>3</sup>	0.7
%C27 <sup>4</sup>	20
%C28 <sup>5</sup>	41
%C29 <sup>6</sup>	39
%22S <sup>7</sup>	58
XC29 <sup>8</sup>	0
Ts/Tm <sup>9</sup>	4
HOP2930 <sup>10</sup>	0.6
28HOP <sup>11</sup>	0
HOPSTN <sup>12</sup>	11.0

- 1 20S/(20S+R)  $\alpha\alpha\alpha$  C29 steranes (m/z 217)
- 2  $\alpha\beta\beta$ /( $\alpha\beta\beta$ + $\alpha\alpha\alpha$ ) 20(R+S) C29 steranes (m/z 217)
- 3 C27  $\beta\alpha$  dia-/C27  $\alpha\alpha\alpha$  (20R+S) steranes (m/z 217)
- 4 C27/(C27+C28+C29)  $\alpha\beta\beta$  (20R+S) steranes (m/z 218)
- 5 C28/(C27+C28+C29)  $\alpha\beta\beta$  (20R+S) steranes (m/z 218)
- 6 C29/(C27+C28+C29)  $\alpha\beta\beta$  (20R+S) steranes (m/z 218)
- 7 22S/(22S+R) C32  $\alpha\beta$  hopanes (m/z 191)
- 8 triterpane X/(triterpane X + normoretane) (m/z 191)
- 9 Ts/(Ts+Tm) (m/z 191)
- 10 C29/C30 hopanes (m/z 191)
- 11 C28-bisnorhopane/C30 hopane (m/z 191)
- 12 intensity C30 hopane/intensity C29  $\alpha\alpha\alpha$  steranes (m/z 191 and m/z 217)

FIGURE 1. WHOLE EXTRACT GAS CHROMATOGRAM FOR SAMPLE FROM 2433m (100% CLAYSTONE)

Analysis Name : [GEOKJEMI] 4 S5951, 1, 1.

