

中藥複方製劑品管之初步研究 (II)

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摘 要

中藥係我國固有國粹，而中藥方劑之應用日益普及，為確保國民健康，中藥品管應日趨嚴格，斷不能因襲陳方，固步自封，故方劑中療效有效成分之確定，中藥品管科學化，藥理及臨床試驗均極待發展。

本研究依據醫方集解中篩選常用中藥方劑六種（附表），其藥材先依傳統方法鑑定基原及品質後，經專家依中藥典籍所述，酒洗（當歸），酒炒（白芍），土炒（白朮），炙（甘草）炮製等，配製成研究用標準方劑。參照中藥典範上所載一般純度試驗，包括乾燥減重，灰分，酸不溶性灰分，稀醇抽提物，化學呈色鑑別法，中藥材成分之 TLC，高壓液相層析及三次元高效能液相層析儀等來檢討中藥方劑所含有效成分以供品管客觀評價之參考。

結果顯示，中藥材因基原產地或季節不同而品質有異，其一般純度試驗中參照中藥典範上所載檢驗方法，若結果超出規定範圍，均分別抽購不同檢體重覆檢驗求取較客觀平均值。

結 論

- (一) 中藥材經炮製處理後與原生藥之一般純度試驗結果不同。
- (二) 人參、紅棗、茯苓、當歸、黃連、半夏、柴胡、陳皮等，中藥典範所載之乾燥減重規格範圍，須加以放寬。
- (三) 中藥典範上所記載稀醇抽提物項之範圍不多，本研究結果可提供衛生署客觀參考規格。
- (四) 應用於高壓液相層析及三次元高效能液相層析儀作進一步探討時發現中藥方劑各藥材化學成分間的相互干擾，故各成分之定性測定極為困難。

在研究中藥複方製劑之品管前，必須從單味藥材之品質開始。並配合方劑中標示藥材成分之薄層層析鑑別來提供中藥複方中有效成分之品管，期能藉此建立中藥品質評鑑客觀參考規格。

一、消遙散 (P.118)	北柴胡 當歸 (陝西、酒洗) 白芍 (杭州、酒炒) 白朮 (土炒) 茯苓 (雲南) 炙甘草 煨薑 薄荷 藥重 5.49 兩 (206gm)	九錢 (33.75gm) 九錢 (33.75gm) 九錢 (33.75gm) 九錢 (33.75gm) 九錢 (33.75gm) 四錢半 (16.88gm) 二錢七分 (10.13gm) 二錢七分 (10.13gm)
二、茵陳蒿湯 (P.249)	茵陳 大黃 (四川) 梔子 (炒) 藥重 5.4 兩 (203gm)	三兩六錢 (135gm) 一兩二錢 (45gm) 六錢 (22.5gm)
三、芍藥甘草湯 (P.115)	白芍 (杭州、酒炒) 炙甘草 藥重 5.4 兩 (203gm)	二兩七錢 (101.25gm) 二兩七錢 (101.25gm)
四、小柴胡湯	柴胡 半夏 人參 (高麗天字三十支) 甘草 黃芩 生薑 紅棗 藥重 5.43 兩 (203.62gm)	一兩六錢八分 (63gm) 一兩五分 (39.38gm) 六錢三分 (23.63gm) 六錢三分 (23.6gm) 六錢三分 (23.6gm) 六錢三分 (23.6gm) 一錢八分九 (7.09gm)
五、六君子湯	人參 (高麗天字三十支) 白朮 (土炒) 茯苓 (雲南) 炙甘草 陳皮 (廣東) 半夏 生薑 紅棗 藥重 5.4 兩 (202.5gm)	八錢 (30gm) 八錢 (30gm) 八錢 (30gm) 四錢 (15gm) 四錢 (15gm) 八錢 (30gm) 八錢 (30gm) 六錢 (22.5gm)
六、三黃瀉心湯	大黃 (四川錦紋) 黃連 (四川雞爪連) 黃芩 藥重 5.6 兩 (210gm)	二兩八錢 (105gm) 一兩四錢 (52.5gm) 一兩四錢 (52.5gm)

乾燥減重測定

	一次測試用藥量 (gm)	乾燥減重%	平均值	規定純度 (中華民國中藥典範)
一、消遙散				
1、北柴胡	5	12.0%, 11.5%	11.75%	13.0%
2、當歸	5	18.0%, 17.6%, 18.5%	11.85%	13.0%
3、白芍	5	11.5%, 10.7%	11.1%	13.0%
4、白朮(土炒)	5	14.25%, 13.4%	11.825%	
5、茯苓	5	19.60%, 18.6%, 19.4%	19.20%	20.0%
6、炙甘草	5	16.25% 15.4%	15.825%	
7、煨薑	5	15.5%		
8、薄荷	5	12.75%, 11.80%	12.275%	13.0%
二、茵陳蒿湯				
9、茵陳	5	11.50%, 10.60%	11.05%	12.0%
10、大黃	5	10.25%, 11.40%	10.825%	13.0%
11、梔子	5	7.0%, 7.8%	7.4%	9.0%
三、芍藥甘草湯				
3、白芍	5	11.5%, 10.7%	11.1%	13.0%
6、炙甘草	5	16.25%, 15.4%	15.825%	
四、小柴胡湯				
1、柴胡	5	13.10%, 12.50%	12.8%	13%
12、半夏	5	13.50%, 15.25%, 14.25%	14.30%	14%
13、人參	5	9.25%, 8.50%	8.875%	9%
6、甘草	5	10.5%		12%
14、黃芩	5	12.0%, 12.25%	12.125%	13%
15、生薑	5	92.0%, 94.10%	93.05%	
16、紅棗	5	21.50%, 28.0%, 28.90%	26.13%	19%
五、六君子湯				
13、人參	5	9.25%, 8.50%	8.875%	9%
4、白朮(土炒)	5	14.25%, 13.40%	13.825%	
5、茯苓	5	19.60%, 19.40%, 18.6%	19.20%	20%
6、炙甘草	5	16.25%, 15.40%	15.825%	
17、陳皮	5	13.50%, 15.25%, 14.28%	14.34%	13%
12、半夏	5	13.50%, 15.25%, 14.25%	14.30%	14%
15、生薑	5	92.0%, 94.10%	93.05%	
16、紅棗	5	21.50%, 28.0%, 28.90%	26.13%	19%
六、三黃瀉心湯				
10、大黃	5	10.25%, 11.40%	10.825%	13%
18、黃連	5	7.75%, 10.0%, 8.75%	8.83%	13%
14、黃芩	5	12.0%, 12.25%	12.125%	13%

總灰分測定

	坩堝 (gm)	中藥取量 (gm)	坩堝+灰分(灰分) (gm)	總灰分 %	規定純度 (中華民國中藥典範)
一、消遙散					
1、北柴胡	26.411	2.031	26.482(0.071)	3.49%	6.5%
2、當歸	23.180	1.666	23.248(0.068)	4.08%	7.0%
3、白芍	23.159	2.011	23.214(0.055)	2.73%	6.5%
4、白朮(土炒)	20.236	1.992	20.328(0.092)	4.62%	
5、茯苓	23.534	1.942	23.540(0.006)	0.31%	1.0%
6、炙甘草	25.486	2.009	25.531(0.045)	2.24%	
7、煨薑	24.961	0.999	25.027(0.066)	6.60%	
8、薄荷	23.102	1.535	23.217(0.115)	7.49%	11.0%
二、茵陳蒿湯					
9、茵陳	21.779	1.011	21.840(0.061)	6.03%	9.0%
10、大黃	16.422	2.001	16.528(0.106)	5.30%	10.0%
11、梔子	20.827	2.019	20.904(0.077)	3.81%	6.0%
三、芍藥甘草湯					
3、白芍	23.159	2.011	23.214(0.055)	2.73%	6.5%
6、炙甘草	25.486	2.009	25.531(0.045)	2.24%	
四、小柴胡湯					
1、柴胡	21.780	2.003	21.865(0.085)	4.24%	6.5%
12、半夏	23.540	2.001	23.563(0.023)	1.15%	3.5%
13、人參	16.421	2.003	16.491(0.07)	3.50%	4.2%
6、甘草	20.831	2.006	20.911(0.08)	3.99%	7.0%
14、黃芩	23.179	2.001	23.264(0.085)	4.25%	6.0%
15、生薑	20.240	2.006	20.256(0.016)	0.80%	
16、紅棗	24.963	2.020	24.998(0.035)	1.73%	3.0%
五、六君子湯					
13、人參	16.421	2.003	16.491(0.07)	3.50%	4.2%
4、白朮(土炒)	20.236	1.992	20.328(0.092)	4.62%	
5、茯苓	23.534	1.942	23.540(0.006)	0.31%	1.0%
6、炙甘草	25.486	2.009	25.531(0.045)	2.24%	
17、陳皮	23.161	2.003	23.224(0.063)	3.145%	4.0%
12、半夏	23.540	2.001	23.563(0.023)	1.15%	3.5%
15、生薑	20.240	2.006	20.256(0.016)	0.80%	
16、紅棗	24.963	2.020	24.998(0.035)	1.73%	3.0%
六、三黃瀉心湯					
10、大黃	16.422	2.001	16.528(0.106)	5.30%	10.0%
18、黃連	26.413	2.004	26.447(0.034)	1.7%	4.0%
14、黃芩	23.179	2.001	23.264(0.085)	4.25%	6.0%

酸不溶性灰分測定

	坩 埚 (gm)	中藥取量 (gm)	坩埚+酸不溶性灰分 (酸不溶性灰分 gm)	酸不溶性灰分 (%)	平均值	規定純度 (中華民國中藥典範)
一、消遙散						
1、北柴胡	26.411	2.031	26.430 (0.019)	0.935%	0.79%	3.0%
2、當歸	23.180	1.666	23.194 (0.014)	0.84%		1.0%
	21.615	2.014	21.630 (0.015)	0.74%	0.395%	0.5%
3、白芍	23.159	2.011	23.168 (0.009)	0.447%		
	16.420	2.038	16.427 (0.007)	0.343%		
4、白朮(土炒)	20.236	1.992	20.264 (0.028)	1.40%		
5、茯苓	23.534	1.942	23.536 (0.002)	0.102%		1.0%
6、炙甘草	25.486	2.009	25.496 (0.01)	0.497%		
7、煨薑	24.961	0.999	24.971 (0.01)	1.00%		
8、薄荷	23.102	1.535	23.120 (0.018)	1.17%		2.5%
二、茵陳蒿湯						
9、茵陳	21.779	1.011	21.791 (0.012)	1.19%		2.0%
10、大黃	16.422	2.001	16.435 (0.013)	0.65%		1.0%
11、梔子	20.827	2.019	20.841 (0.014)	0.69%		1.0%
三、芍藥甘草湯						
3、白芍	23.159	2.011	23.168 (0.009)	0.447%	0.395%	0.5%
	16.420	2.038	16.427 (0.007)	0.343%		
6、炙甘草	25.486	2.009	25.496 (0.01)	0.497%		
四、小柴胡湯						
1、柴胡	21.780	2.003	21.796 (0.016)	0.798%		3.0%
12、半夏	23.540	2.001	23.542 (0.002)	0.10%		1.0%
13、人參	16.421	2.003	16.430 (0.009)	0.45%		1.0%
6、甘草	20.831	2.006	20.839 (0.008)	0.40%		2.0%
14、黃芩	23.179	2.001	23.191 (0.012)	0.60%		1.0%
15、生薑	20.240	2.006	20.241 (0.001)	0.05%		
16、紅棗	24.963	2.020	24.969 (0.006)	0.30%		1.0%
五、六君子湯						
13、人參	16.421	2.003	16.430 (0.009)	0.45%		1.0%
4、白朮(土炒)	20.236	1.992	20.264 (0.028)	1.40%		
5、茯苓	23.534	1.942	23.536 (0.002)	0.10%		1.0%
6、炙甘草	25.486	2.009	25.496 (0.01)	0.497%		
17、陳皮	23.161	2.003	23.168 (0.007)	0.35%		1.0%
12、半夏	23.540	2.001	23.542 (0.002)	0.10%		1.0%
15、生薑	20.240	2.006	20.241 (0.001)	0.05%		
16、紅棗	24.963	2.020	24.969 (0.006)	0.30%		1.0%
六、三黃瀉心湯						
10、大黃	16.422	2.001	16.435 (0.013)	0.65%		1.0%
18、黃連	26.413	2.004	26.419 (0.006)	0.30%		1.0%
14、黃芩	23.179	2.001	23.191 (0.012)	0.60%		1.0%

稀醇抽提物測定

	中藥取量 (gm)	蒸發皿 (gm)	蒸發皿+抽提物 (抽提物 gm)	稀醇抽提物 (%)	平均值	規定純度 (中華民國中藥典範)
一、消遙散						
1、北柴胡	2.001	85.704	85.823(0.119)	5.95%	6.96%	11%
	2.004	84.350	84.499(0.149)	7.44%		
	2.002	87.197	87.347(0.150)	7.49%		
2、當歸	2.002	79.268	79.836(0.568)	28.4%		
3、白芍	2.002	87.302	87.450(0.148)	7.4%		
4、白朮(土炒)	2.003	84.353	84.563(0.021)	10.5%		
5、茯苓	2.001	87.194	87.212(0.018)	0.9%		
6、炙甘草	2.001	82.154	82.594(0.44)	22.0%		
7、煨薑	2.004	81.673	81.687(0.014)	0.69%		
8、薄荷	2.004	85.288	85.478(0.19)	9.5%		
二、茵陳蒿湯						
9、茵陳	2.001	83.181	83.328(0.147)	7.35%	7.53%	15%
	2.004	87.302	87.452(0.15)	7.5%		
	2.003	83.181	83.336(0.155)	7.75%		
10、大黃	2.001	81.327	81.728(0.401)	20.04%	21.04%	30%
	2.002	82.154	82.596(0.442)	22.1%		
	2.002	84.350	84.770(0.42)	20.98%		
11、梔子	2.002	81.685	81.939(0.254)	12.7%		
三、芍藥甘草湯						
3、白芍	2.002	87.302	87.450(0.148)	7.4%		
6、炙甘草	2.001	82.154	82.594(0.44)	22.0%		
四、小柴胡湯						
1、柴胡	2.001	85.704	85.823(0.119)	5.95%	6.96%	11%
	2.004	84.350	84.499(0.149)	7.44%		
	2.002	87.197	87.347(1.150)	7.49%		
12、半夏	2.001	85.718	85.727(0.009)	0.45%	14.0%	
13、人參	2.003	85.298	85.682(0.384)	19.17%		
6、甘草	2.000	81.692	82.031(0.339)	16.95%		
14、黃芩	2.002	82.161	82.525(0.364)	18.18%		
15、生薑	2.007	79.274	79.287(0.013)	0.65%		
16、紅棗	2.008	81.330	81.878(0.548)	27.29%		
五、六君子湯						
13、人參	2.003	85.298	85.682(0.384)	19.17%		14.0%
4、白朮(土炒)	2.003	84.353	84.563(0.21)	10.5%		
5、茯苓	2.001	87.194	87.212(0.018)	0.9%	19.605%	30%
6、炙甘草	2.001	82.154	82.594(0.44)	22.0%		
17、陳皮	2.003	87.306	87.714(0.408)	20.37%		
	2.006	85.288	85.666(0.378)	18.84%		
12、半夏	2.001	85.718	85.727(0.009)	0.45%		
15、生薑	2.007	79.274	79.287(0.013)	0.65%		
16、紅棗	2.008	81.330	81.878(0.548)	27.29%		
六、三黃瀉心湯						
10、大黃	2.002	82.154	82.596(0.442)	22.1%	21.04%	30%
	2.002	84.350	84.770(0.42)	20.98%		
	2.001	81.327	81.728(0.401)	20.04%		
18、黃連	2.004	87.198	87.422(0.224)	11.18%		
14、黃芩	2.002	82.161	82.525(0.364)	18.18%		

	乾燥減重	規定純度	總灰分 (%)	規定純度	酸不溶性灰分 (%)	規定純度	稀酸抽提物 (%)		化學呈色 Screening Test
							規定純度	規定純度	
一、消遙散									
1、北柴胡	11.75%	<13.0%	3.49%	<6.5%	0.935%	<3.0%	6.96%	>11.0%	Saponin
2、當歸	17.87%	<13.0%	4.08%	<7.0%	0.79%	<1.0%	28.4%		
3、白芍	11.1%	<13.0%	2.73%	<6.5%	0.395%	<0.5%	7.4%		FeCl ₃ (+)
4、白朮(土炒)	13.825%		4.62%		1.40%		10.5%		
5、茯苓	19.20%	<20.0%	0.31%	<1.0%	0.102%	<1.0%	0.9%		L. B. (+)
6、炙甘草	15.825%		2.24%		0.497%		22.0%		
7、煨薑	15.5%		6.60%		1.00%		0.69%		
8、薄荷	12.275%	<13.0%	7.49%	<11.0%	1.17%	<2.5%	9.5%		
二、茵陳蒿湯									
9、茵陳	11.05%	<12.0%	6.03%	<9.0%	1.19%	<2.0%	7.53%	>15%	FeCl ₃ (+)
10、大黃	10.825%	<13.0%	5.30%	<10.0%	0.65%	<1.0%	21.04%	>30%	
11、梔子	7.4%	<9.0%	3.81%	<6.0%	0.69%	<1.0%	12.7%		
三、芍藥甘草湯									
3、白芍	11.1%	<13.0%	2.73%	<6.5%	0.395%	<0.5%	7.4%		
6、炙甘草	15.825%		2.24%		0.497%		22.0%		

	乾燥減重		規定純度		總灰分 (%)		規定純度		酸不溶性灰分 (%)		稀酸抽提物 (%)		規定純度		化學呈色 Screening Test	
四、小柴胡湯																
1、柴胡	12.8%	<13.0%	4.24%	<6.5%	0.798%	<3.0%	6.96%	>11.0%	Saponin							
12、半夏	14.30%	<14.0%	1.15%	<3.5%	0.10%	<1.0%	0.45%	>14.0%								
13、人參	8.875%	<9.0%	3.50%	<4.2%	0.45%	<1.0%	19.17%									
6、甘草	10.5%	<12.0%	3.99%	<7.0%	0.40%	<2.0%	16.95%									
14、黃芩	12.125%	<13.0%	4.25%	<6.0%	0.60%	<1.0%	18.18%		FeCl ₃ (+)							
15、生薑	93.05%		0.80%		0.05%		0.65%									
16、紅棗	26.13%	<19.0%	1.73%	<3.0%	0.30%	<1.0%	27.29%		Fehling (+)							
五、六君子湯																
13、人參	8.875%	<9.0%	3.50%	<4.2%	0.45%	<1.0%	19.17%	>14.0%	Saponin							
4、白朮(土炒)	13.825%		4.62%		1.40%		10.5%									
5、茯苓	19.20%	<20.0%	0.31%	<1.0%	0.10%	<1.0%	0.9%		Saponin							
6、炙甘草	15.825%		2.24%		0.497%		22.0%									
17、陳皮	14.34%	<13.0%	3.145%	<4.0%	0.35%	<1.0%	19.605%	>30.0%	Flavon (+)							
12、半夏	14.75%	<14.0%	1.15%	<3.5%	0.10%	<1.0%	0.45%									
15、生薑	93.05%		0.80%		0.05%		0.65%									
16、紅棗	26.13%	<19.0%	1.73%	<3.0%	0.30%	<1.0%	27.29%		Fehling (+)							
六、三黃瀉心湯																
10、大黃	10.825%	<13.0%	5.3%	<10.0%	0.65%	<1.0%	21.04%	>30.0%	Dragendorff's (+)							
18、黃連	8.83%	<9.0%	1.7%	<4.0%	0.30%	<1.0%	11.18%									
14、黃芩	12.125%	<13.0%	4.25%	<6.0%	0.60%	<1.0%	18.18%		FeCl ₃ (+)							

※ L. B. : Liebermann Burchardis Test

中藥成分 T. L. C. 鑑別實驗結果：

取生藥粉末約 1.0gm 加甲醇 10ml 淬取，過濾、濃縮後供作檢液。

薄層層析條件：

(1) 層析板：Silica Gel 60 F₂₅₄

(2) 展開溶媒：A, MeOH : CHCl₃ / 1 : 9

B, MeOH : CHCl₃ / 1 : 4

C, n-butanol : H₂O : Glacial
Acetic acid / 7 : 2 : 1

D, n-hexane : AcOEt / 4 : 1

(3) 檢出方法：A、UV lamp 366 nm

B、UV lamp 254 nm

C、10% H₂SO₄, 110°C, 5min

D、茴香醛-硫酸發色液

(Anisaldehyde-Sulfuric acid)

105°C, 5min

E、氯化鐵發色液 (Ferric chloride)

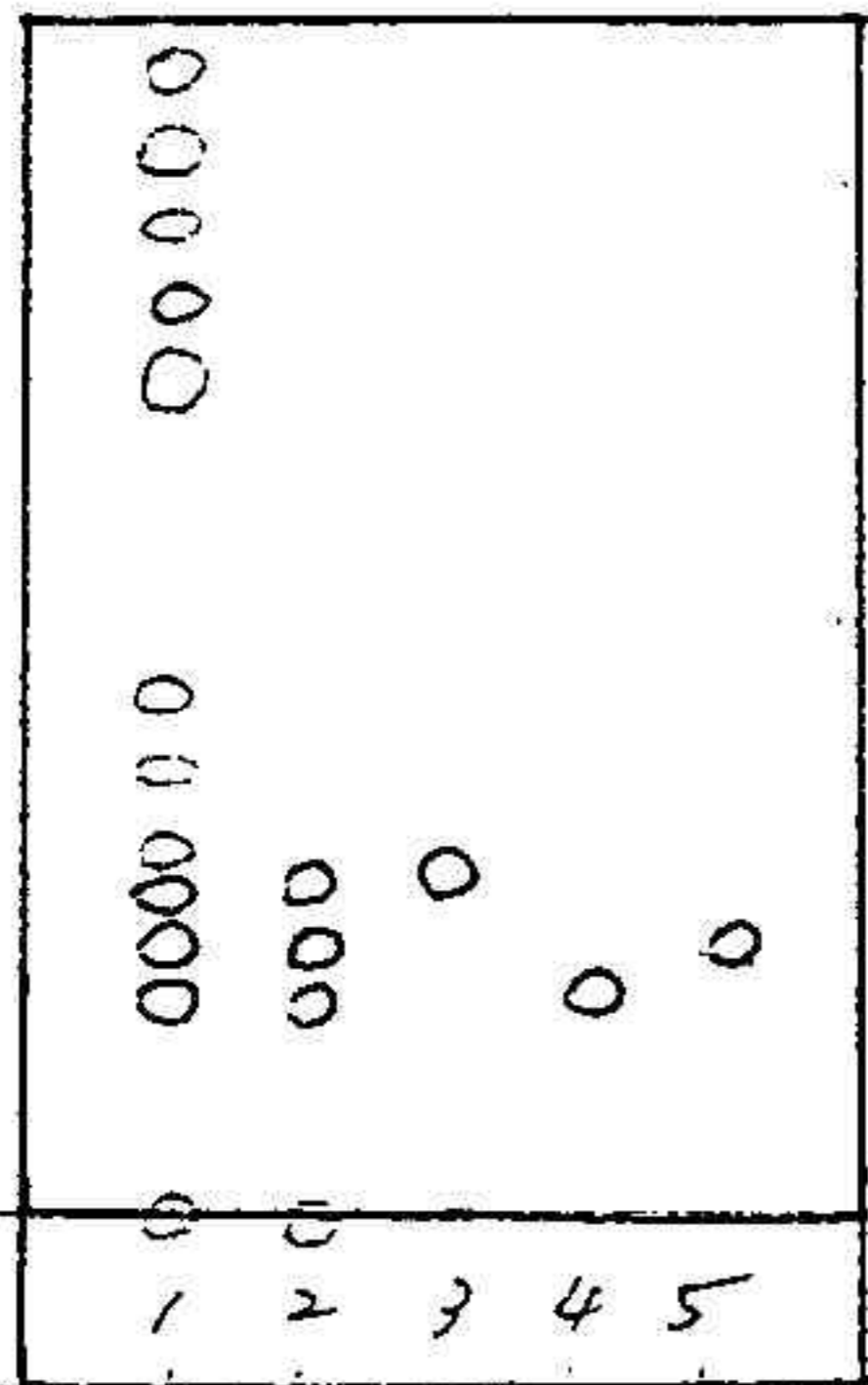
(4) 展開距離：7 cm

一. 消遙散

薄層層析條件:

層析板 = Silica gel 60 F₂₅₄

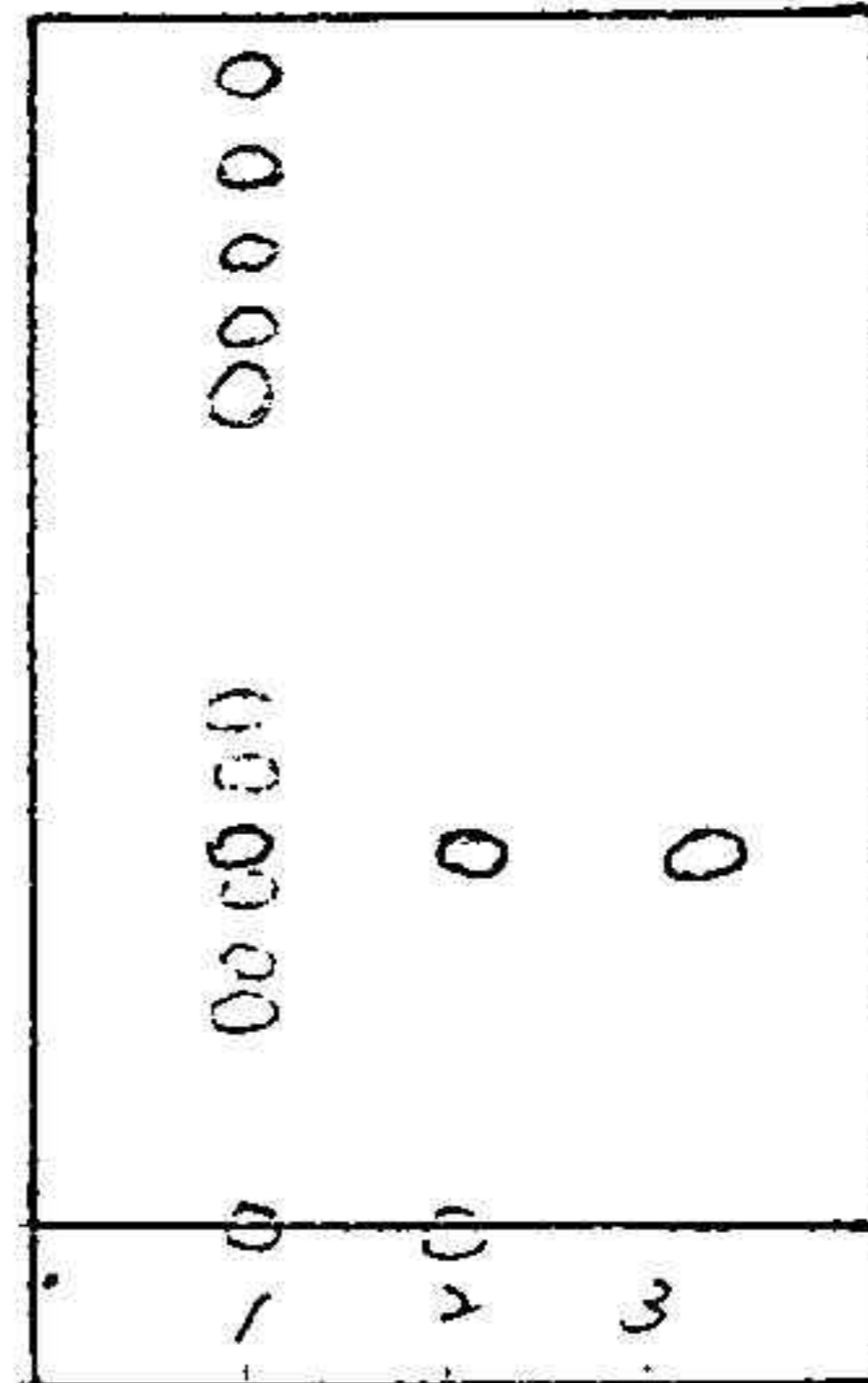
展開距離 = 7cm



展開溶媒: $CHCl_3 = MeOH / 4 = 1$

檢出方法與結果: 10% H_2SO_4

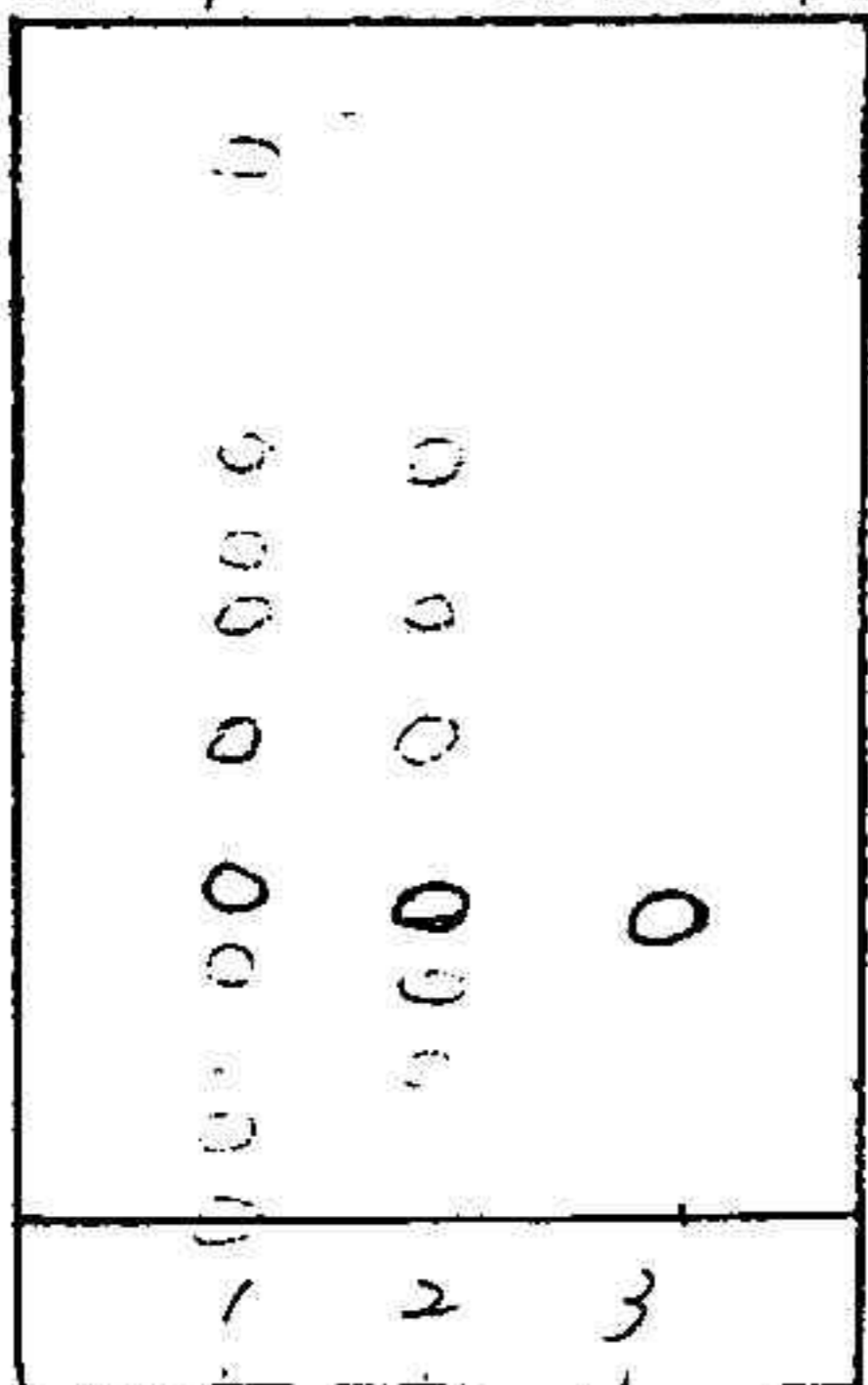
1. 消遙散散劑
2. 北柴胡
3. Saikosaponin a Standard, Rf值約 0.28
4. Saikosaponin c Standard, Rf值約 0.17
5. Saikosaponin d Standard, Rf值約 0.21



