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APPENDIX

ศูนย์วิจัยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

A) MEOH=ACETONE=CHCl<sub>3</sub>=BEN (12.5:25:30:20)

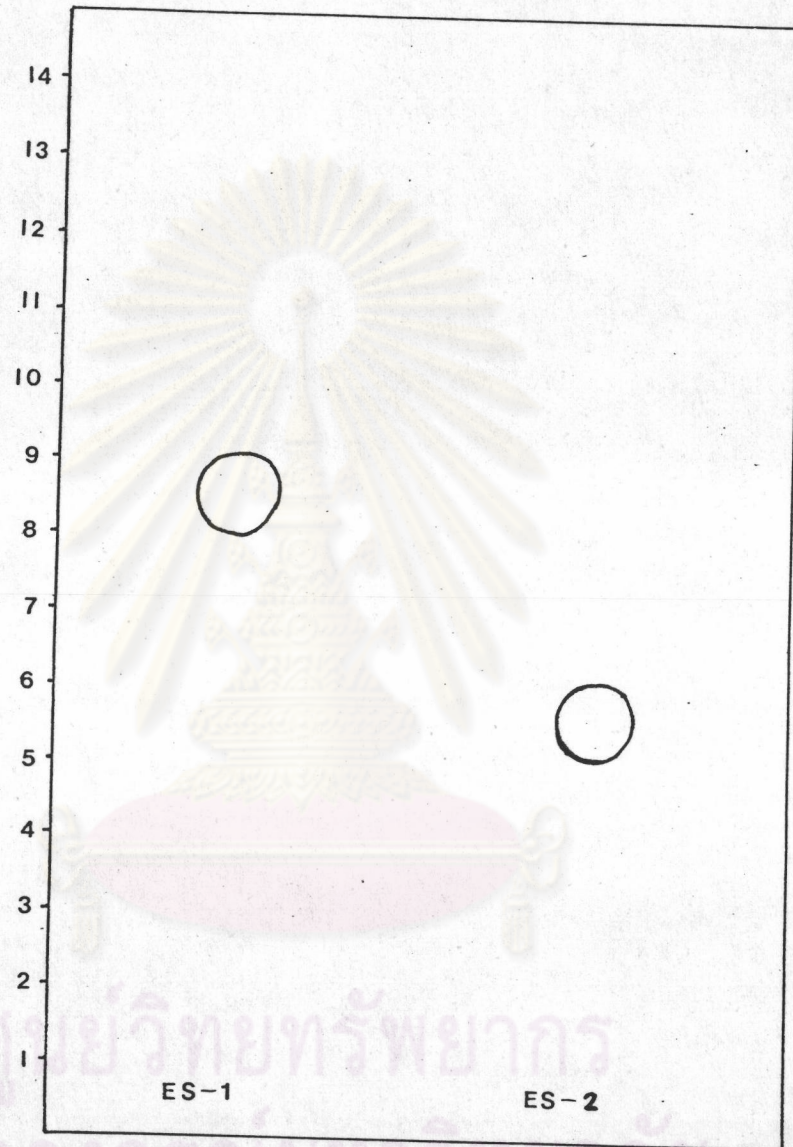


Figure 1: Thin layer chromatogram of ES-1,ES-2.

ES-1 = Scopoletin

ES-2 = Scopolin

## B) MEOH : DICHLOROETHANE ( 2:9 )

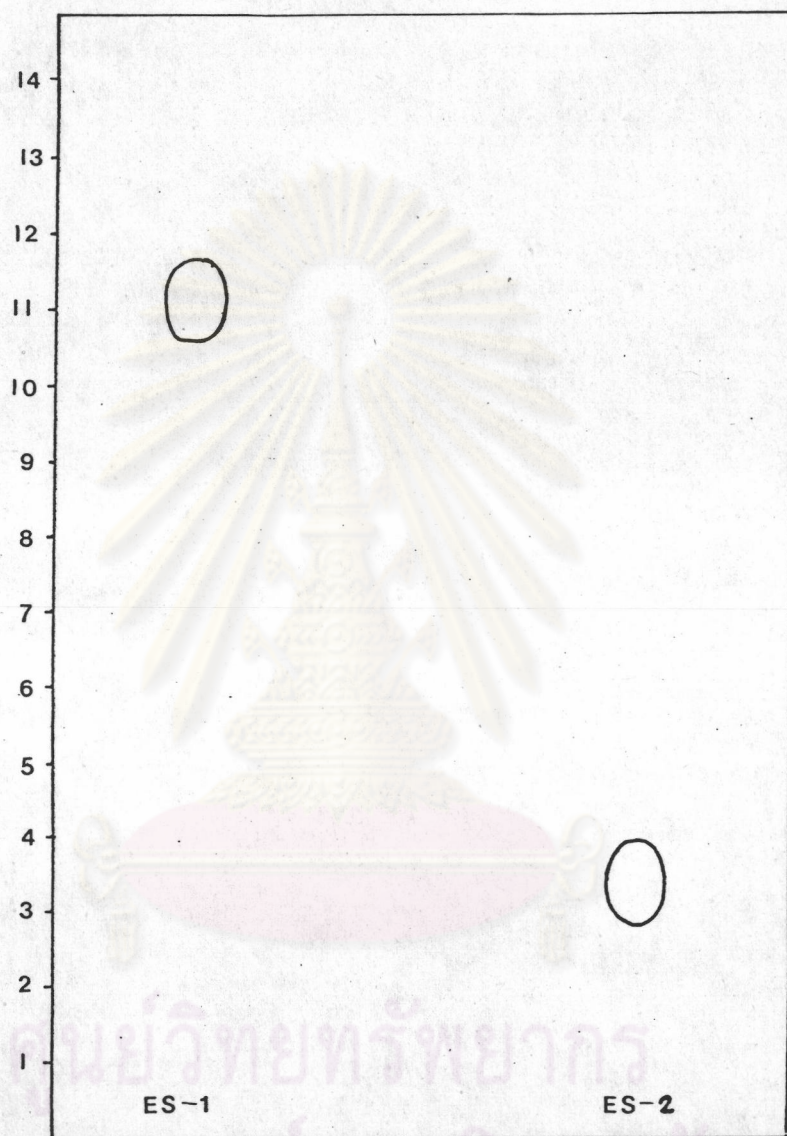


Figure 2: Thin layer chromatogram of ES-1,ES-2.