Multichrom



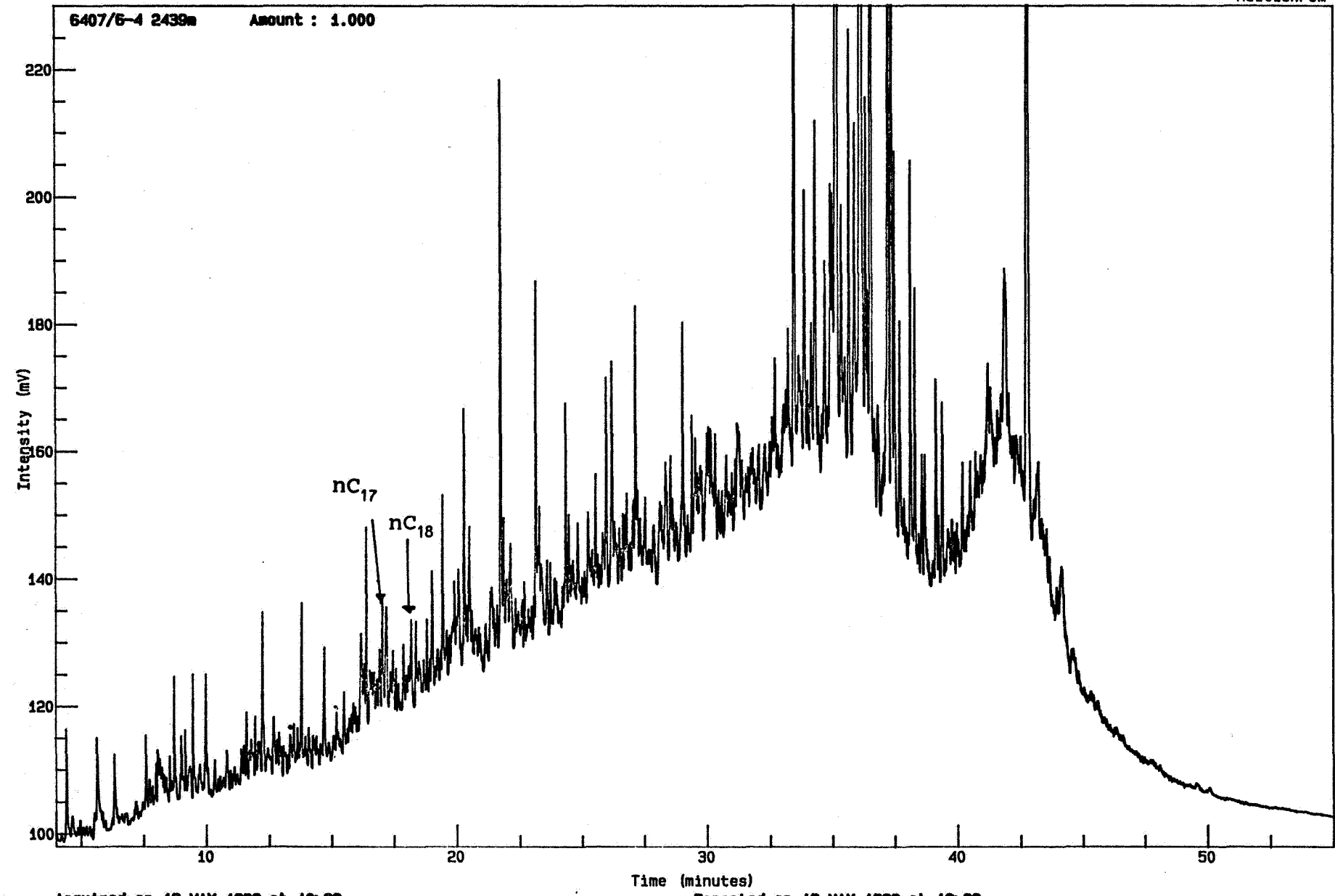
Acquired on 15-MAY-1992 at 14:03

Reported on 19-MAY-1992 at 13:06

FIGURE 2. WHOLE EXTRACT GAS CHROMATOGRAM FOR SAMPLE FROM 2439m (75% CLYST; 25% SST)

Analysis Name : [GEOKJEMI] 4 S5953, 1, 1.

Multichrom