展開溶媒: $CHCl_3 = MeOH / 4 = 1$

檢出方法與結果: 10% H_2SO_4

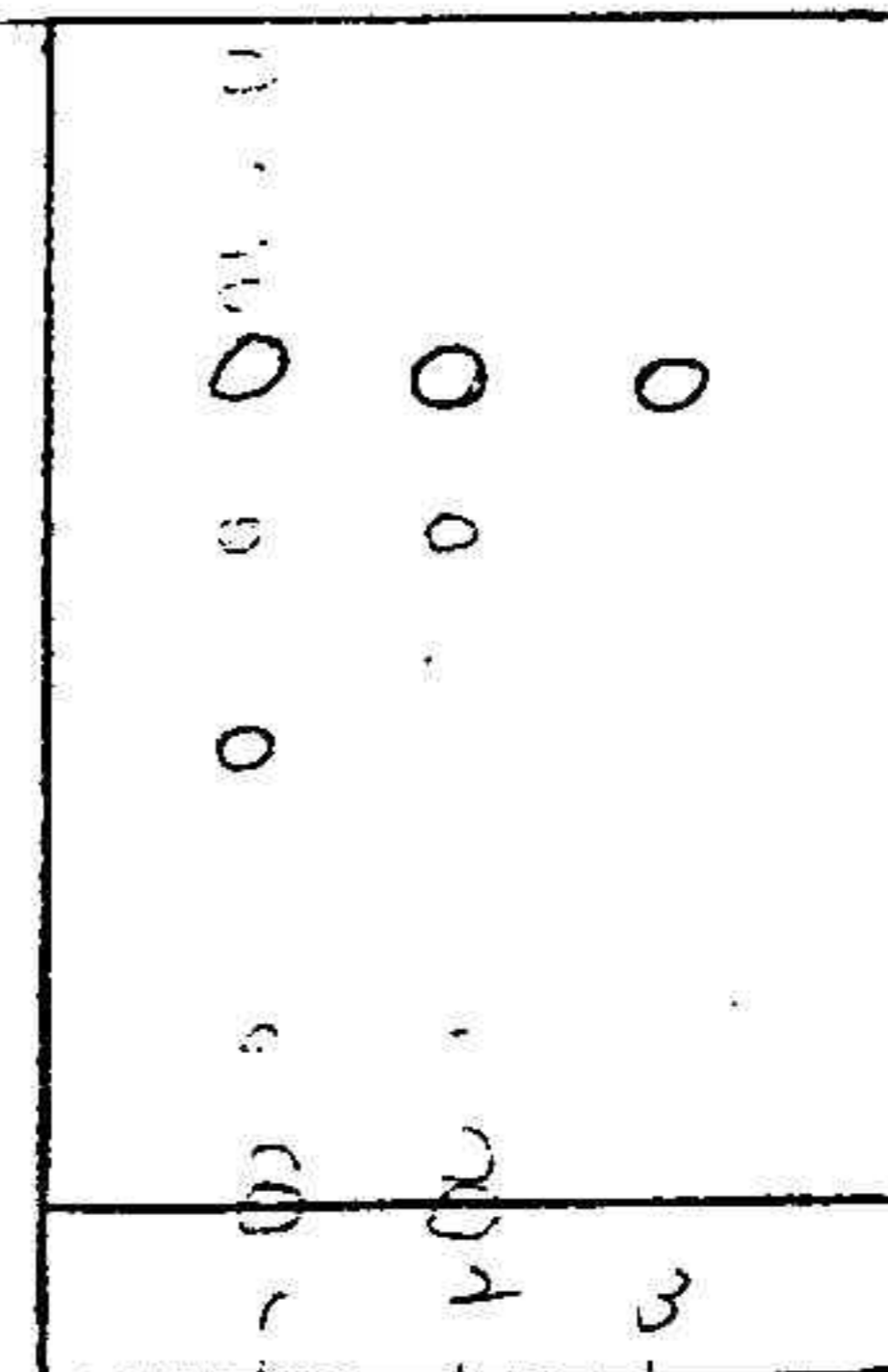
1. 消遙散散劑
2. 芍藥
3. Paeoniflorin Standard, Rf值約 0.27



展開溶媒: $n\text{-butanol} : H_2O : Glacial\ Acetic\ acid / 7 = 2 = 1$

檢出方法與結果: 紫外線 (波長 254nm)

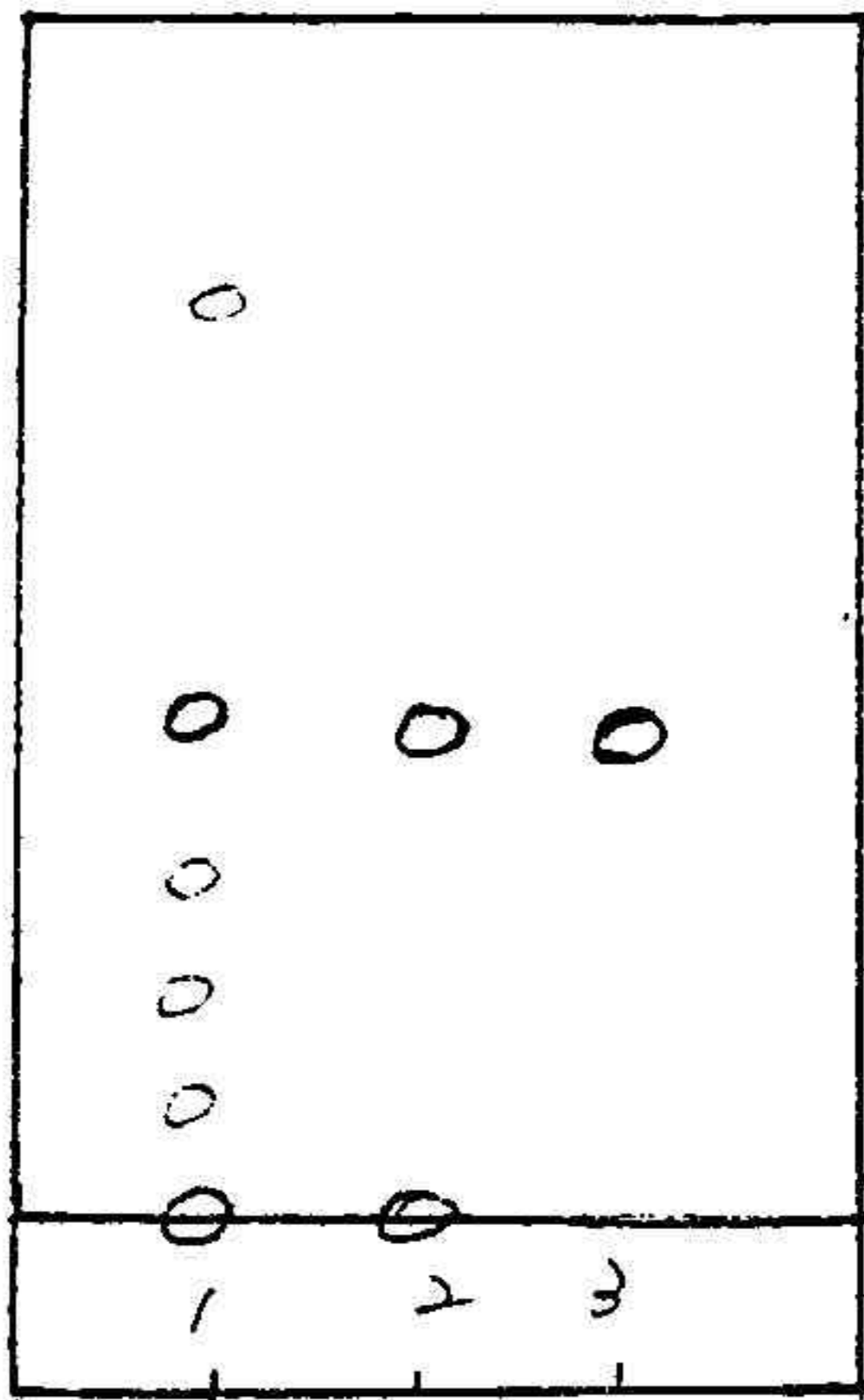
1. 消遙散散劑
2. 炙甘草
3. Glycyrrhizin, Rf值約 0.28



展開溶媒: $CHCl_3 = MeOH / 4 = 1$

檢出方法與結果: 紫外線 (波長 366nm)

1. 消遙散散劑
2. 炙甘草
3. Glycyrrhetic acid, Rf值約 0.68



展開溶媒 = n -hexane = AcEt / 4 = 1
 檢出方法與結果 = 茴香醛 - 硫酸發色
 液, 105°C , 5 min.

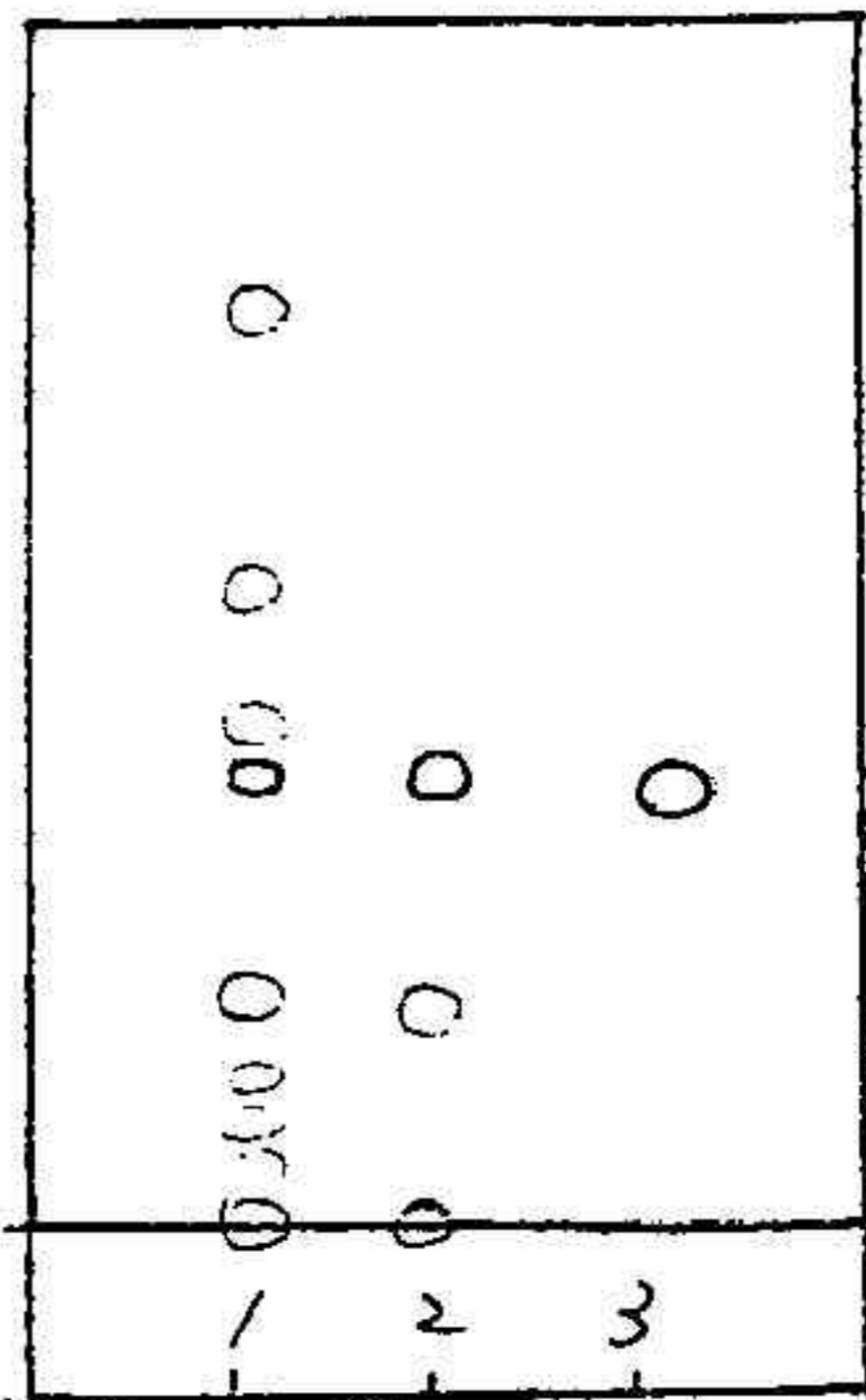
1. 消遙散散劑.
2. 薄荷.
3. Menthol Standard, R_f 值約 0.4,
藍綠色.

二. 茵陳蒿湯

薄層層析條件:

層析板: Silica gel 60 F254

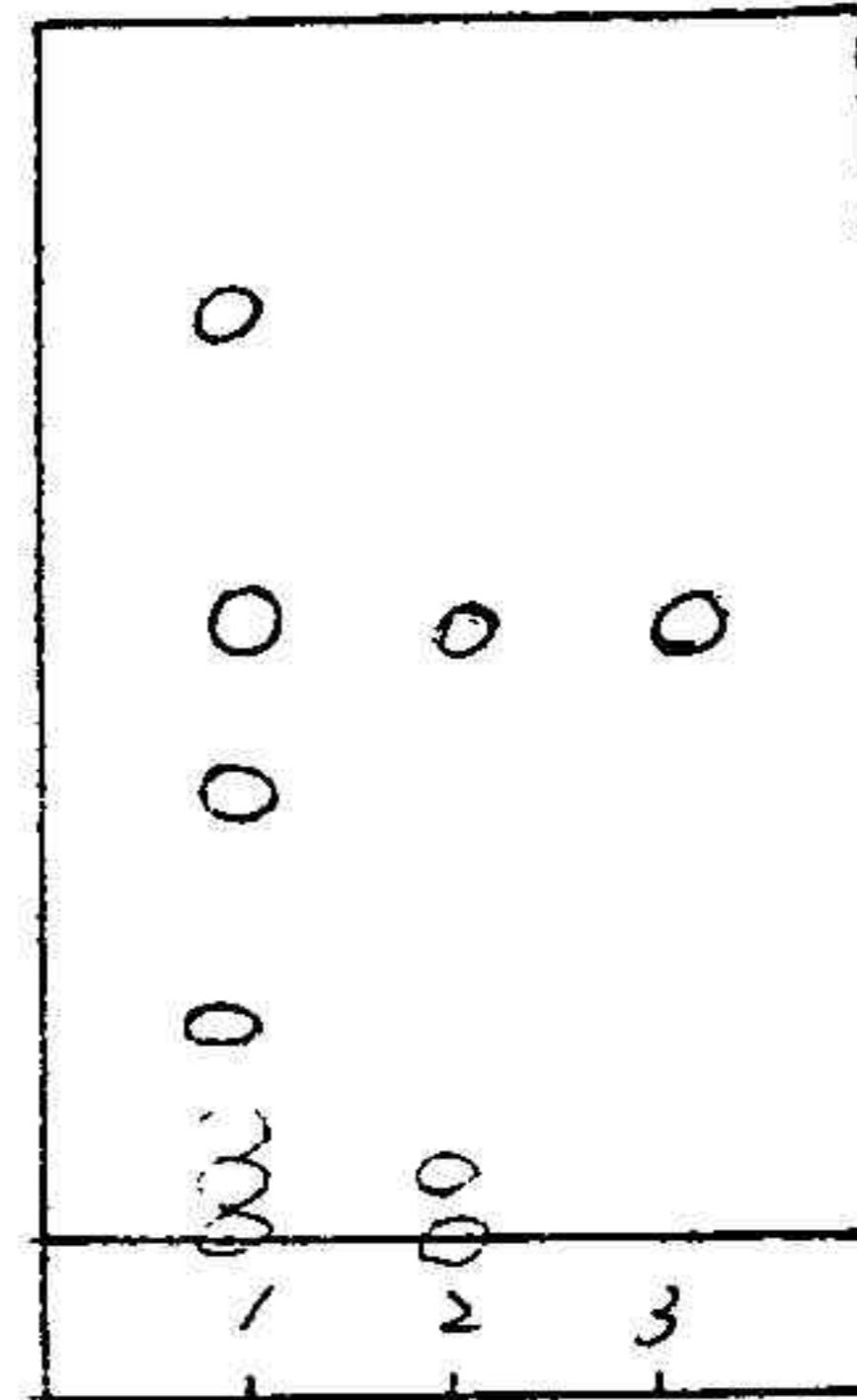
展開距離 = 7 cm



展開溶媒: $\text{CHCl}_3 = \text{MeOH} / 9 = 1$

檢出方法與結果: 紫外線 (波長 366 nm)

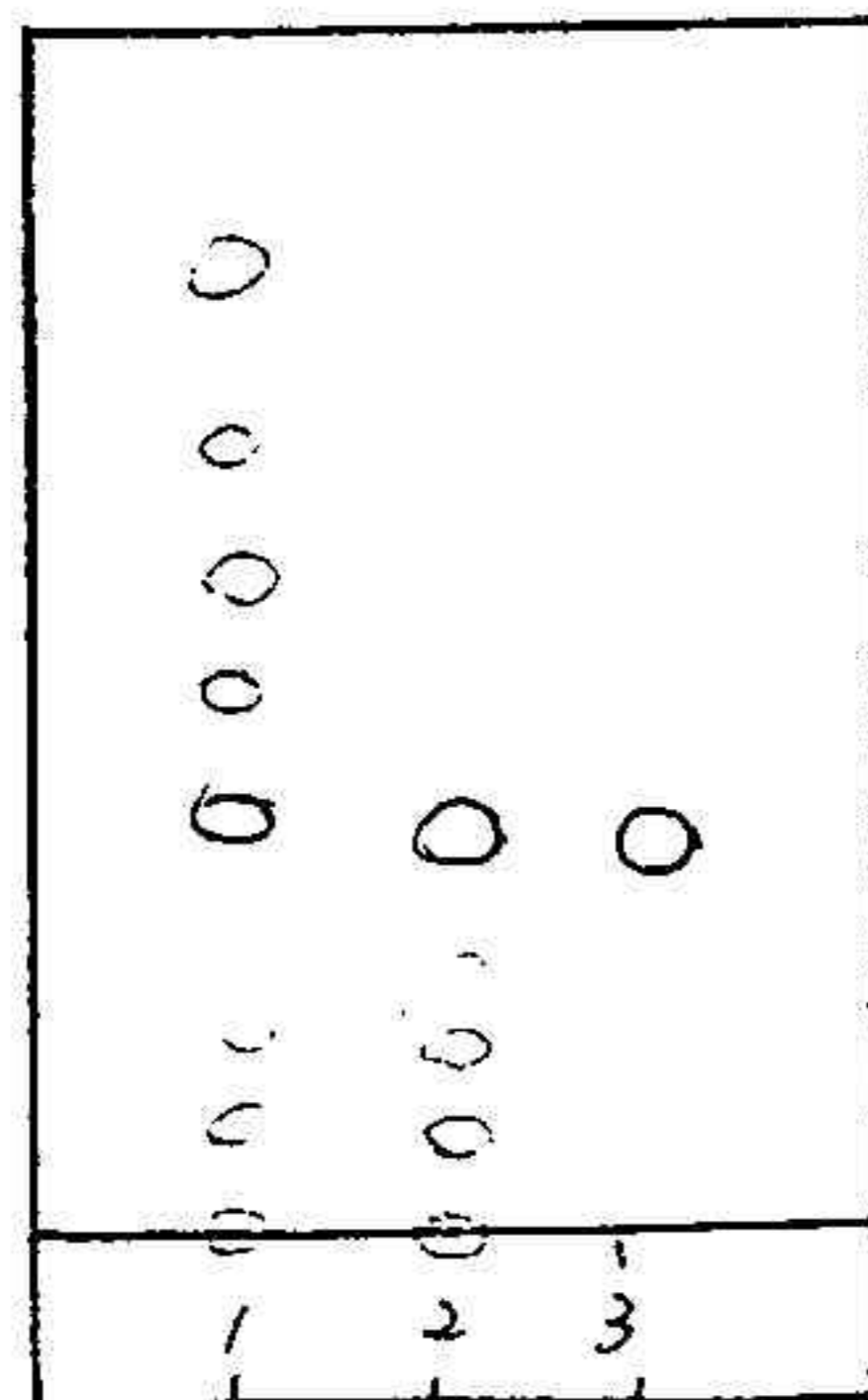
1. 茵陳蒿湯散劑
2. 茵陳
3. Capillarisin standard, Rf值約 0.36.



展開溶媒: $\text{CHCl}_3 = \text{MeOH} / 9 = 1$

檢出方法與結果: 紫外線 (波長 366 nm)

1. 茵陳蒿湯散劑
2. 大黃
3. Emodin standard, Rf值約 0.51.



展開溶媒: $\text{CHCl}_3 = \text{MeOH} / 4 = 1$

檢出方法與結果: 紫外線 (波長 366 nm)

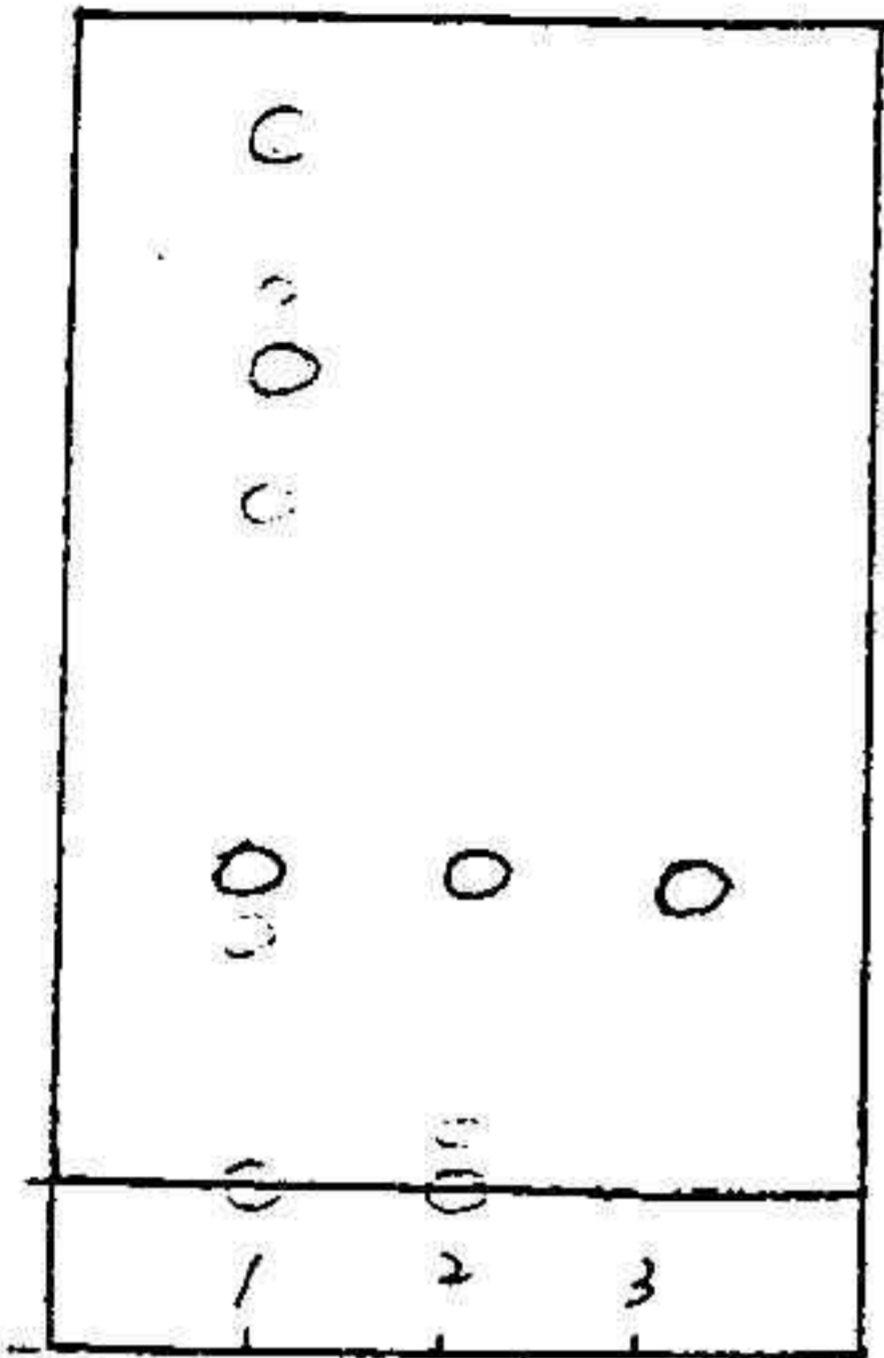
1. 茵陳蒿湯散劑
2. 梔子
3. Geniposide standard, Rf值約 0.32.

