

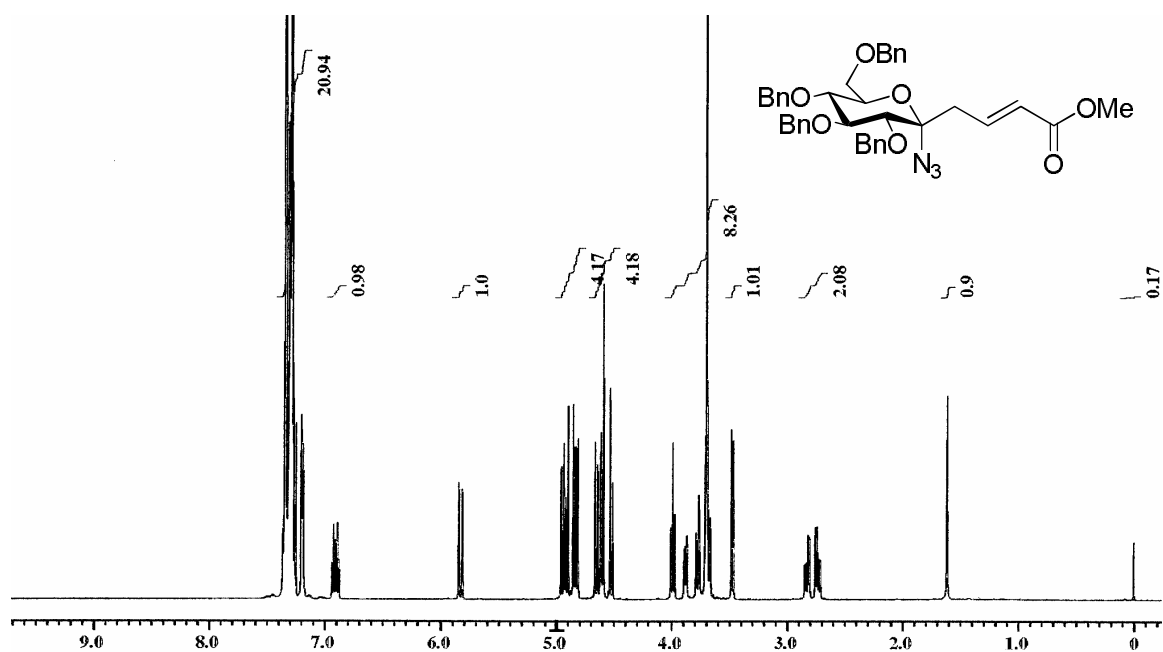
## **Synthesis of sugar-derived spiroaminals via lactamization and metathesis reactions**

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Doddi<sup>a</sup> and Yashwant D. Vankar<sup>\*a</sup>**

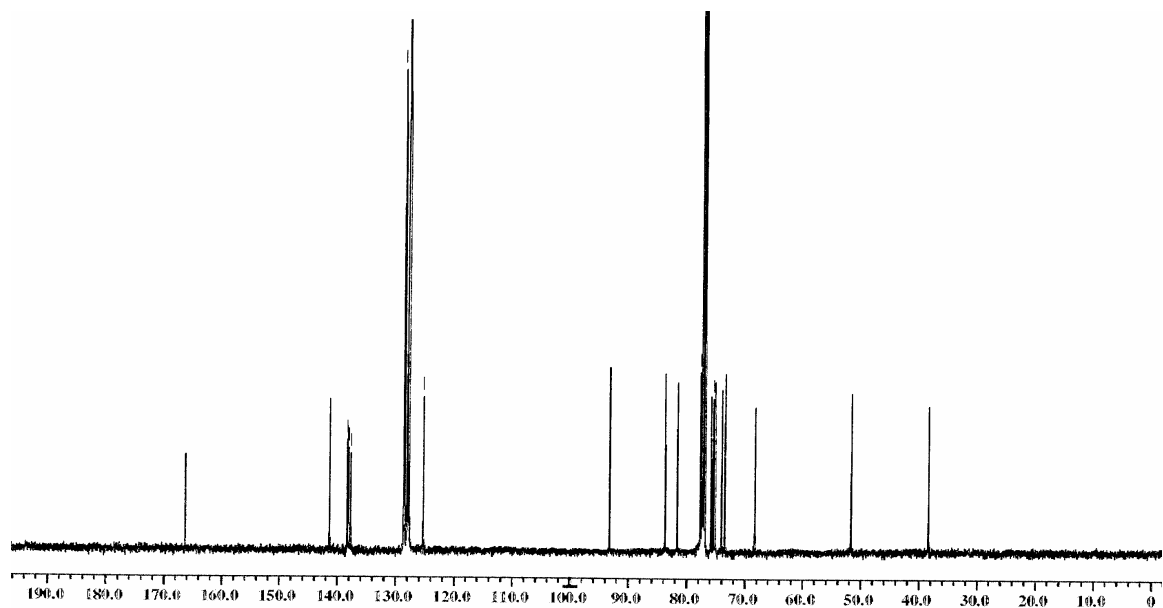
Department of Chemistry, Indian Institute of Technology,  
Kanpur – 208 016, India.

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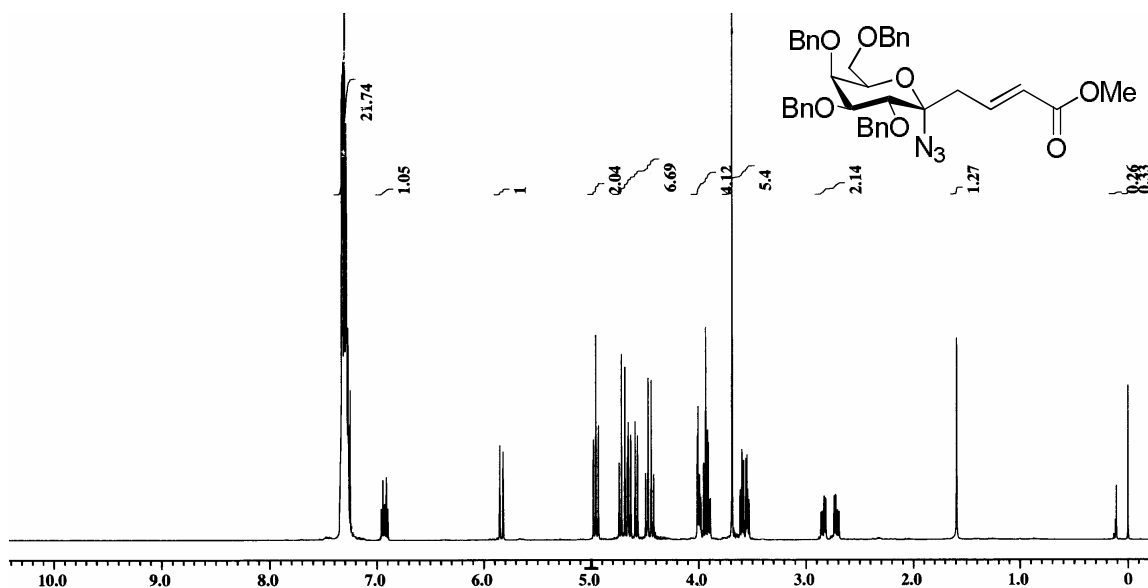
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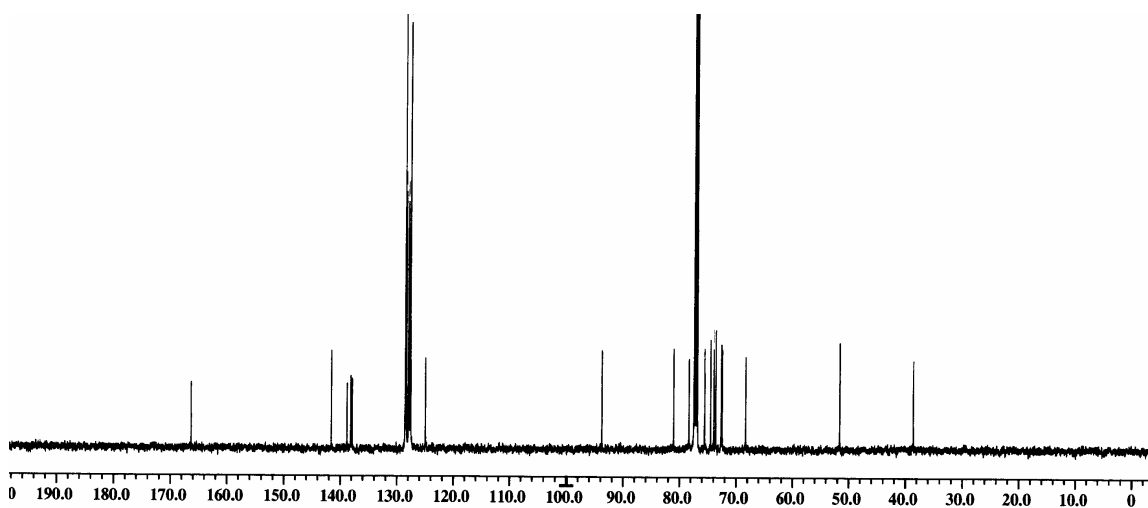
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**Figure 2:** <sup>13</sup>C NMR (500 MHz) spectrum of compound **21**



**Figure 3:** <sup>1</sup>H NMR (500 MHz) spectrum of compound 22



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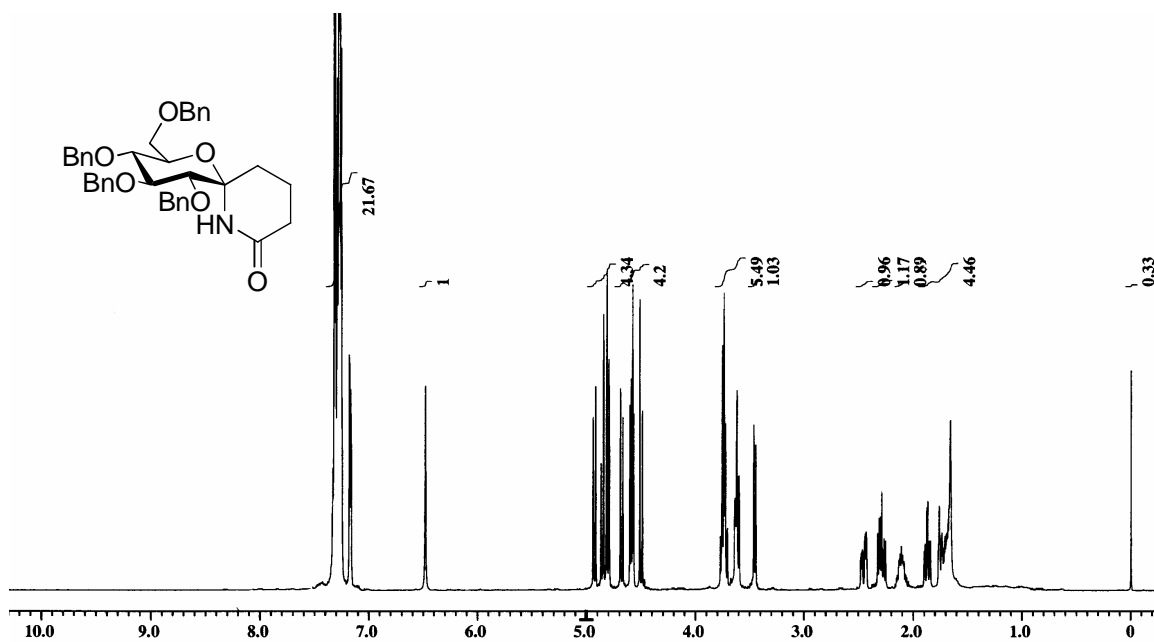


Figure 5: <sup>1</sup>H NMR (500 MHz) spectrum of compound 23a

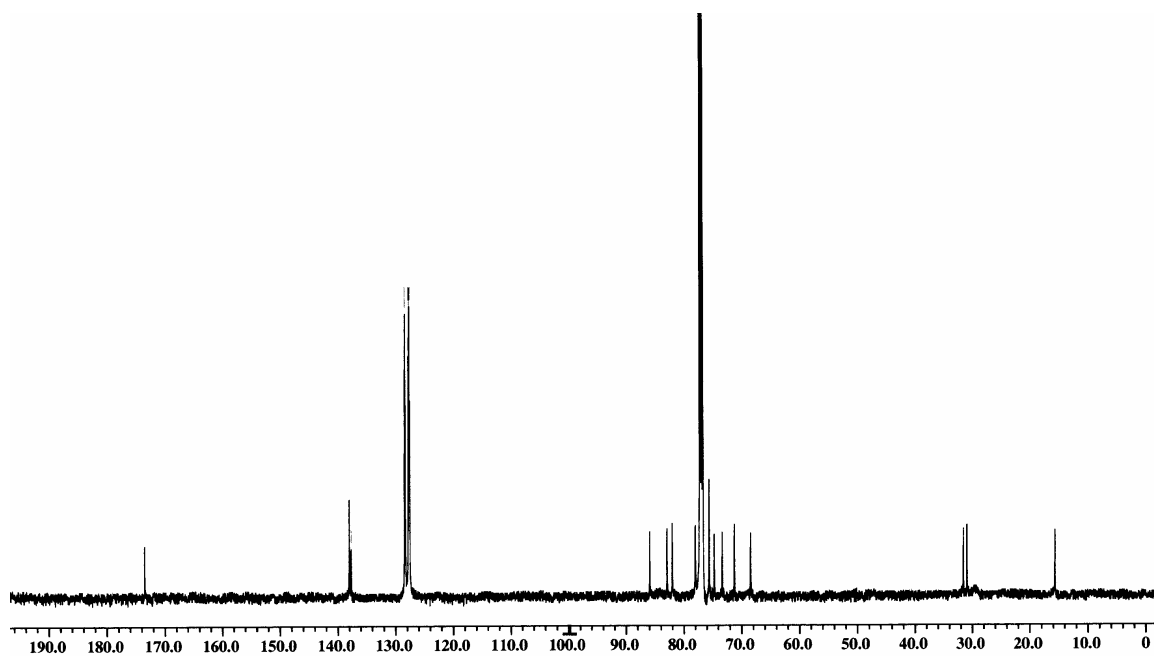
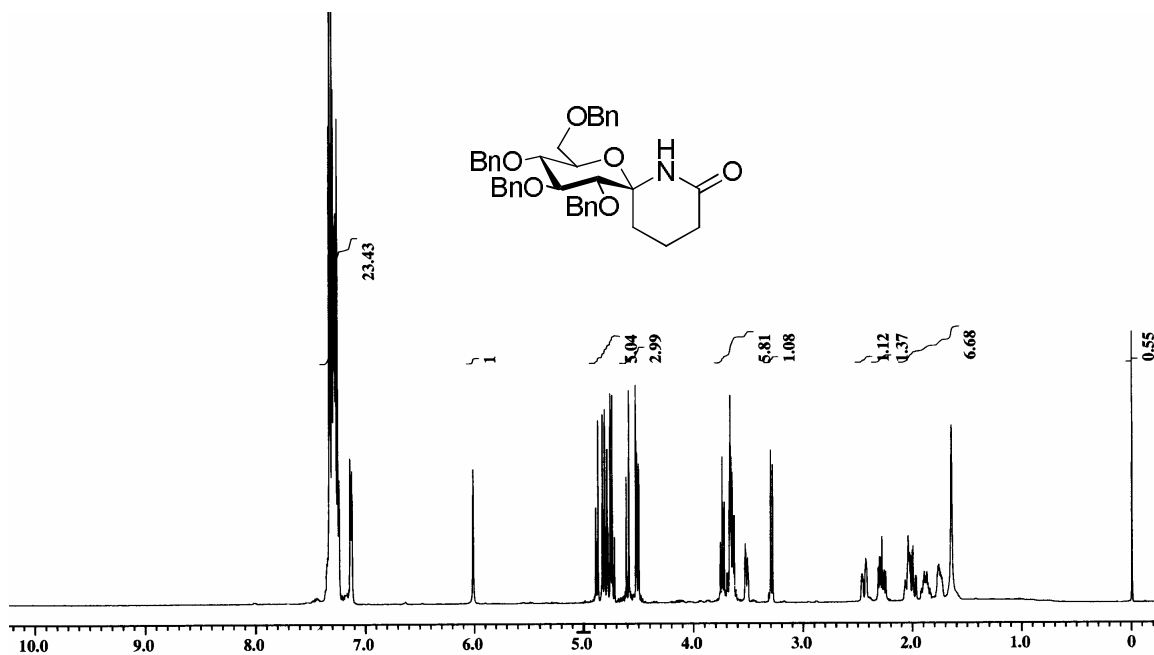
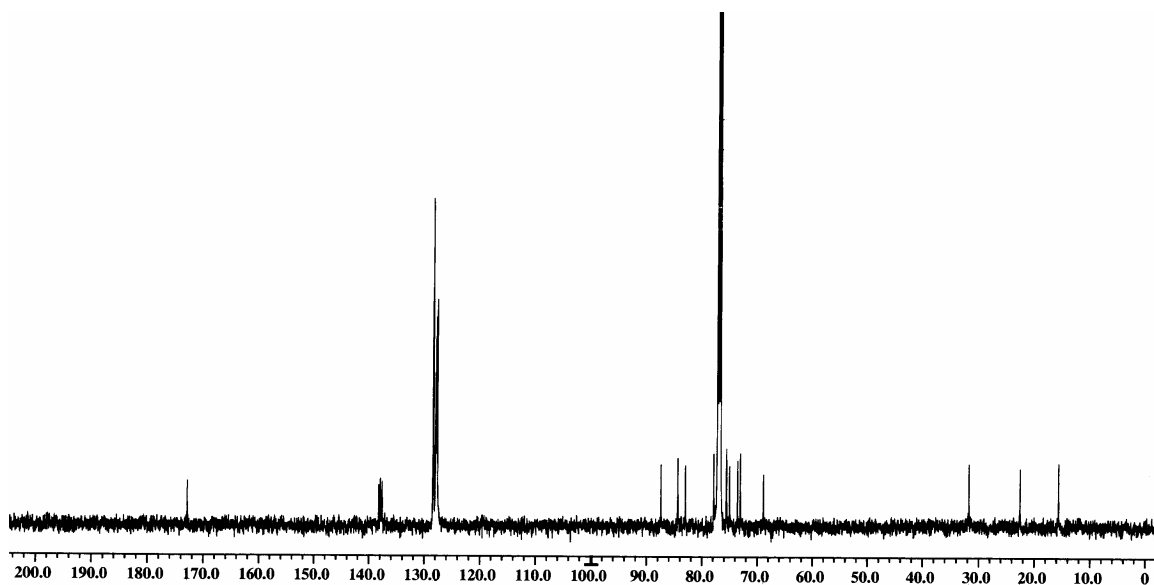