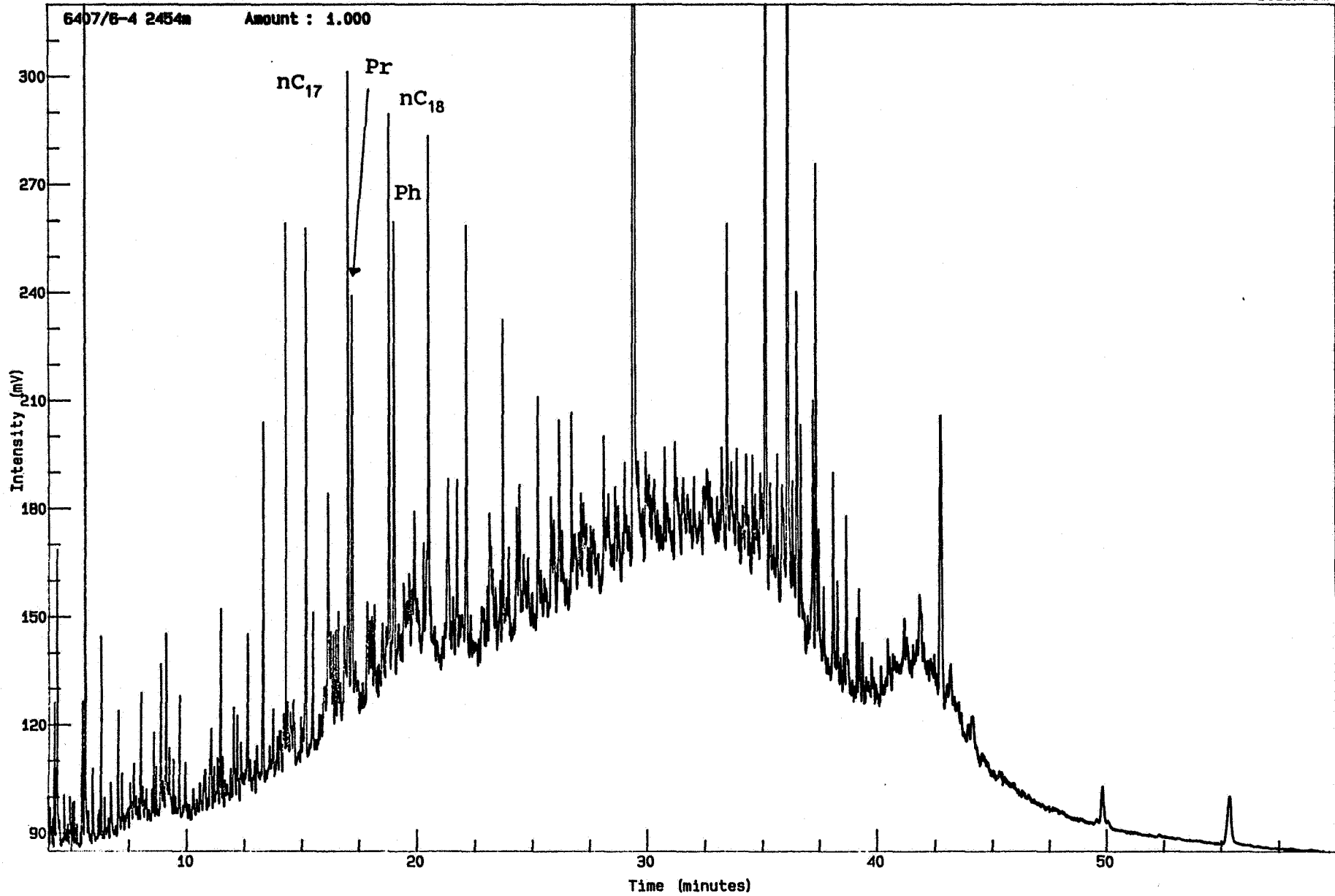
Acquired on 19-MAY-1992 at 10:22

Time (minutes)  
Reported on 19-MAY-1992 at 12:22

FIGURE 3. WHOLE EXTRACT GAS CHROMATOGRAM FOR SAMPLE FROM 2454m (65% CLYST; 35% SST)

Analysis Name : [GEOKJEMI] 4 S5958, 1, 1.