三、芍藥甘草湯

薄層層析條件：

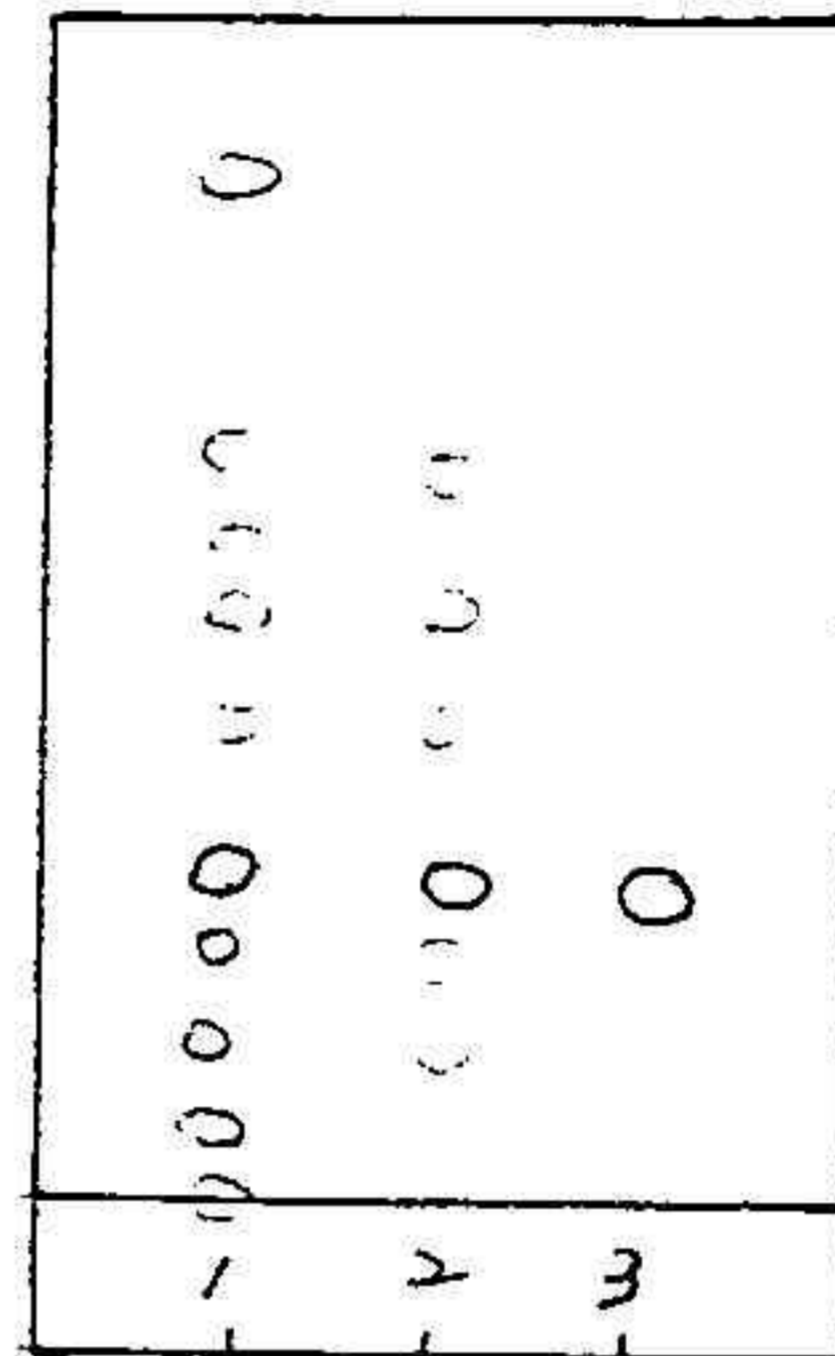
層析板：Silica gel 60 F₂₅₄

展開距離：7cm



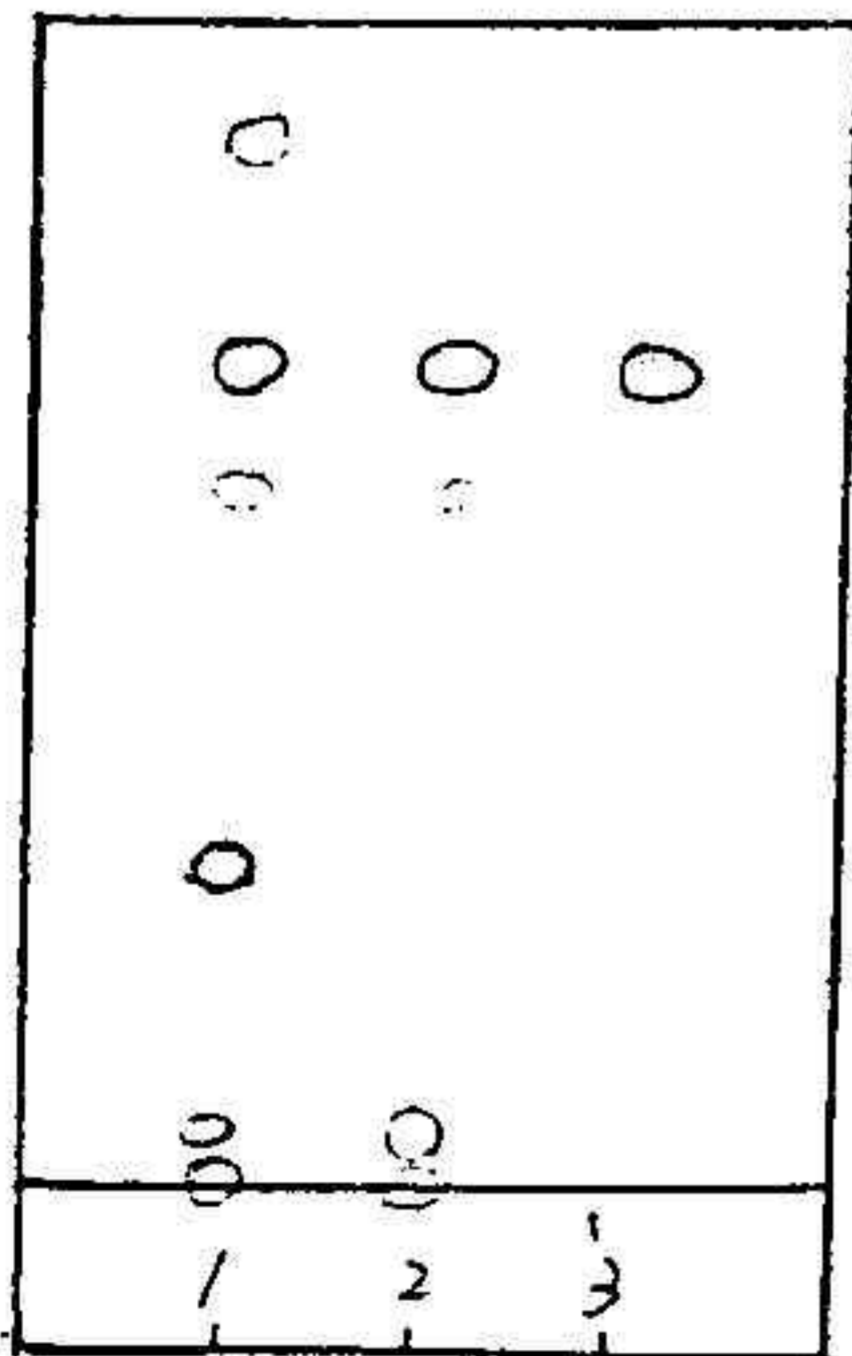
展開溶媒：CHCl₃ = MeOH / 4 = 1
 檢出方法與結果：紫外線 (波長 366 nm)

1. 芍藥甘草湯散劑
2. 芍藥
3. Paeoniflorin standard, R_f 值約 0.27.



展開溶媒：n-butanol = H₂O = Glacial
 Acetic acid / 7 = 2 = 1

檢出方法與結果：紫外線 (波長 > 540 nm) 510
 1. 芍藥甘草湯散劑. 504
 2. 炙甘草
 3. Glycyrrhizin, R_f 值約 0.28.



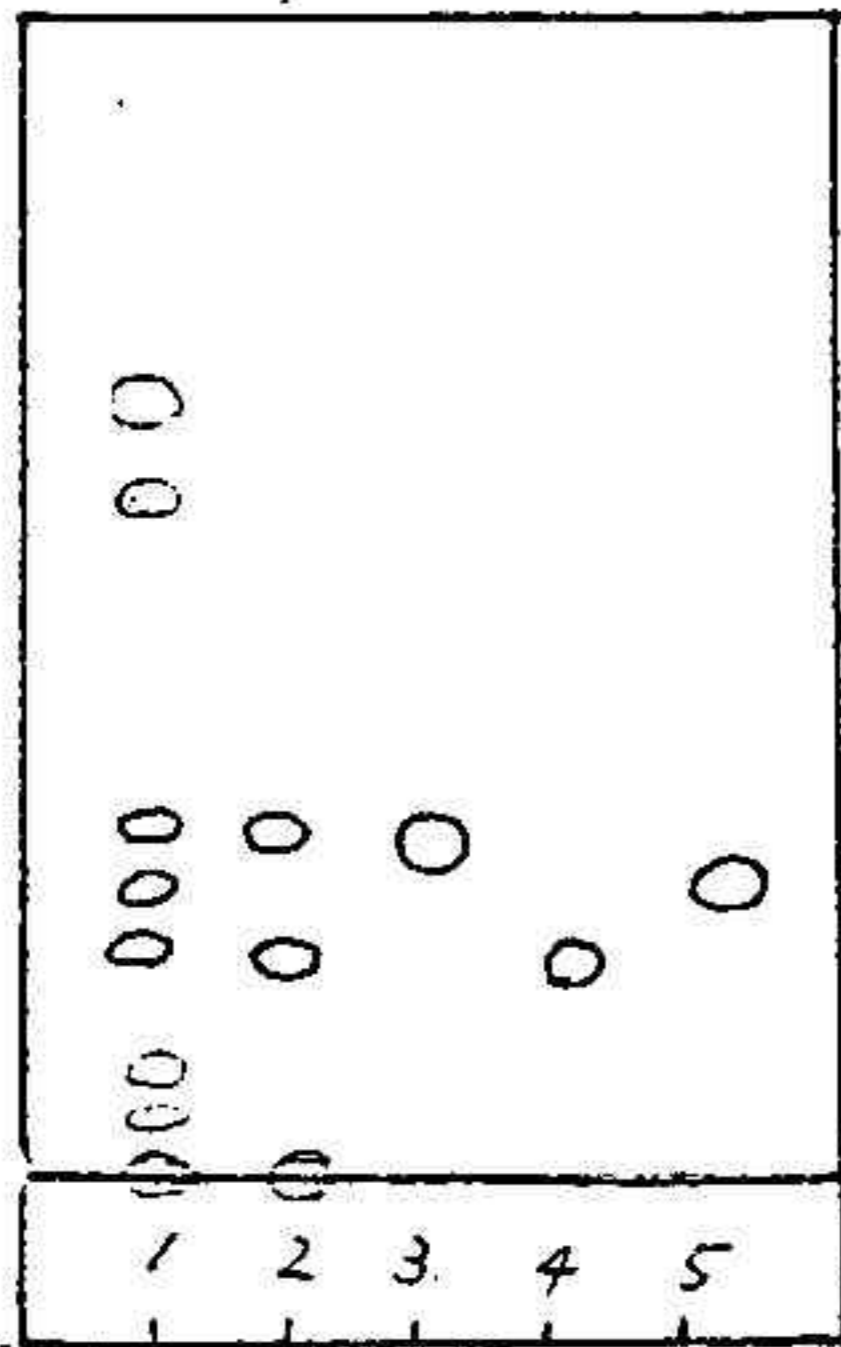
展開溶媒：CHCl₃ = MeOH / 4 = 1
 檢出方法與結果：10% H₂SO₄

1. 芍藥甘草湯
2. 炙甘草
3. Glycyrrhetic acid, R_f 值約 0.68

四. 小柴胡湯

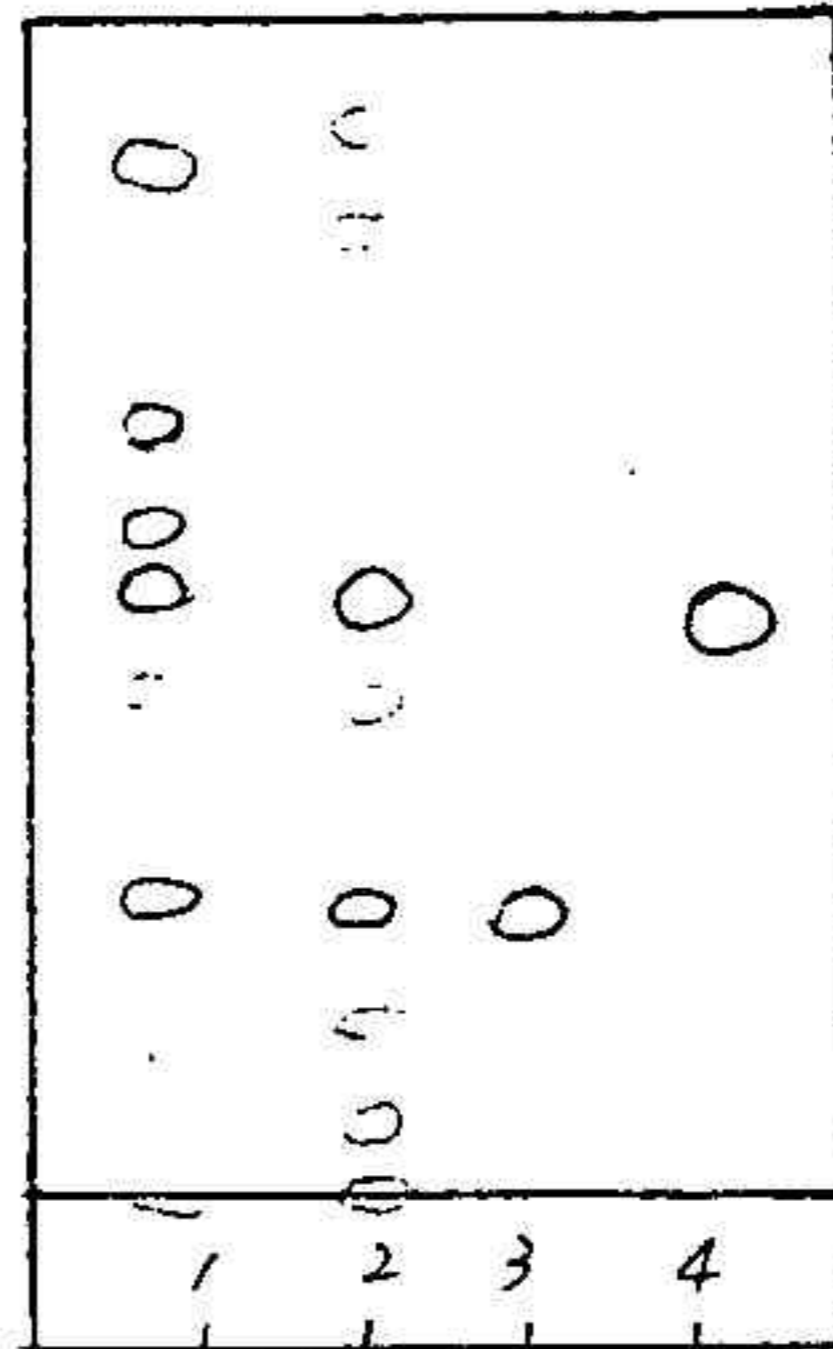
薄層層析條件:

層析板 = Silica gel 60 F₂₅₄
 展開距離 = 7 cm



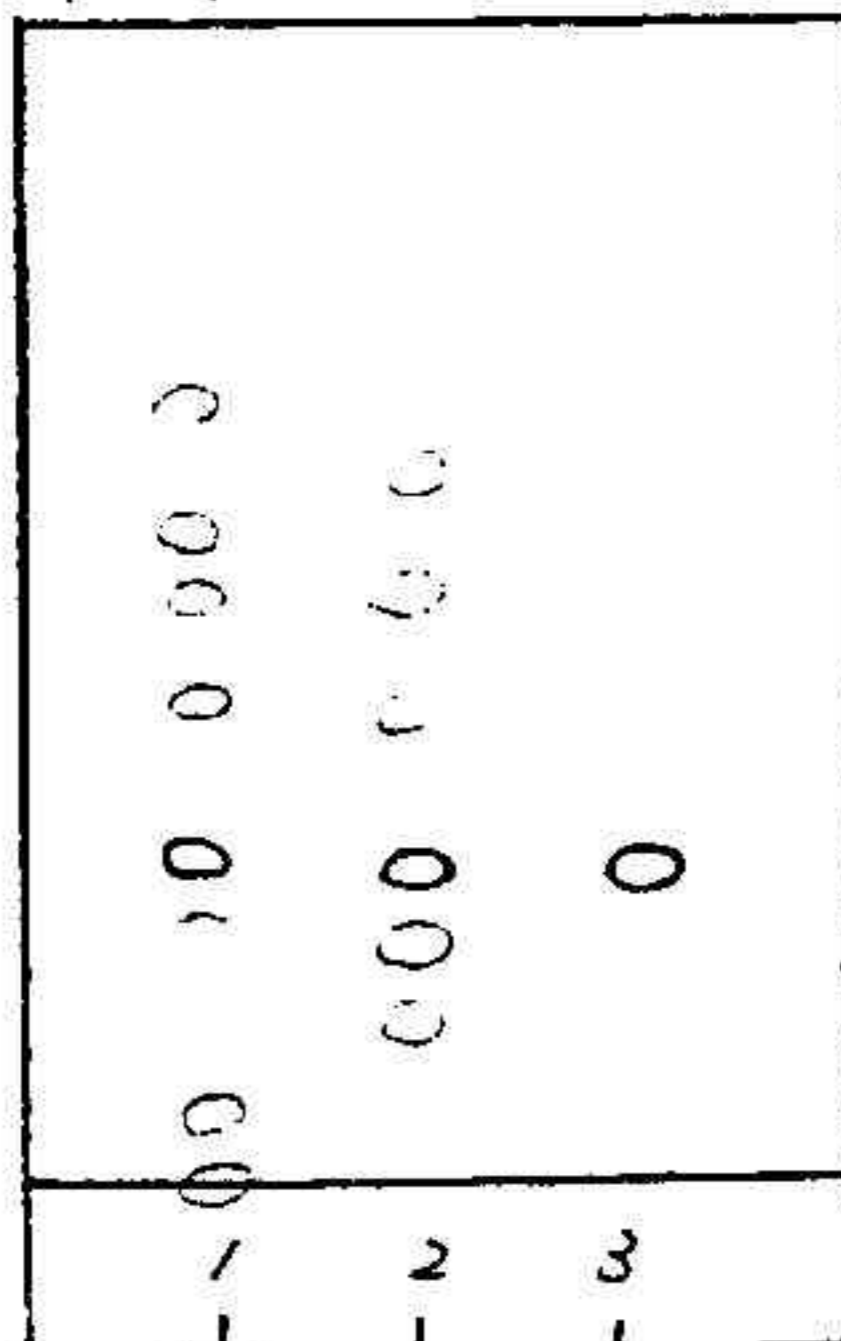
展開溶媒 = $\text{CHCl}_3 = \text{MeOH} / 4 = 1$
 檢出方法與結果: 稀硫酸發色液 (10% H_2SO_4)

1. 小柴胡湯散劑
2. 柴胡
3. Saikosaponin a Standard, Rf值約 0.28
4. Saikosaponin c Standard, Rf值約 0.17
5. Saikosaponin d Standard, Rf值約 0.21



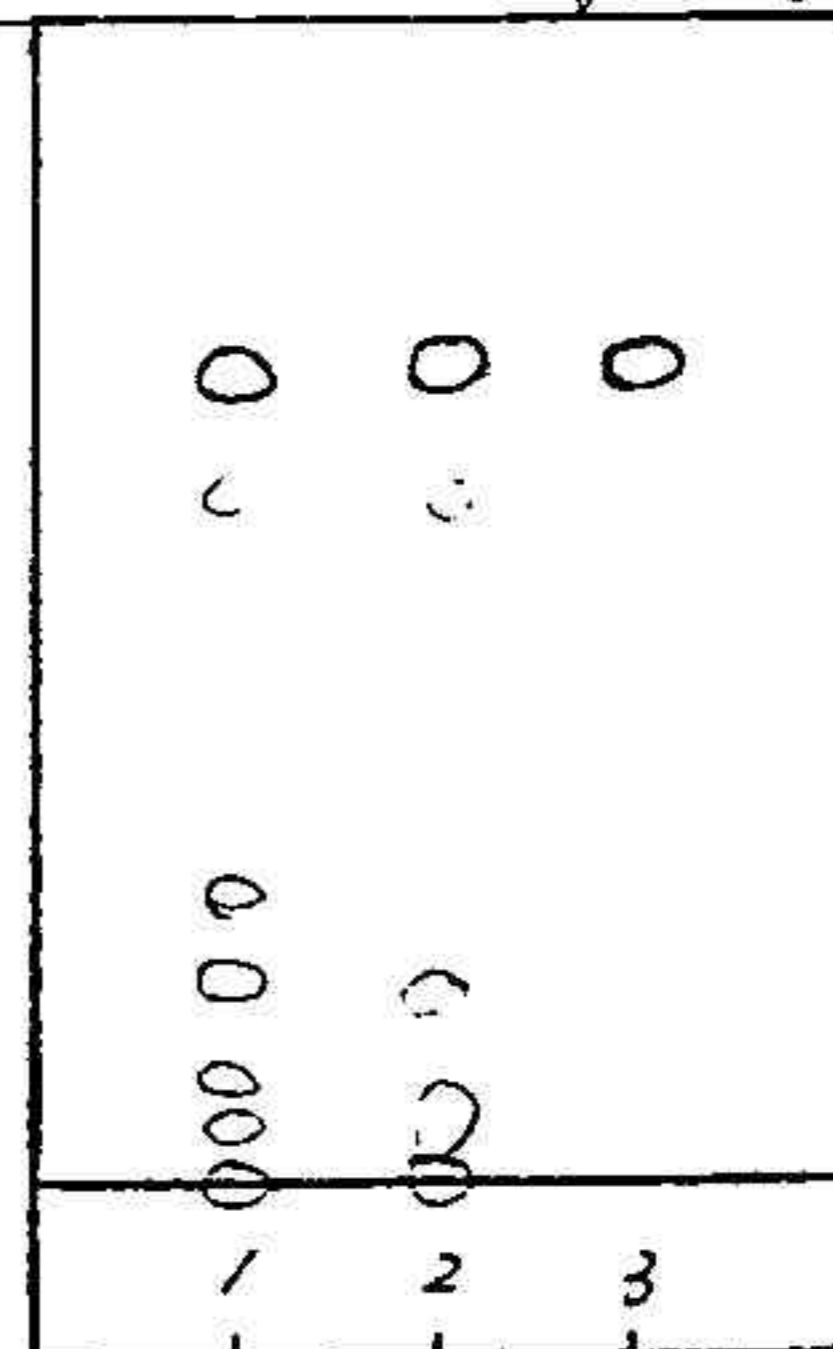
展開溶媒 = $n\text{-butanol} \cdot \text{H}_2\text{O} = \text{Glacial Acetic acid} / 7 = 2 = 1$
 檢出方法與結果: 稀硫酸發色液 (10% H_2SO_4)

1. 小柴胡湯散劑
2. 人參
3. Ginsenoside R_{b1}, Rf值約 0.24
4. Ginsenoside R_{g1}, Rf值約 0.48



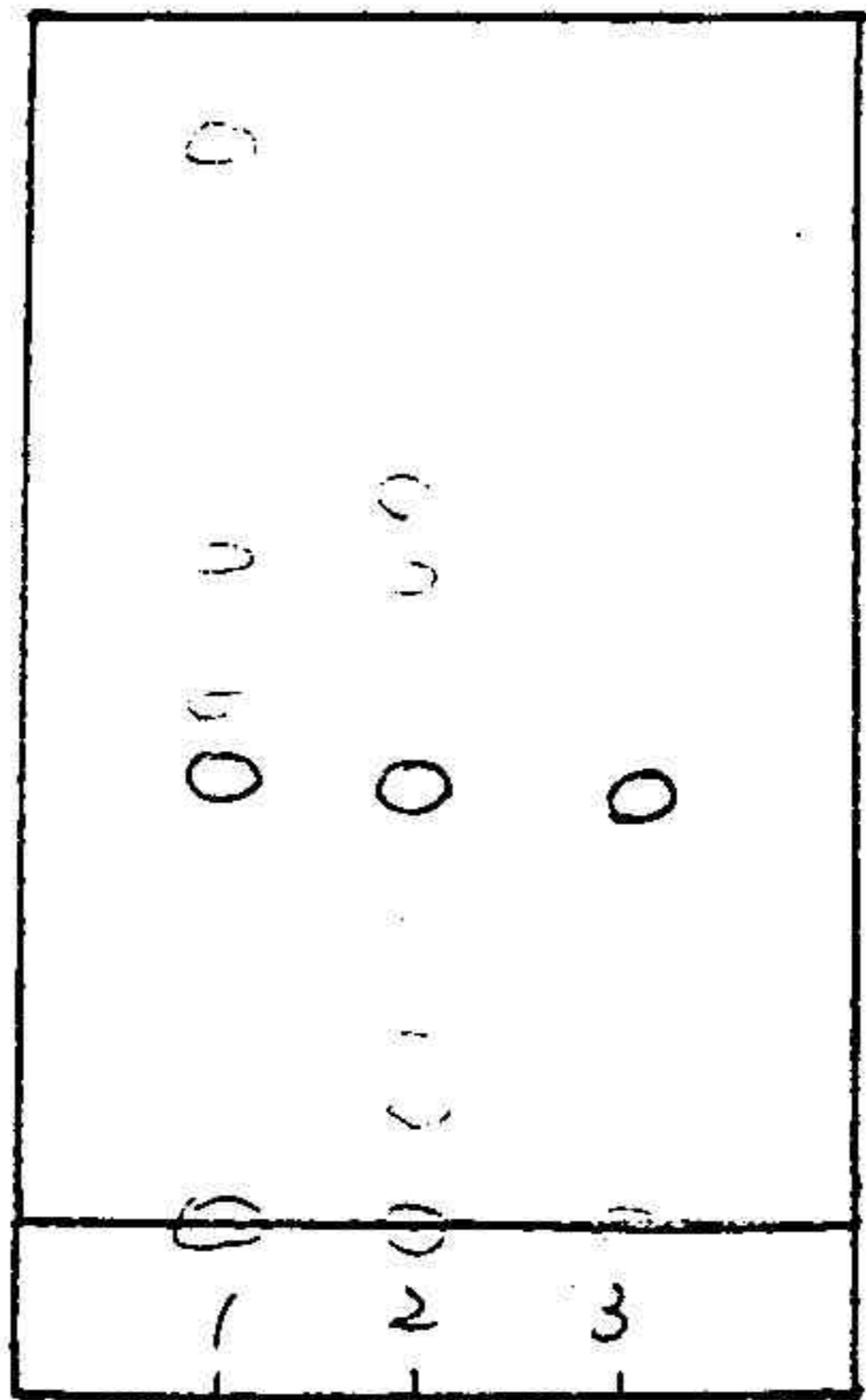
展開溶媒 = $n\text{-butanol} \cdot \text{H}_2\text{O} = \text{Glacial Acetic acid} / 7 = 2 = 1$
 檢出方法與結果: 紫外線 (波長 254 nm)