Figure 6: <sup>13</sup>C NMR (500 MHz) spectrum of compound 23a



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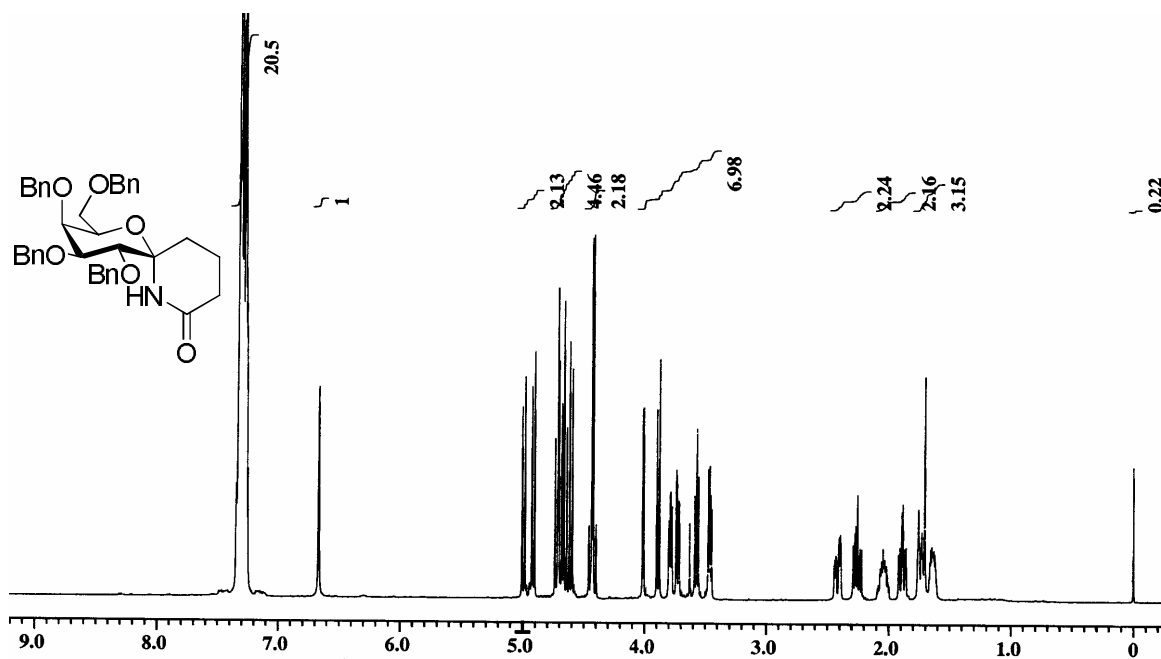


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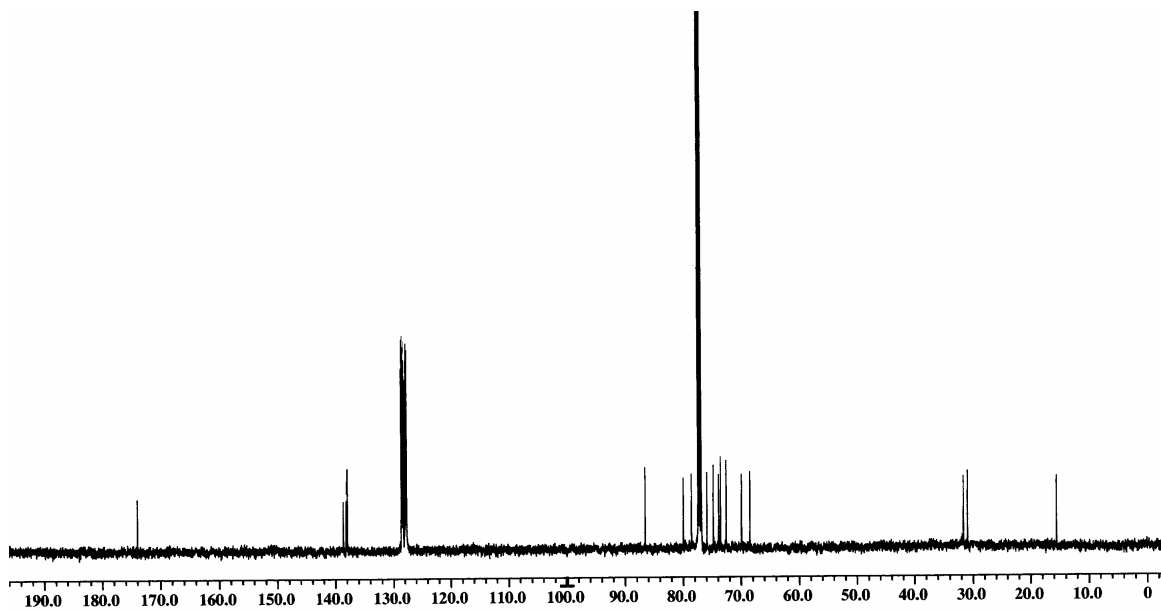
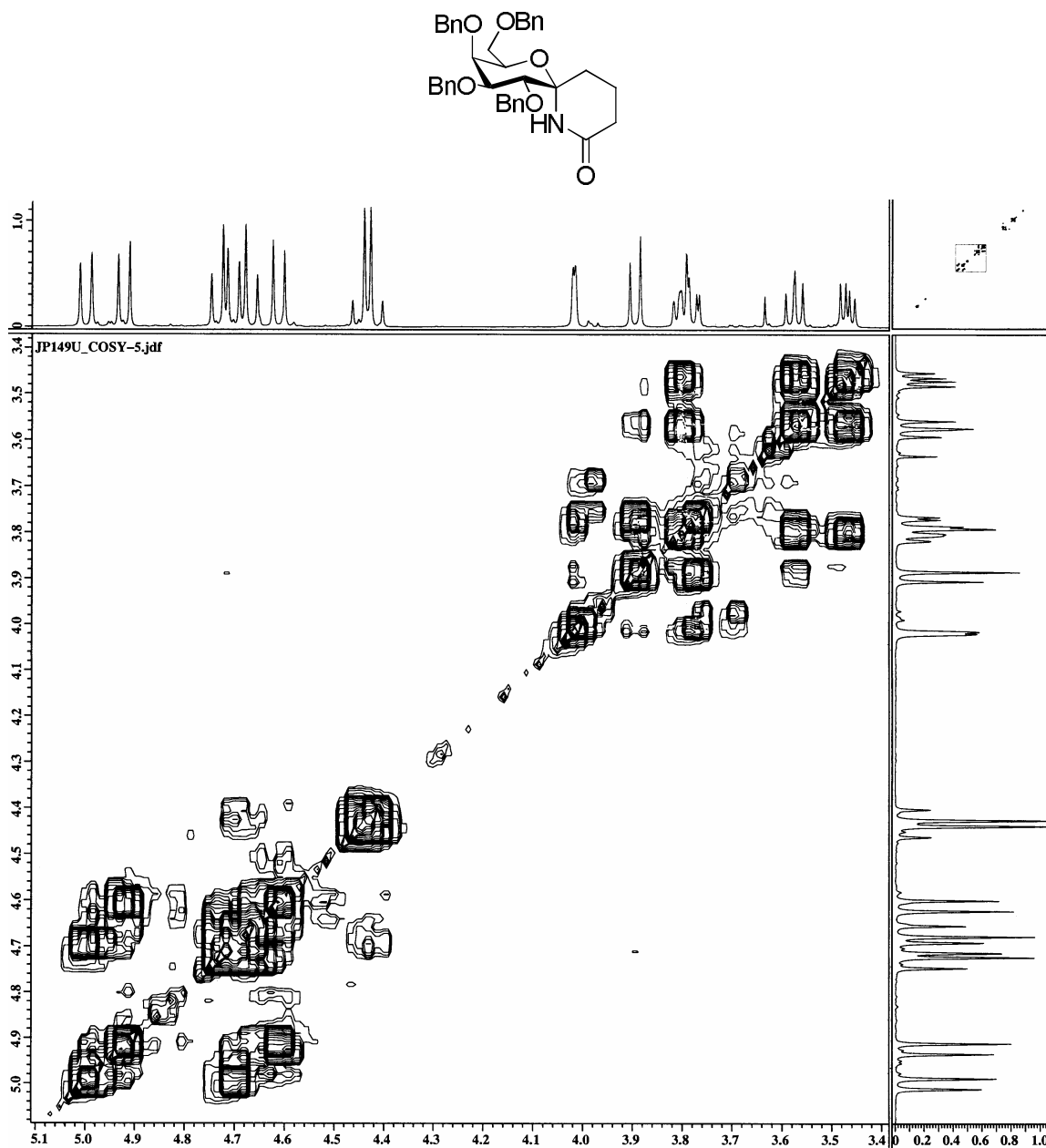
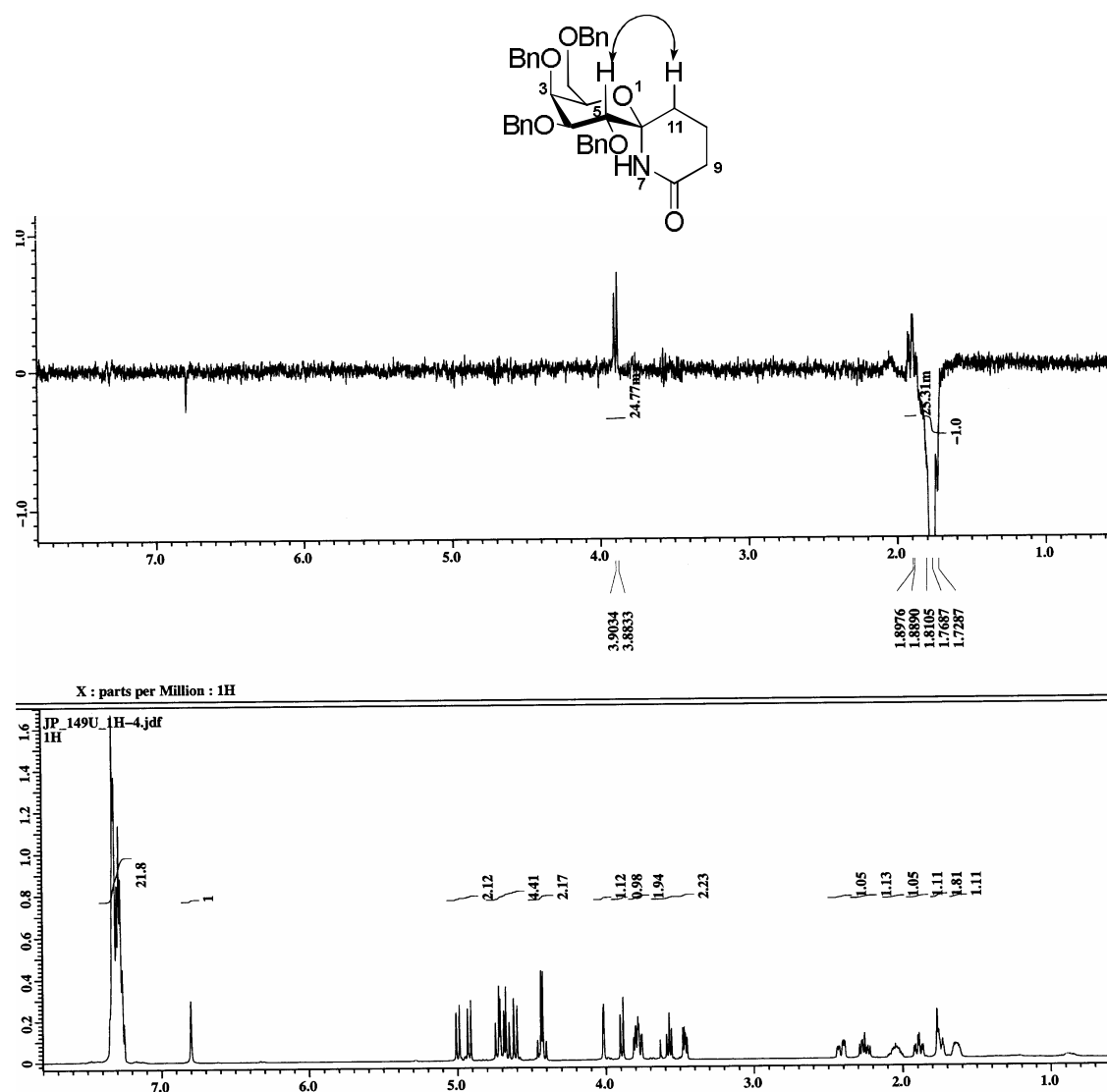