Multichrom



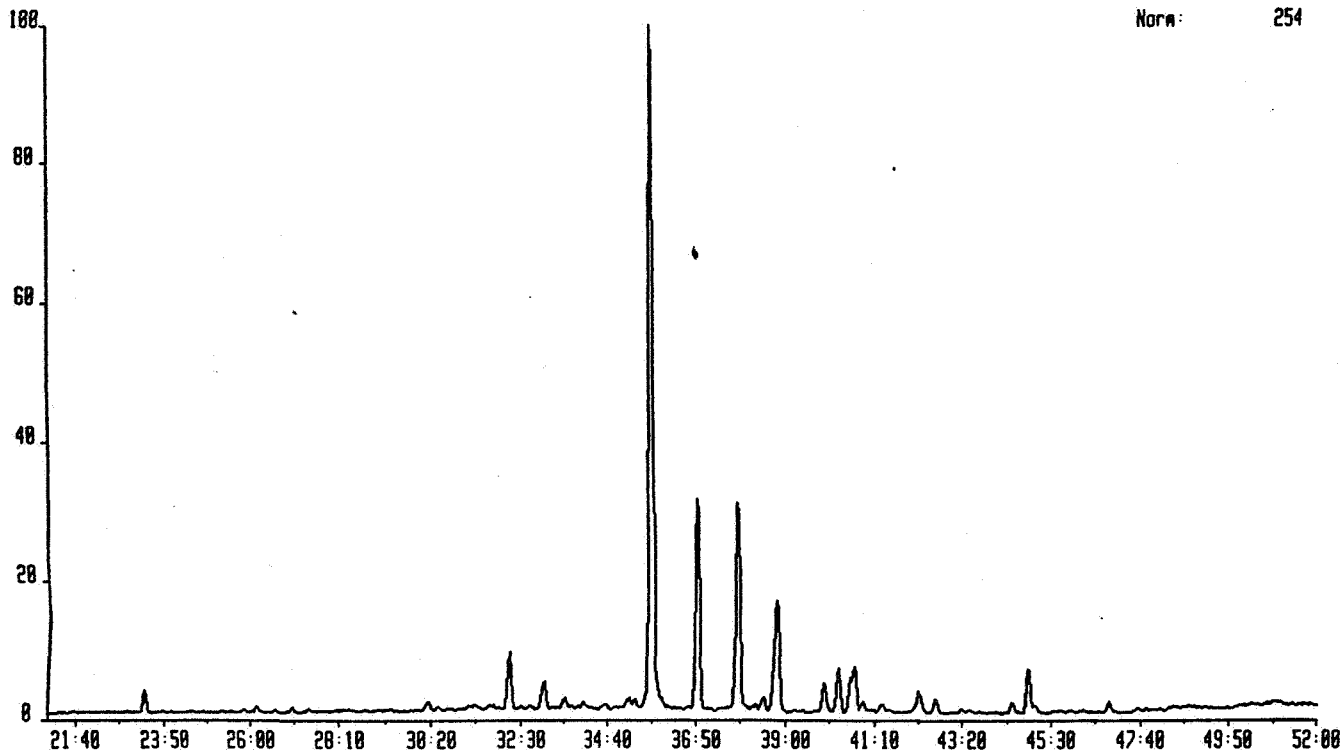
Acquired on 15-MAY-1992 at 12:17

Reported on 19-MAY-1992 at 13:33

S5958 1-JUN-92 Str:Magnetic TS250 Sys: HRPB10  
Sample 1 Injection 1 Group 1 Mass 177.1648  
Text:HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