ES-1 = Scopoletin

ES-2 = Scopolin



C) MEOH: BEN (15: 85)

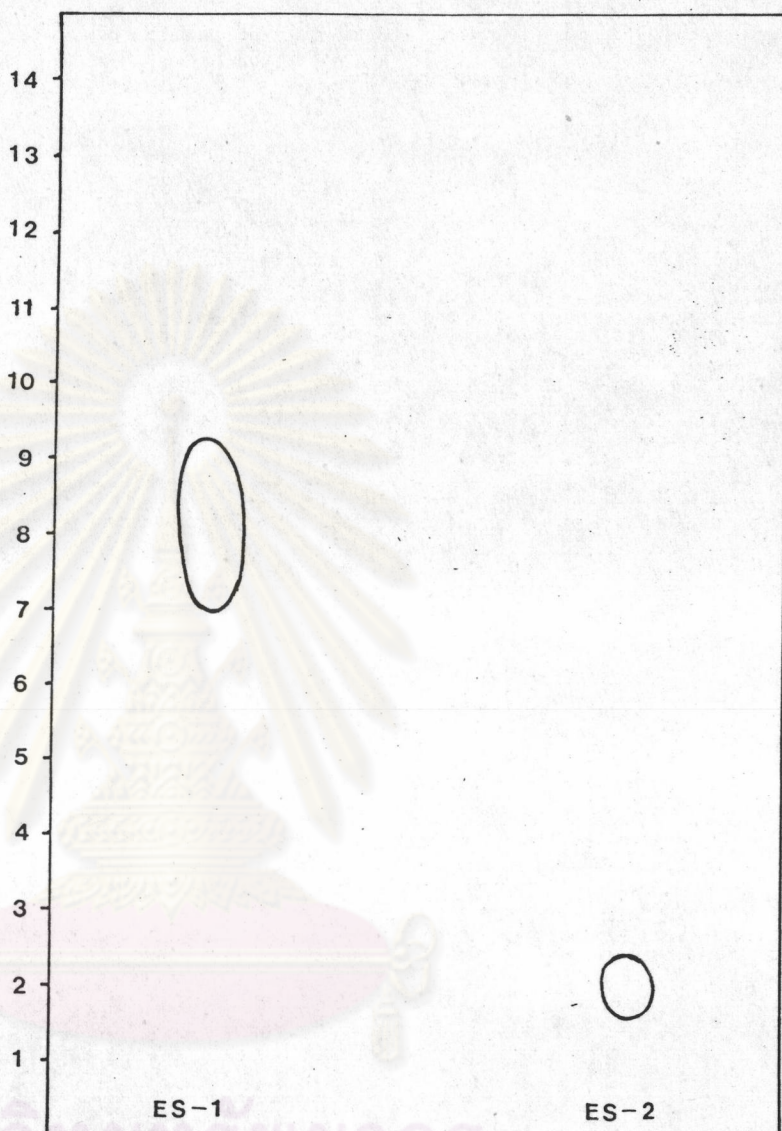


Figure 3: Thin layer chromatogram of ES-1, ES-2.

ES-1 = Scopoletin

ES-2 = Scopolin

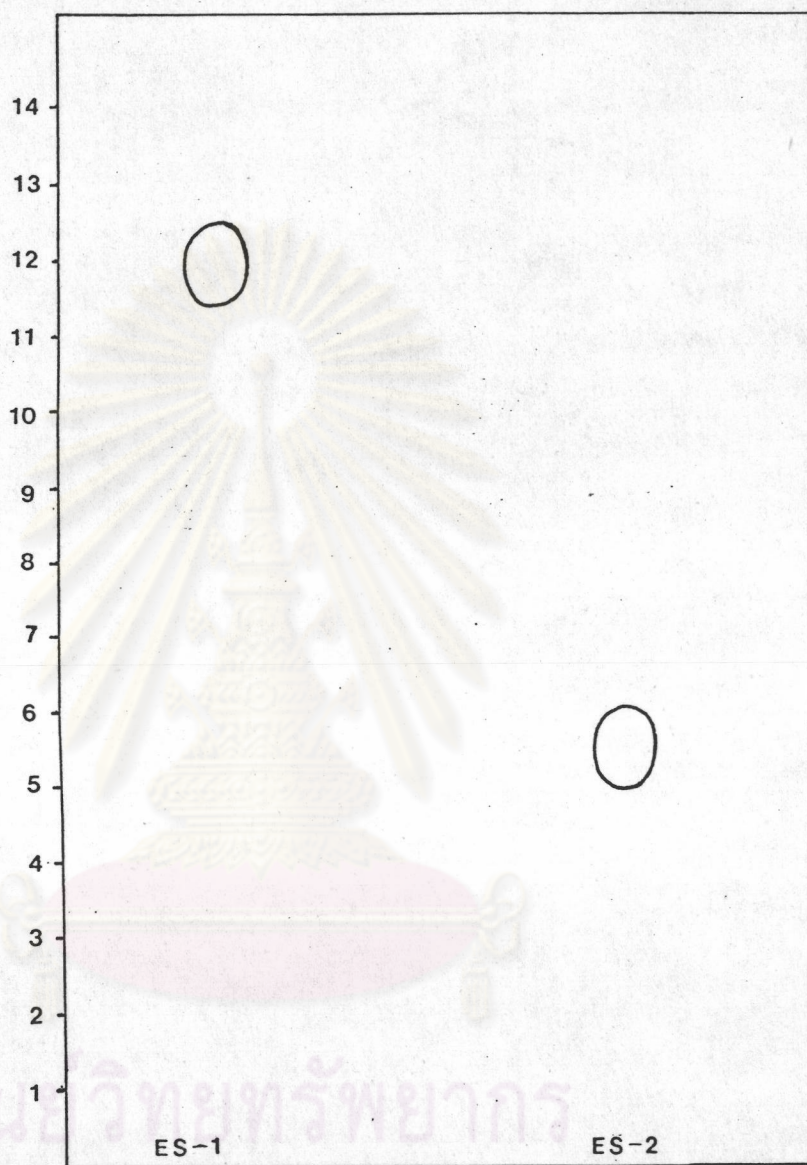
D)  $\text{CHCl}_3$  = MEOH (9:3)

Figure 4: Thin layer chromatogram of ES-1, ES-2.