Figure 10: <sup>13</sup>C NMR (500 MHz) spectrum of compound 24a

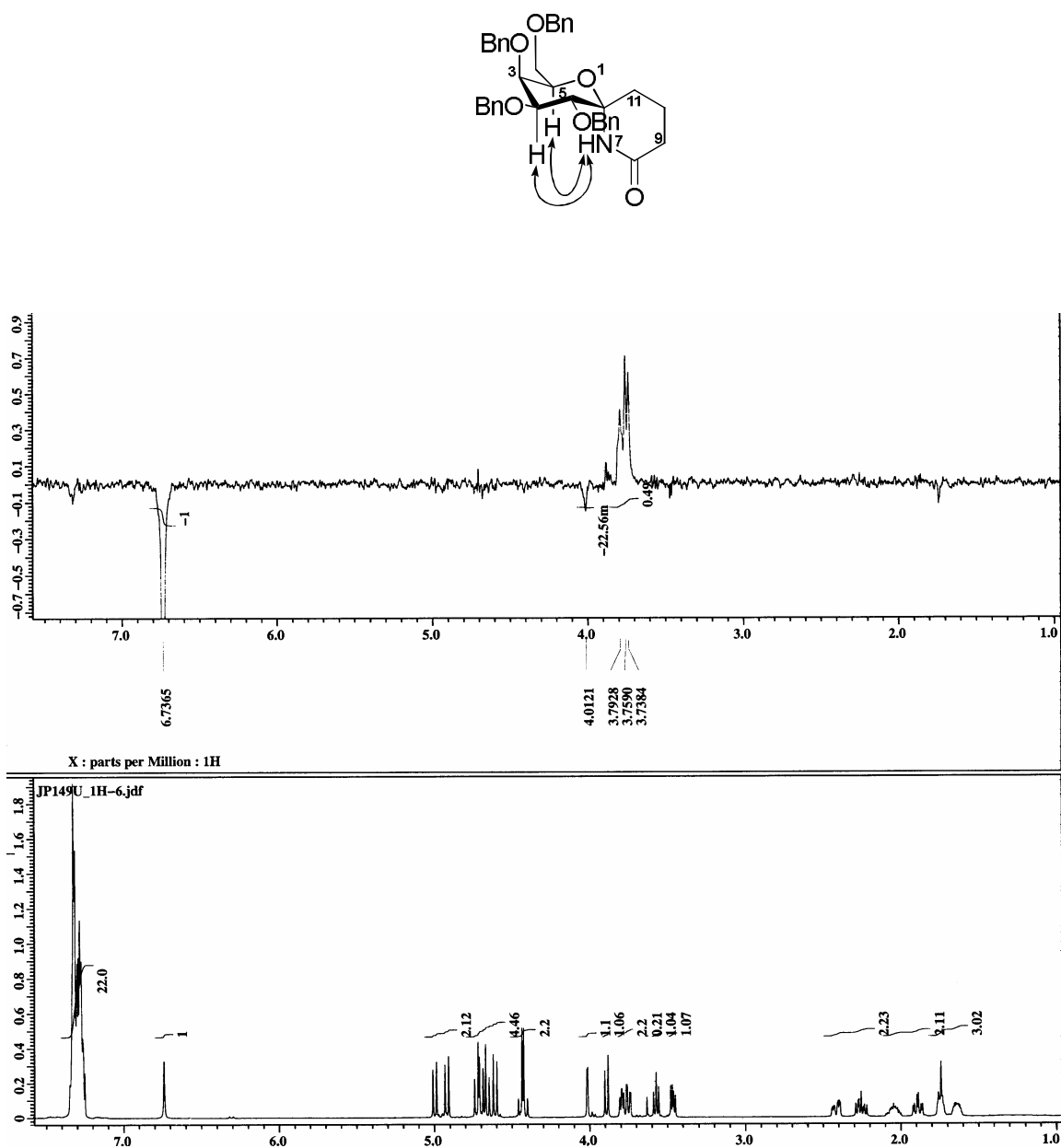


**Figure 11:**  $^1\text{H}$ - $^1\text{H}$  COSY (500 MHz) spectrum of compound **24a**

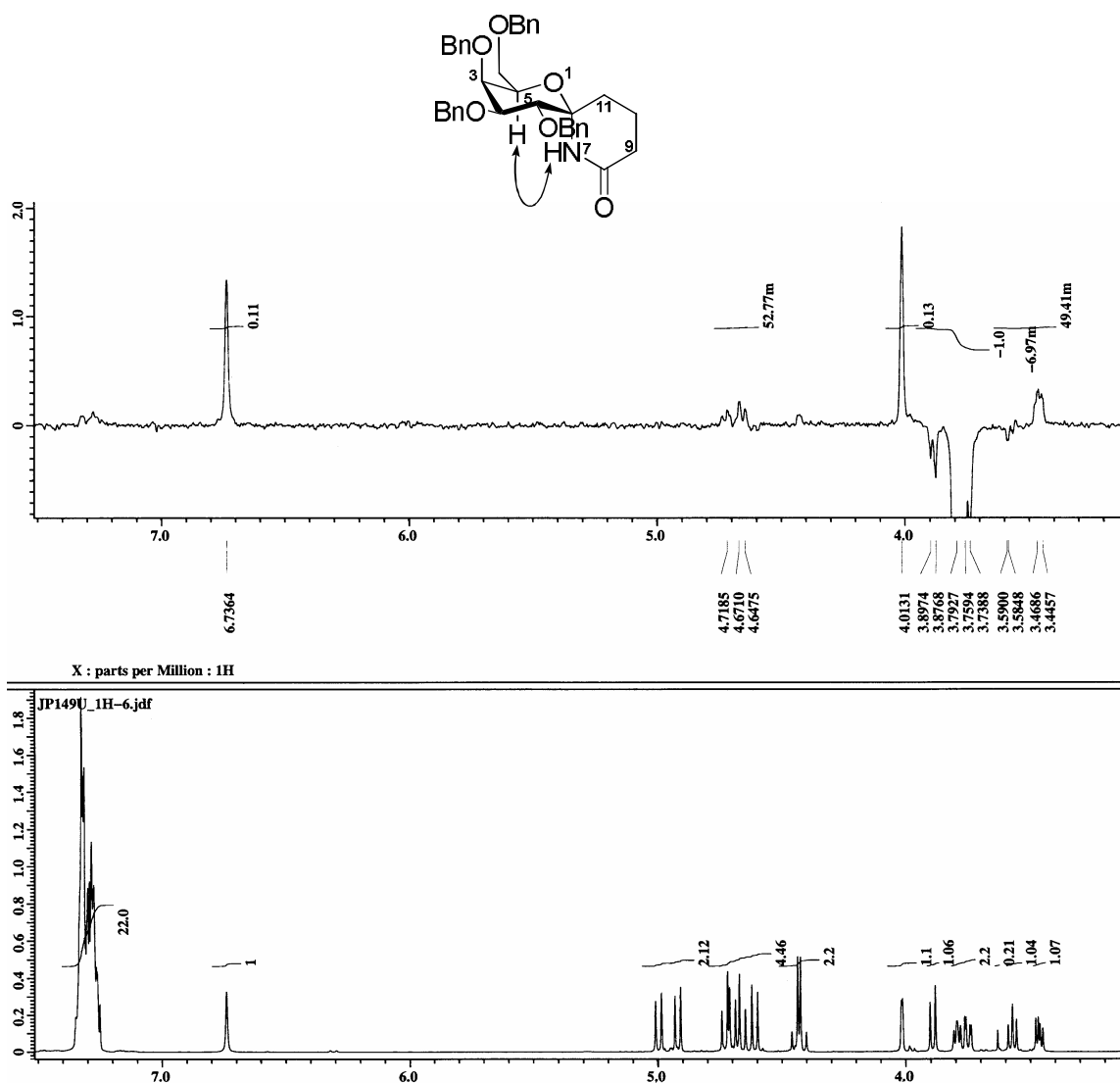


**Figure 12:** nOe (irradiation of H-11) spectrum of compound **24a**

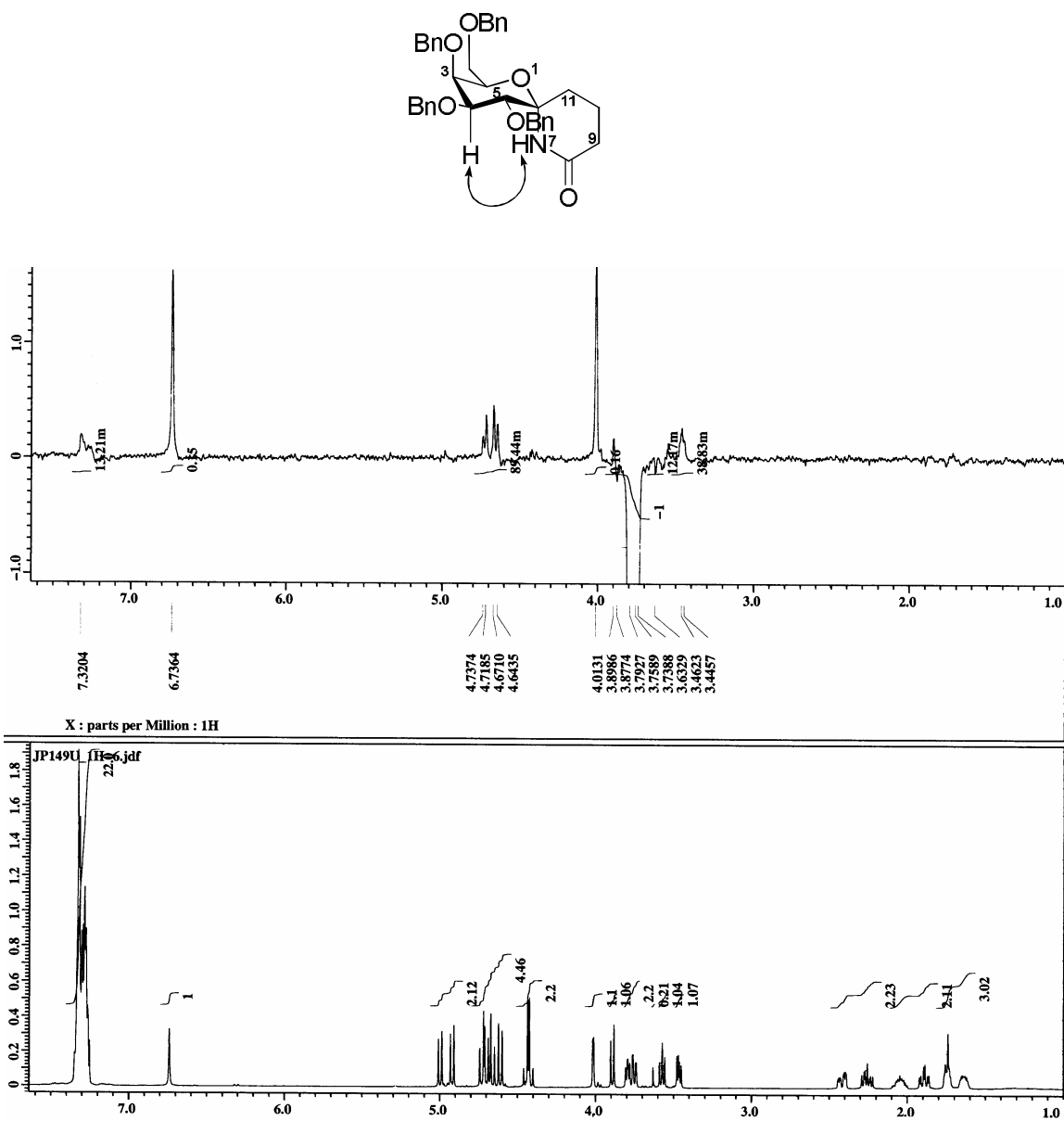




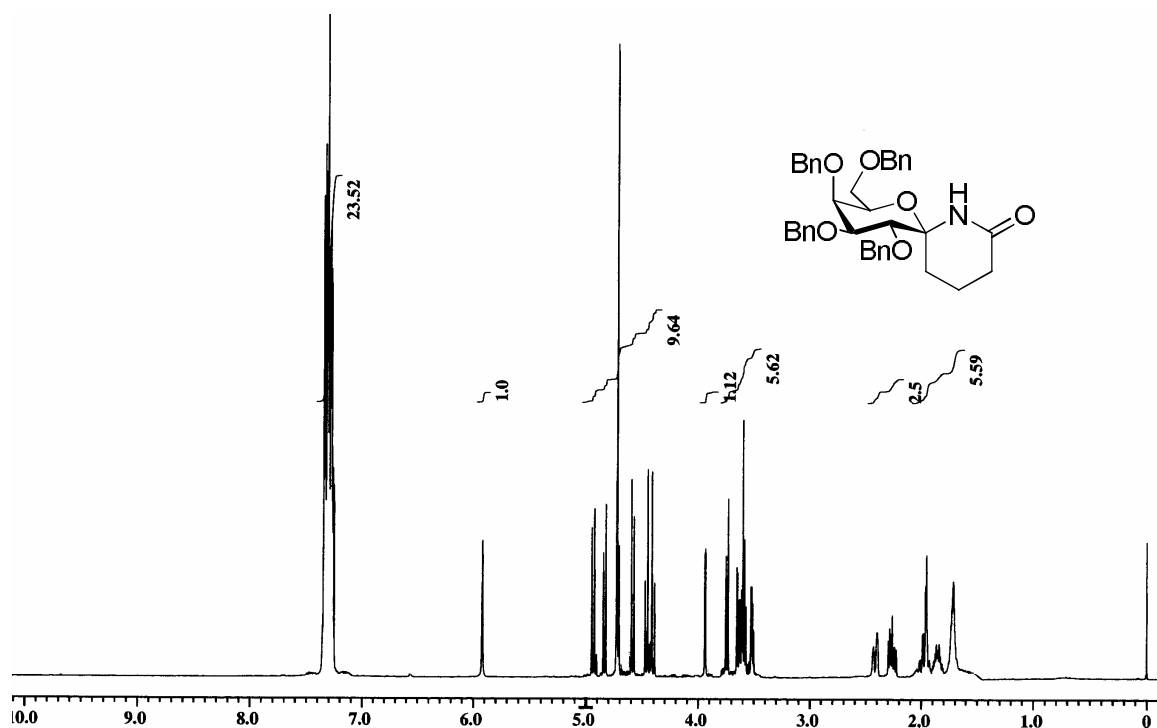
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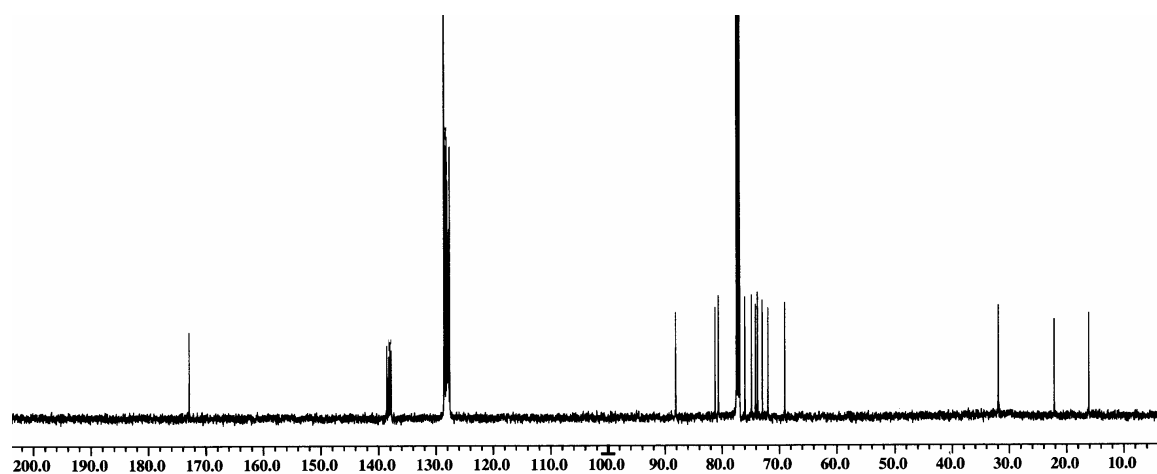