a) m/z 177.164

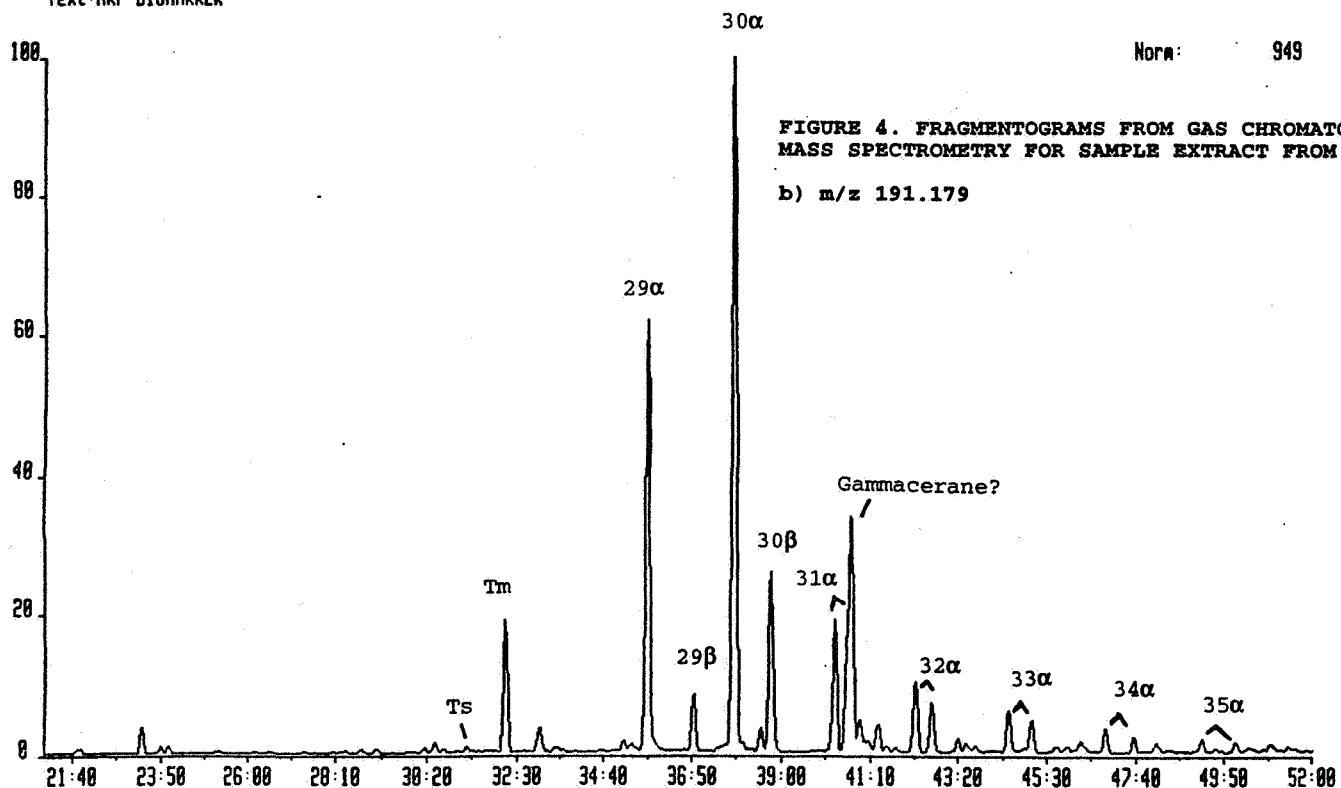


Norm: 254

S5958 1-JUN-92 Str:Magnetic TS250 Sys: HRPB10  
Sample 1 Injection 1 Group 1 Mass 191.1798  
Text:HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