ES-1 = Scopoletin

ES-2 = Scopolin

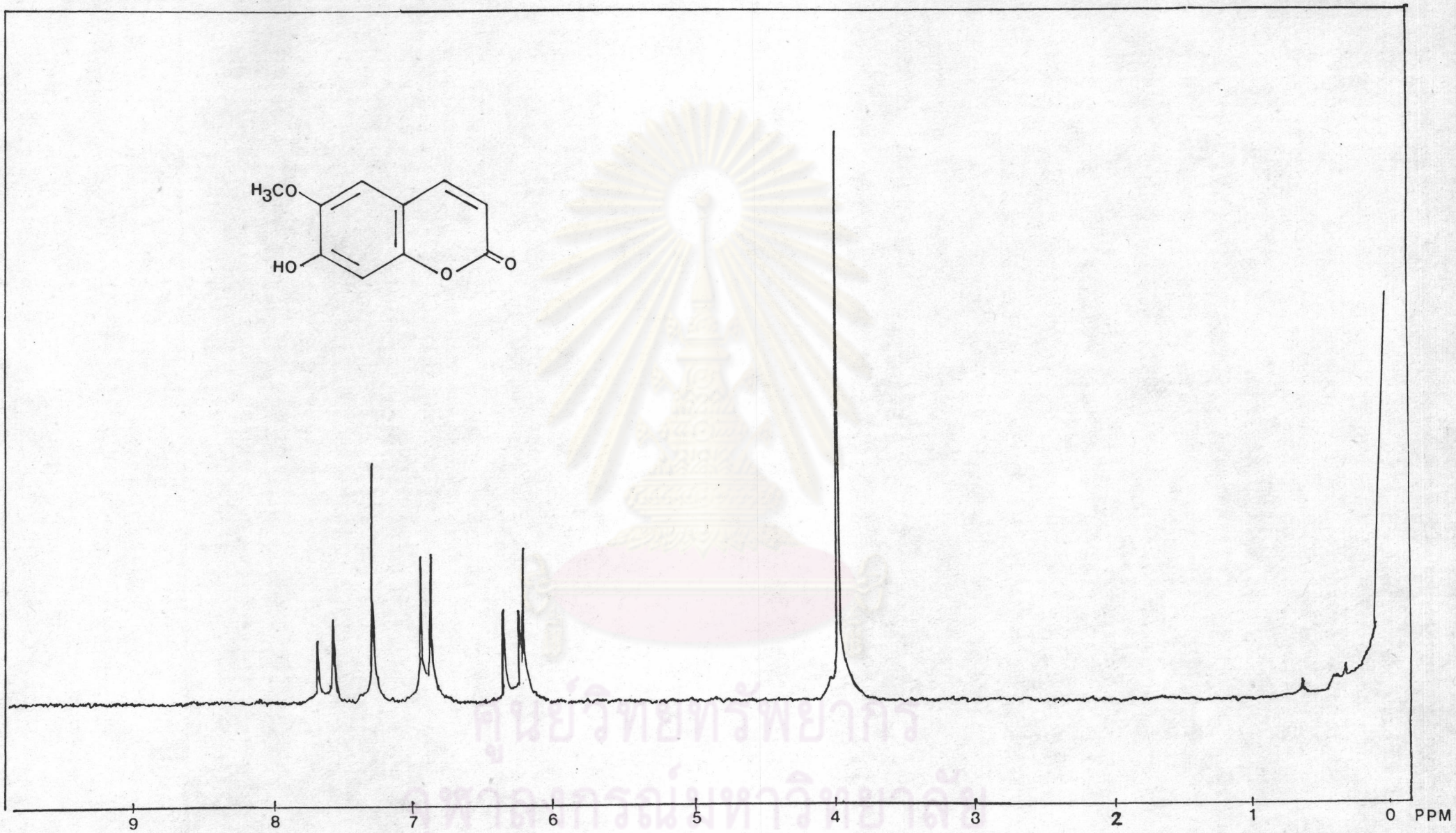


Figure 5: Proton nuclear magnetic resonance of ES-1

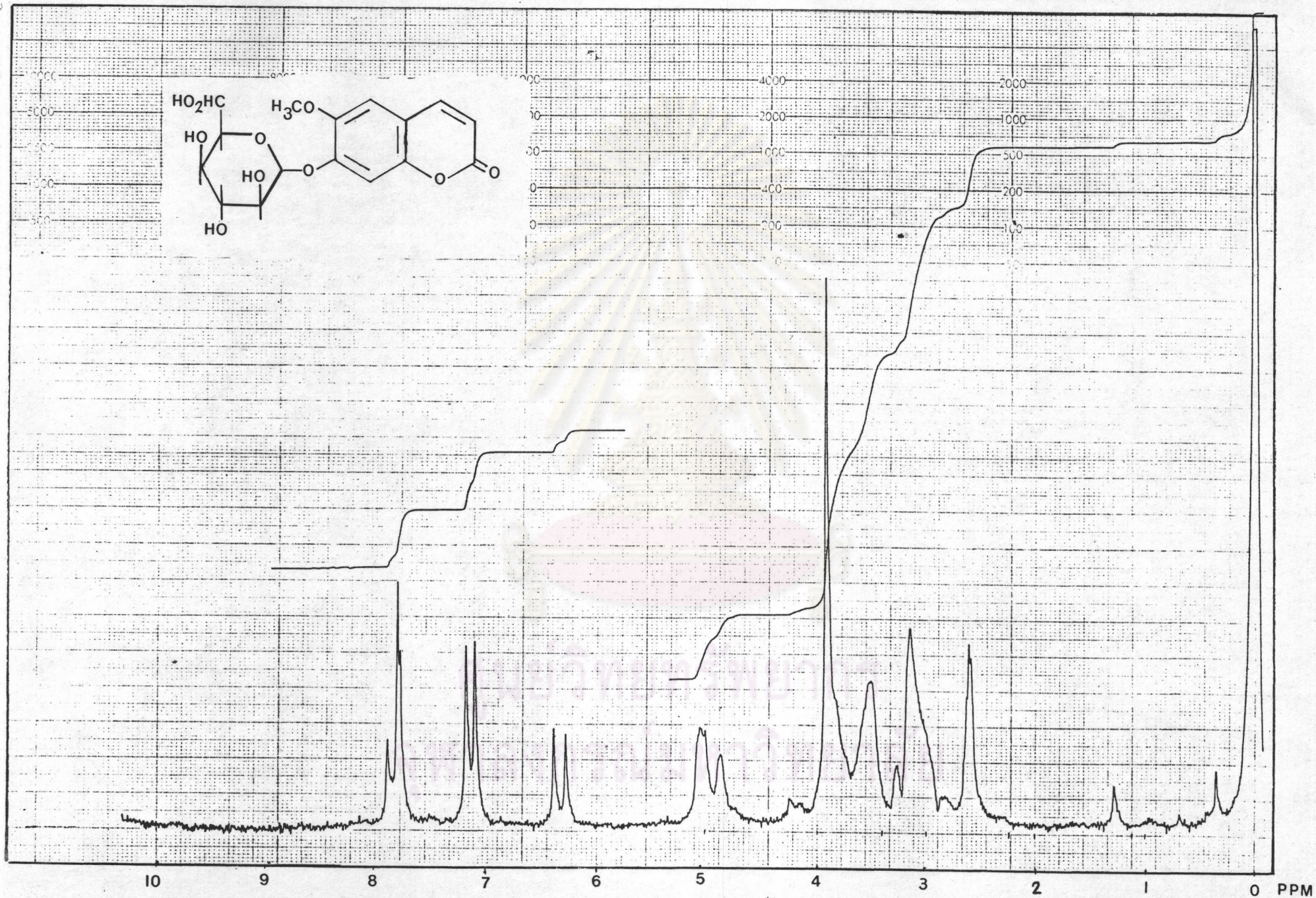