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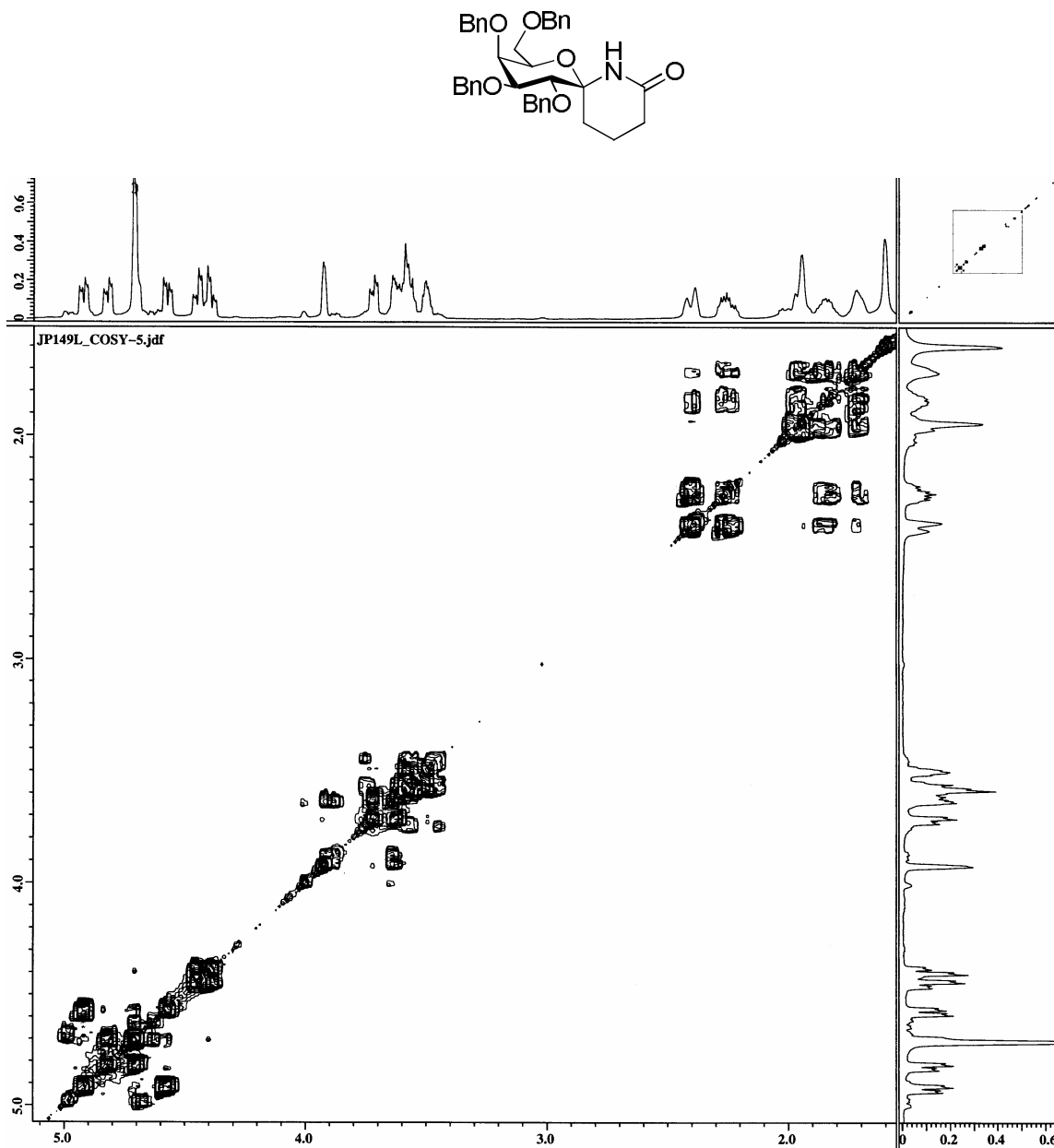
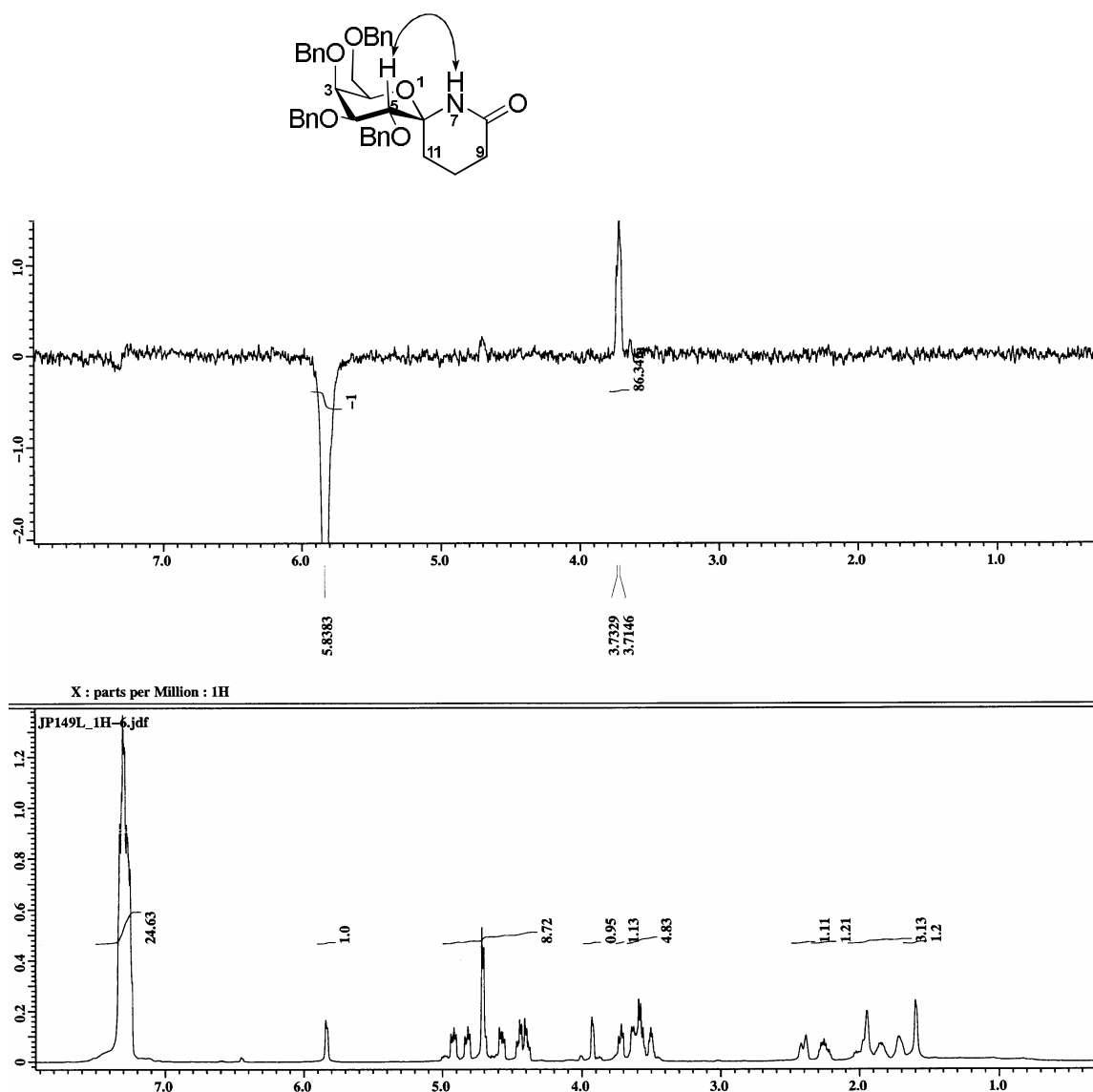
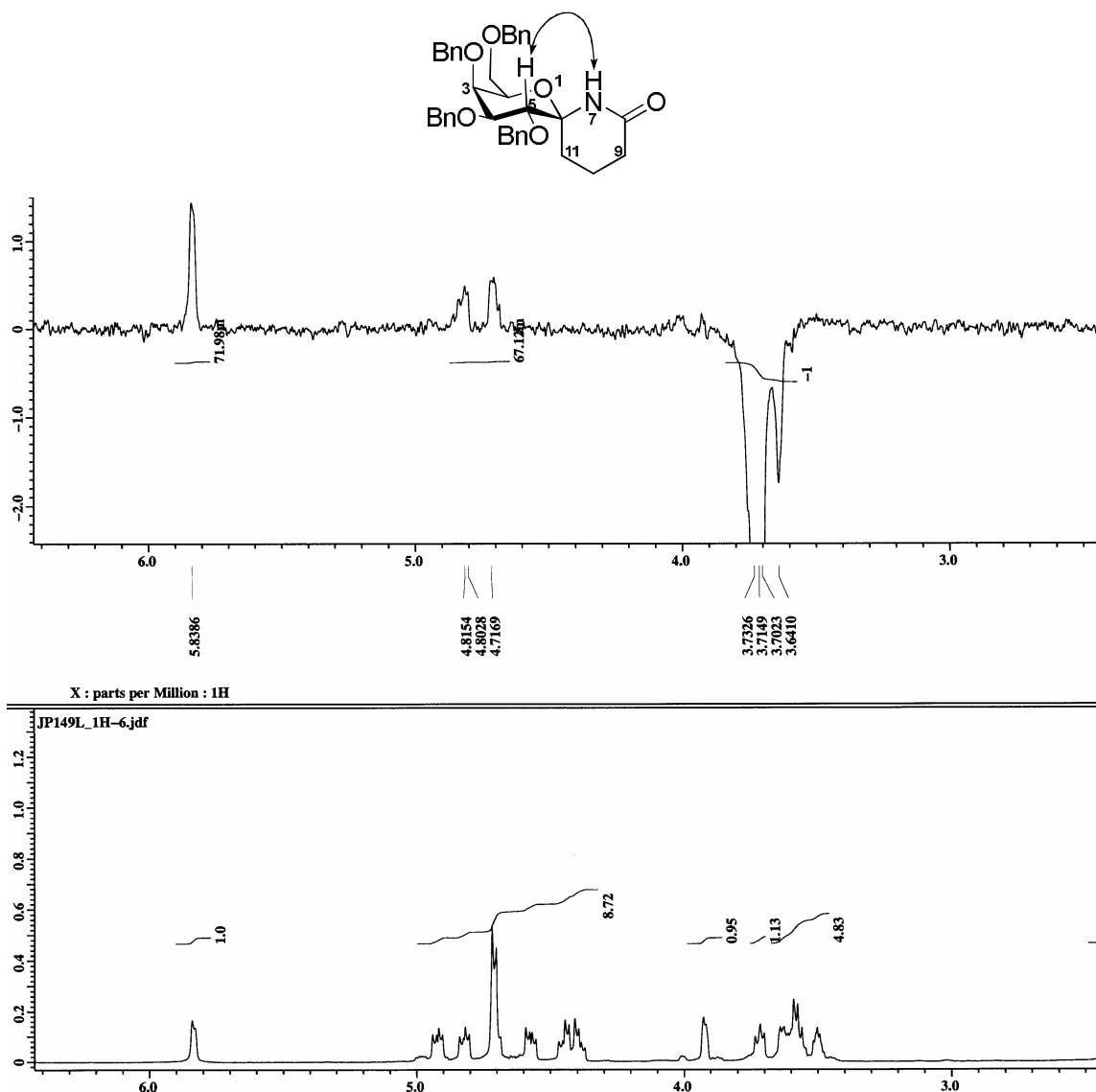


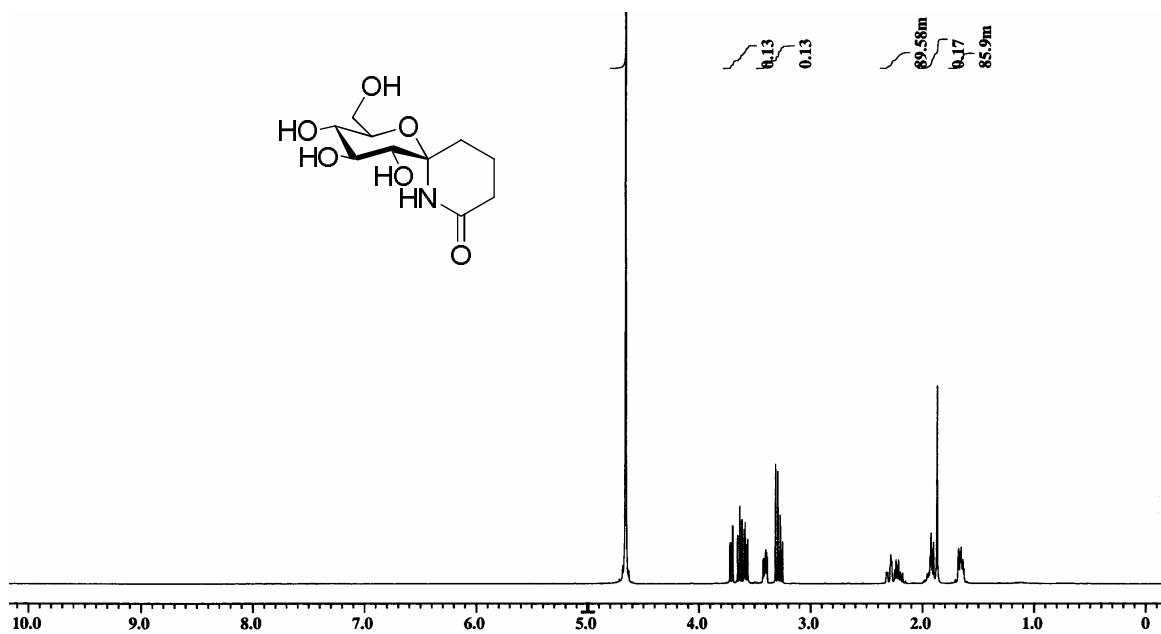
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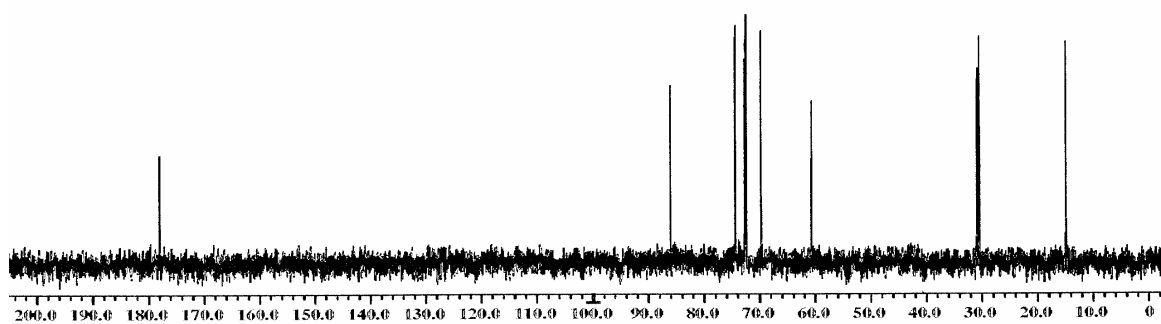
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**Figure 20:** nOe (irradiation of H-5) spectrum of compound **24b**