b) m/z 191.179

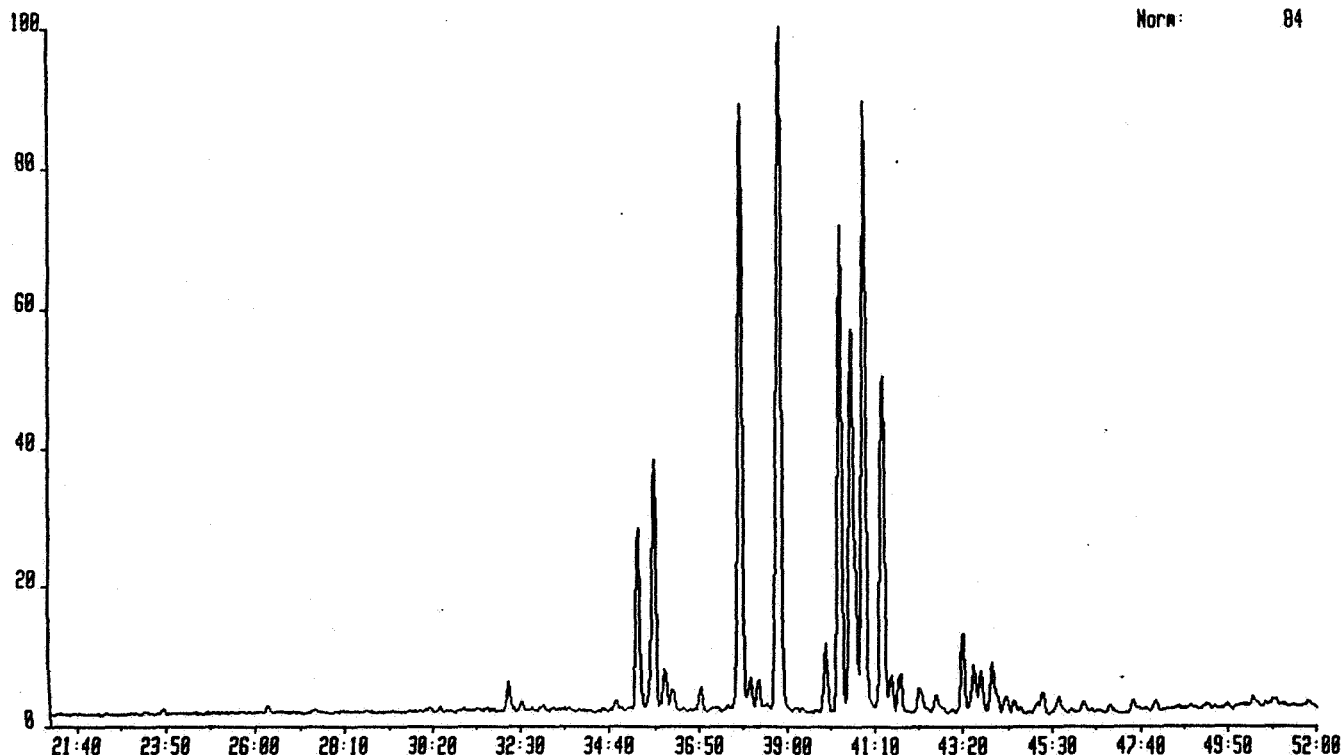


Norm: 949

S5958 1-JUN-92 Sir:Magnetic TS258 Sys: HRPB10  
Sample 1 Injection 1 Group 1 Mass 205.1958  
Text:HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

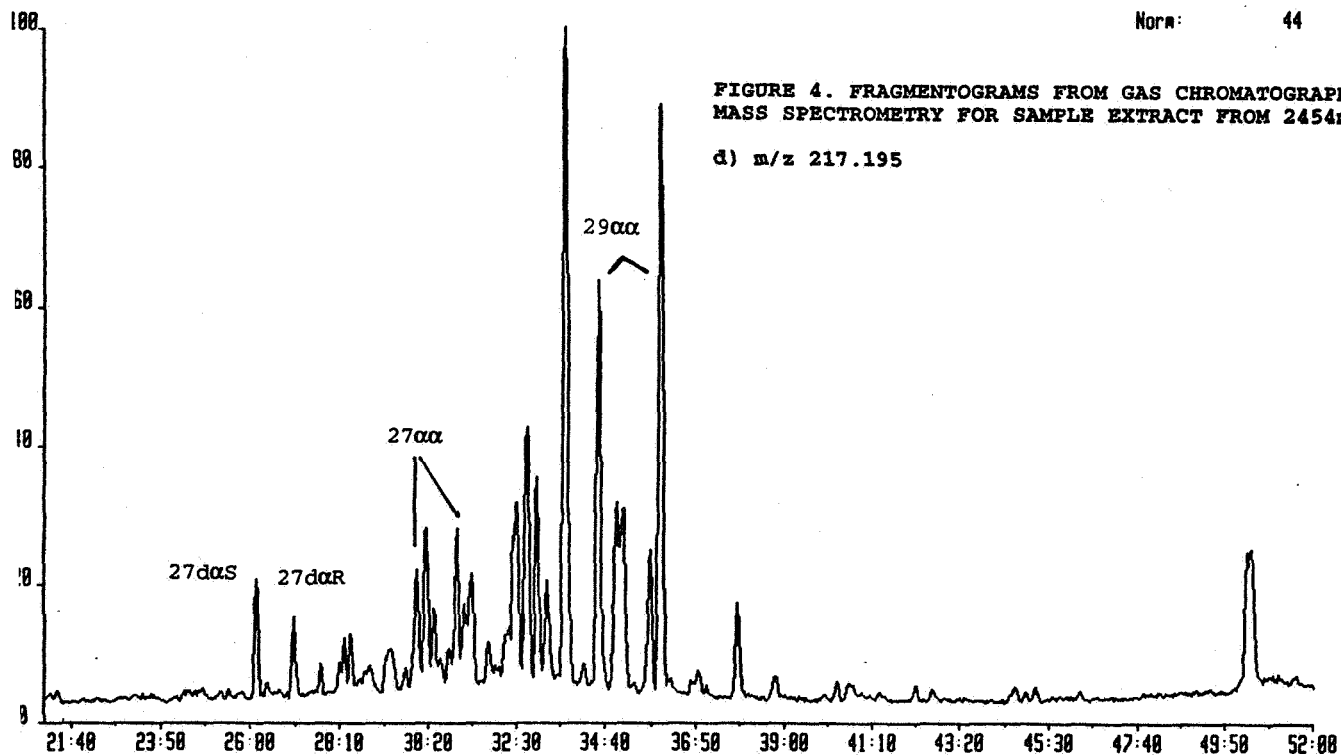
c) m/z 205.195



S5958 1-JUN-92 Sir:Magnetic TS258 Sys: HRPB10  
Sample 1 Injection 1 Group 1 Mass 217.1958  
Text:HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