FIGURE 6:  $^1\text{H-NMR}$  OF ES-2

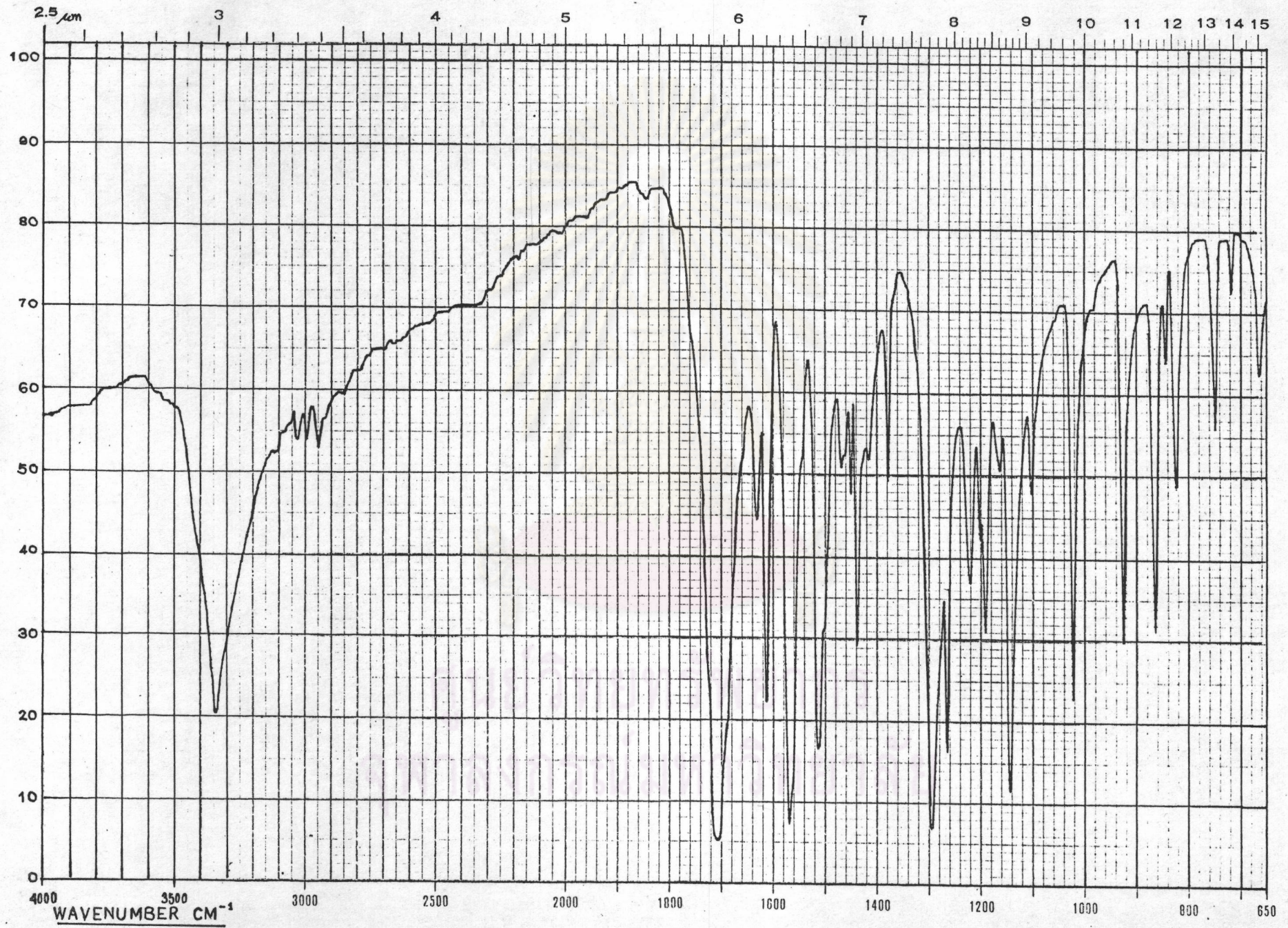


Figure 7: Infrared absorption spectrum of ES-1



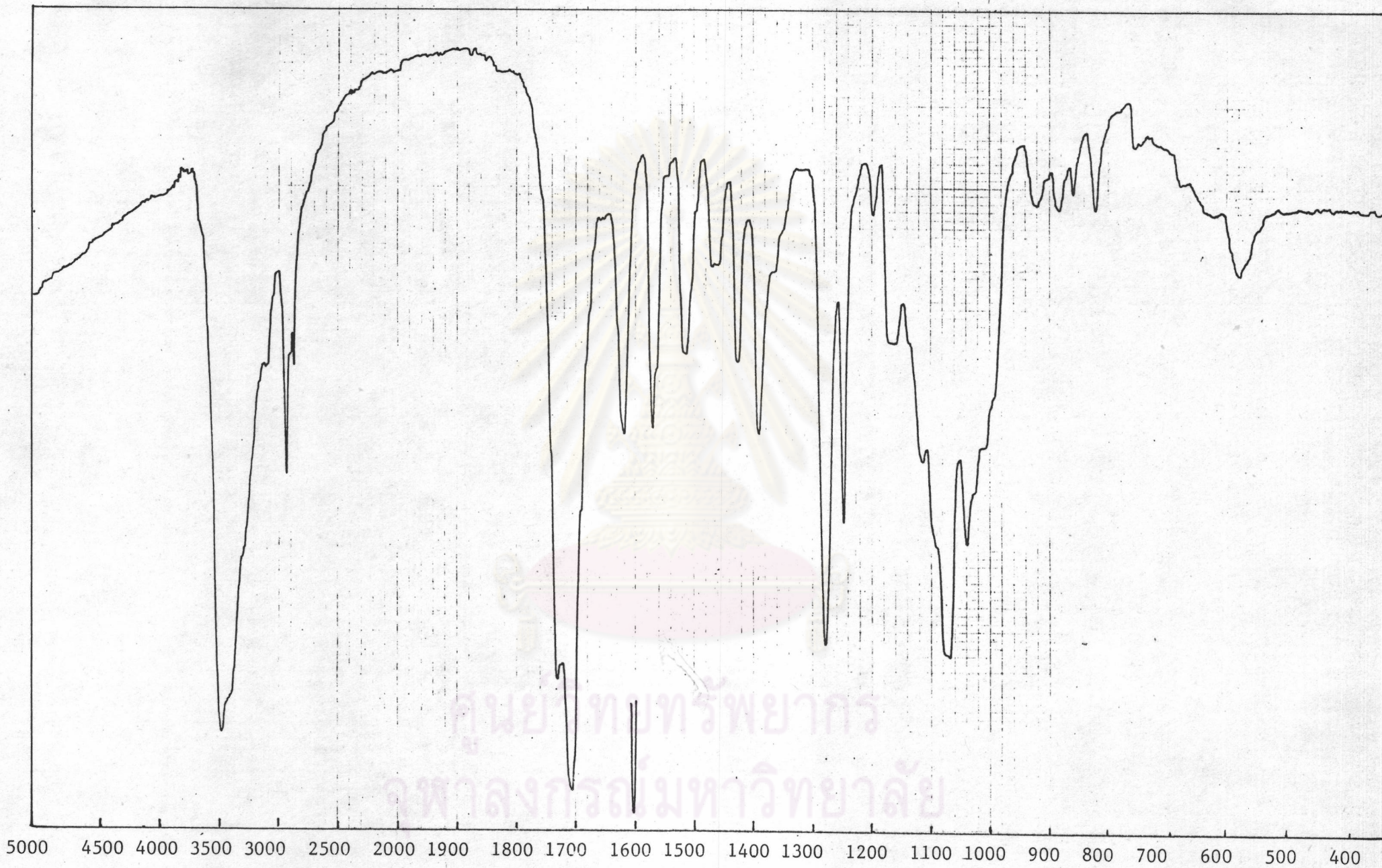