1. 小柴胡湯散劑
2. 甘草
3. Glucurharin Rf: 0.24, 0.0



展開溶媒 = $\text{CHCl}_3 = \text{MeOH} / 4 = 1$
 檢出方法與結果: 10% H_2SO_4

1. 小柴胡湯散劑
2. 甘草
3. Glycyrrhetic acid, Rf值約 0.68



展開溶媒： CHCl_3 : MeOH / 9 = 1

檢出方法與結果：氯化鐵發色液

1. 小柴胡湯散劑

2. 黃芩

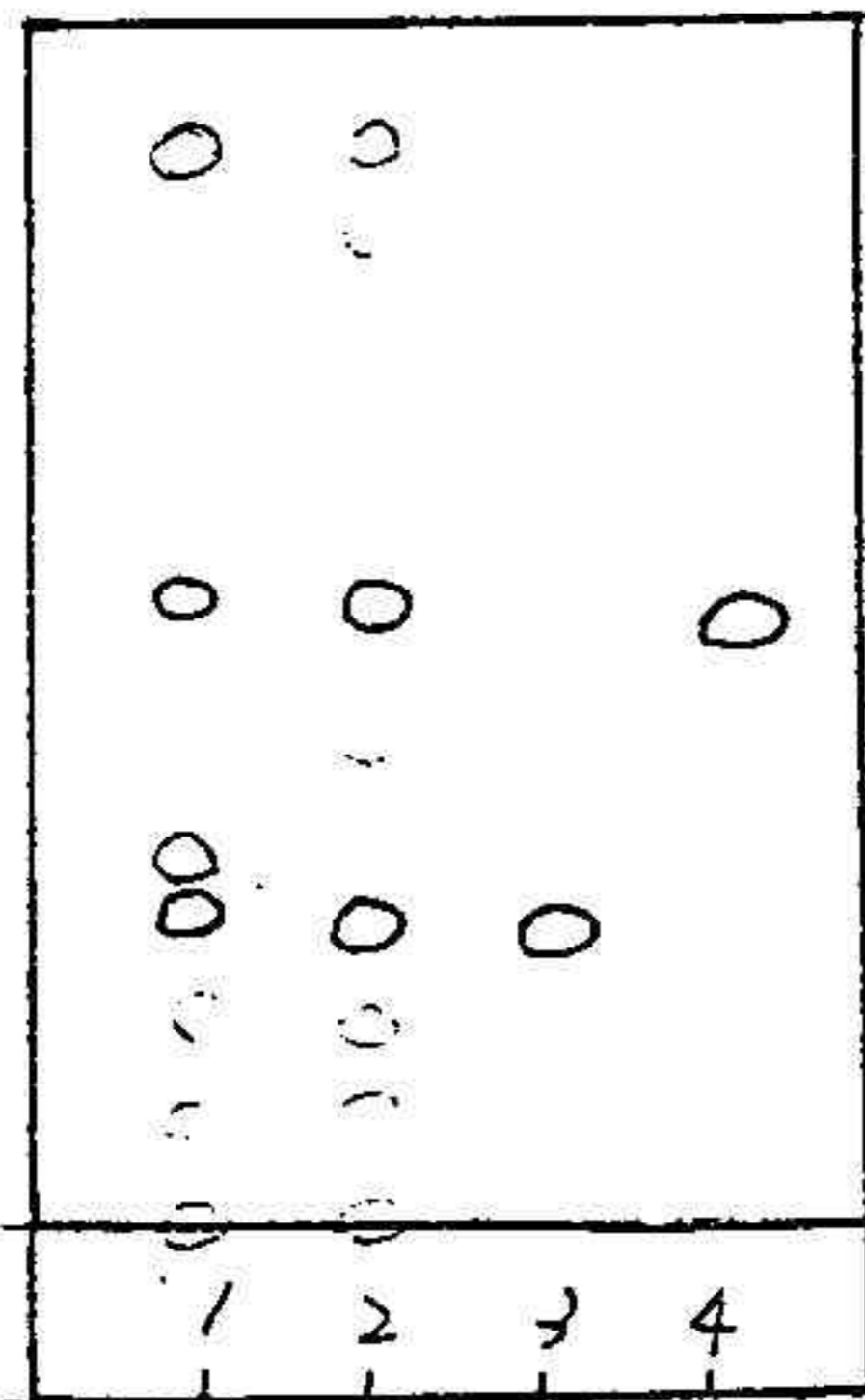
3. Baicalein Standard, Rf值約0.35,
暗綠色。

五. 六君子湯

薄層層析條件:

層析板: Silica gel 60 F₂₅₄

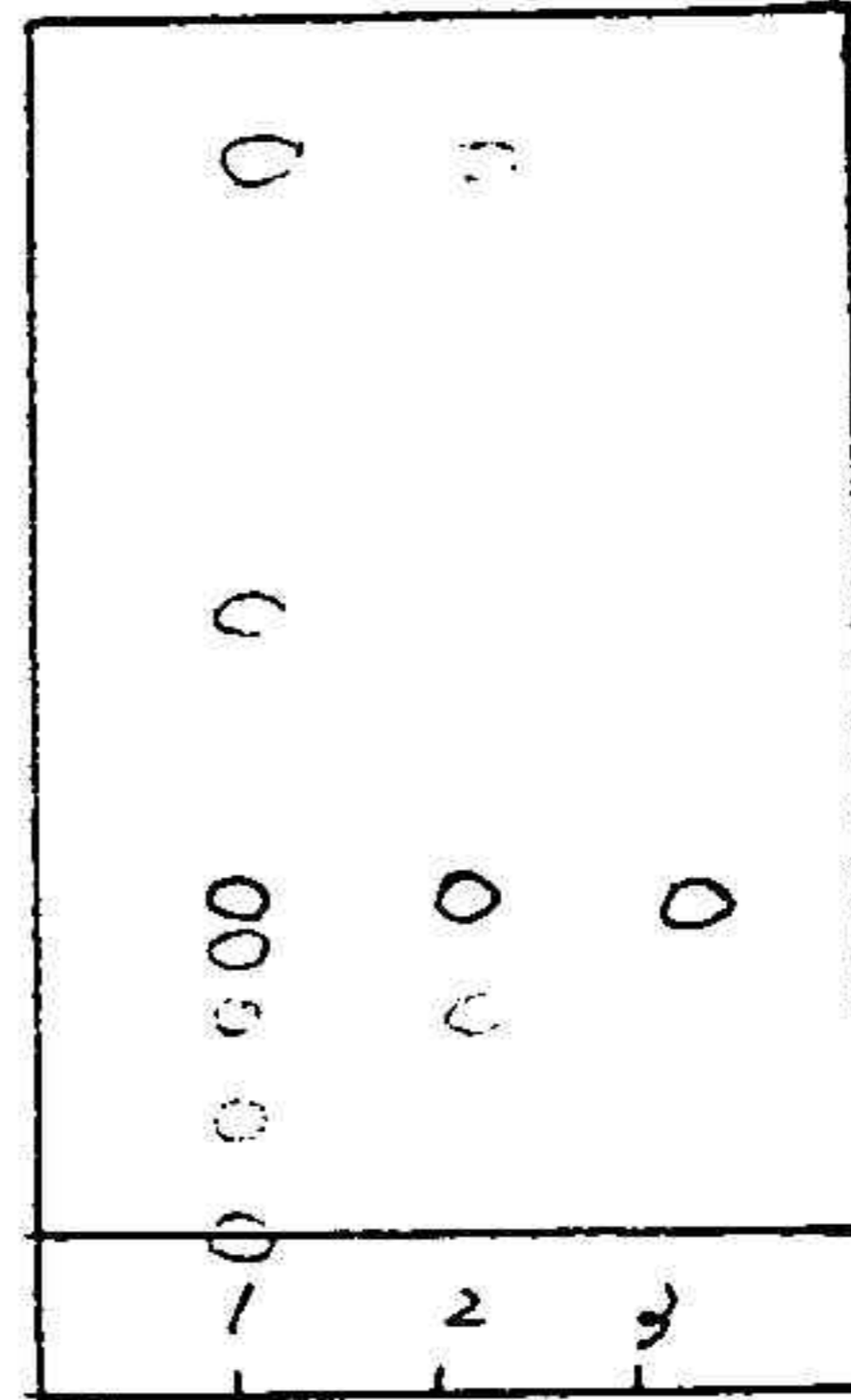
展開距離: 7 cm



展開溶媒: n-butanol: H₂O: Glacial Acetic acid
1:2:1

檢出方法與結果: 10% H₂SO₄

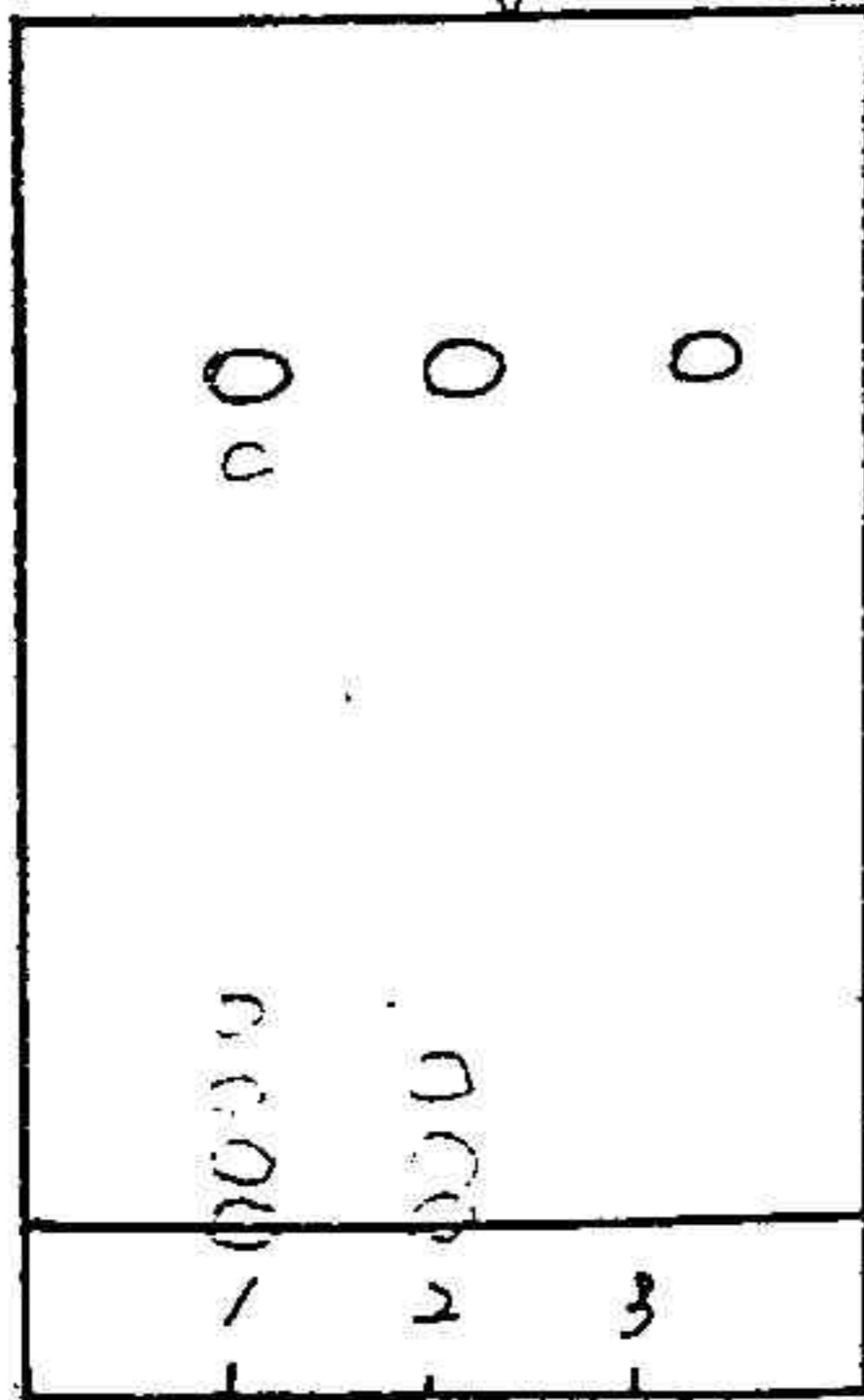
1. 六君子湯散劑
2. 人參
3. Ginsenoside R_{b1}, R_f值約 0.24
4. Ginsenoside, R_{g1}, R_f值約 0.98



展開溶媒: 如左

檢出方法與結果: 紫外線 (波長 254 nm)

1. 六君子湯散劑
2. 甘草
3. Glycyrrhizin, R_f值約 0.28



展開溶媒: CHCl₃: MeOH / 4:1

檢出方法與結果: 10% H₂SO₄

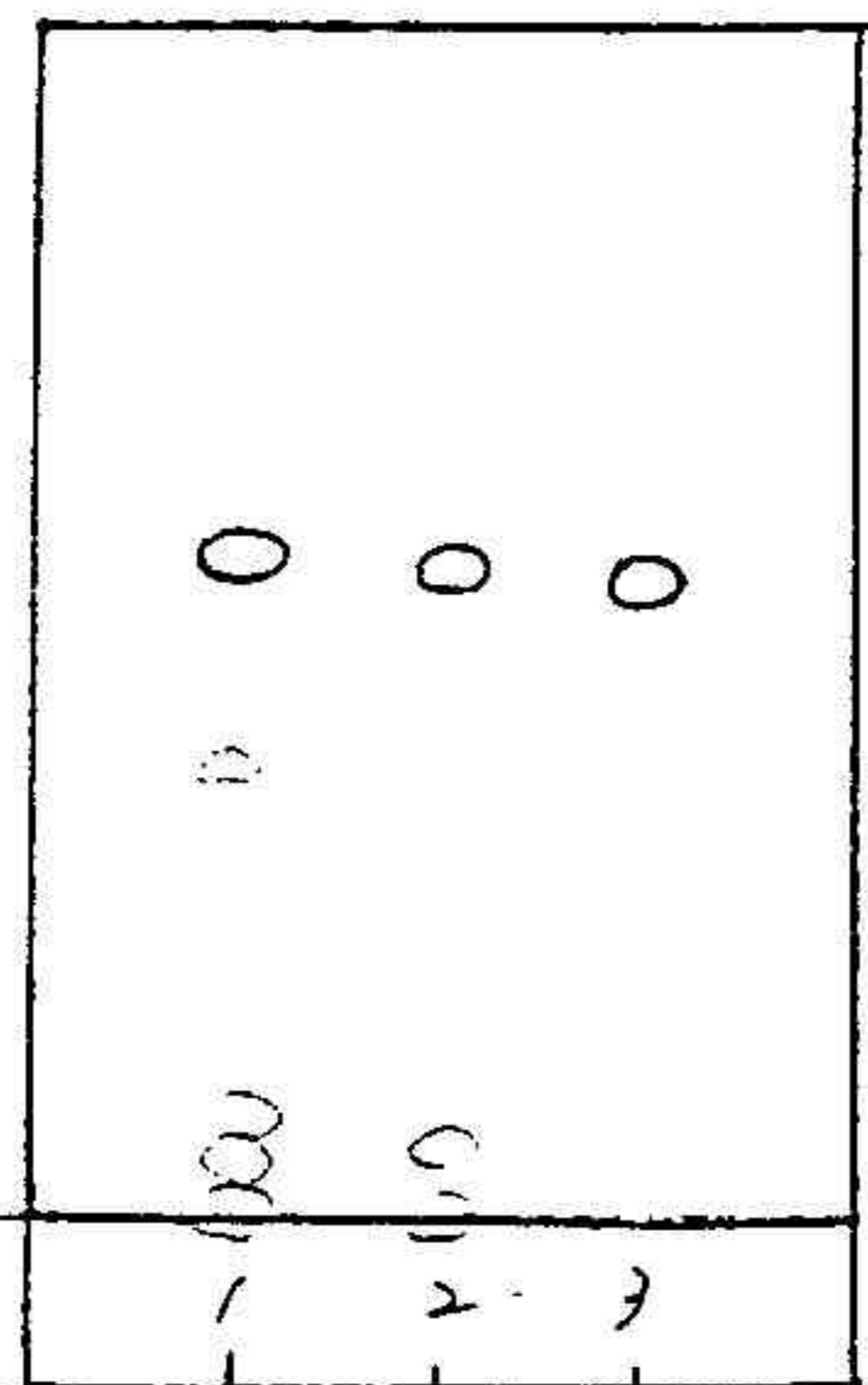
1. 六君子湯散劑
2. 甘草
3. Glycyrrhetic acid, R_f值約 0.68.

之: 三黃瀉心湯

薄層層析條件:

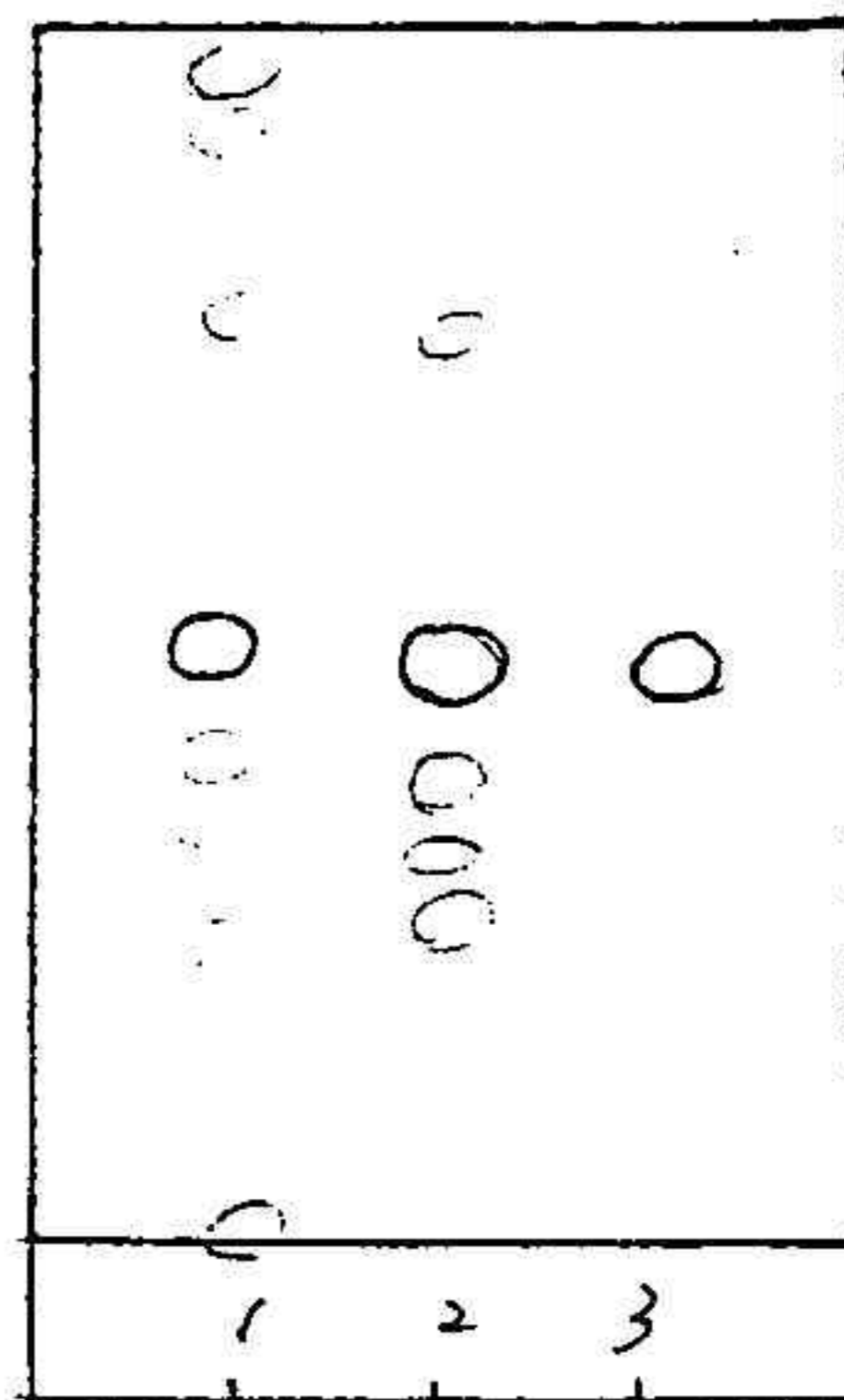
層析板: Silica gel 60 F₂₅₄

展開距離: 7cm



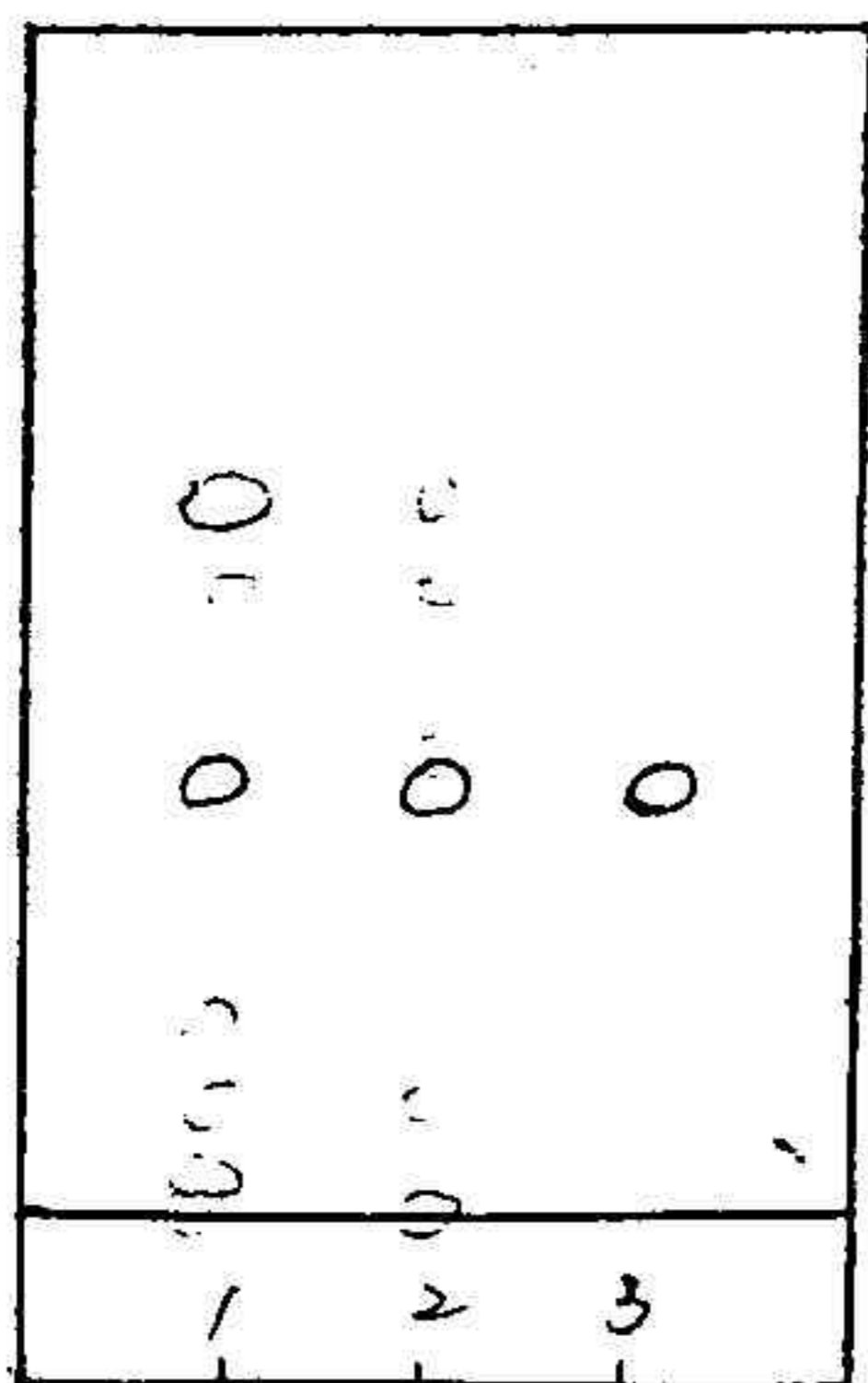
展開溶媒: $CHCl_3 : MeOH / 9 = 1$
 檢出方法與結果: 紫外線 (波長 366nm)

1. 三黃瀉心湯散劑
2. 大黃
3. Emodin Standard, Rf值約 0.51.



展開溶媒: $n\text{-butanol} : H_2O : Glacial$
 $Acetic\ acid / 7 = 2 : 1$
 檢出方法與結果: 紫外線 (波長 366nm)

1. 三黃瀉心湯散劑
2. 黃連
3. Berberine Standard, Rf值約 0.48, 黃色螢光.



展開溶媒: $CHCl_3 : MeOH / 9 = 1$
 檢出方法與結果: 氯化鐵發色液

1. 三黃瀉心湯散劑.
2. 黃芩
3. Baicalein Standard, Rf值約 0.35, 暗綠色.

HPLC圖譜鑑定部份

摘 要

市售中藥方劑中因含多味藥材，成分極為複雜，無法以普通化學定量法精確測定其成分含量，維其如此，所以至今一般中藥廠仍無適切可遵行之檢驗方法，做品質管制之依據。目前我國藥政工作正推行「優良藥品製造標準」及建立「藥品完全資訊與評估制度」，因此本報告乃針對此目的，進行中藥之檢驗研究，利用分離解析度較大的高效能液相層析分析法檢驗中藥複方成分，最後更進一步使用三次元（3D）高效能液相層析儀，並比對單離成分的紫外線全光譜，以確定指標成分分析之可信度。

緒言：

市售中藥會因產生品種不同，而有成分之差異，因此藥理作用有時也不盡相同而評價生藥的質量除了傳統上通過形態官能來把握生藥的特性外，目前已演進到使用儀器分析，以達到控制有效成份含有量和不純物而使用的定性定量測定法。應用層析分析法，可使檢驗的敏感度高到 10^{-6} — 10^{-9} g之程度因此對微量之分析有很大之幫助，目前我國藥政單位已界定一些常用中藥方劑之薄層層析圖譜對中藥之製劑有了初步的品管和規格之檢驗標準，然而中藥之複方成分相當複雜薄層分析法可能已不敷實際之定性、定量、分析要求，因此本研究改以具有較高分離度之高效能層析儀作為分析工具，以遂行中藥複方之檢驗品管工作。

實驗方法：

(I) 儀器裝置：

三次元 HPLC : Shimadzu HPLC Chromatograph

Pump : LC-6AD (兩台)

System Controller : SCL-6B

Photodiode Array Detector : Shimadzu SPD-M6A

NEC Pinwriter P5300

(II) 中藥處理程序：

各中藥複方劑依比例配取約 5gm，粉碎後稱取 1gm 重方劑置于 Soxhlet extractor 中，用 MeOH: disH₂O/1:1 連續萃取，濃縮後稀釋於 50ml 之定量瓶中，經過濾後取 3ml 作 HPLC 之檢體。

(III) 高效能層析分析條件：

管 柱：Interstil ODS-2 (5 u, 4.6 mm × 25 cm)

沖提溶液：[Exp. 1] Solvent A : 70% CH₃CN in H₂O

B : 0.1% H₃PO₄ in H₂O

Linear gradient from 4% solvent

A to 90% solvent A in 90 min.

[Exp. 2] Solvent A : CH₃CN

B : 0.05% H₃PO₄ in H₂O

Linear gradient from 4% solvent

A to 90% solvent A in 60 min.

[Exp. 3] Solvent A : 70% CH₃CN in H₂O

B : 0.1% H₃PO₄ in H₂O

Linear gradient from 4% solvent

A to 85% solvent A in 90 min.

流 速：1.20 mL/min

(IV) 中藥複方方劑：

選用消遙散、茵陳蒿湯、芍藥甘草湯等三種方劑，每種方劑之藥材，比率如下：

一、消遙散 (P. 118)	北柴胡	九錢 (33.75gm)
	當歸 (陝西、酒洗)	九錢 (33.75gm)
	白芍 (杭州、酒炒)	九錢 (33.75gm)
	白朮 (土炒)	九錢 (33.75gm)
	茯苓 (雲南)	九錢 (33.75gm)
	炙甘草	四錢半 (16.88gm)
	煨薑	二錢七分 (10.13gm)
	薄荷	二錢七分 (10.13gm)
	藥重 5.49 兩 (206gm)	
二、茵陳蒿湯 (P. 249)	茵陳	三兩六錢 (135gm)
	大黃 (四川)	一兩二錢 (45gm)
	梔子 (炒)	六錢 (22.5gm)
	藥重 5.4 兩 (203gm)	
三、芍藥甘草湯 (P. 115)	白芍 (杭州、酒炒)	二兩七錢 (101.25gm)
	炙甘草	二兩七錢 (101.25gm)
	藥重 5.4 兩 (203gm)	

(V) 三次元 HPLC 圖譜分析如下列：圖一至圖三。

(VI) 本報告中所選用之三種複方其中二種，即消遙散、芍藥甘草湯均含有甘草之成分，而甘草中之主成分之一為甘草酸 (Glycyrrhizin)。因此利用甘草酸作為指標成分，很容易作精確的定性或定量。因為三次元的 HPLC 可作出任何分離波峰之紫外全光譜，因此對應于甘草酸之波峰亦可作出 UV 光譜 (如圖一&三)，確認對應之波峰為一單一成分 (甘草酸)，UVmax 均在 252nm，茵陳蒿湯以 Geniposide 為指標成分，其 UVmax 241nm (如圖二)

結 論：

利用三次元高效能層析儀，更能有效精確的作中藥複方品管檢驗，唯中藥複方成份複雜，因此要精確的作定量或定性分析，有賴標準品之搜集，除了部份標準品可購得外，大部份均需額外花費人力、時間，從單味藥材中抽取，因此希望能有相關規劃之計劃，作標準品之抽取、分離，俾利中藥複方指標成分之建立。

Exp. 4.