d) m/z 217.195

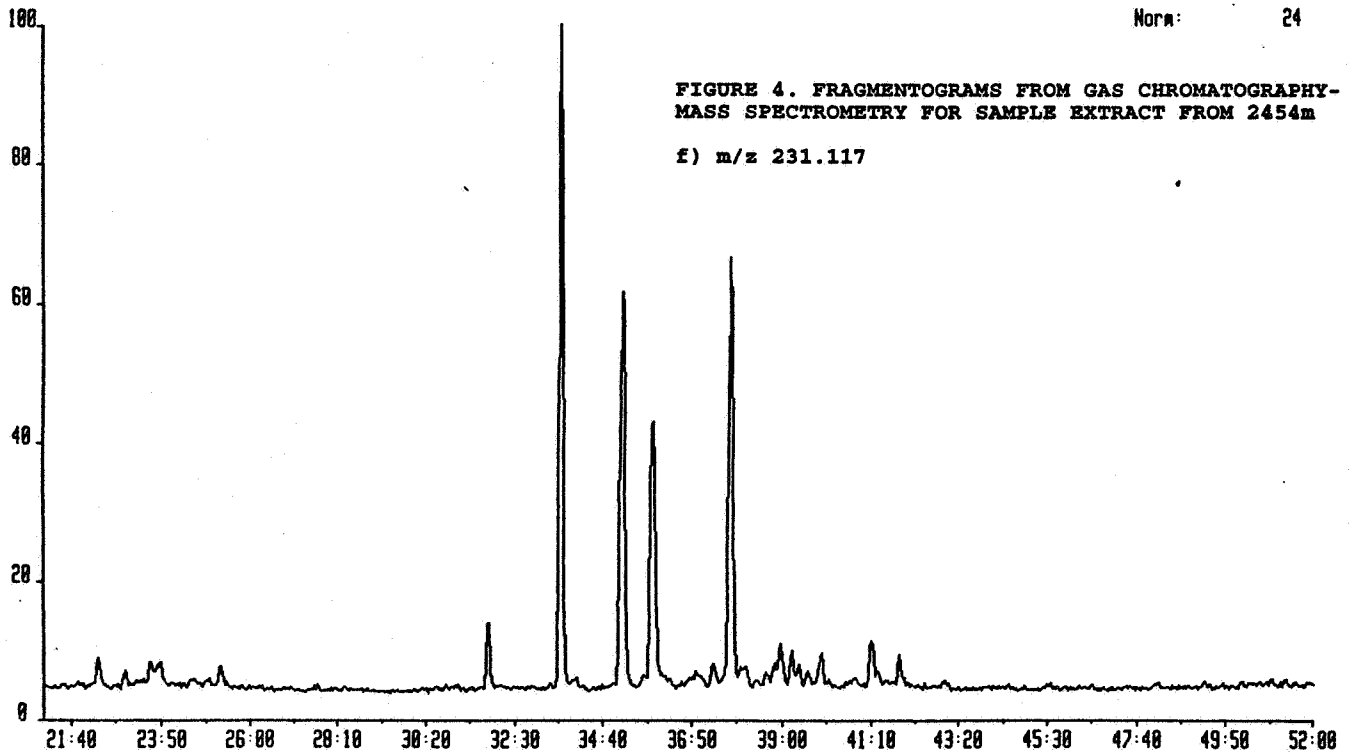
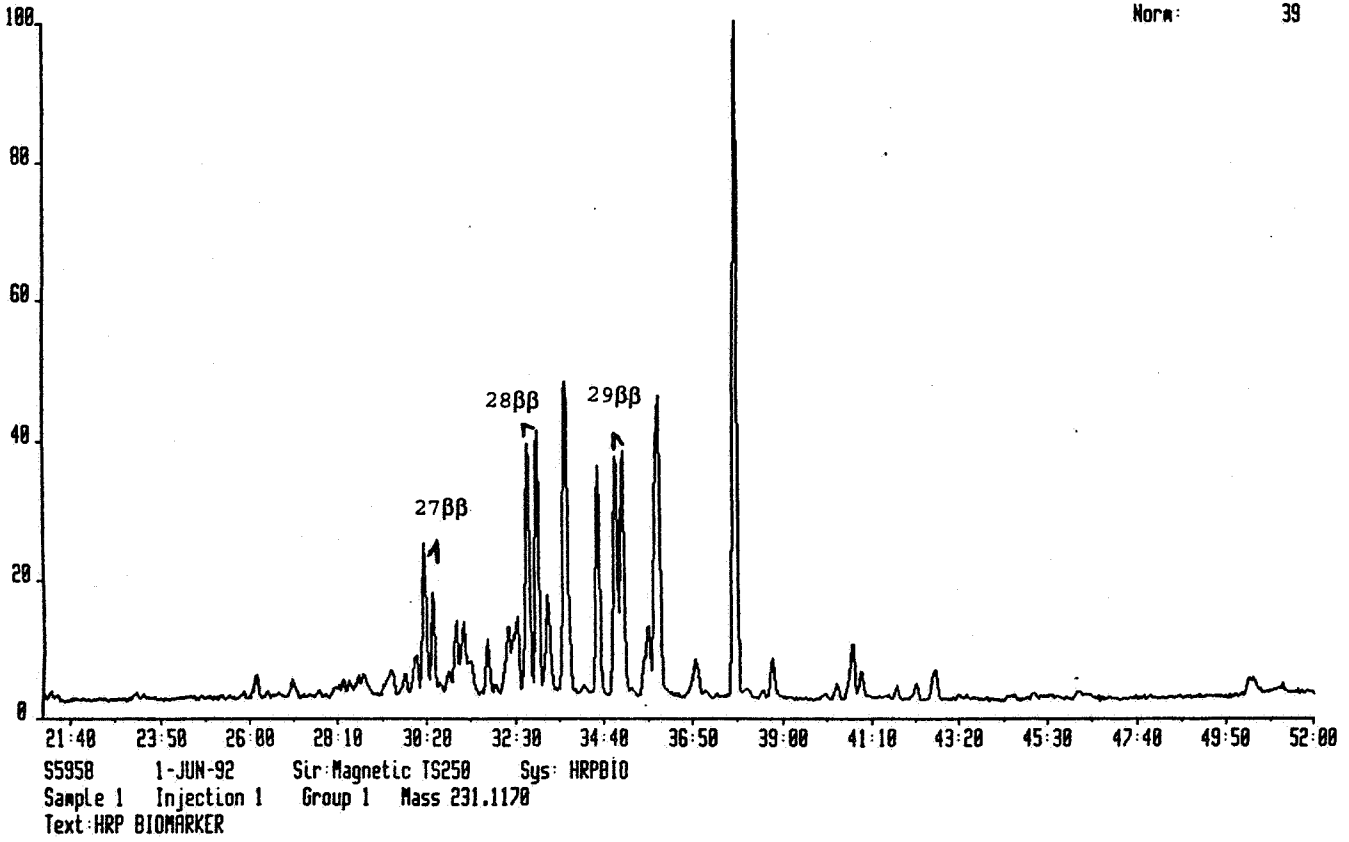