**Figure 21:** <sup>1</sup>H NMR (500 MHz) spectrum of compound **25a**



**Figure 22:** <sup>13</sup>C NMR (500 MHz) spectrum of compound **25a**



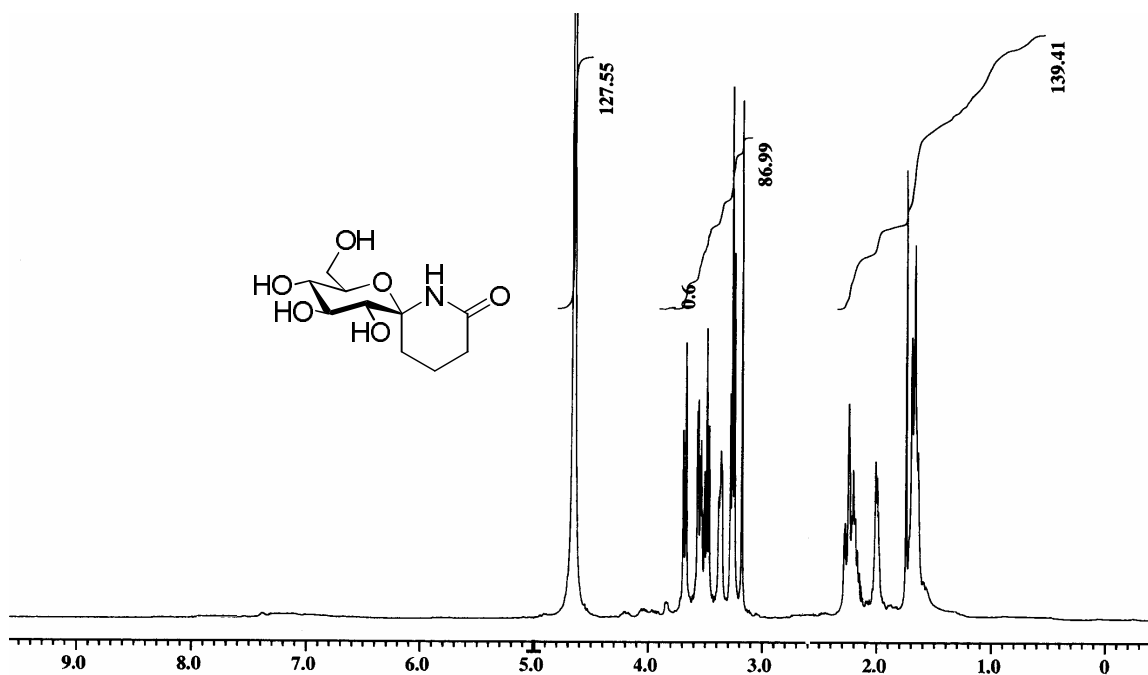


Figure 23:  $^1\text{H}$  NMR (500 MHz) spectrum of compound 25b

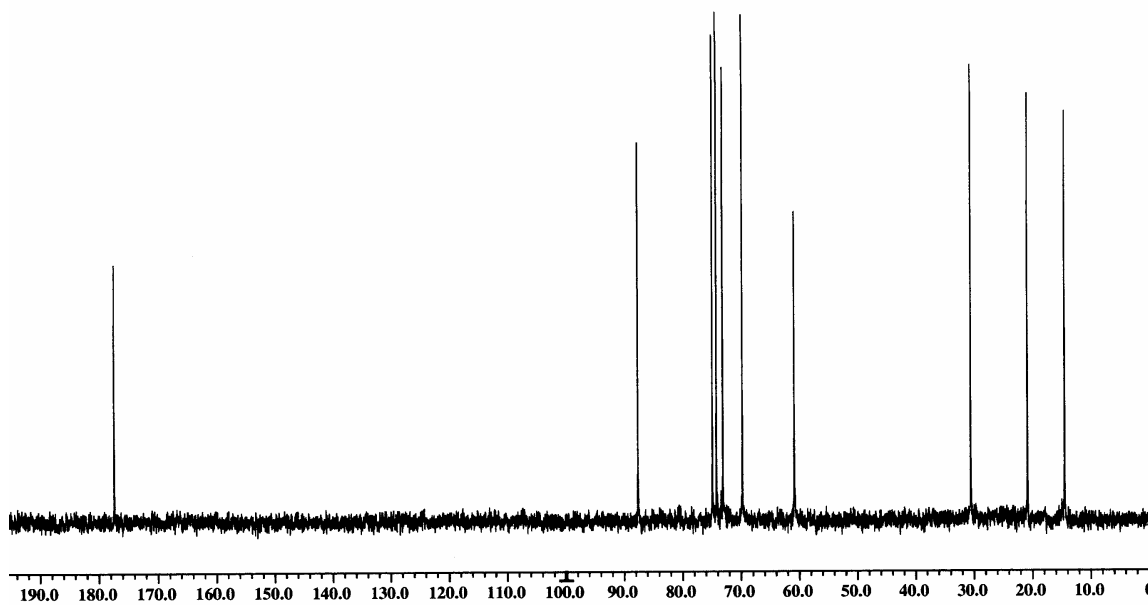
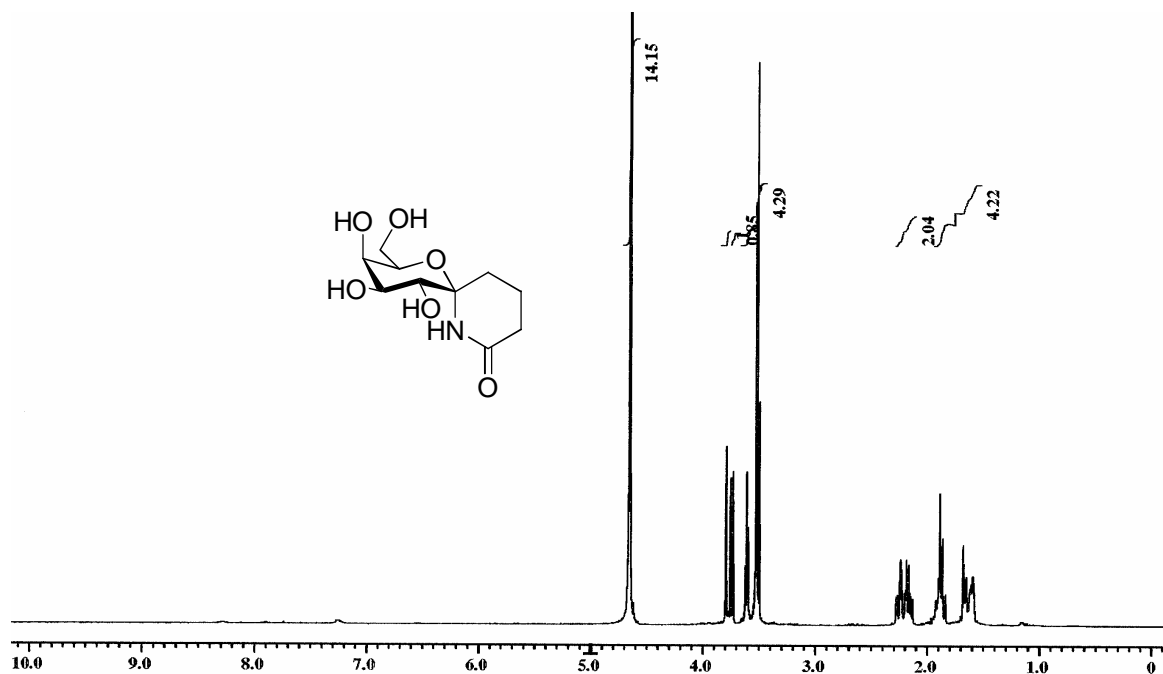
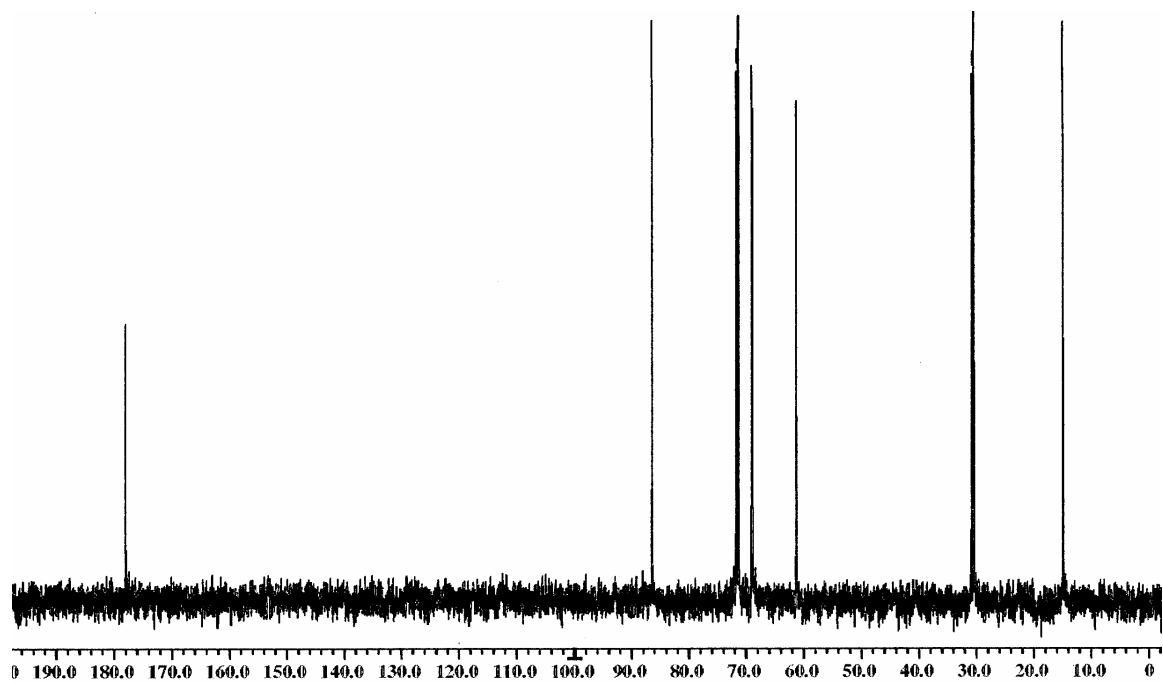


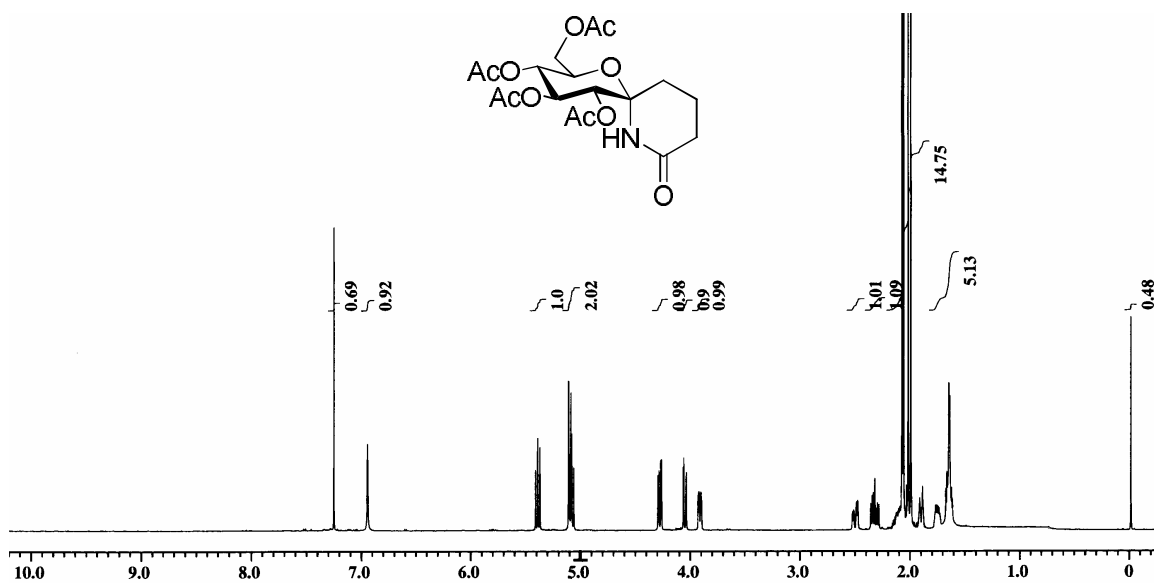
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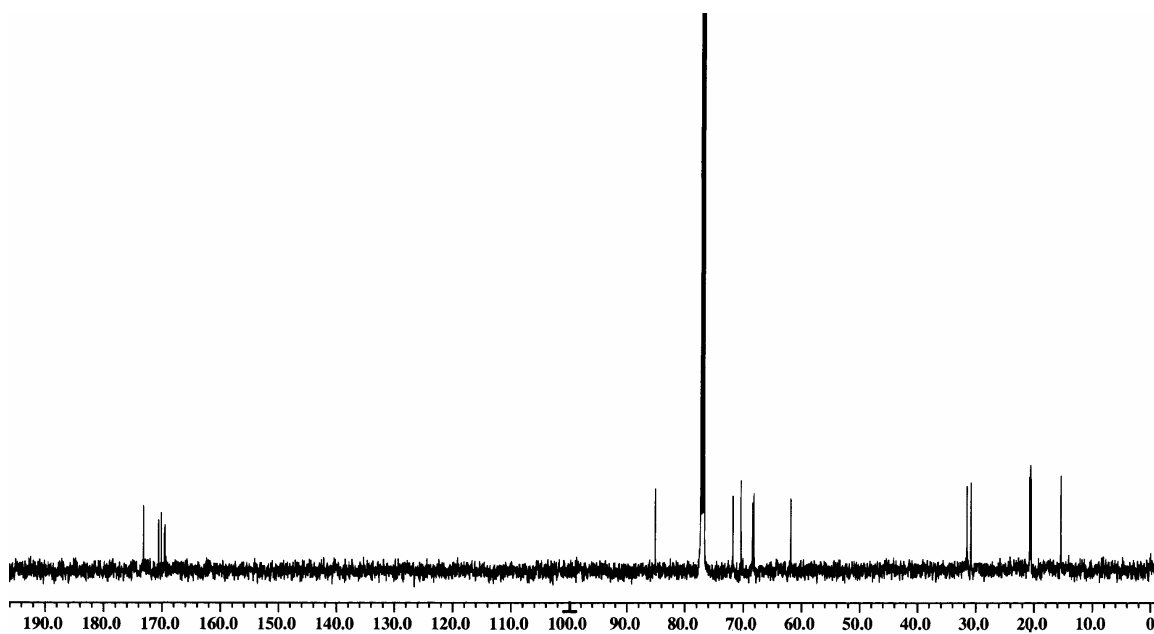
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**Figure 28:** <sup>13</sup>C NMR (500 MHz) spectrum of compound 27a