Figure 8: Infrared absorption spectrum of ES-2

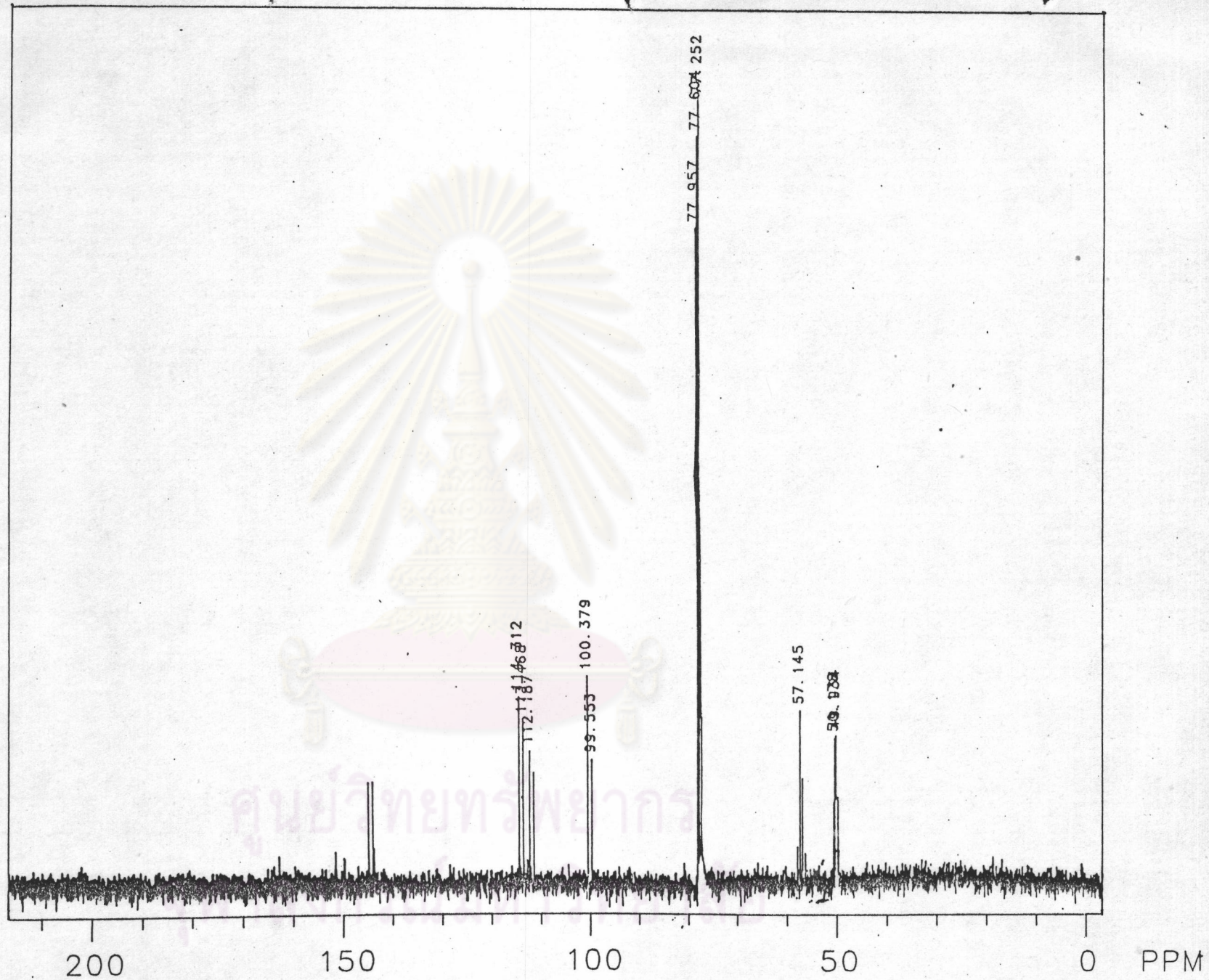


Figure 9: Carbon-13 nuclear magnetic resonance of ES-1