三消還散(工)

HPLC Condition

HPLC: Shimadzu LC-6AD
Column: Interstil ODS-2 (5 μ , 4.6 mm x 25 cm)
Mobile Phase: Solvent A: 70% CH₃CN in H₂O
B: 0.1% H₃PO₄ in H₂O
Linear gradient from 4% solvent A to
90% solvent A in 90 min.
Flow Rate: 1.20 mL/min
Detection: Photodiode Array UV detector (SPD-M6A)
Temperature: Ambient
Volume Injected: 20 μ L

☐

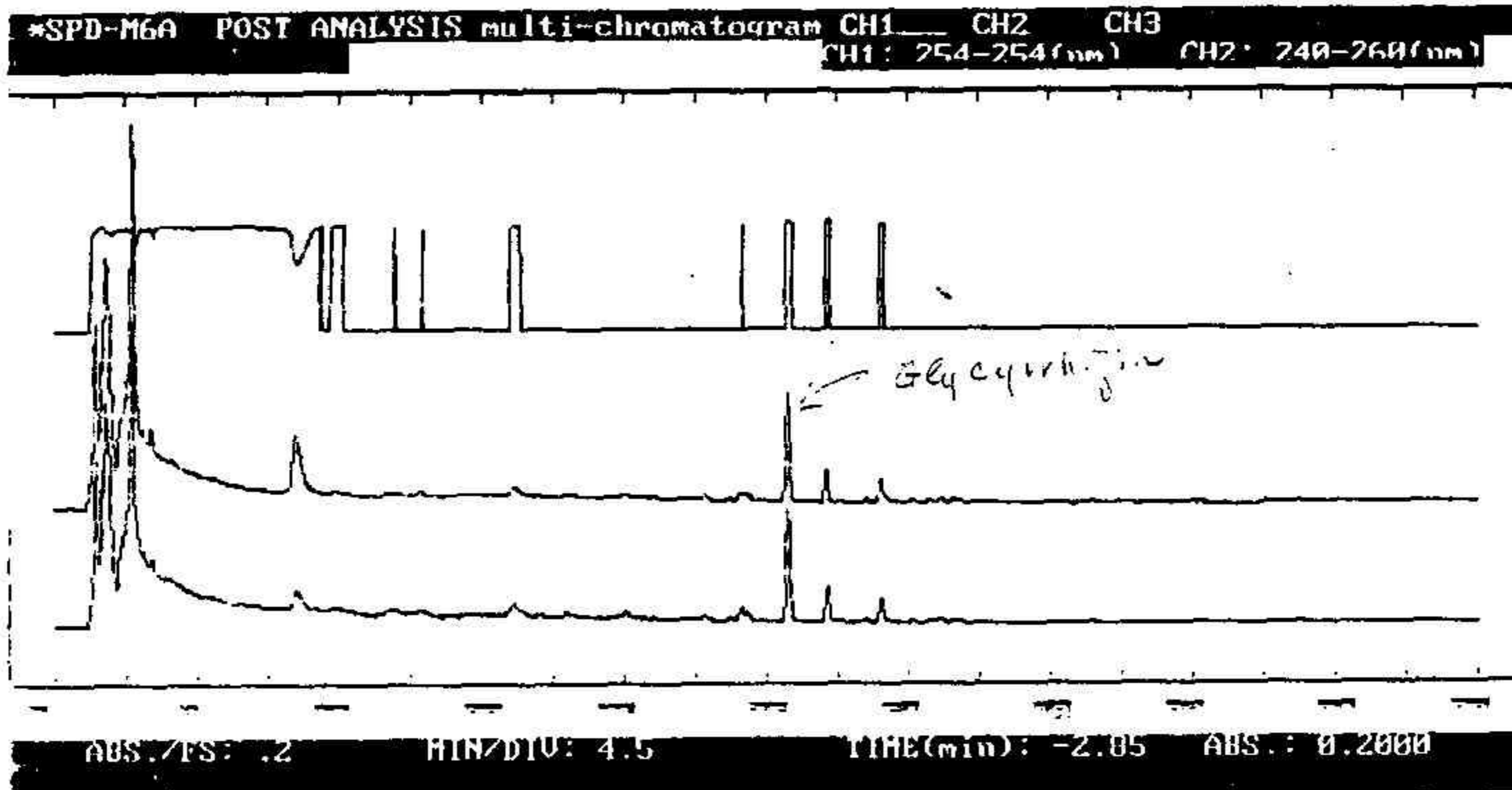
[Result]

Glycyrrhizin (glycyrrhizic acid)

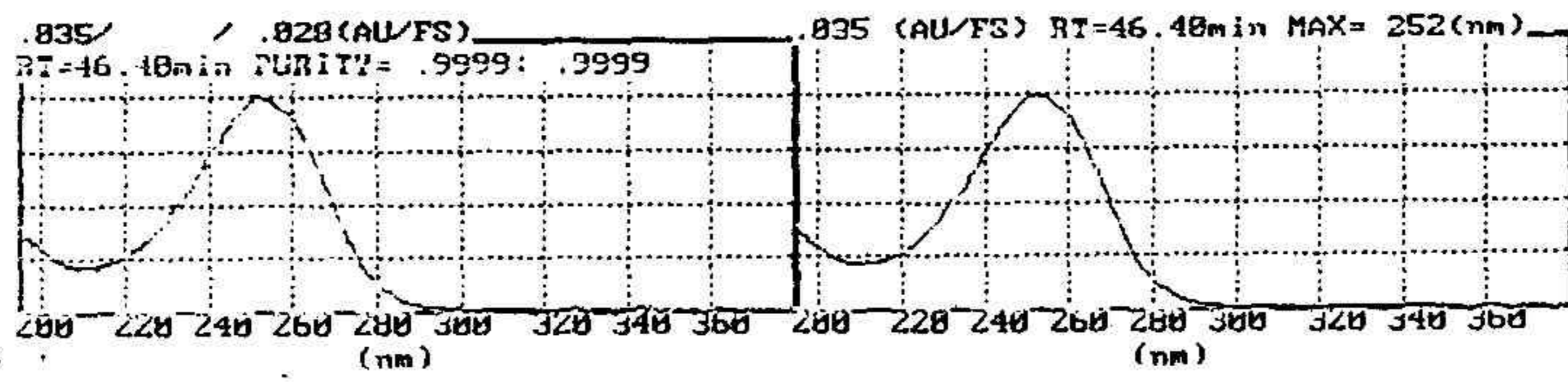
RT: 46.40 min

UV max at 252 nm.

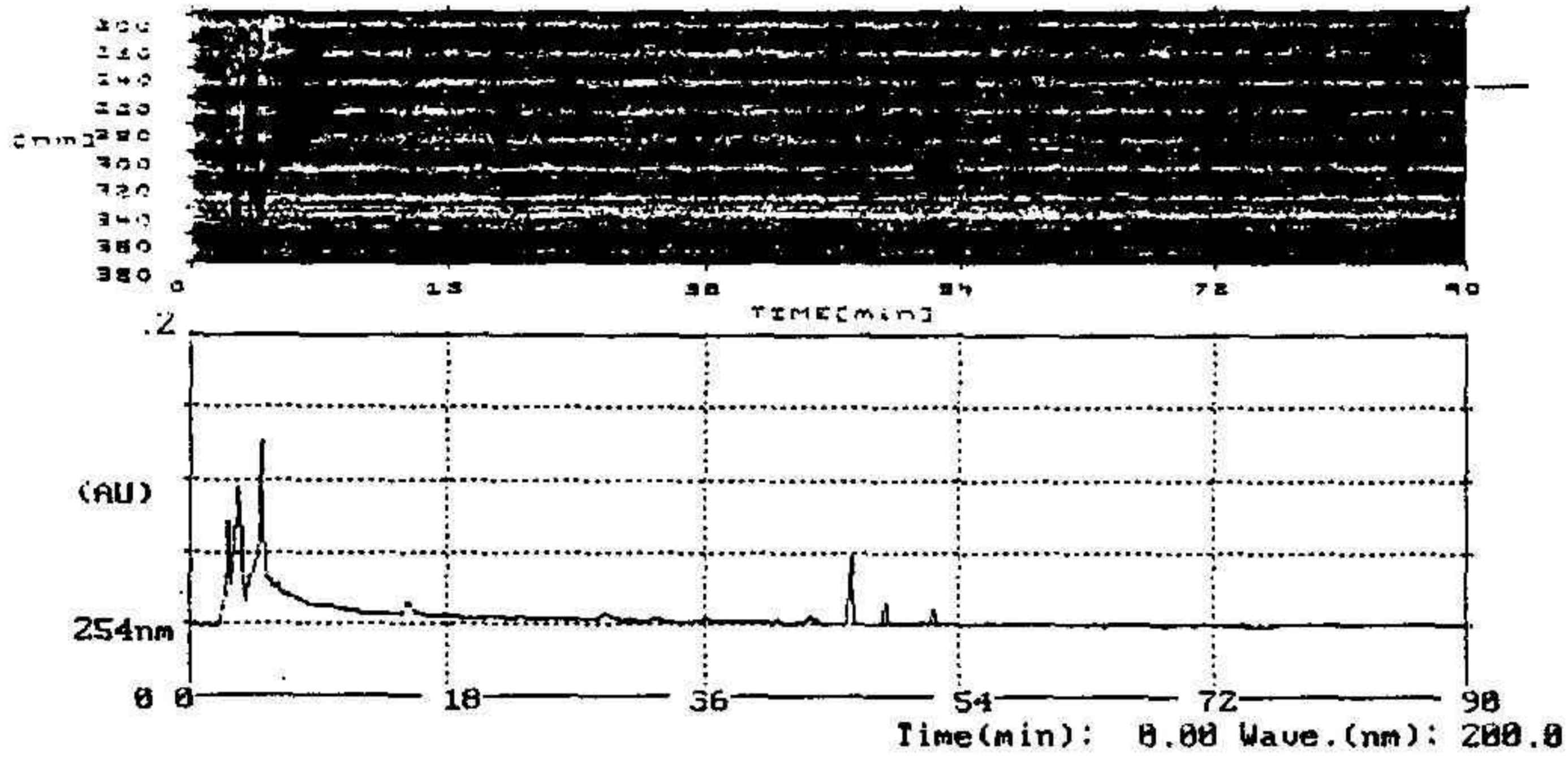
21
1/15
1/15



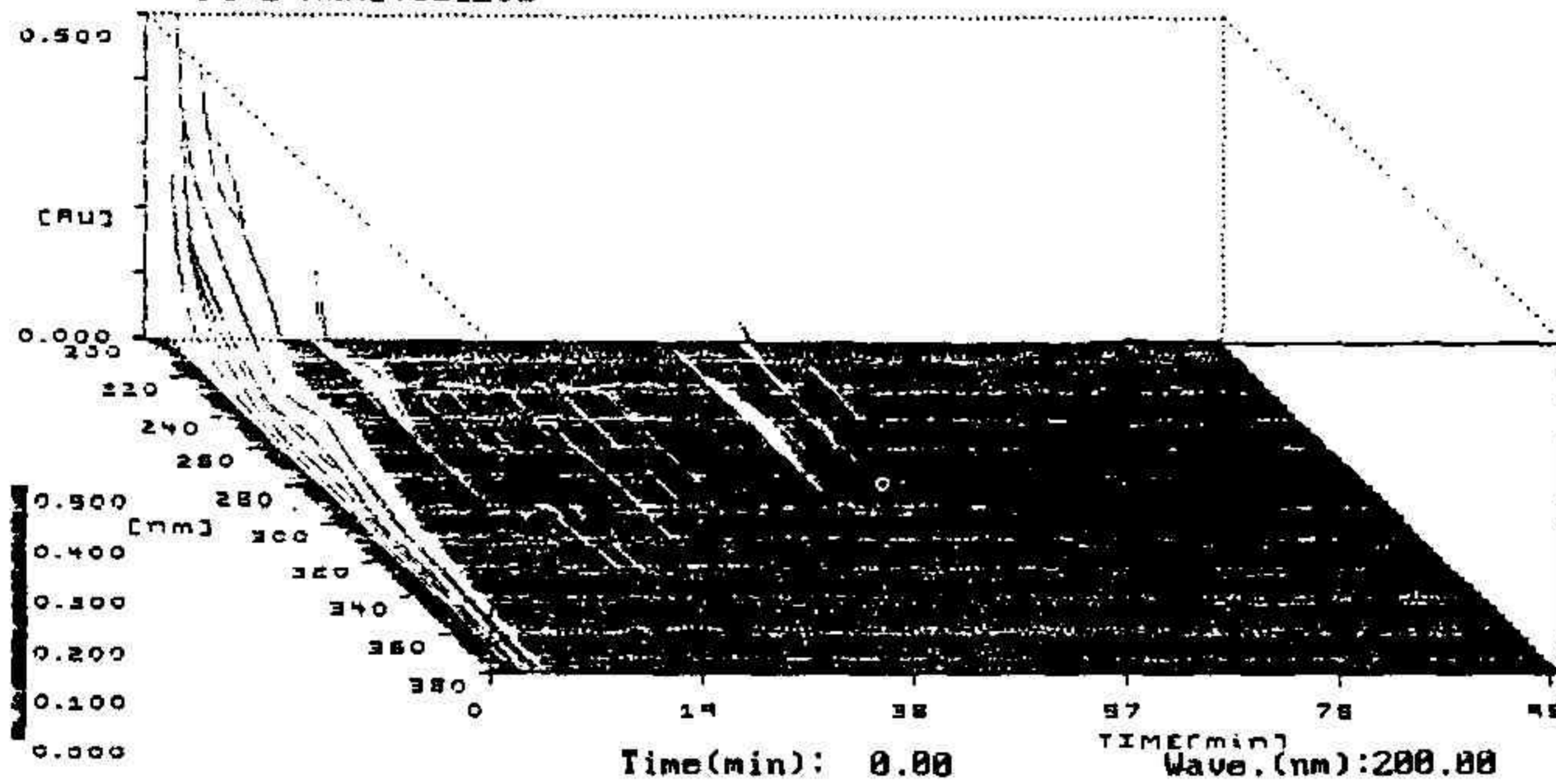
FILE NAME: YICEOL DATE: 07-05-1991
STORAGE TIME(min): 0 - 96.6 LAMP STATUS: D2 *** 195-380(nm) TIME CONST.(s): 2



F7



FILE NAME: c:YICEOL DATE:07-06-1991
STORAGE TIME(min): 0 - 96.6 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2



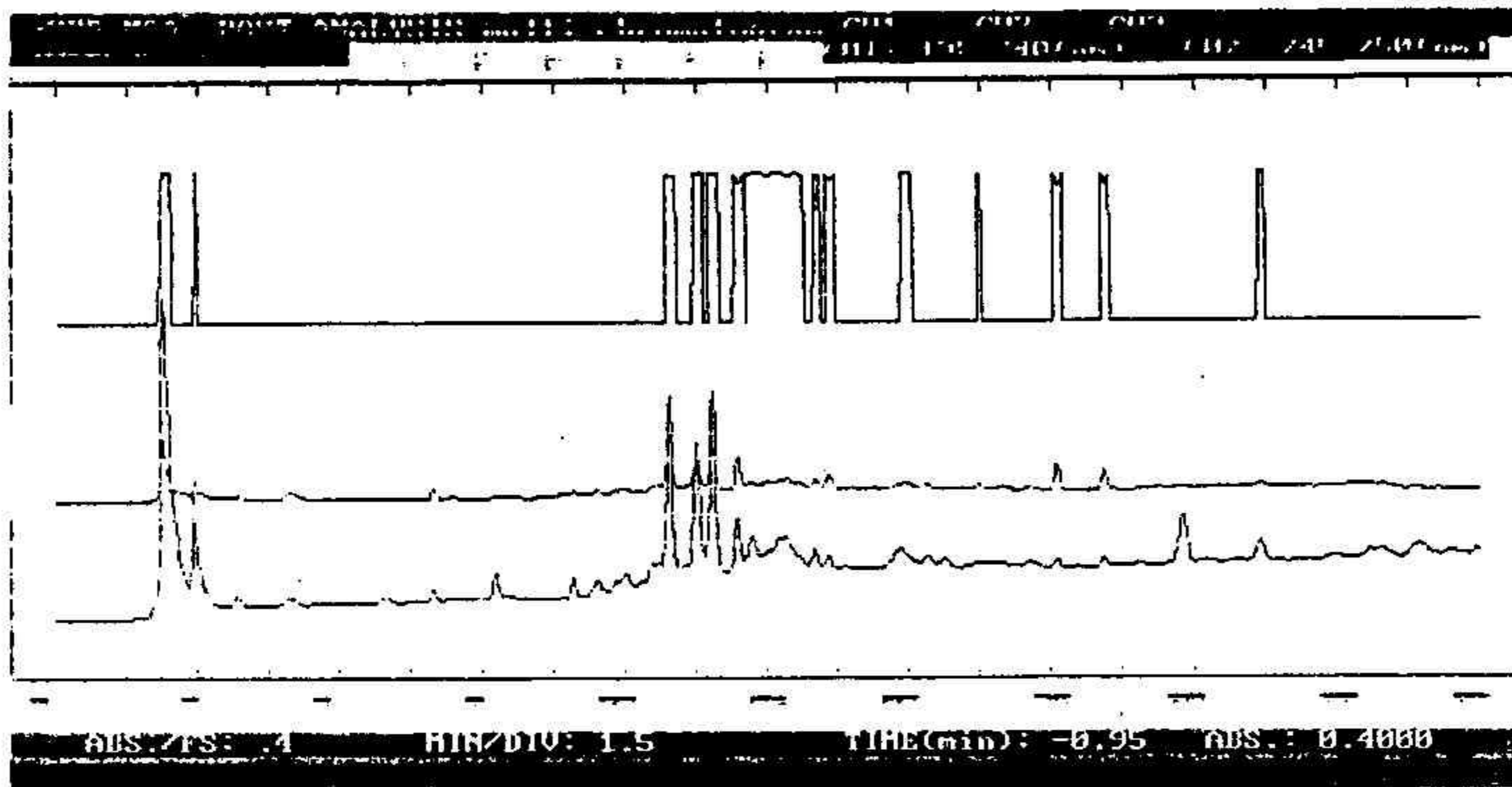
FILE NAME: YICEOL DATE:07-06-1991
STORAGE TIME(min): 0 - 96.6 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

清邊散(II)

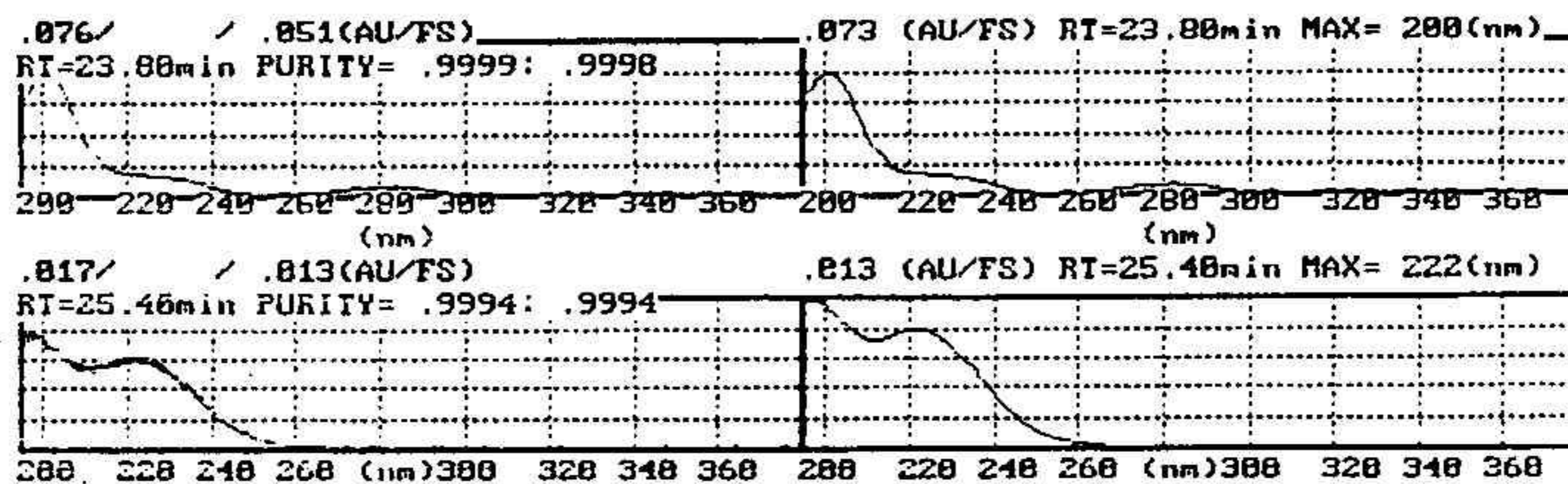
HPLC Condition

HPLC: Shimadzu LC-6AD
Column: Interstil ODS-2 (5 μ , 4.6 mm x 25 cm)
Mobile Phase: Solvent A: CH₃CN
B: H₂O
Linear gradient from 2% solvent A to
90% solvent A in 30 min.
Flow Rate: 1.00 mL/min
Detection: Photodiode Array UV detector (SPD-M6A)
Temperature: Ambient
Volume Injected: 20 μ L

消選散



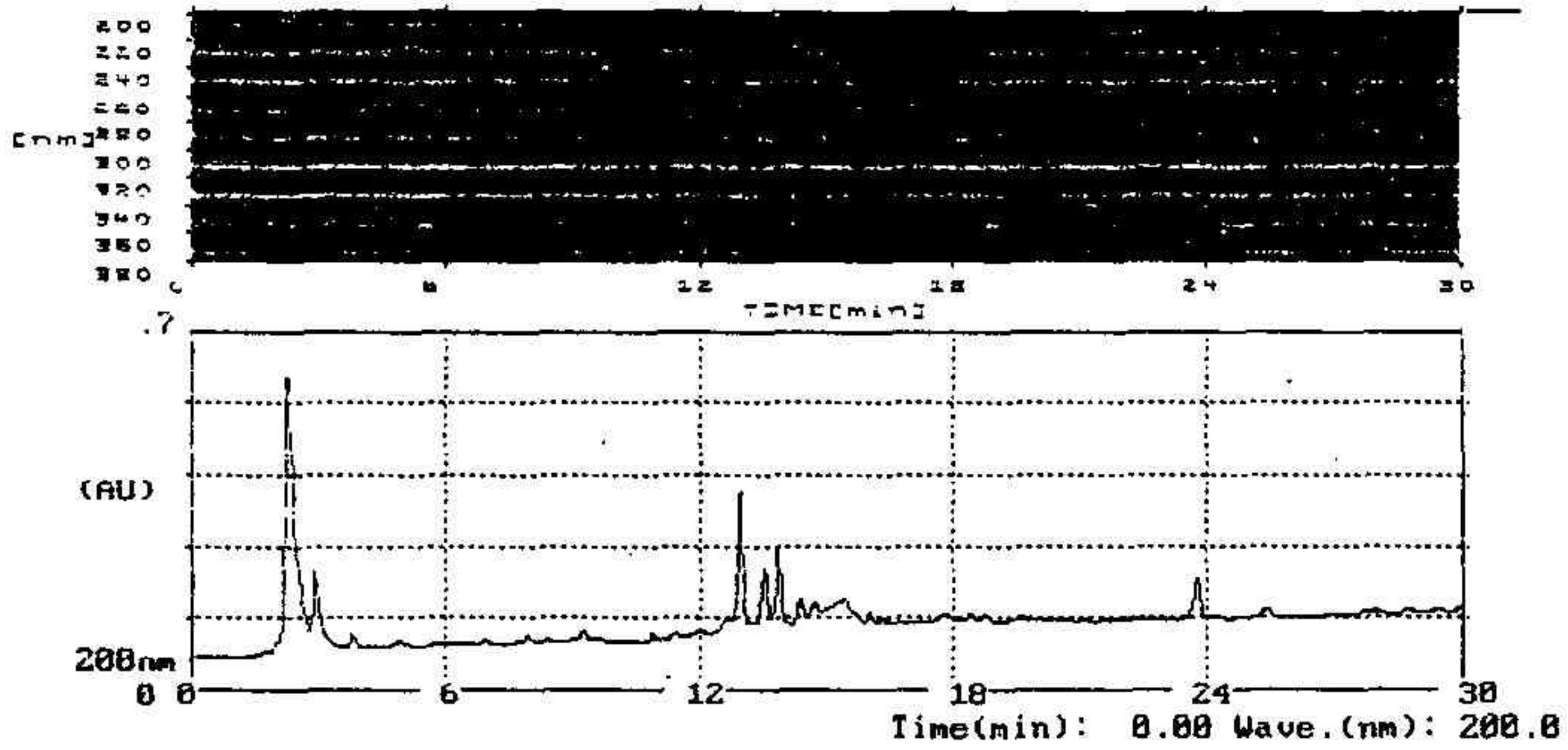
FILE NAME: Y1CE DATE: 07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS: D2 *** 195-380(nm) TIME CONST. (s)



消遣散

*SPD-M6A POST ANALYSIS Contour Plot

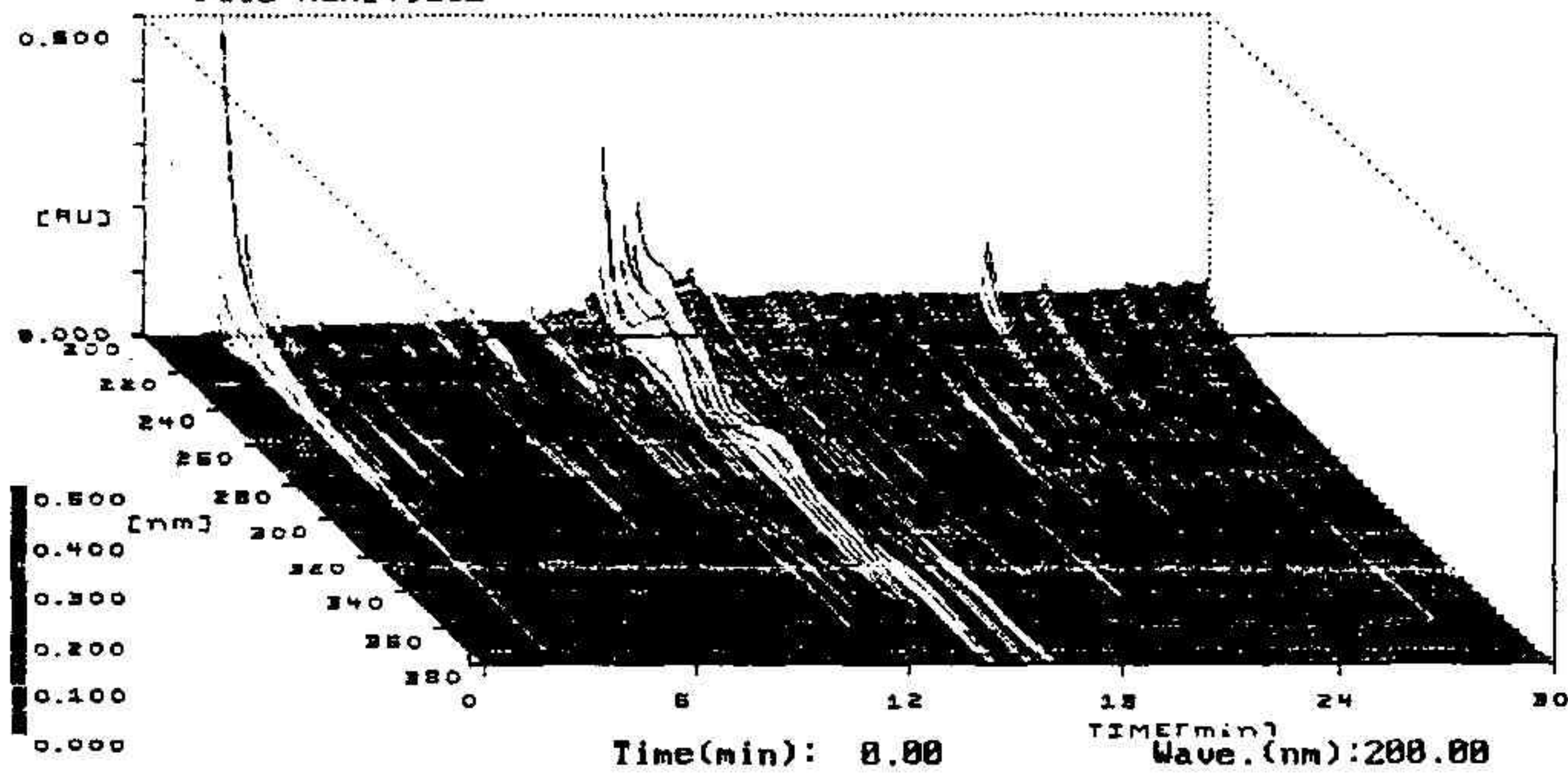
'HOME' ->Page2



FILE NAME: YICE DATE:07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s)