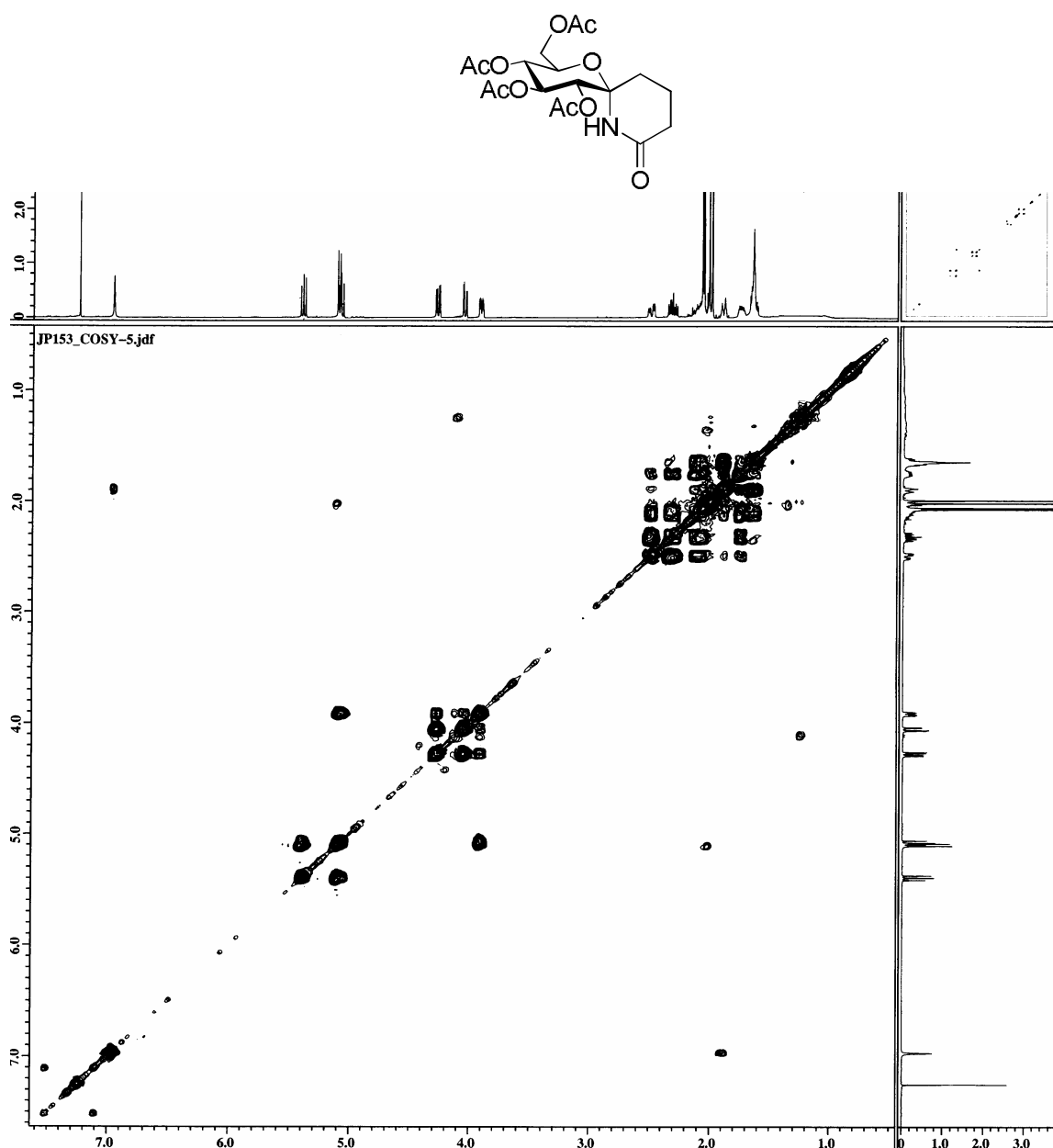
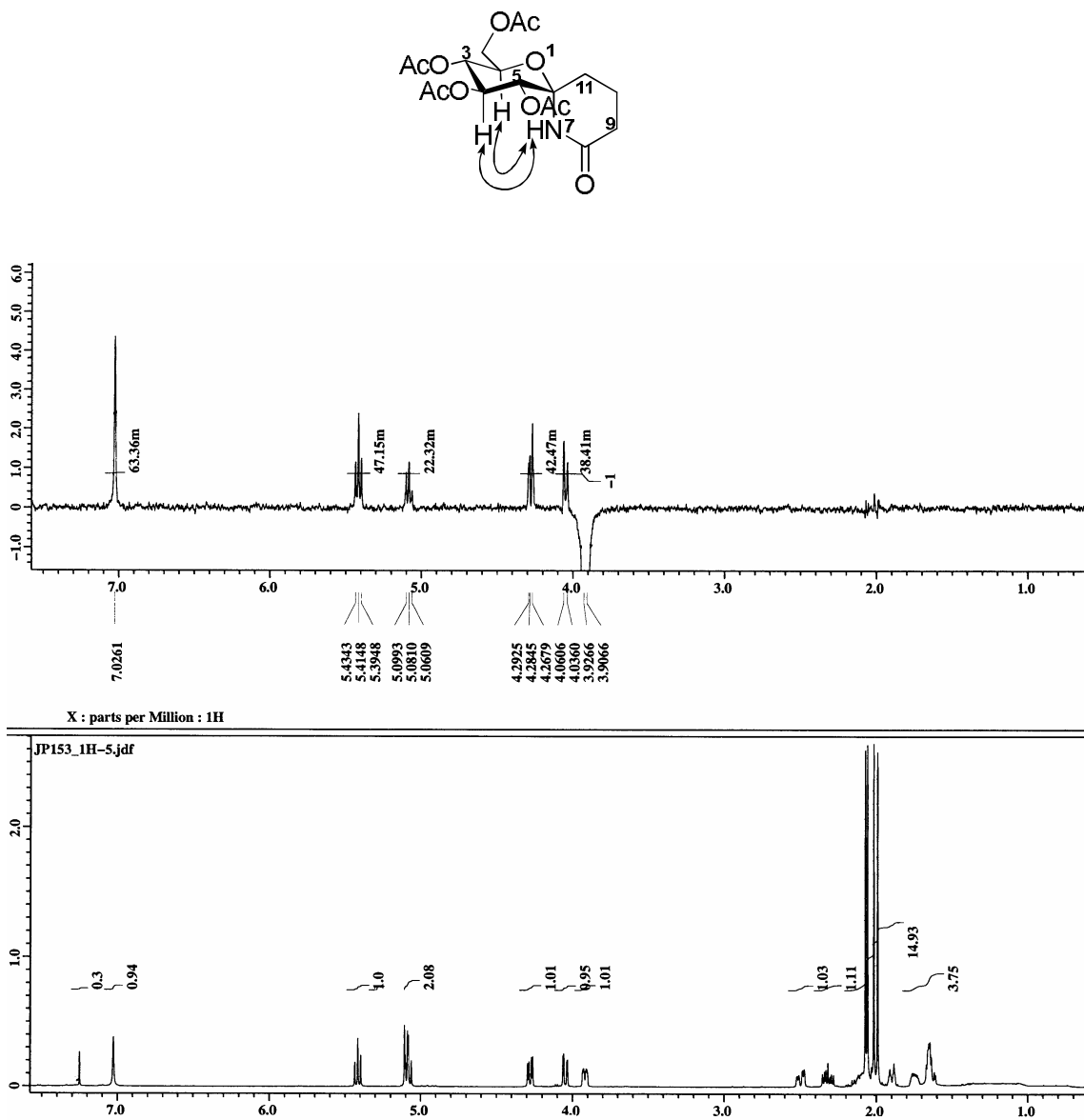
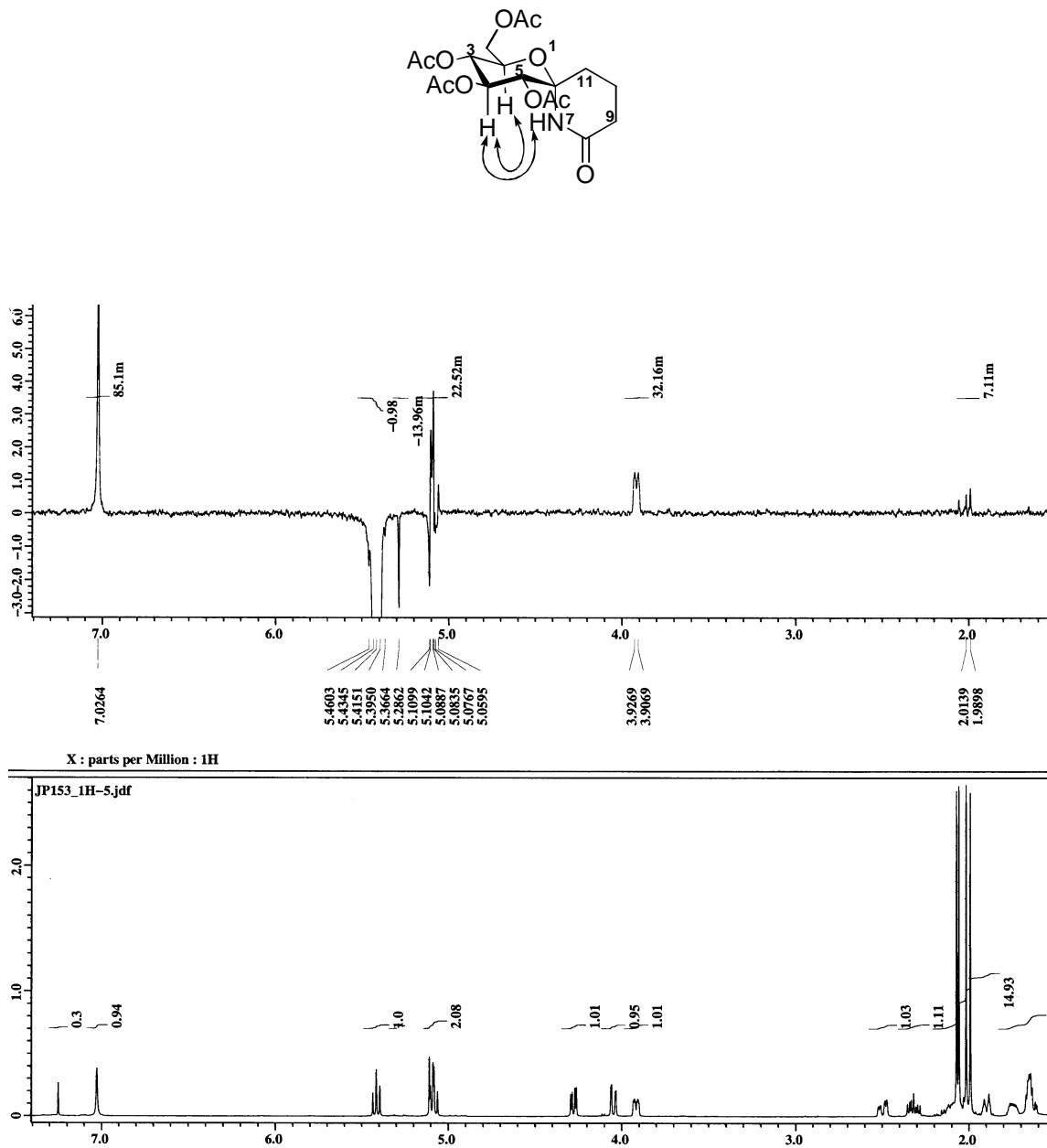


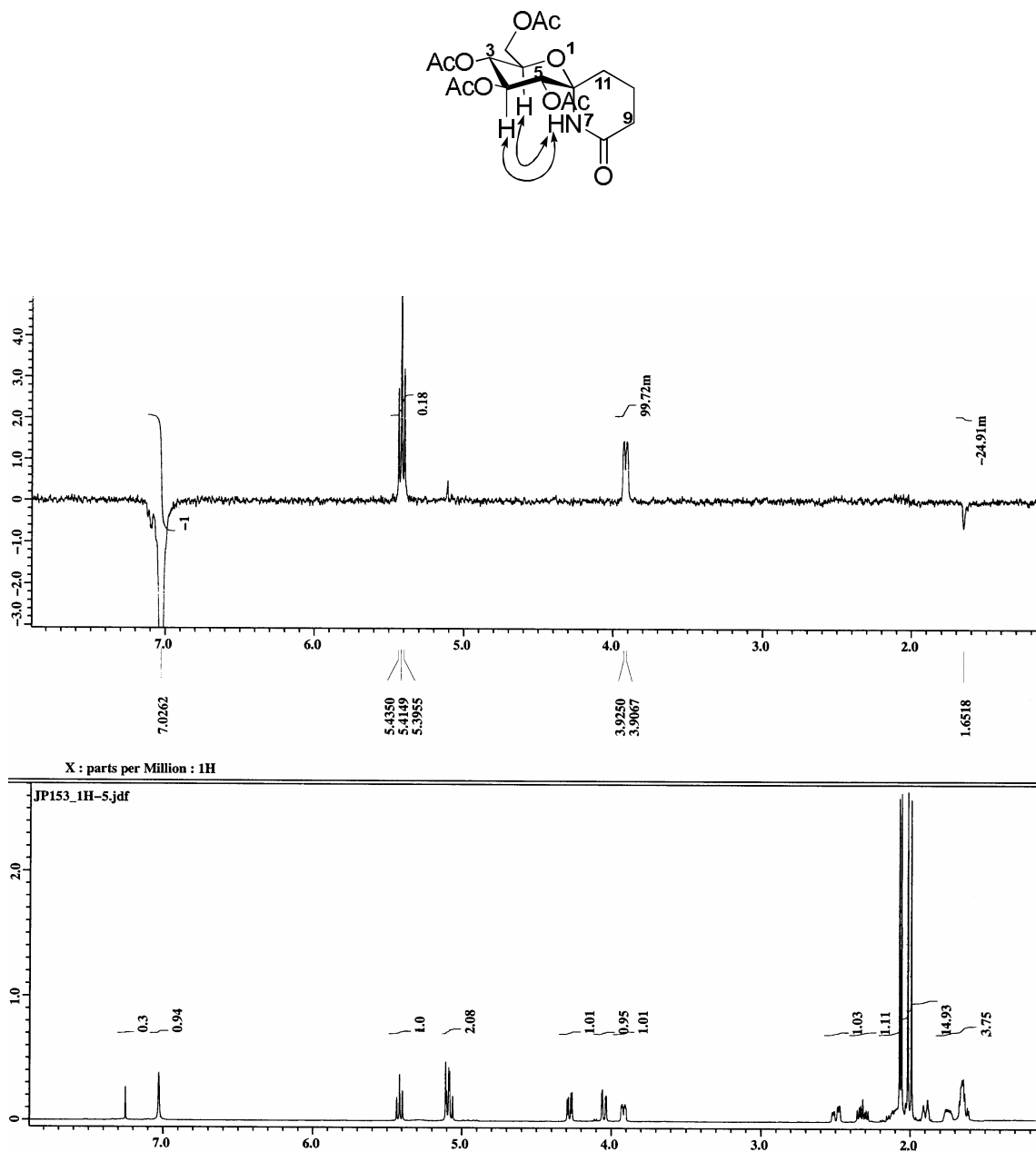
Figure 29:  $^1\text{H}$ - $^1\text{H}$  COSY (500 MHz) spectrum of compound 27a