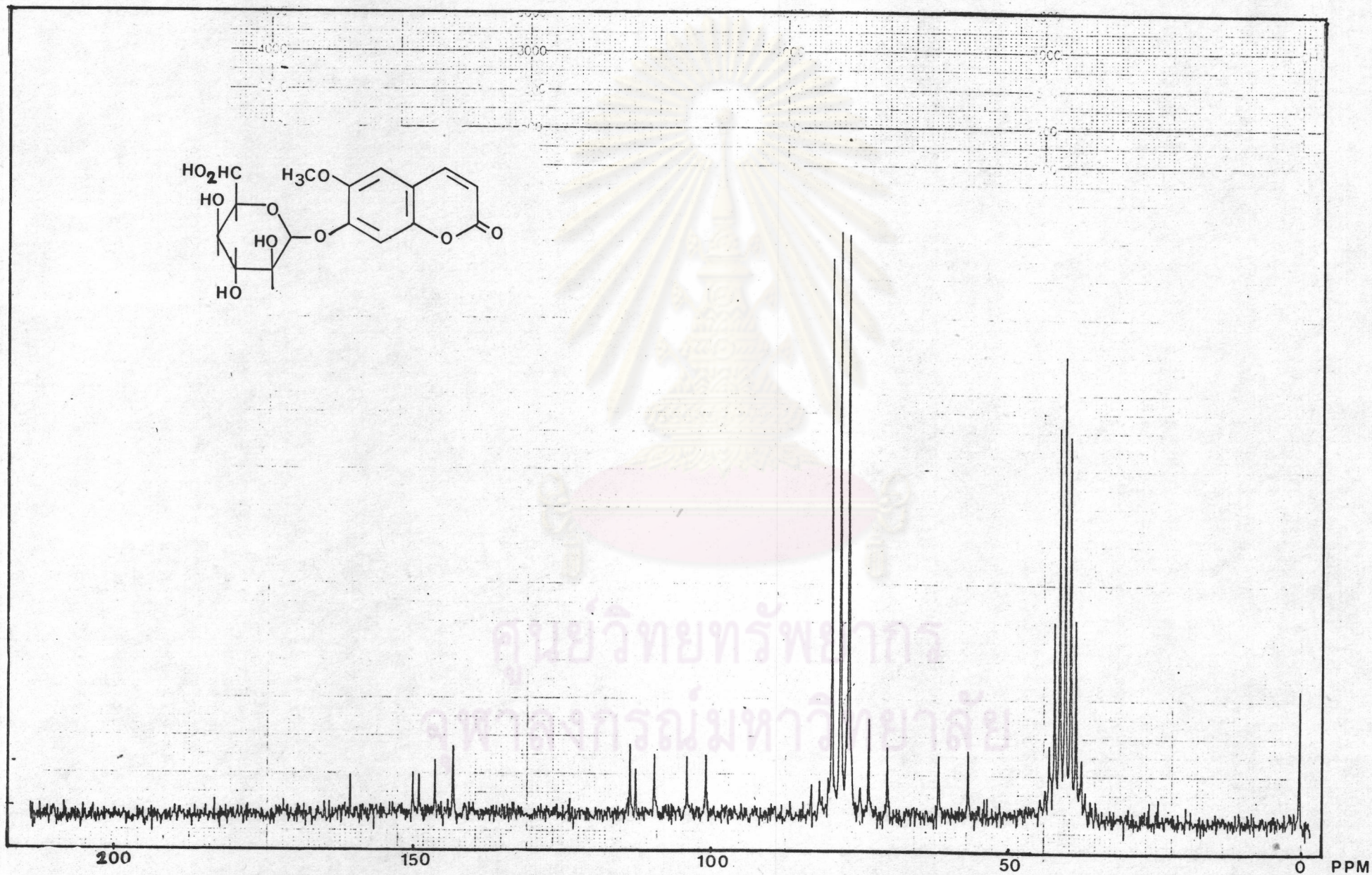


Figure 10: Carbon-13 nuclear magnetic resonance of ES-2

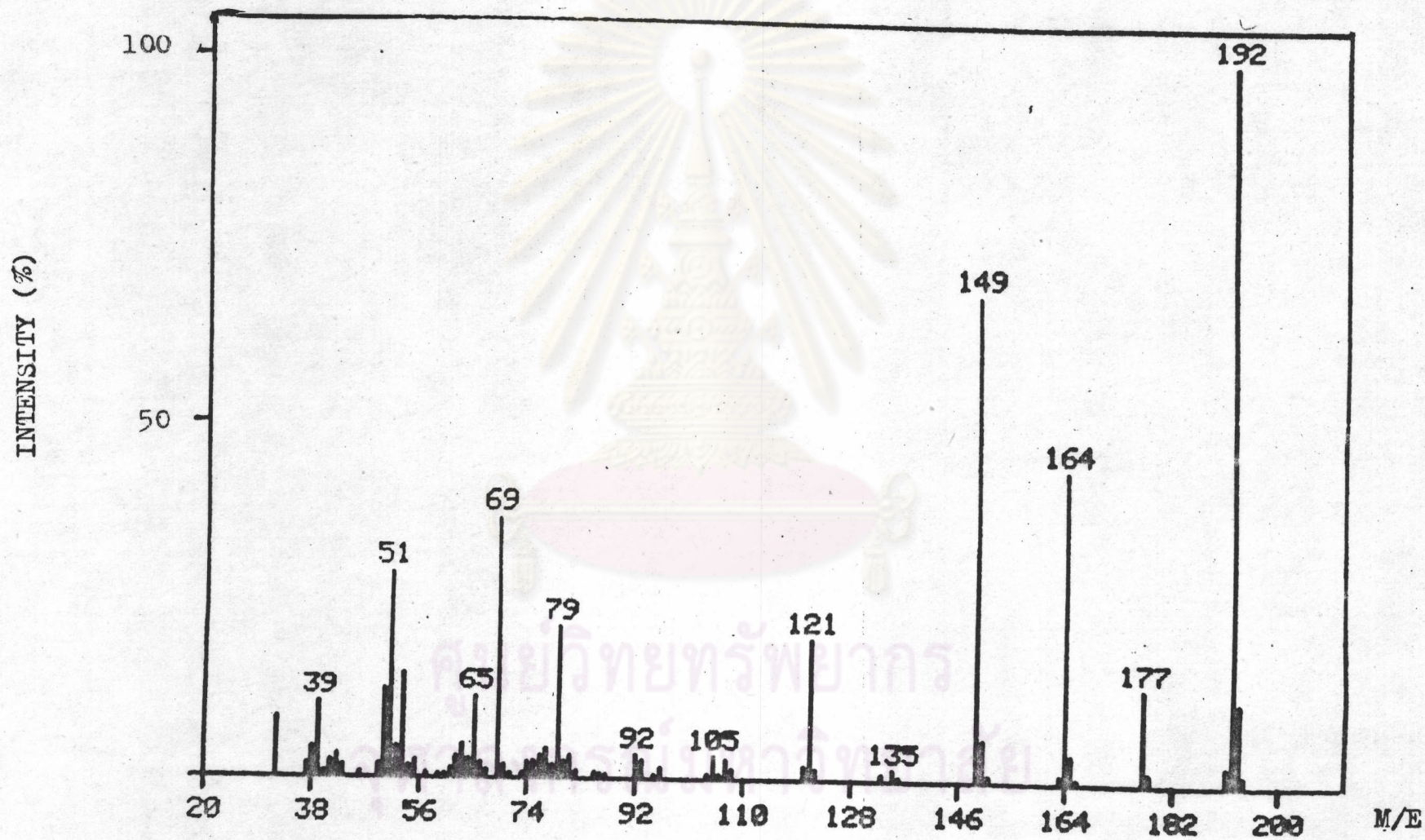
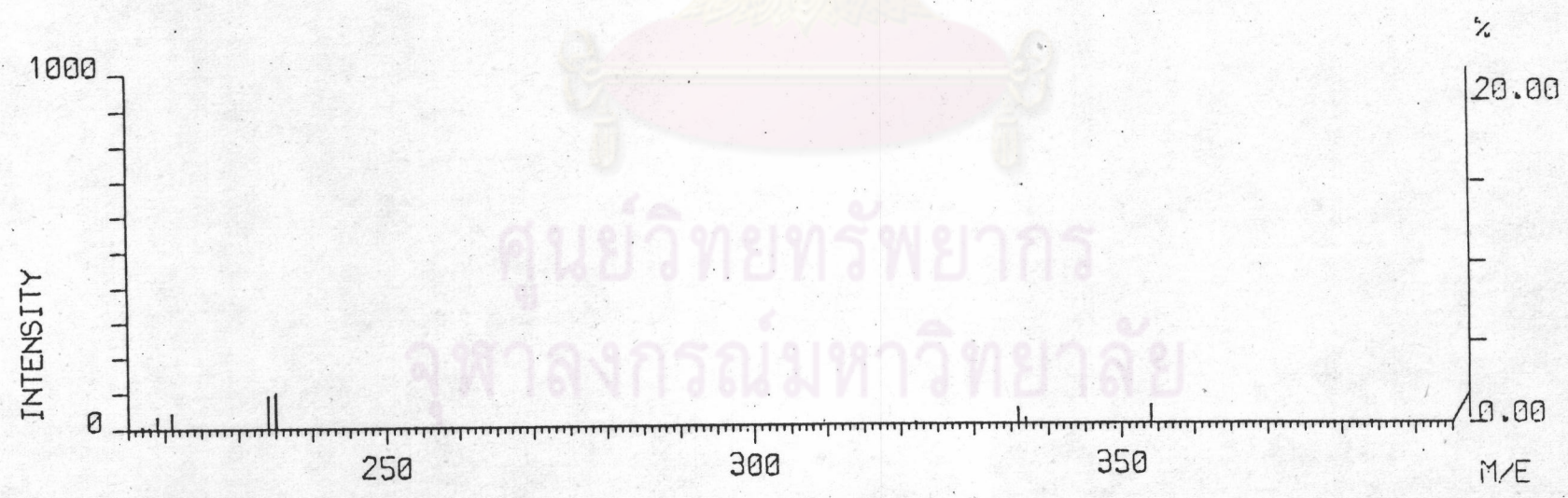