*SPD-M6A POST ANALYSIS 3-Dimensional Chromatogram
File Name:YICE

'HOME' ->Page2

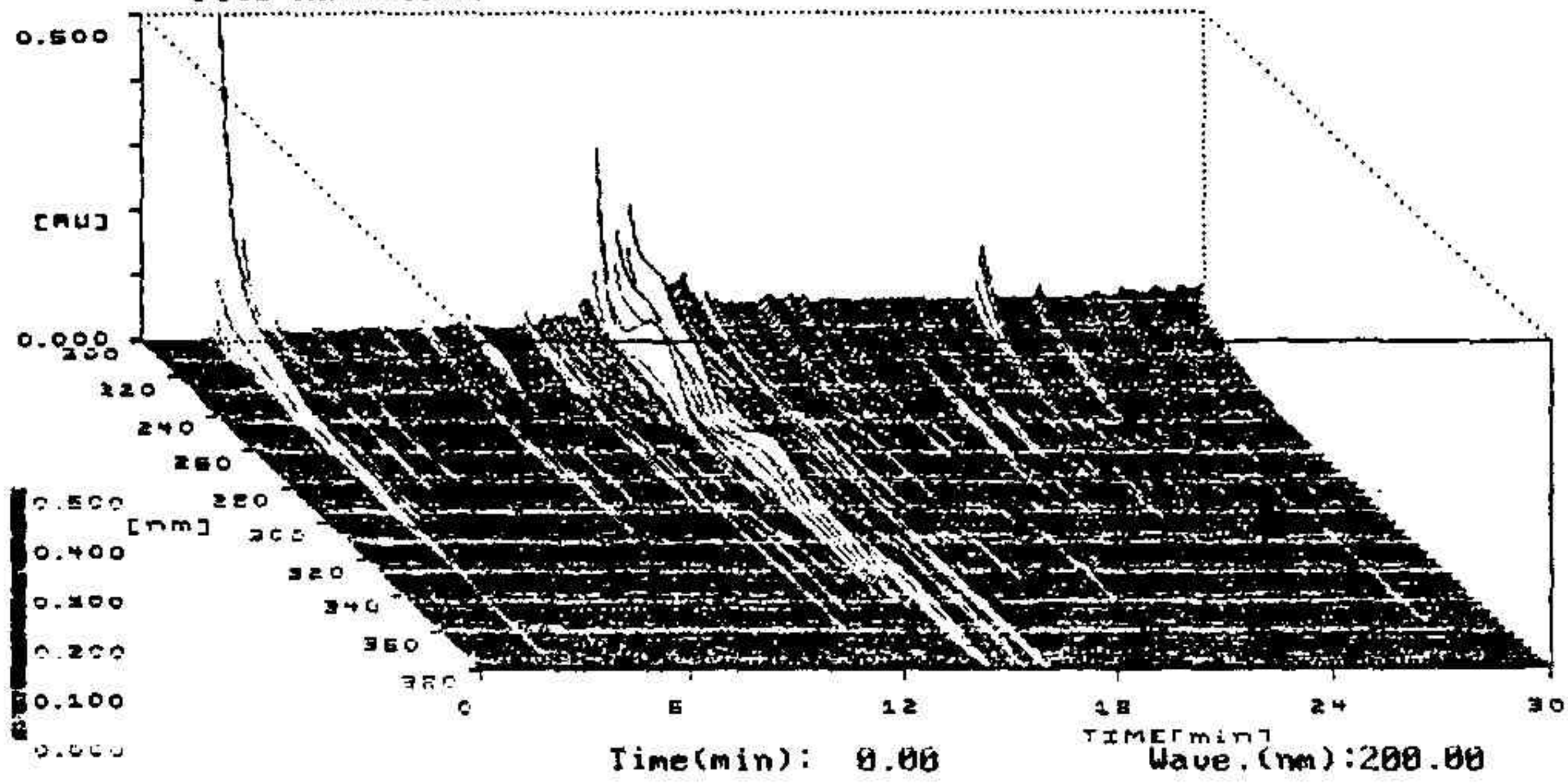


FILE NAME: YICE DATE:07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s)

有遷散

*SPD-M6A POST ANALYSIS 3-Dimensional Chromatogram
File Name: YICE

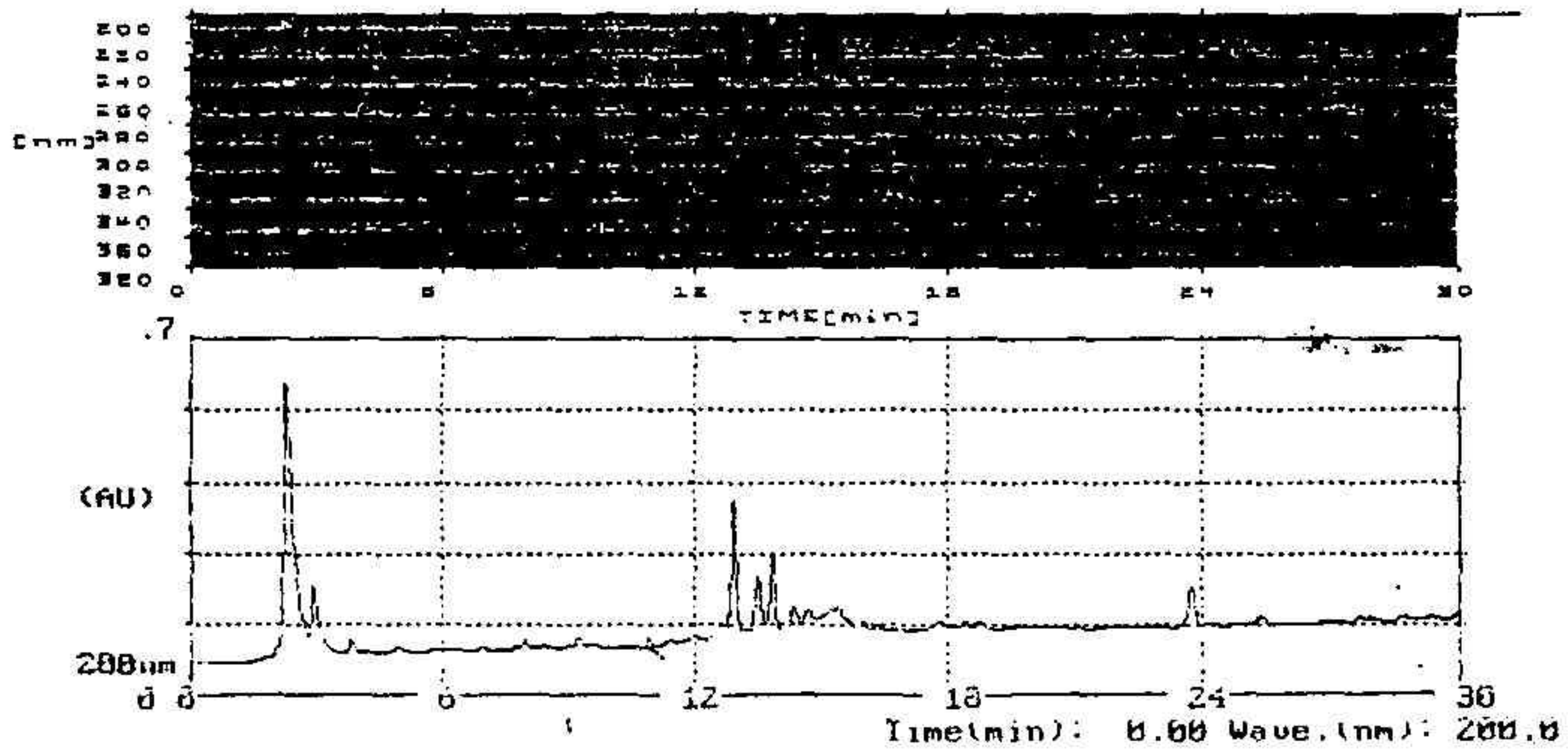
'HOME' ->Page2



FILE NAME: YICE DATE: 07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS: D2 *** 195-380(nm) TIME CONST.(s): 2

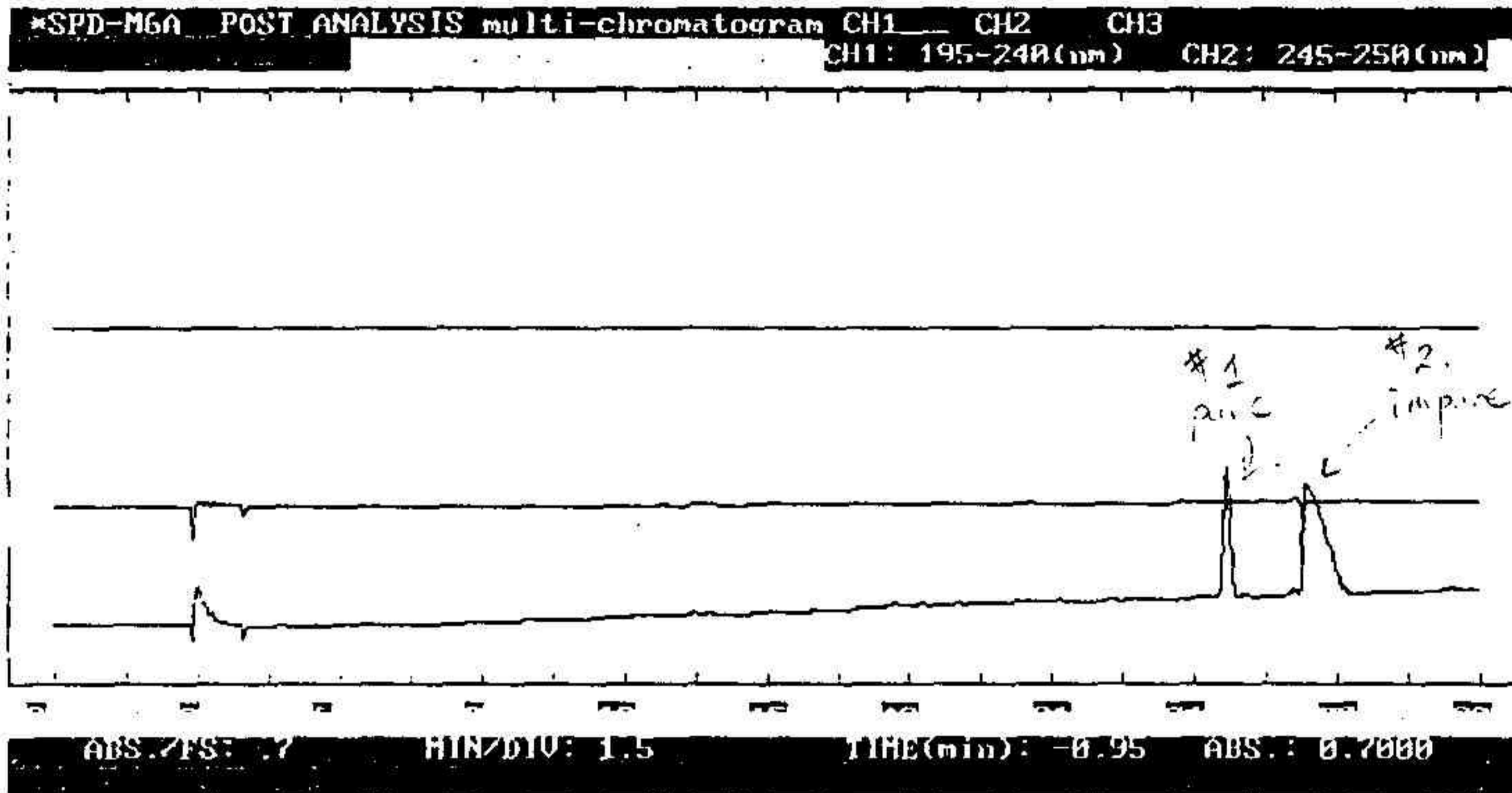
*SPD-M6A POST ANALYSIS Contour Plot

'HOME' ->Page2

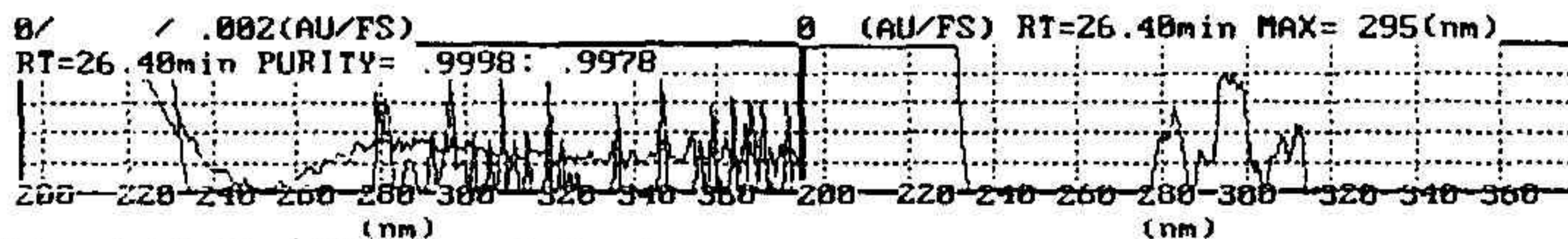
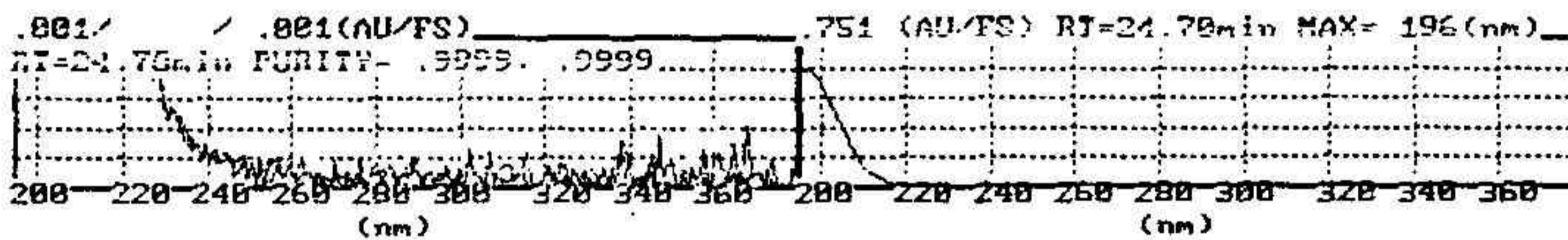


FILE NAME: YICE DATE: 07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS: D2 *** 195-380(nm) TIME CONST.(s): 2

Menthol



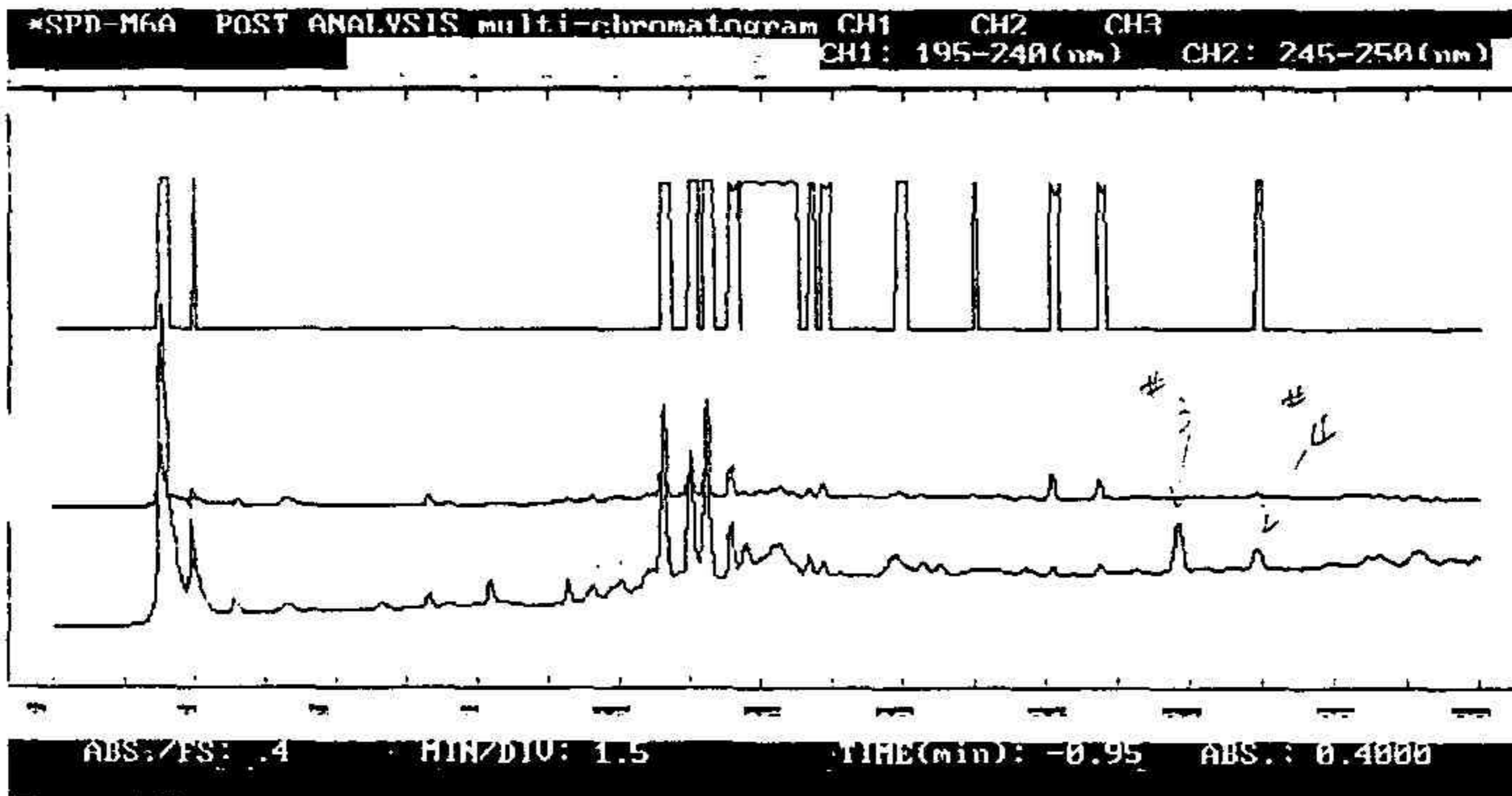
FILE NAME: Y1M DATE:07-05-1991
STORAGE TIME(min): 0 - 29.99 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s):
1.28



F7 -> PRINT , 'HOME' -> Page1

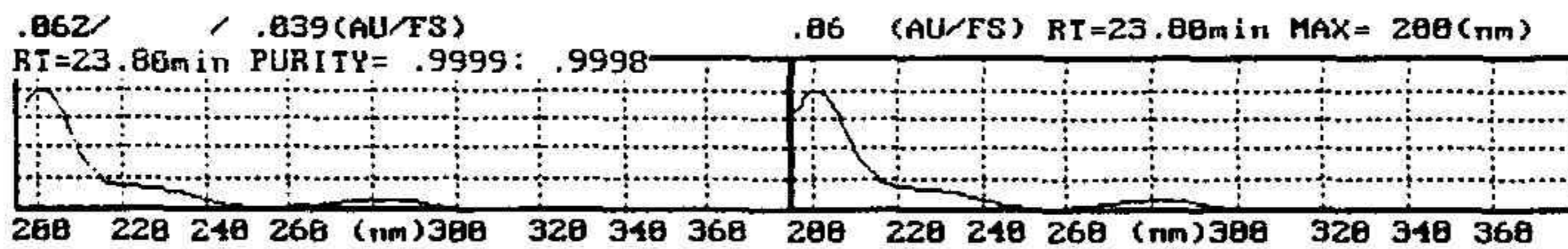
FILE NAME: Y1M DATE:07-05-1991
STORAGE TIME(min): 0 - 29.99 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s):
1.28

清道夫

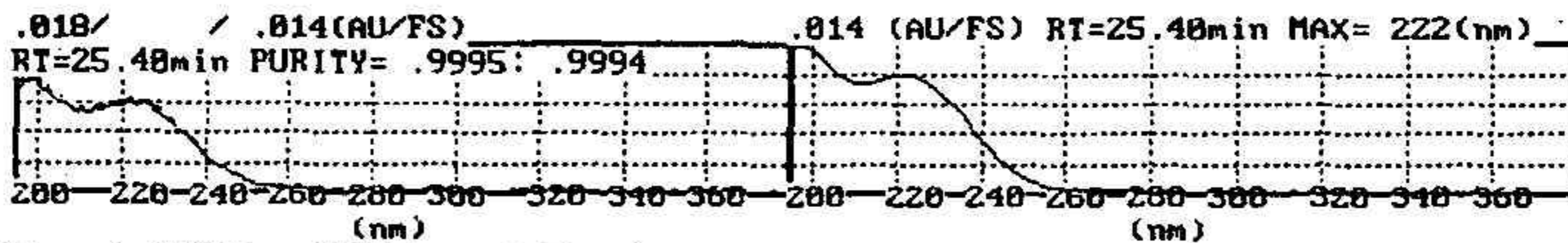


FILE NAME: YICE DATE: 07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS: D2 *** 195-380(nm) TIME CONST.(s): 2

3



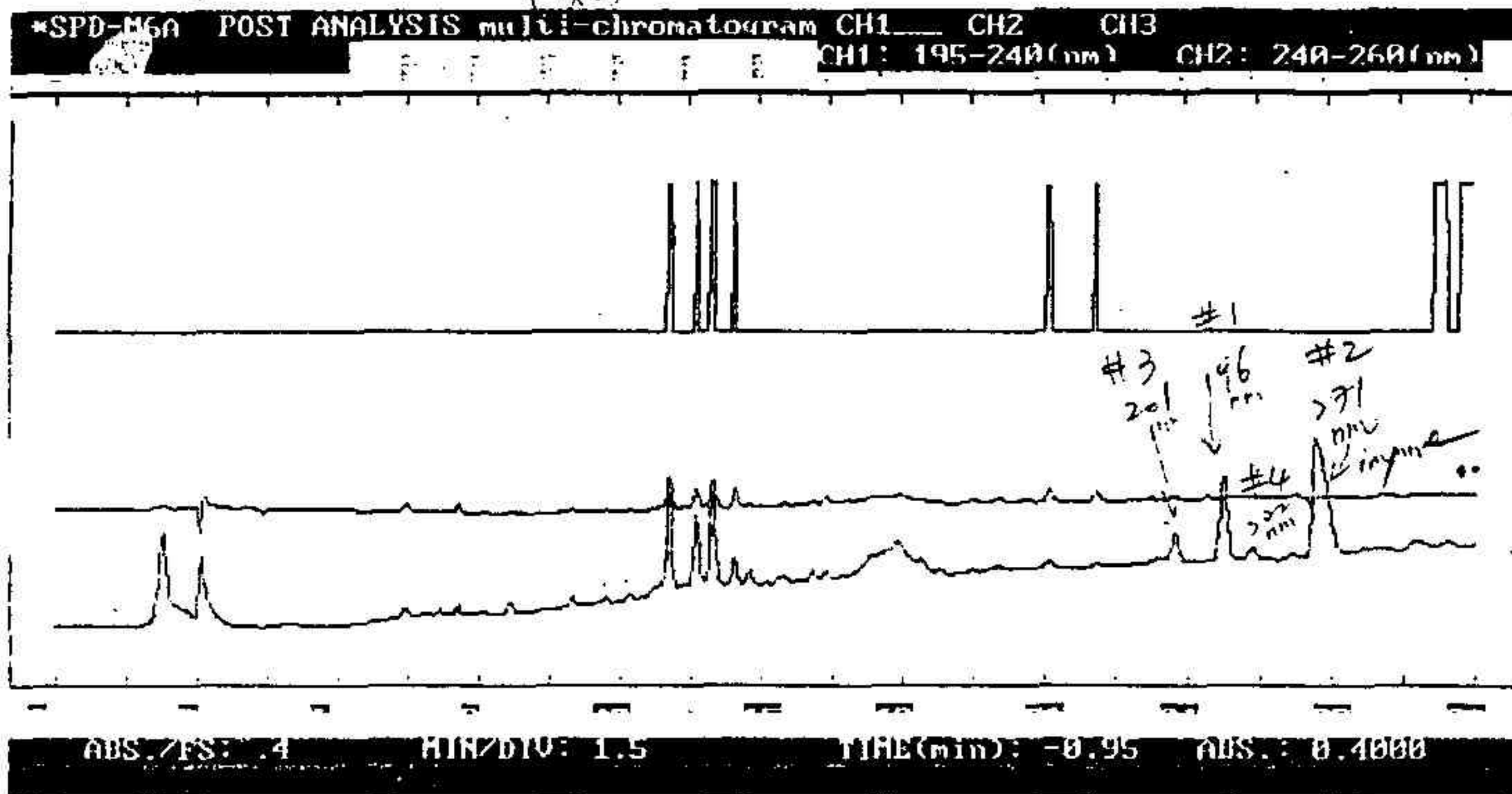
#4



F7 -> PRINT , 'HOME' -> Page1

FILE NAME: YICE DATE: 07-05-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS: D2 *** 195-380(nm) TIME CONST.(s): 2

消遙散 ext + Menthol
(std)



FILE NAME: YIMIX DATE: 07-06-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS: D2 *** 195-380 (nm) TIME CONST. (s): 2

此類消遙散, menthol 及 # mixture 之圖譜。

- (1) Menthol (std) 有 two peaks, 標明 #1, #2 之 UV pattern & max absorb data.
- (2) 消遙散 #3, #4 之 UV pattern & max absorb data, 和 menthol 不同
- (3) (1)+(2) mixture 圖譜, 發現 four peaks. 請見分析圖

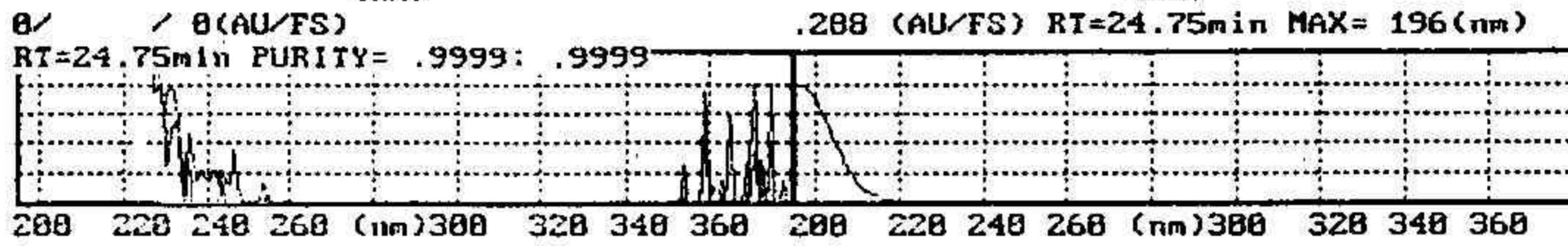
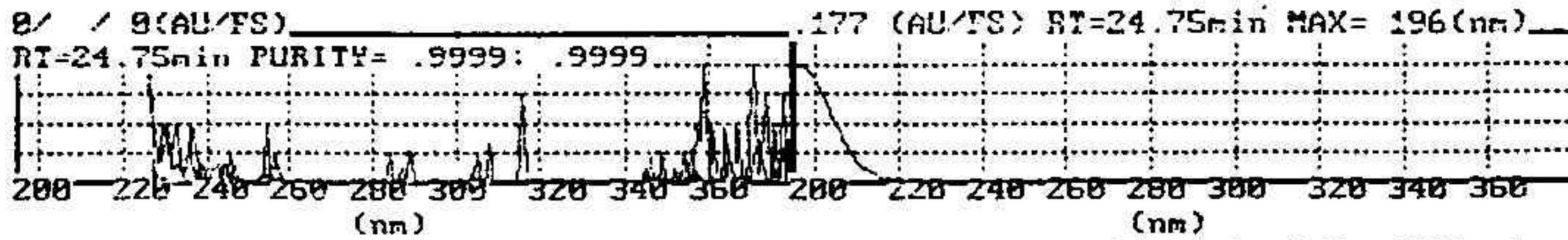
討論 ① 消遙散 Menthol 之 std. 有問題, 需再找較純者再試