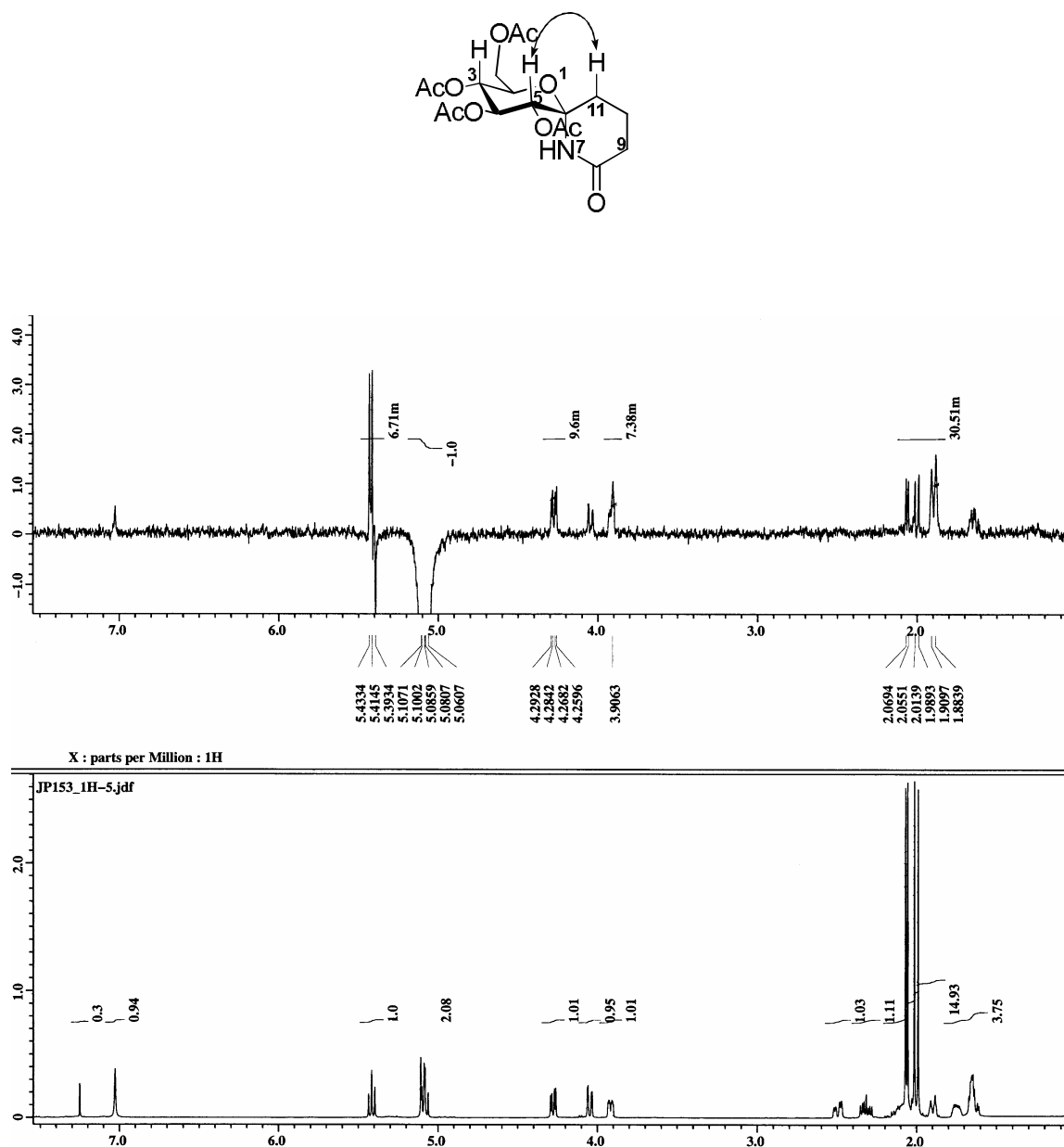
**Figure 30:** nOe (irradiation of H-2) spectrum of compound **27a**  
(Vicinal enhancements were not highlighted in the structure)



**Figure 31:** nOe (irradiation of H-4) spectrum of compound **27a**

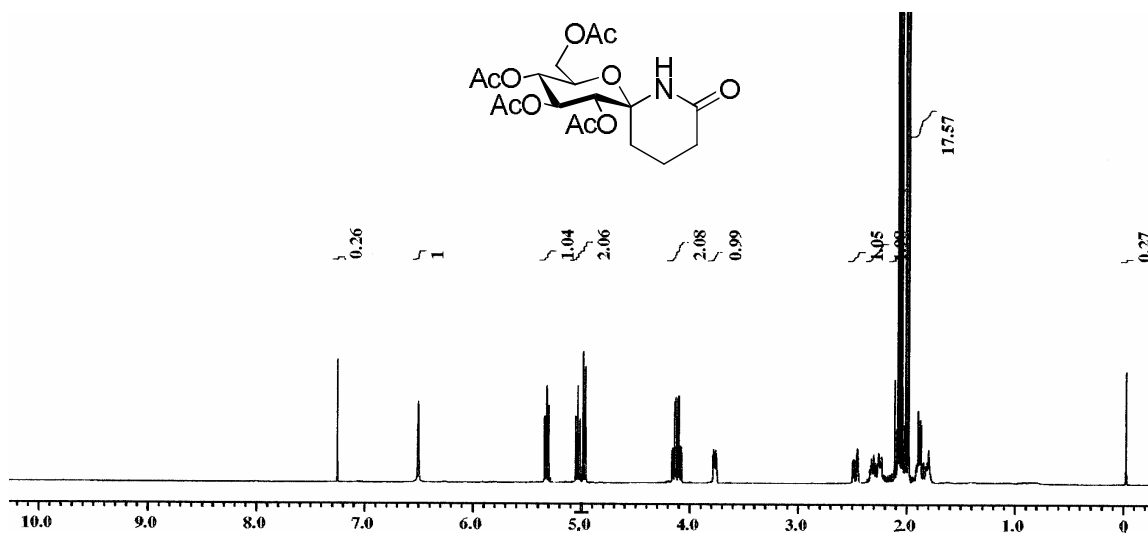


**Figure 32:** nOe (irradiation of -NH) spectrum of compound **27a**

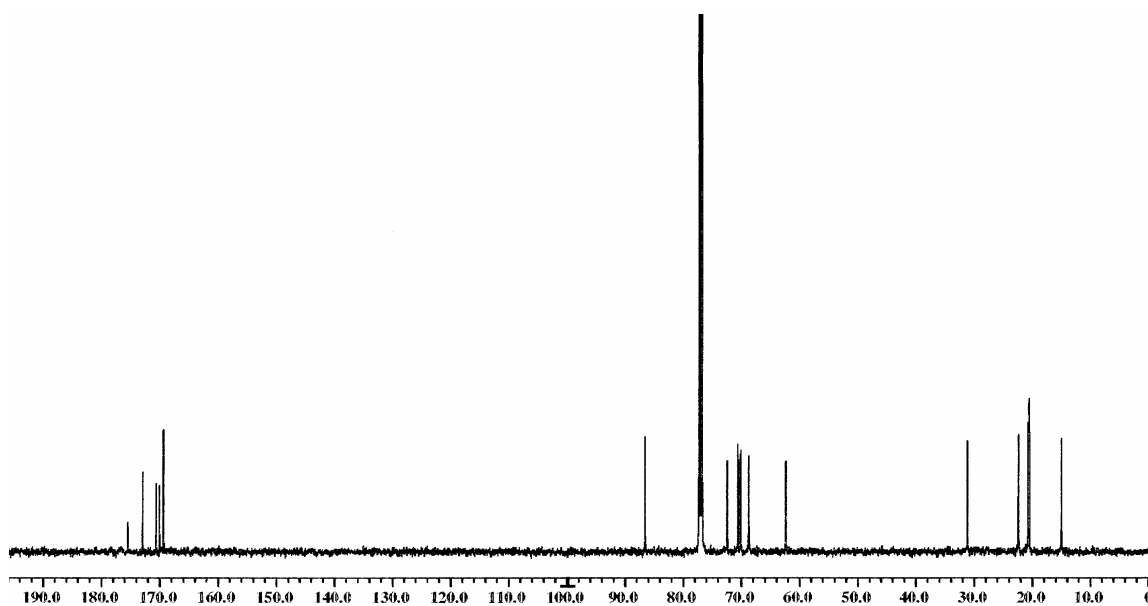


**Figure 33:** nOe (irradiation of H-3 and H-5) spectrum of compound **27a**  
(H-3 enhanced the  $-\text{CH}_2\text{OAc}$  group protons, which were not highlighted in the structure)

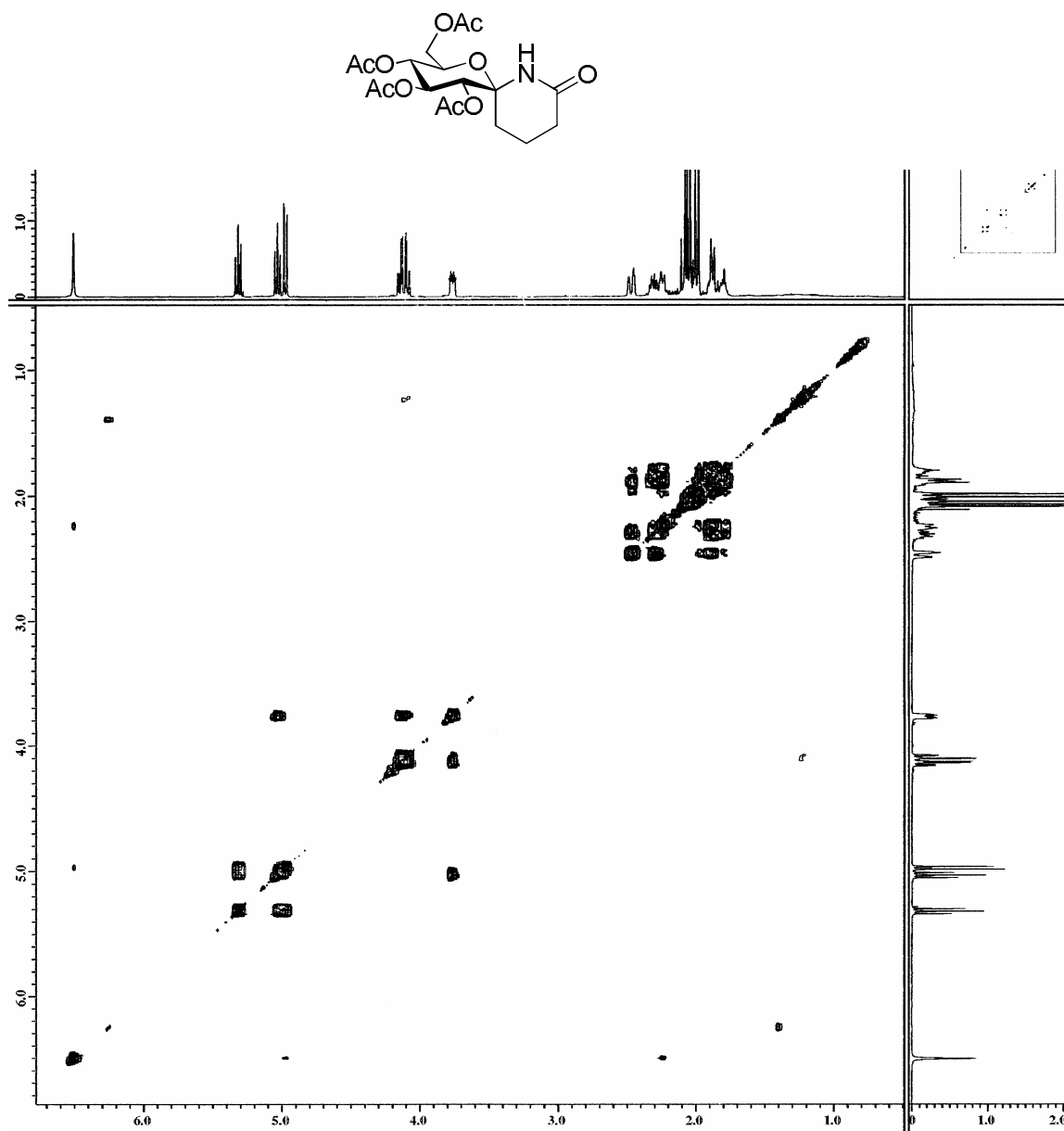




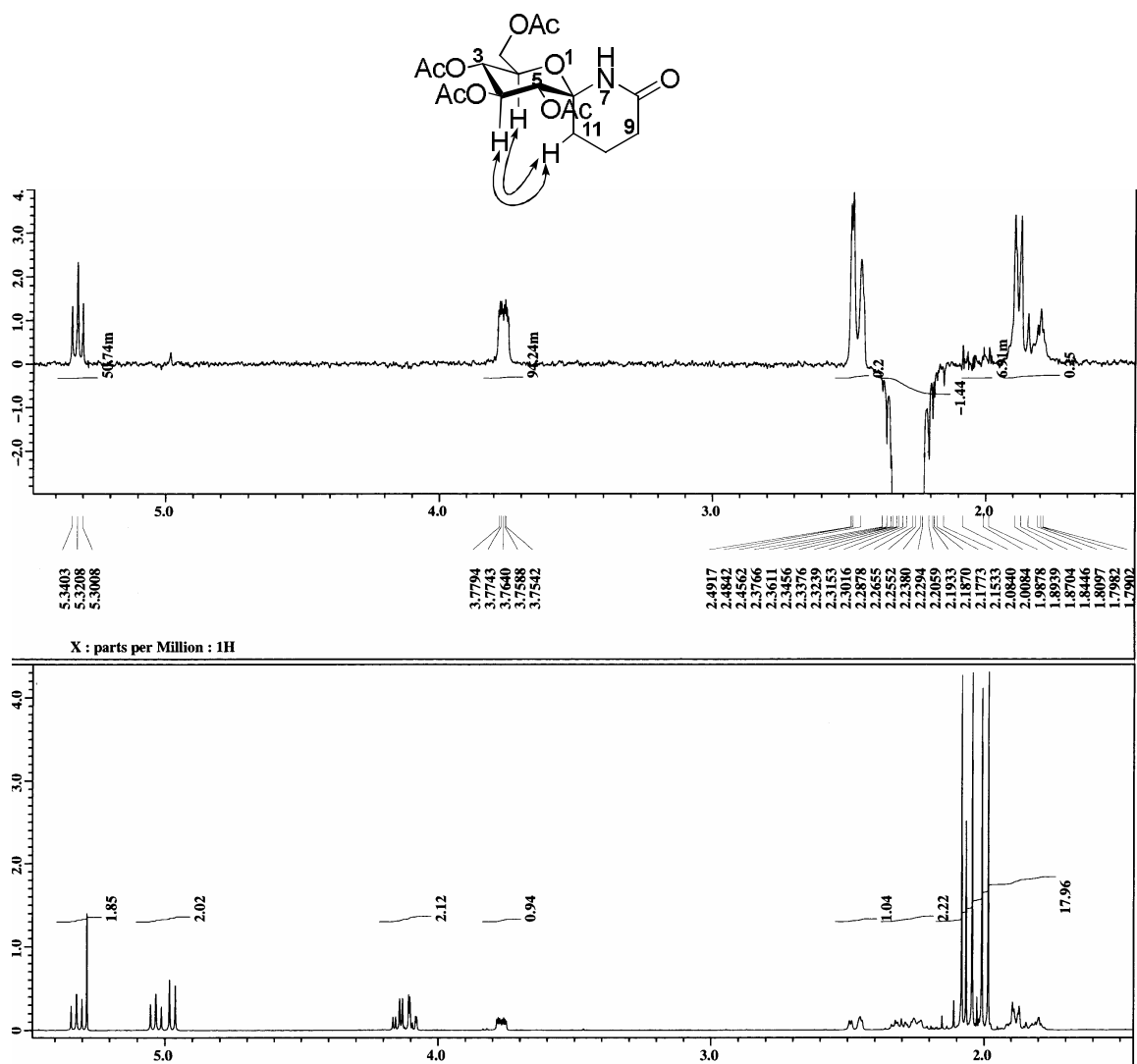
**Figure 34:** <sup>1</sup>H NMR (500 MHz) spectrum of compound **27b**