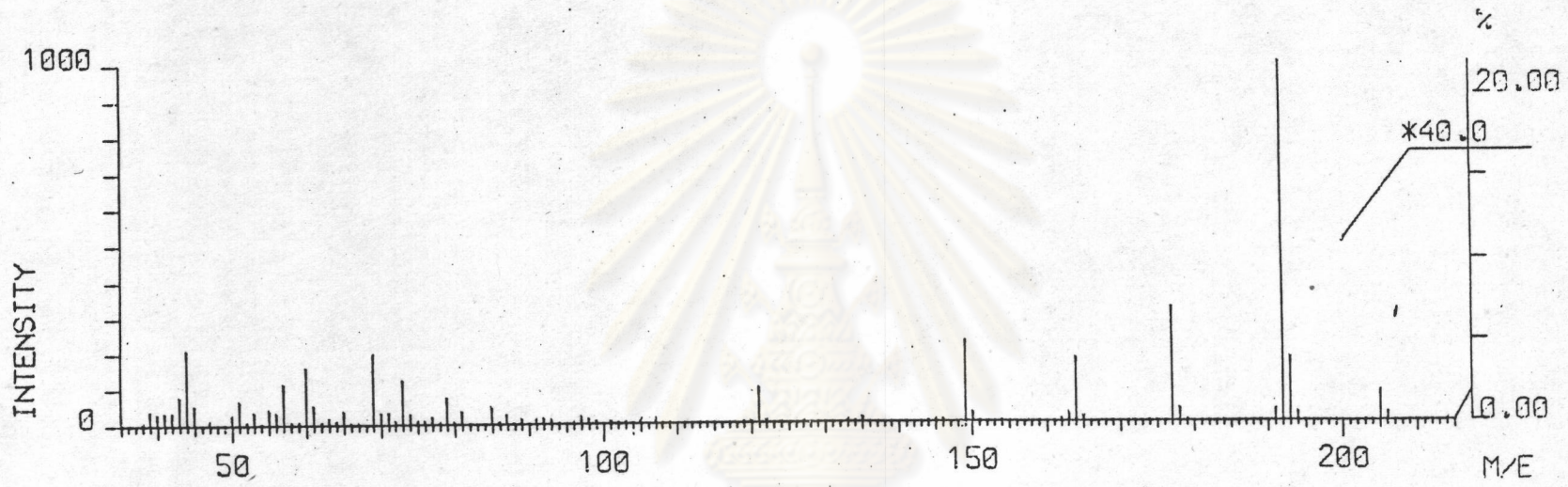


Figure 11: Mass spectrum of ES-1



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Figure 12: Mass spectrum of ES-2