② 另 try 在學胡胡粉, tube 內幾沒有內容物, 以 50% MeOH 溶之. HPLC 分析結果, 僅得 Baseline, no result *

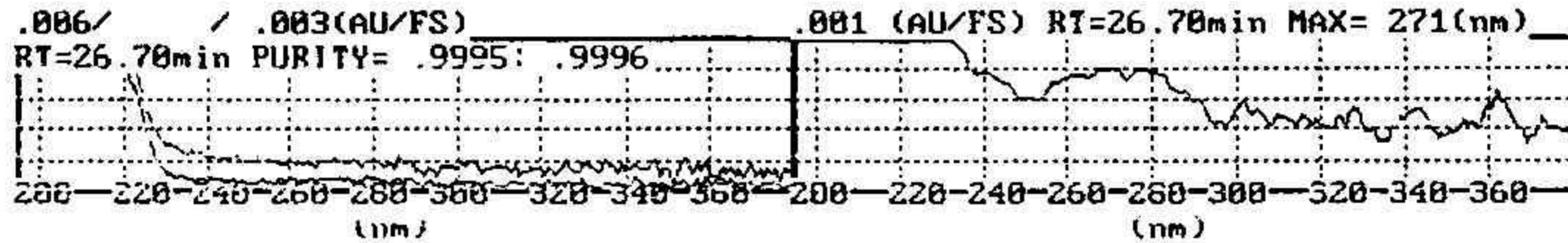
③ 同上, 消遙散, 僅以 "Glycyrrhizin" (std) 訂出 *

薄荷醇 est + menthol

#1



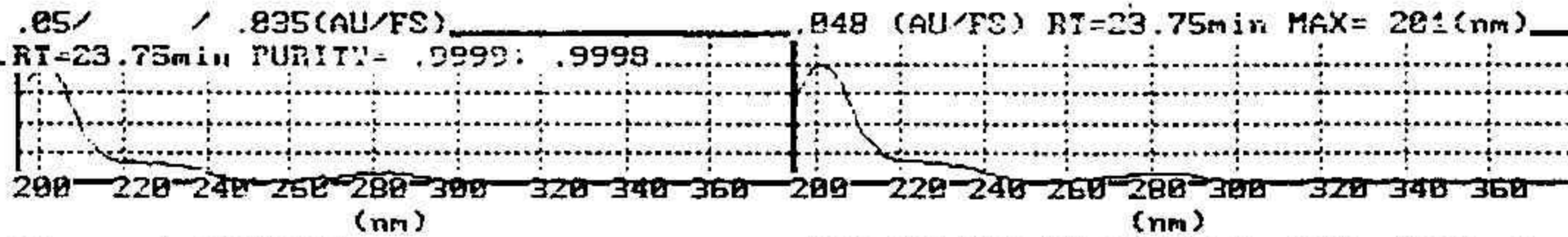
#2



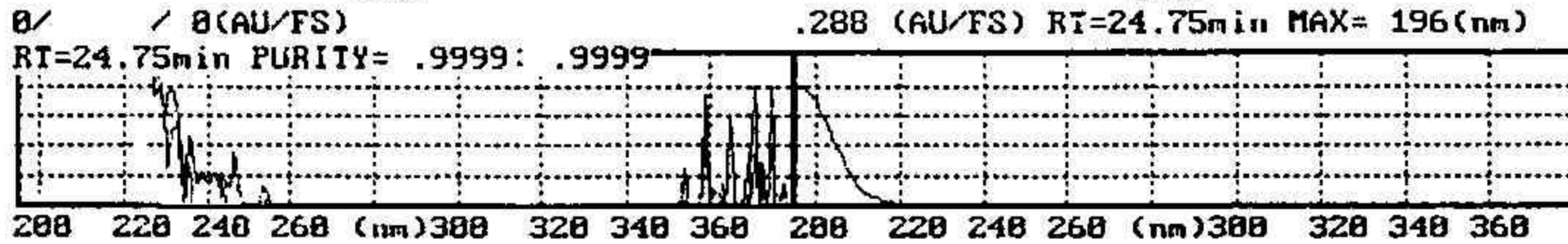
F7 --> PRINT , 'HOME' --> Page1

FILE NAME: Y1MIX DATE:07-06-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

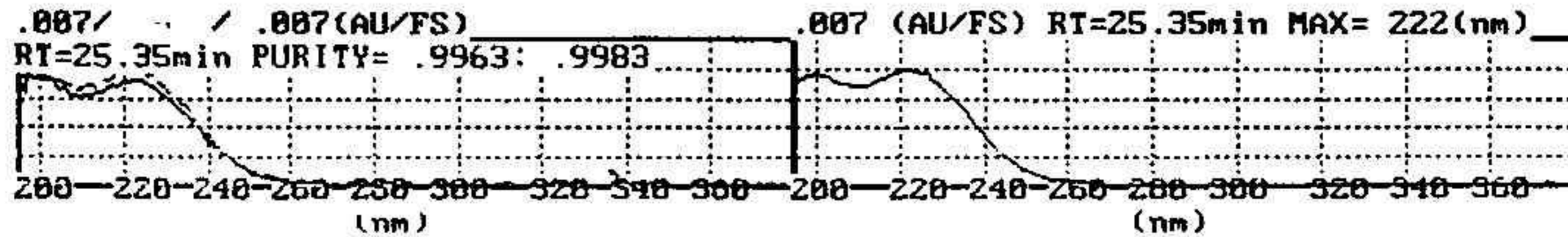
#3



#1



#4



F7 --> PRINT , 'HOME' --> Page1

FILE NAME: Y1MIX DATE:07-06-1991
STORAGE TIME(min): 0 - 30 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

Exp. 2

HPLC Condition

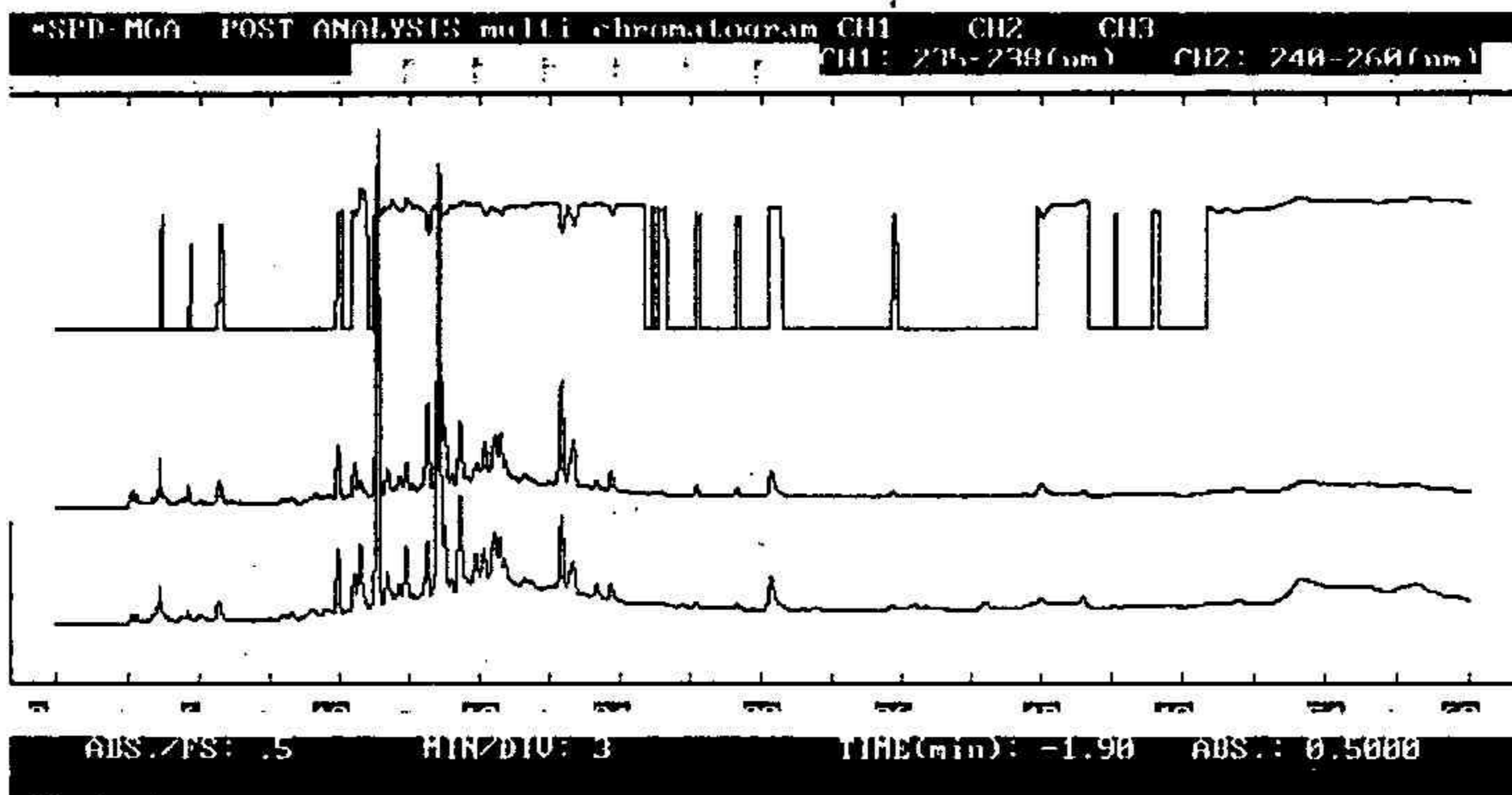
HPLC: Shimadzu LC-6AD
Column: Interstil ODS-2 (5 μ , 4.6 mm x 25 cm)
Mobile Phase: Solvent A: CH₃CN
B: 0.05% H₃PO₄ in H₂O
Linear gradient from 4% solvent A to
90% solvent A in 60 min..
Flow Rate: 1.20 mL/min
Detection: Photodiode Array UV detector (SPD-M6A)
Temperature: Ambient
Volume Injected: 20 μ L



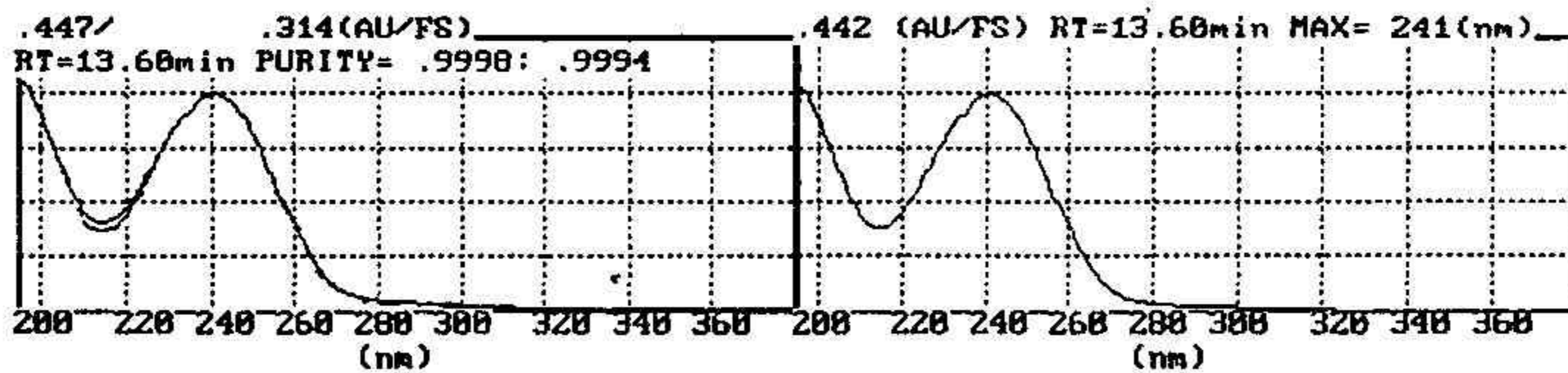
=

[Result]

Geniposide RT: 13.6 min
UV max at 241 nm.



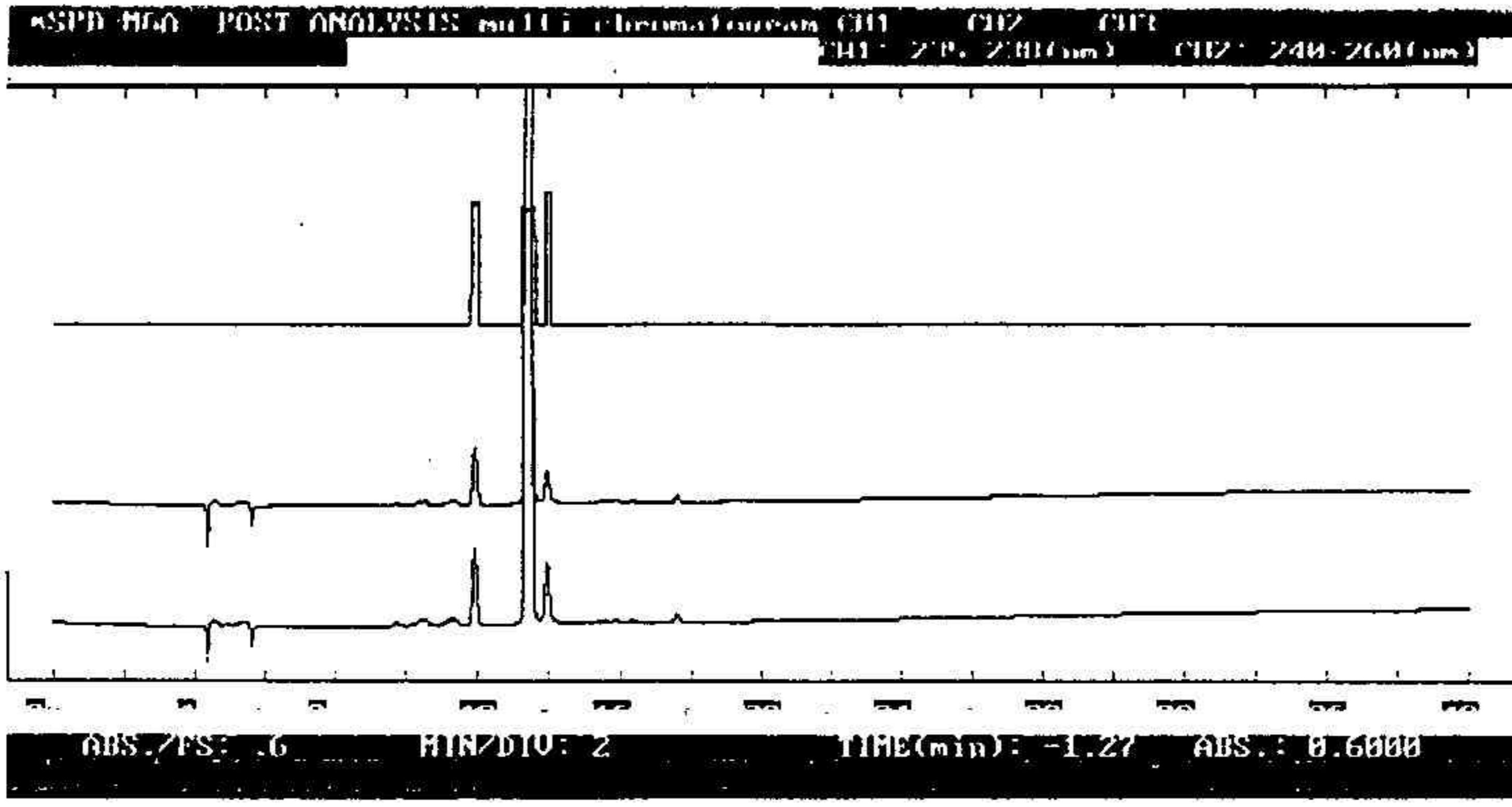
FILE NAME: c:Y260 DATE:07-26-1991
 STORAGE TIME(min): 0 - 60 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2



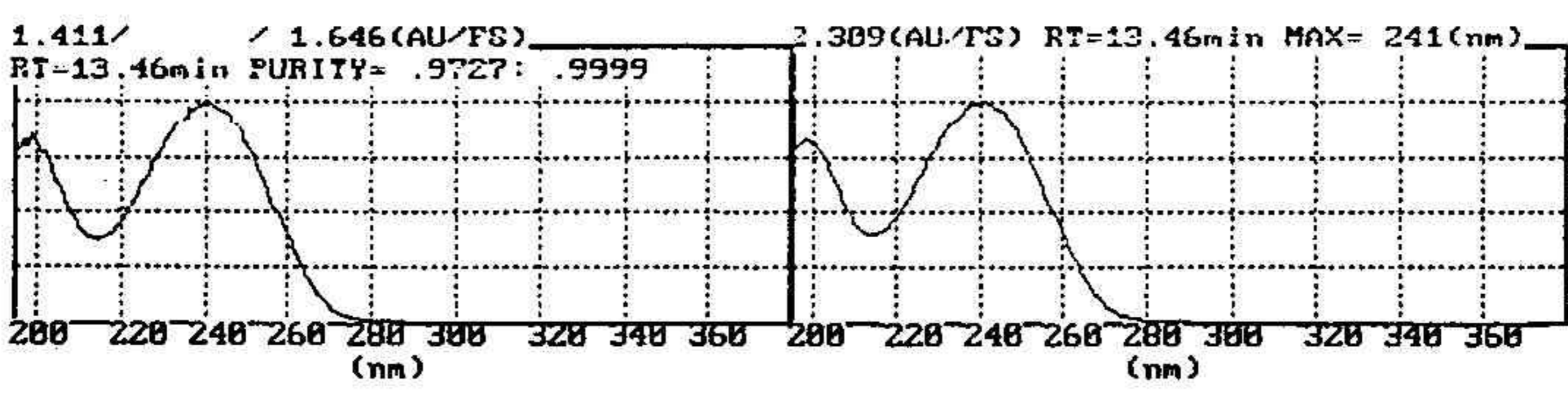
F7 → PRINT , 'HOME' → 'Page1

FILE NAME: c:Y260 DATE:07-26-1991
 STORAGE TIME(min): 0 - 60 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

Gteniposide



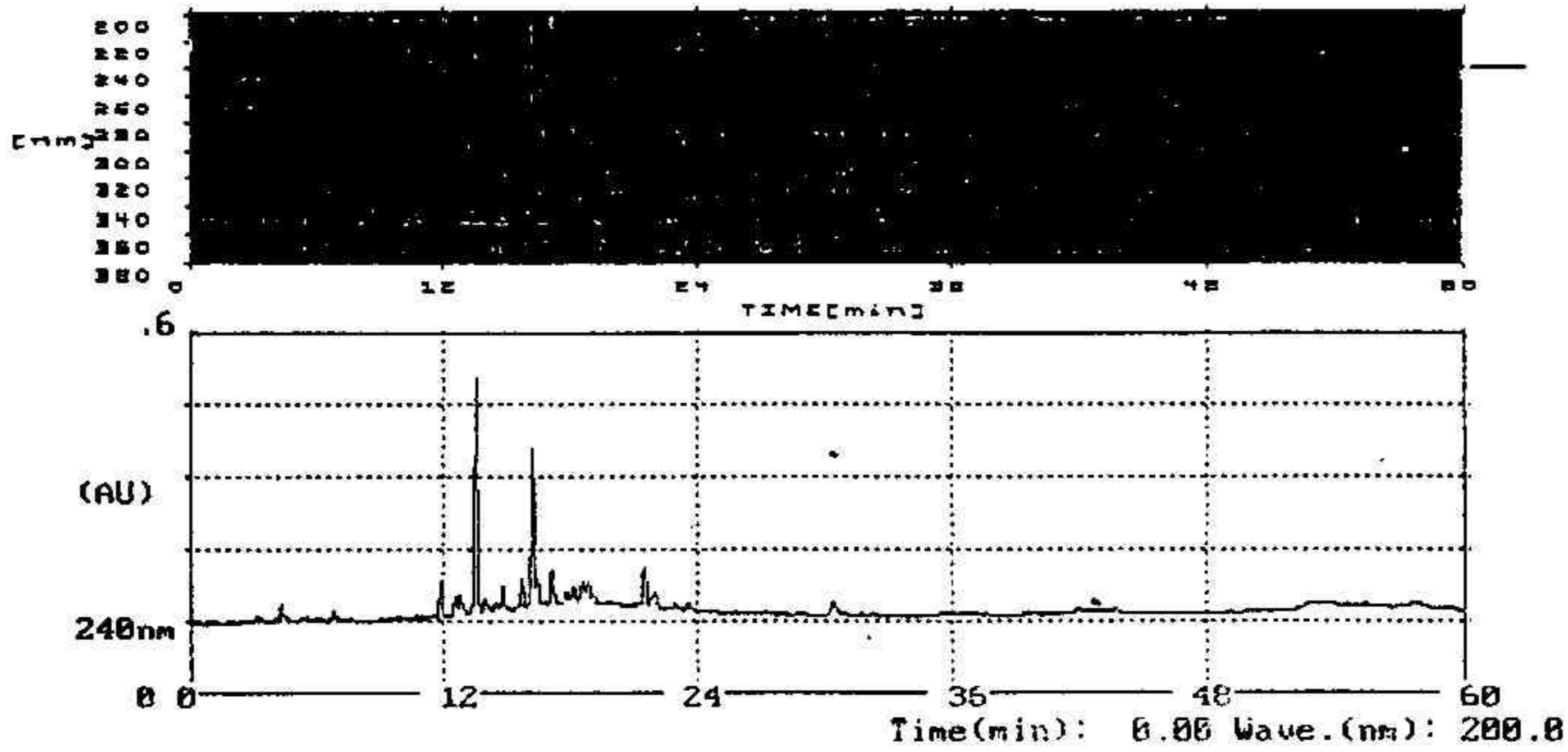
FILE NAME: Y2GEN DATE:07-29-1991
STORAGE TIME(min): 0 - 40 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2



F7 —> PRINT , 'HOME' —> Page1
FILE NAME: Y2GEN DATE:07-29-1991
STORAGE TIME(min): 0 - 40 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

*SPD-M6A POST ANALYSIS Contour Plot

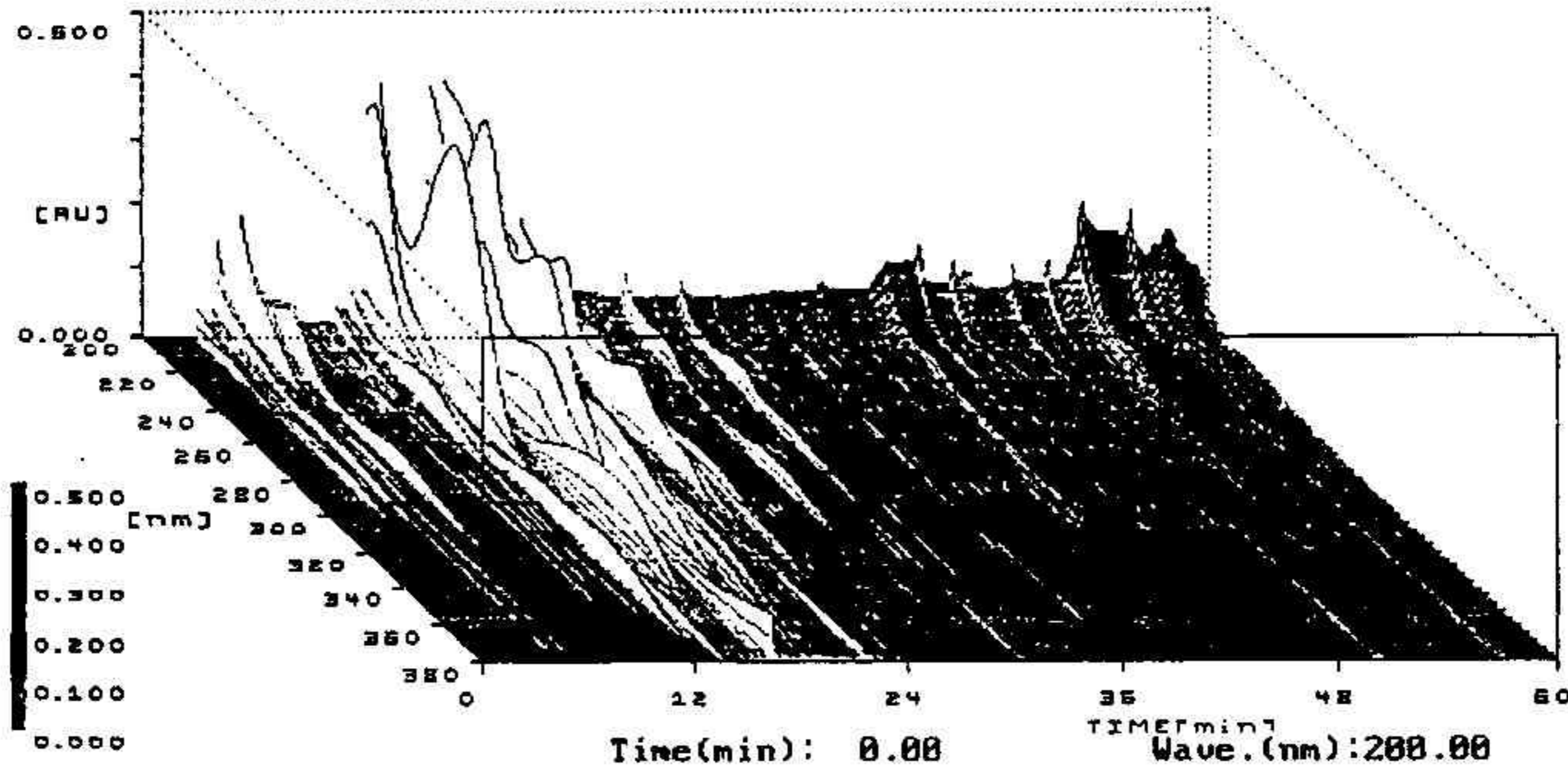
'HOME' ->Page2



FILE NAME: Y260 DATE:07-30-1991
STORAGE TIME(min): 0 - 60 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

*SPD-M6A POST ANALYSIS 3-Dimensional Chromatogram
File Name:Y260

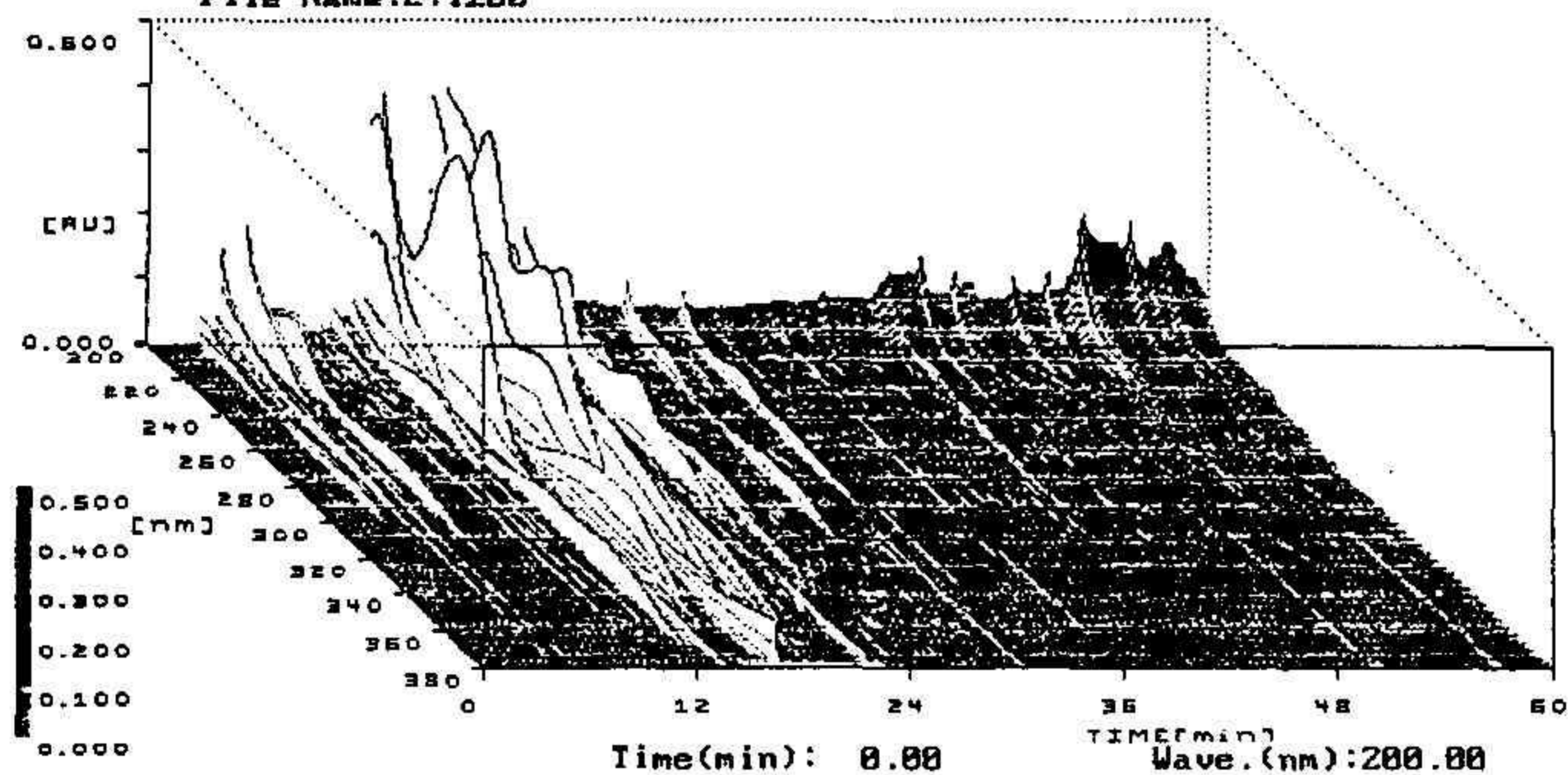
'HOME' ->Page2



FILE NAME: Y260 DATE:07-30-1991
STORAGE TIME(min): 0 - 60 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