S5958 1-JUN-92 Sir:Magnetic TS250 Sys: HRPB10  
Sample 1 Injection 1 Group 1 Mass 218.2030  
Text:HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

e) m/z 218.203

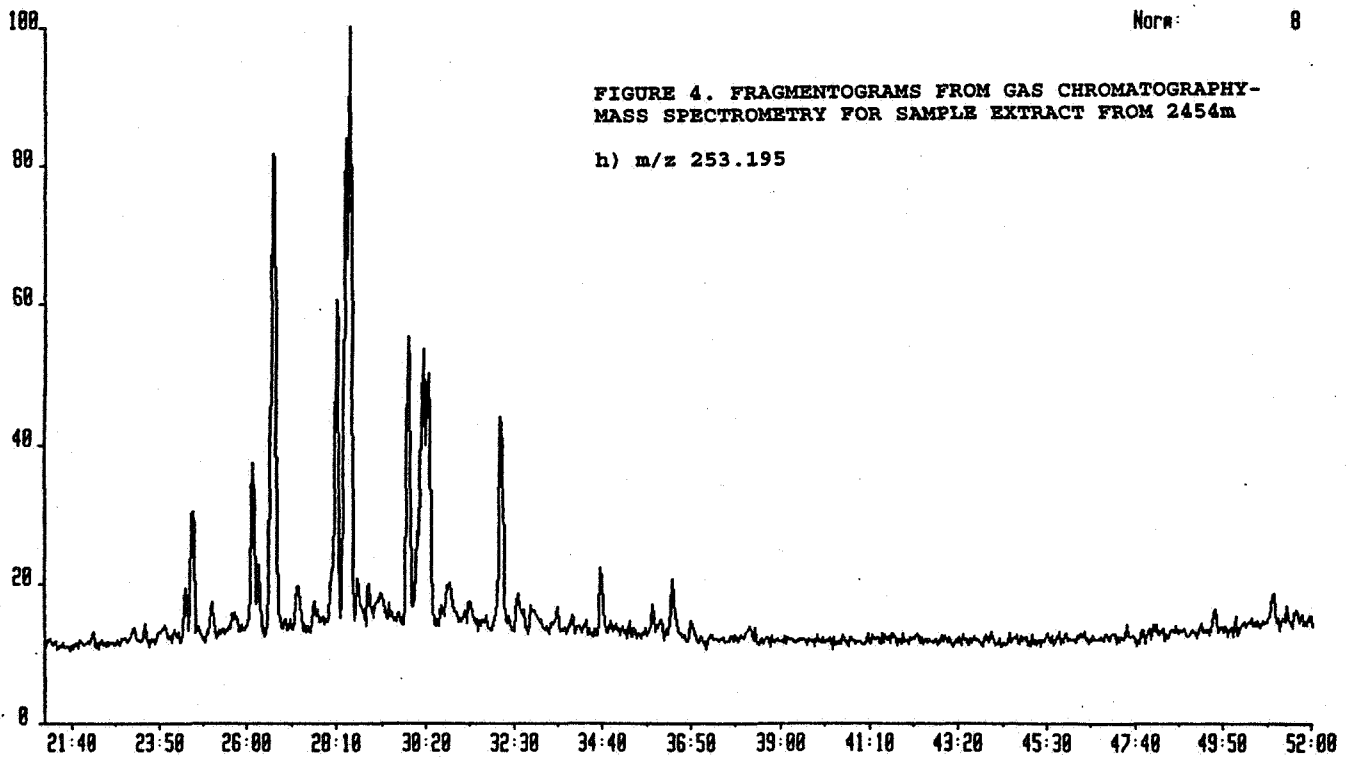
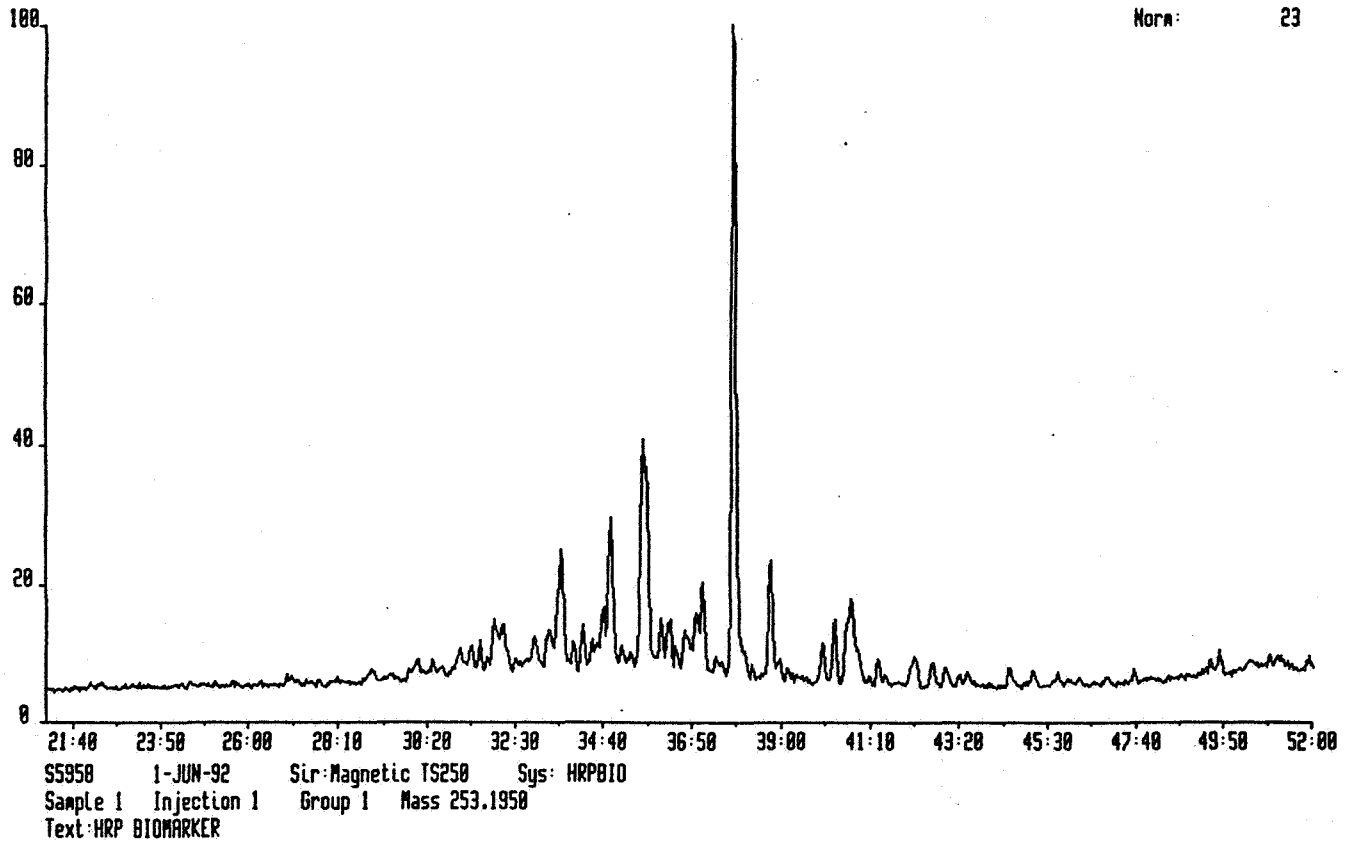
Norm: 39



S5958 1-JUN-92 Sir:Magnetic TS250 Sys: HRPB10  
Sample 1 Injection 1 Group 1 Mass 231.2110  
Text:HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

g) m/z 231.211



S5958 1-JUN-92 Sir: Magnetic TS258 Sys: HRP810  
Sample 1 Injection 1 Group 1 Mass 259.2428  
Text: HRP BIOMARKER

FIGURE 4. FRAGMENTOGRAMS FROM GAS CHROMATOGRAPHY-  
MASS SPECTROMETRY FOR SAMPLE EXTRACT FROM 2454m

1) m/z 259.242

Norm: 13