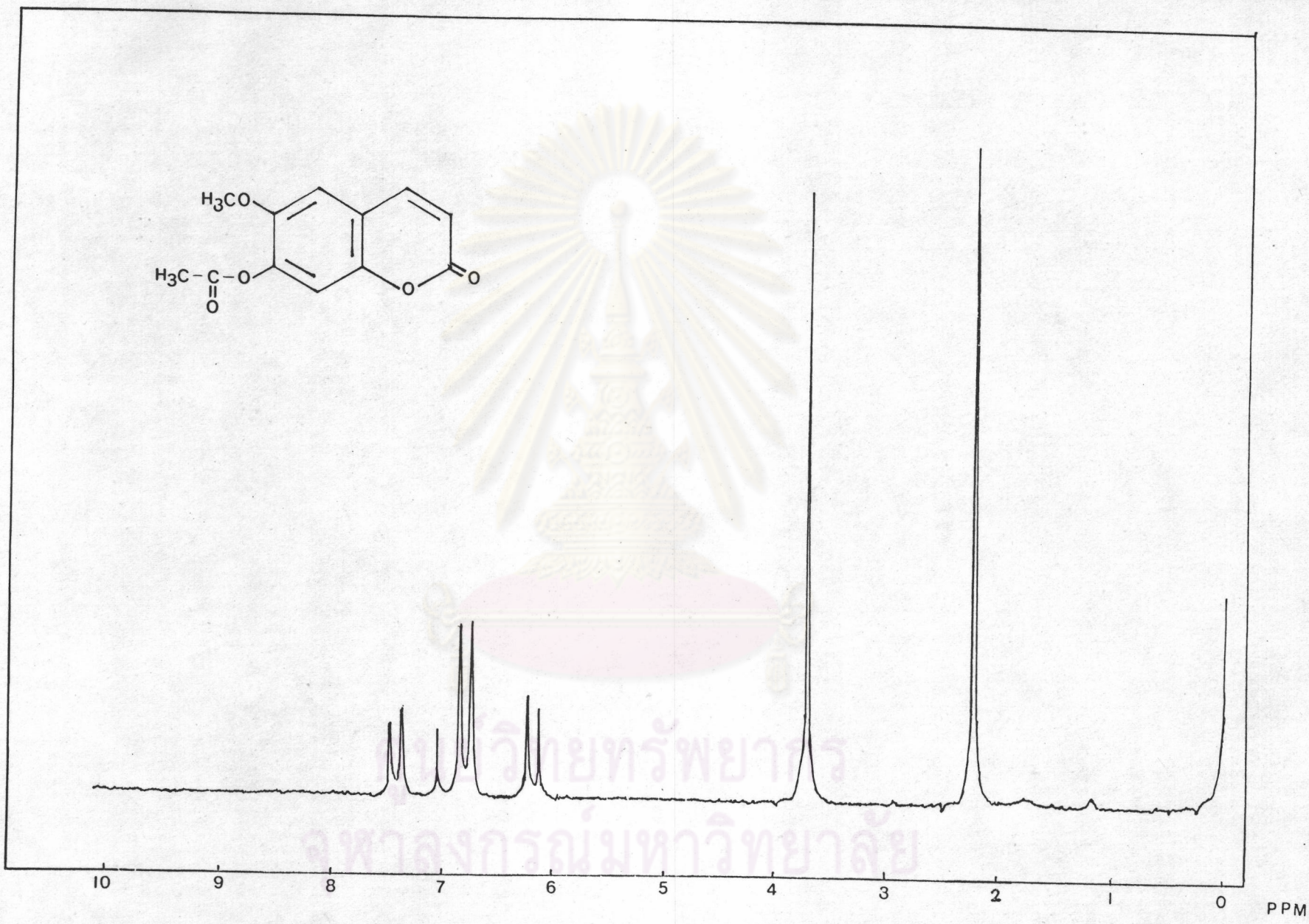


Figure 13: Proton nuclear magnetic resonance of ES-1 acetate

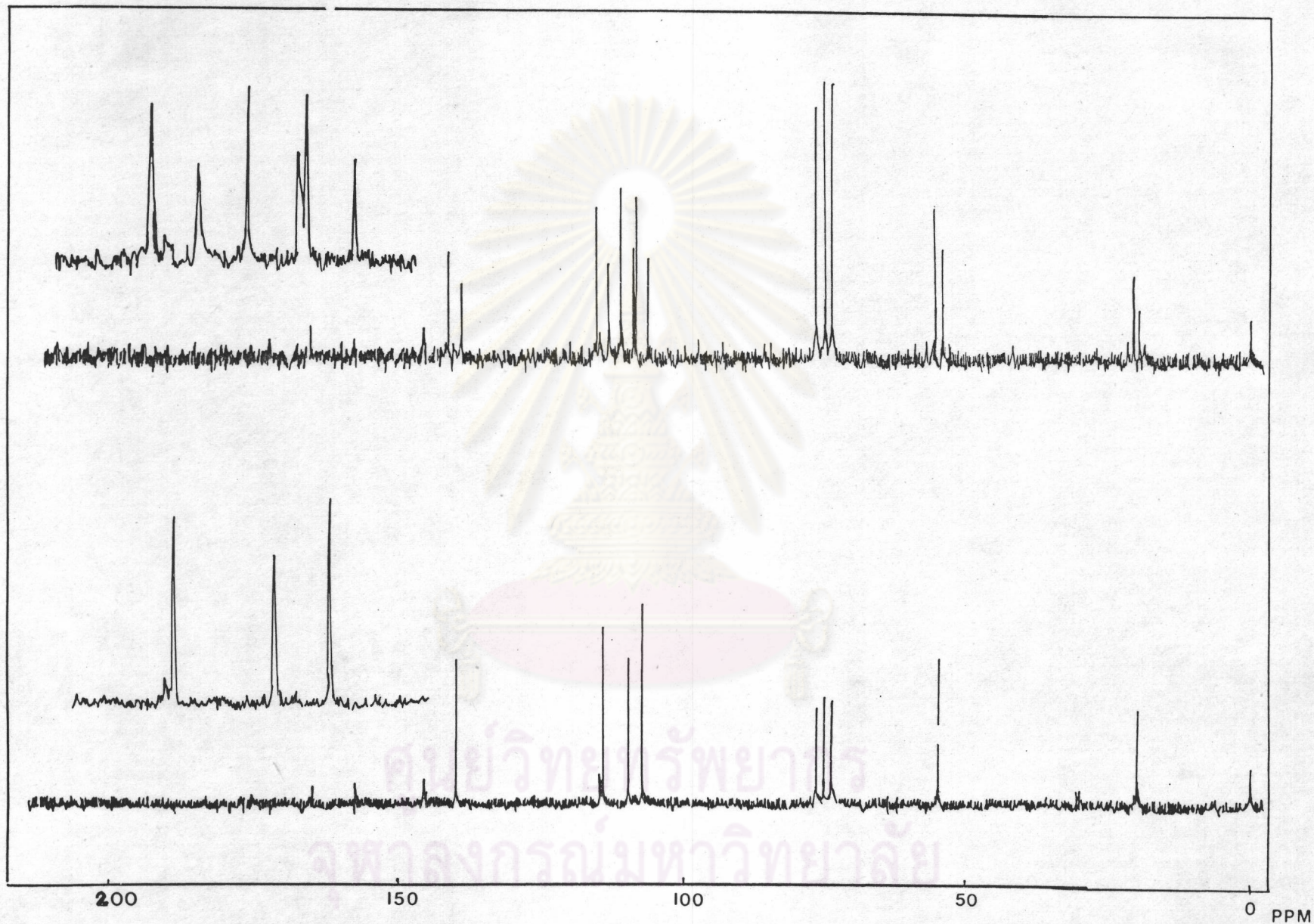


Figure 14: Carbon-13 nuclear magnetic resonance of ES-1 acetate



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