*SPD-M6A POST ANALYSIS 3-Dimensional Chromatogram
File Name:c:Y260

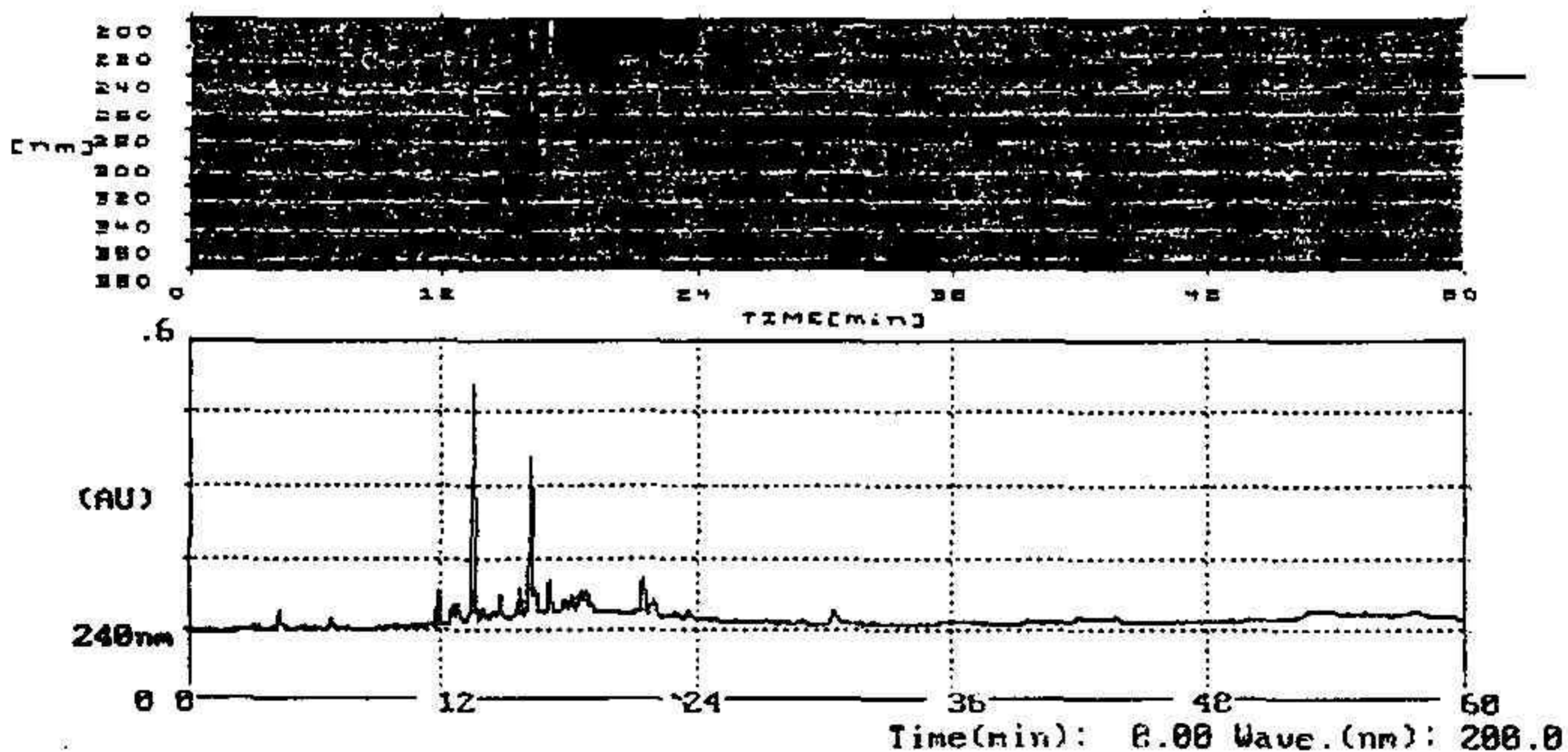
'HOME' ->Page2



FILE NAME: c:Y260 DATE:07-30-1991
STORAGE TIME(min): 0 - 60 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

*SPD-M6A POST ANALYSIS Contour Plot

'HOME' ->Page2



FILE NAME: Y260 DATE:07-30-1991
STORAGE TIME(min): 0 - 60 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

Exp. 3

芍薬#甘草湯

HPLC Condition

HPLC: Shimadzu LC-6AD
Column: Interstil ODS-2 (5 μ , 4.6 mm x 25 cm)
Mobile Phase: Solvent A: 70% CH₃CN in H₂O
B: 0.1% H₃PO₄ in H₂O
Linear gradient from 4% solvent A to
85% solvent A in 90 min.
Flow Rate: 1.20 mL/min
Detection: Photodiode Array UV detector (SPD-M6A)
Temperature: Ambient
Volume Injected: 20 μ L

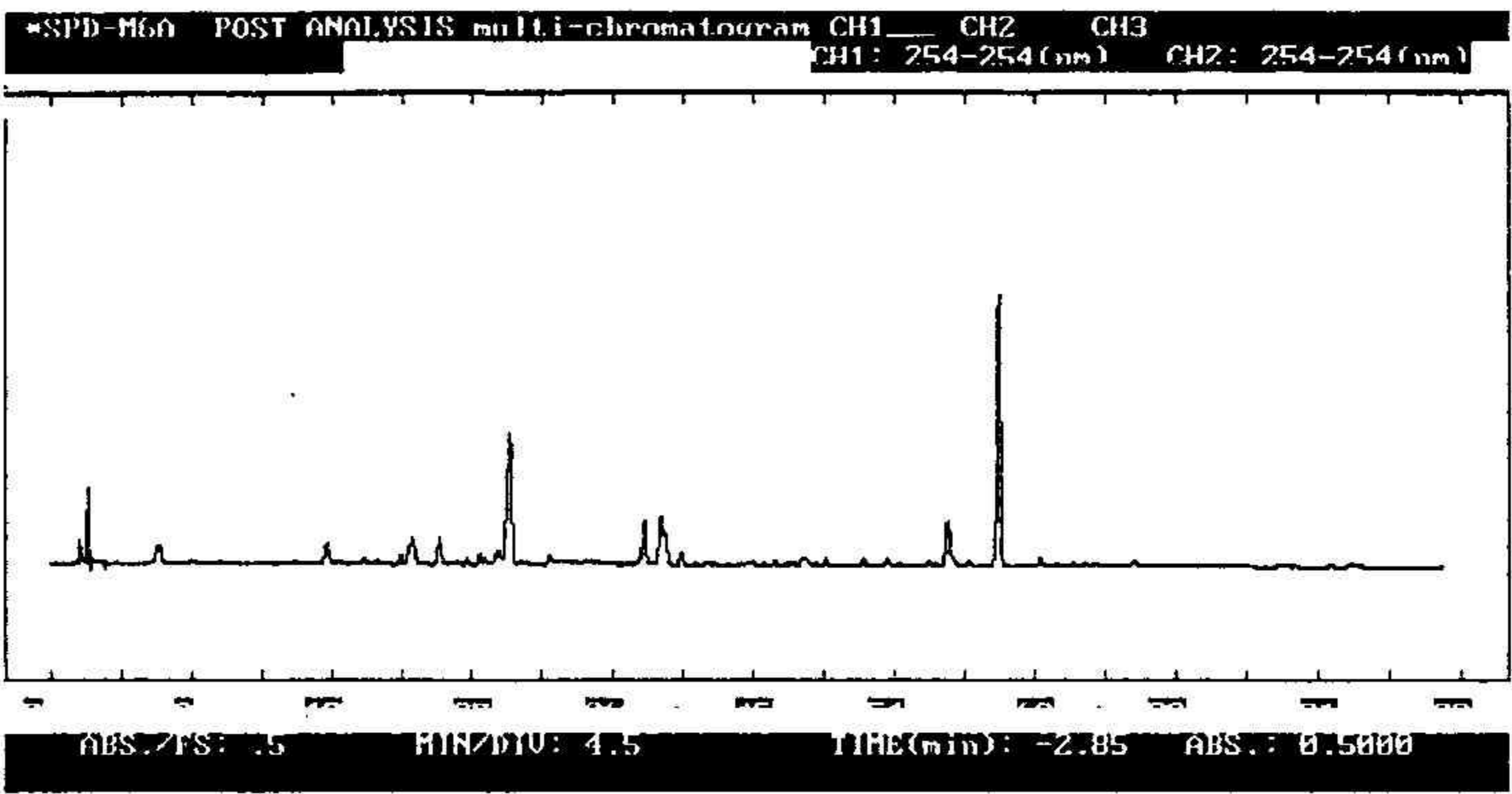
100

[Result]

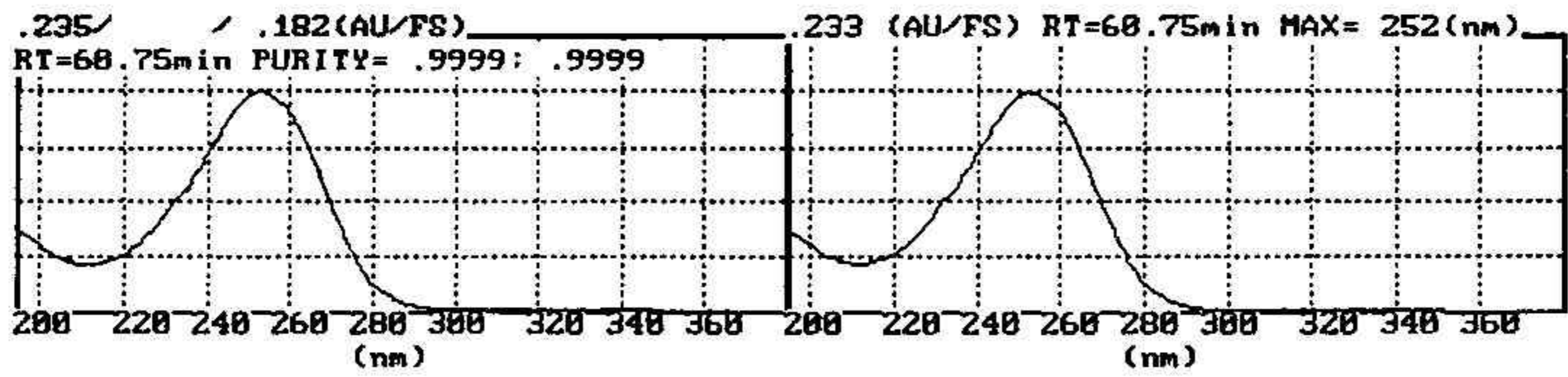
Glycyrrhizin (glycyrrhizic acid)

RT: 60.75 min

UV max at 252 nm.



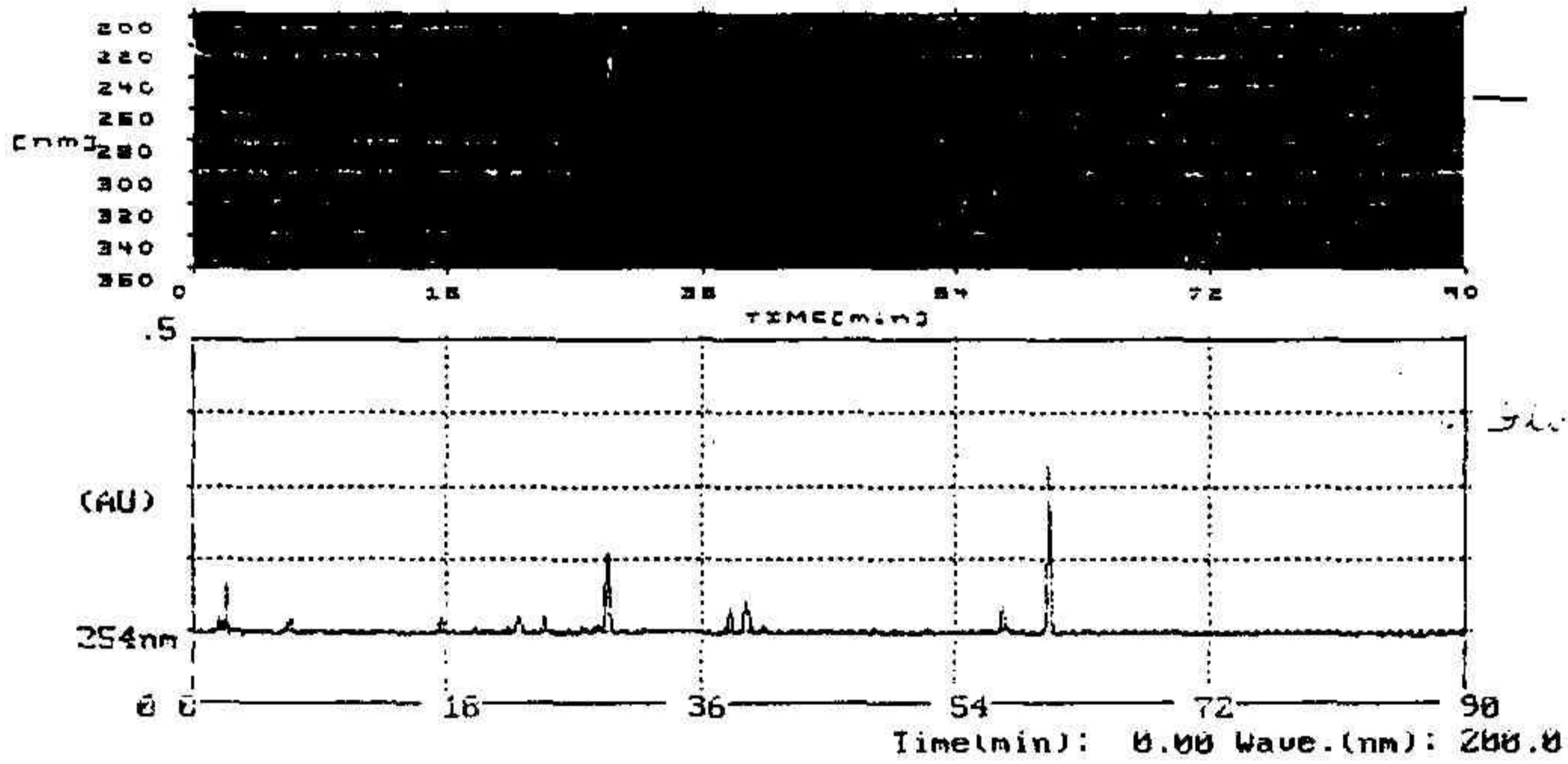
FILE NAME: e:Y3SOUK DATE:07-04-1991
 STORAGE TIME(min): 0 - 90 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2



Handwritten notes in the top left corner, possibly including 'SPD-M6A' and other identifiers.

*SPD-M6A POST ANALYSIS Contour Plot

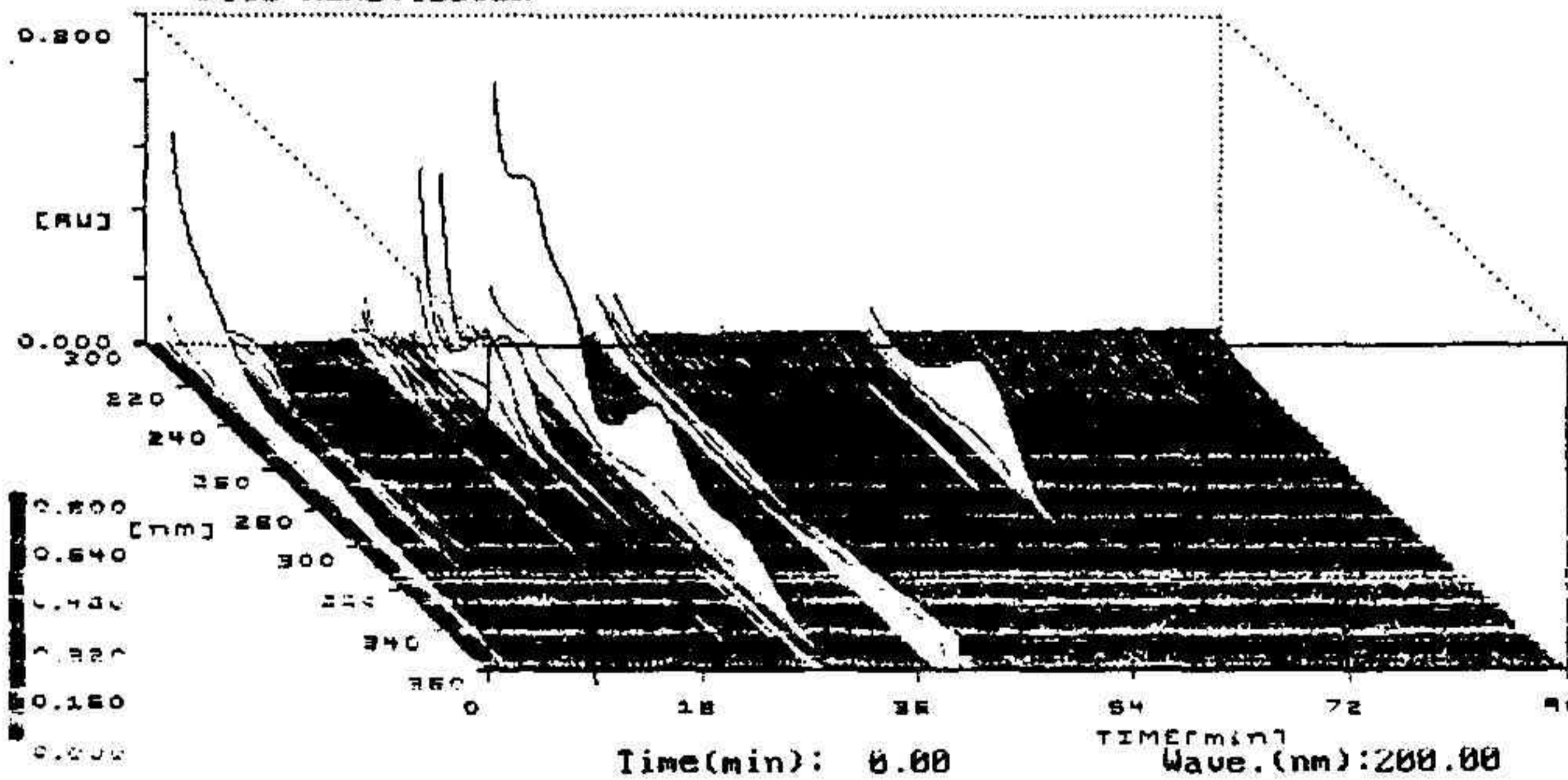
'HOME' ->Page2



FILE NAME: Y3SOUK DATE:06-26-1991
STORAGE TIME(min): 0 - 90 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

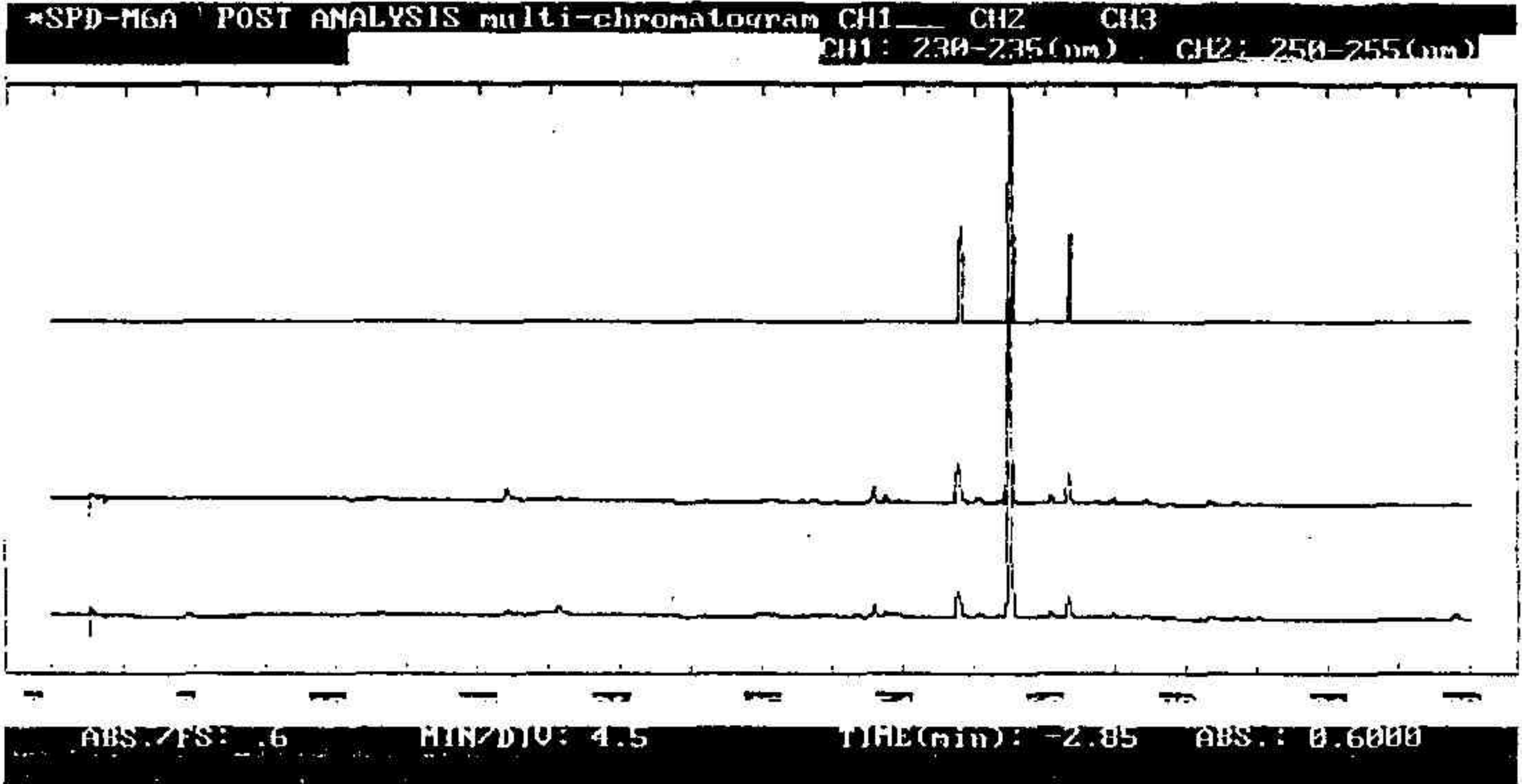
*SPD-M6A POST ANALYSIS 3-Dimensional Chromatogram
File Name:Y3SOUK

'HOME' ->Page2

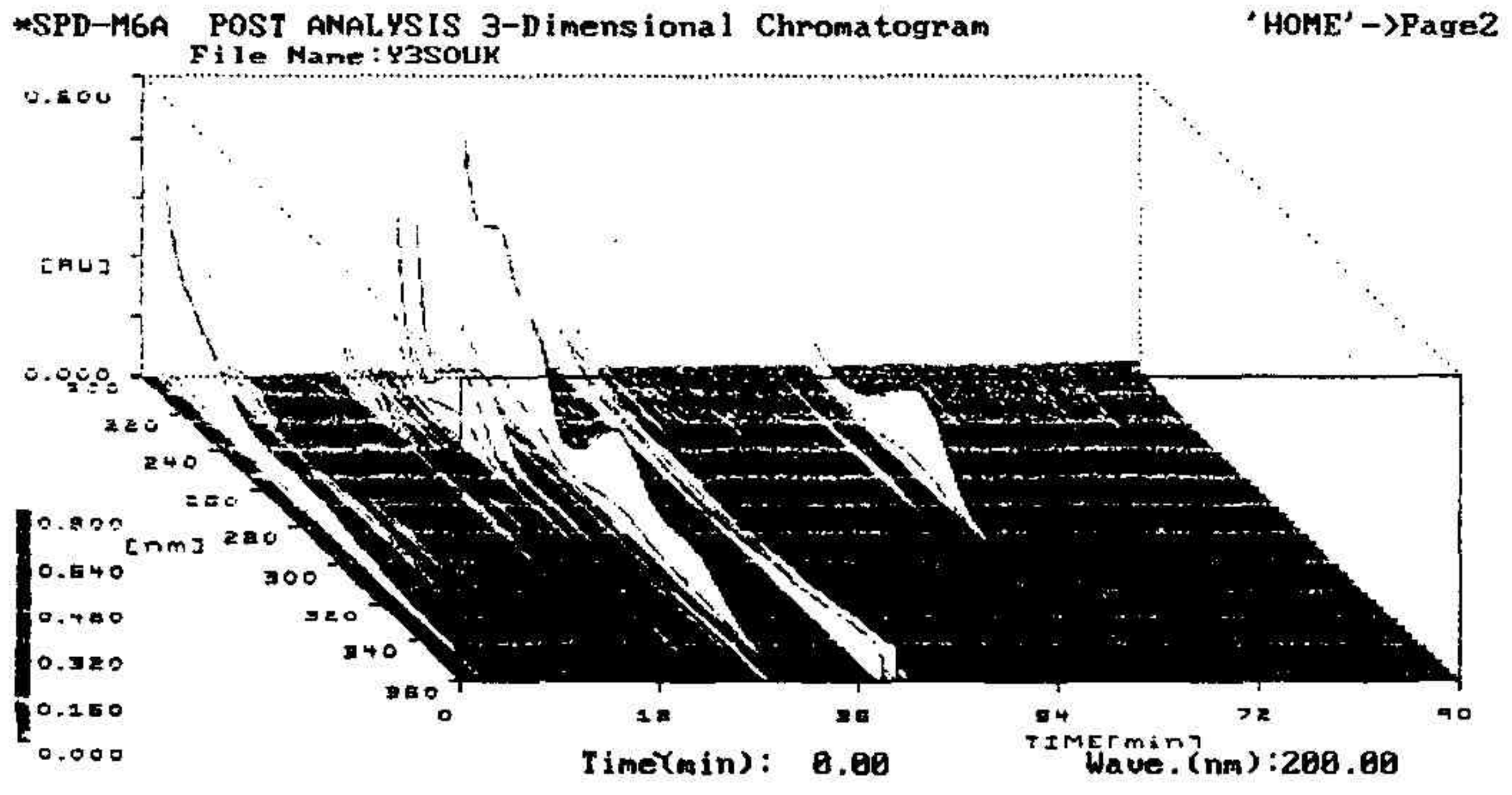


FILE NAME: Y3SOUK DATE:06-26-1991
STORAGE TIME(min): 0 - 90 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2

glycylglycine



FILE NAME: Y3GLY DATE:06-26-1991
STORAGE TIME(min): 0 - 90 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2



FILE NAME: Y3SOUK DATE:06-26-1991
STORAGE TIME(min): 0 - 90 LAMP STATUS:D2 *** 195-380(nm) TIME CONST.(s): 2