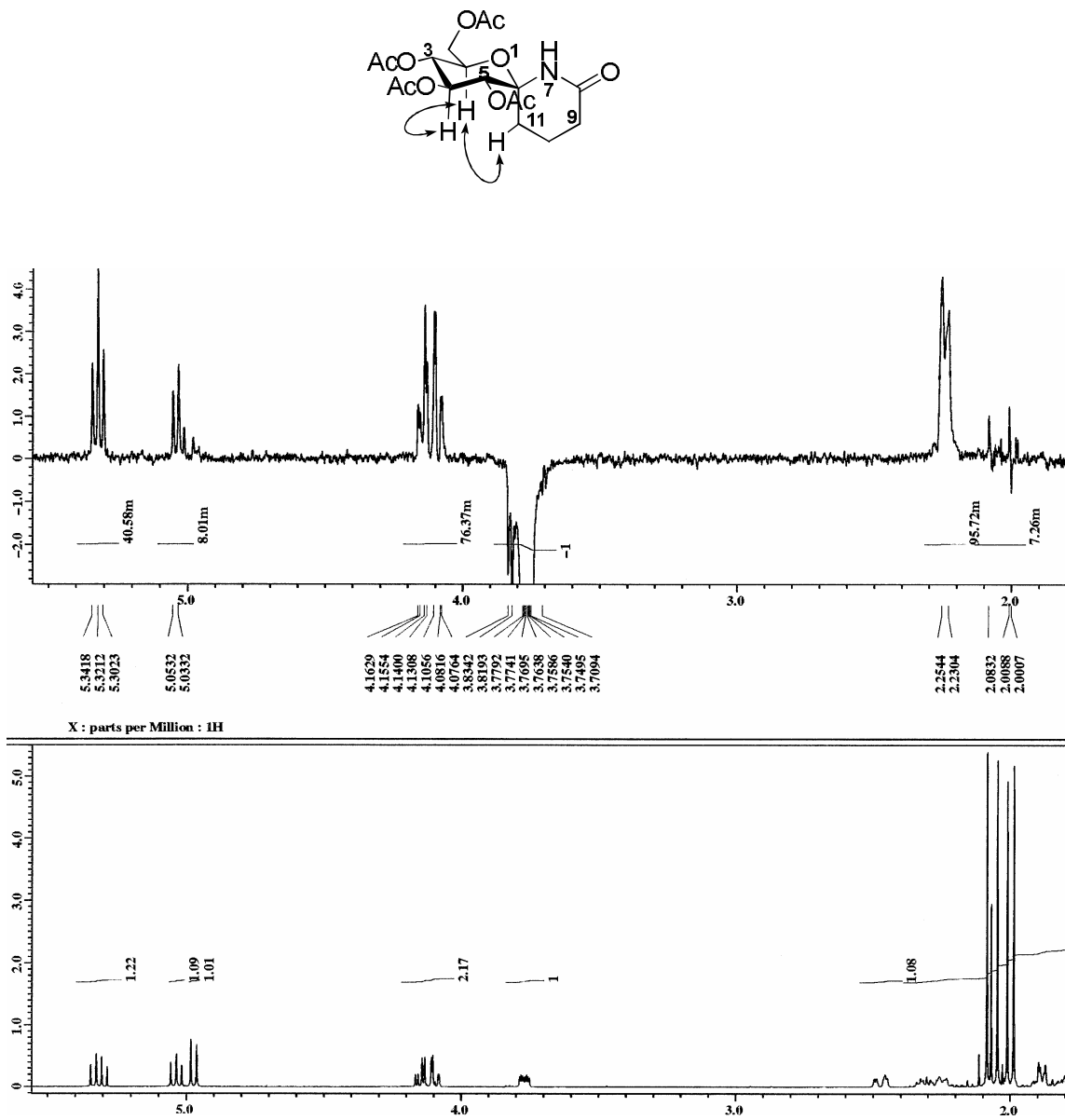
**Figure 35:** <sup>13</sup>C NMR (500 MHz) spectrum of compound **27b**



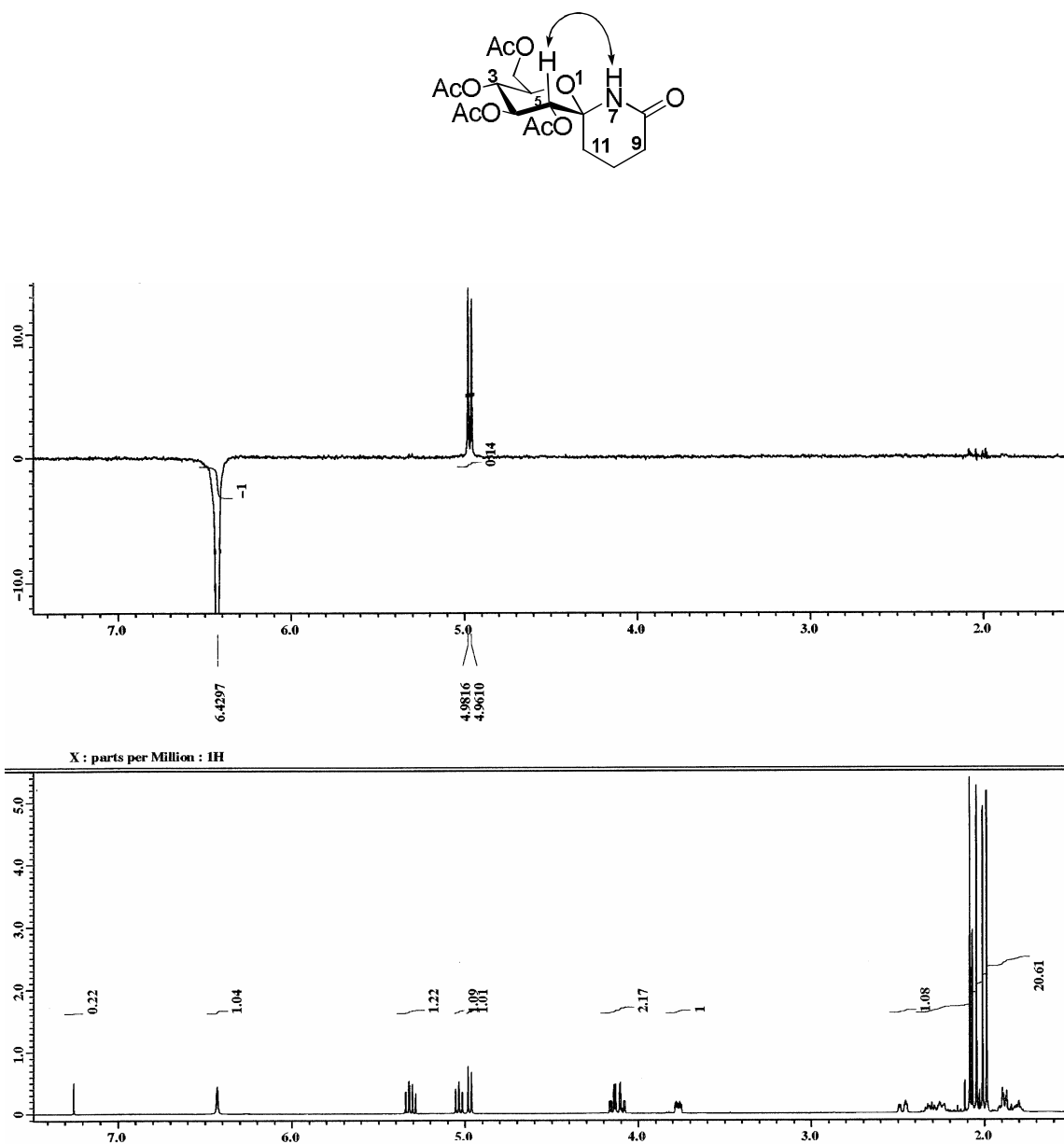
**Figure 36:**  $^1\text{H}$ - $^1\text{H}$  COSY (500 MHz) spectrum of compound **27b**



**Figure 37:** nOe (irradiation of H-11) spectrum of compound **27b**



**Figure 38:** nOe (irradiation of H-2) spectrum of compound **27b**  
(Vicinal enhancements were not highlighted in the structure)



**Figure 39:** nOe (irradiation of -NH) spectrum of compound **27b**

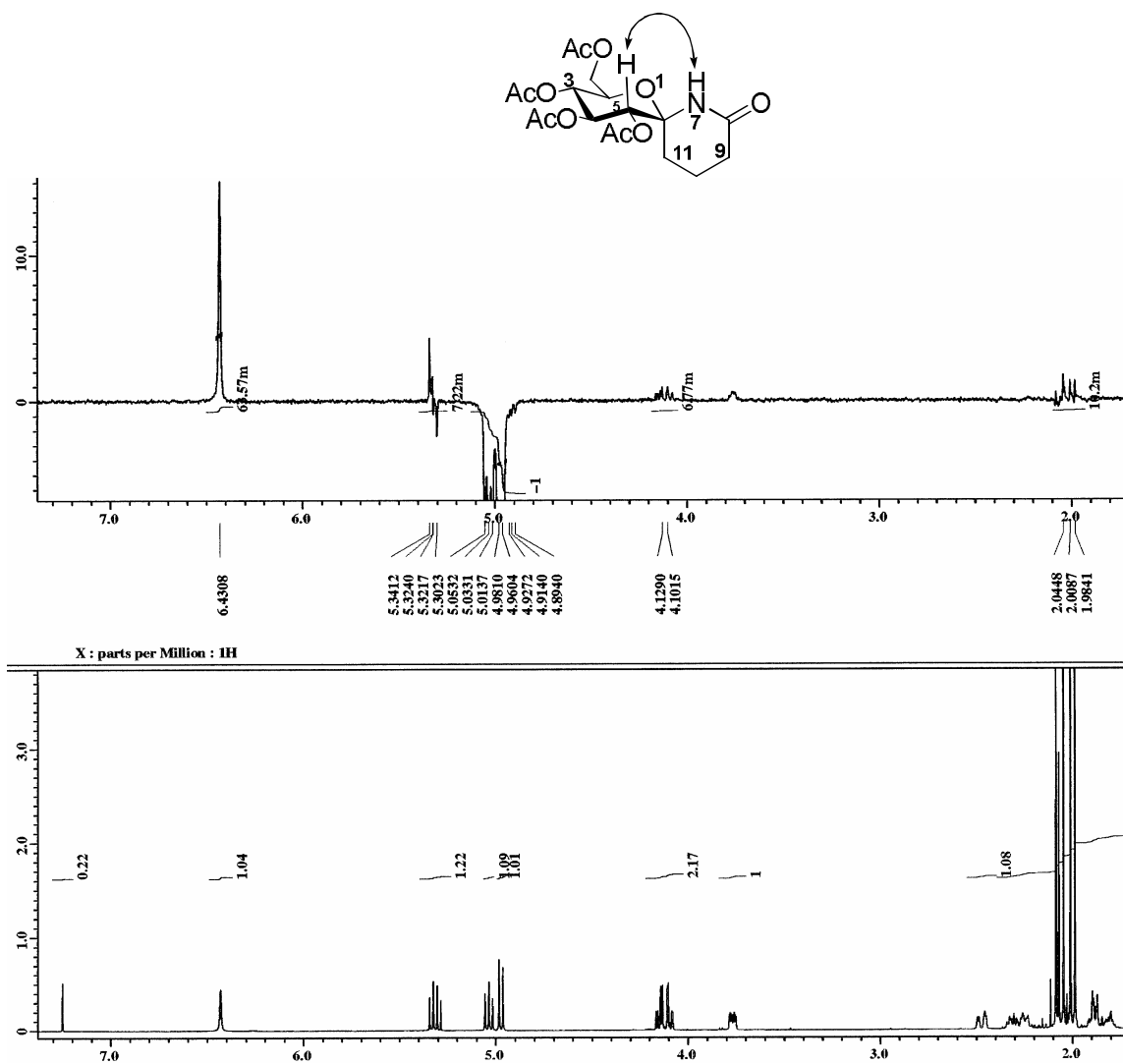
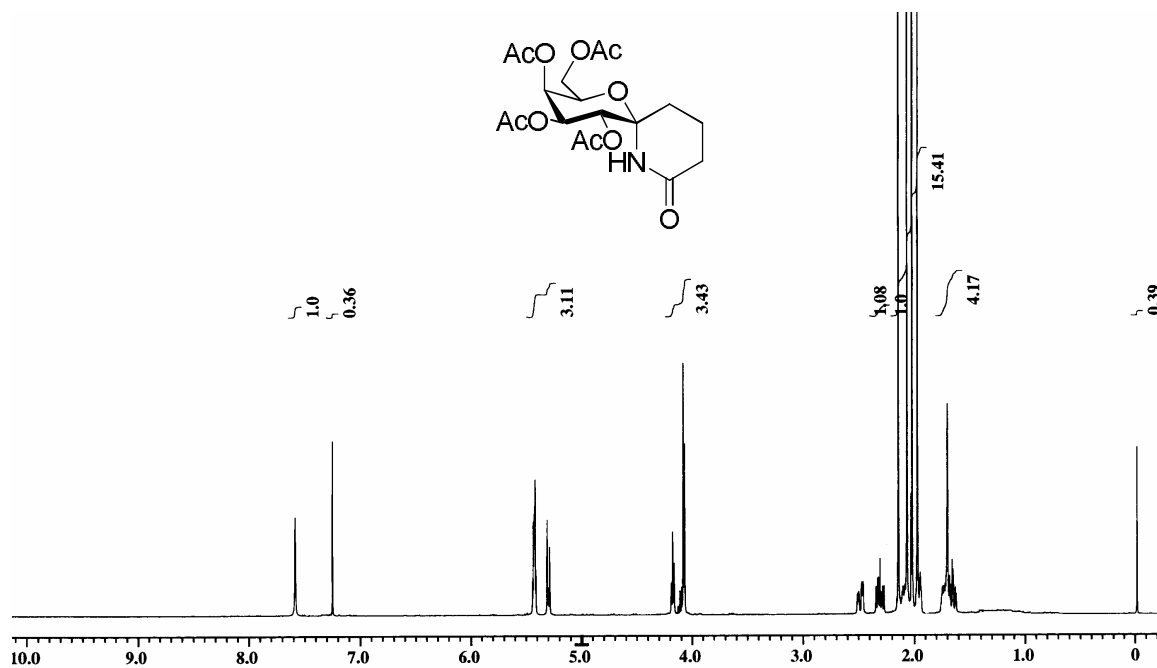
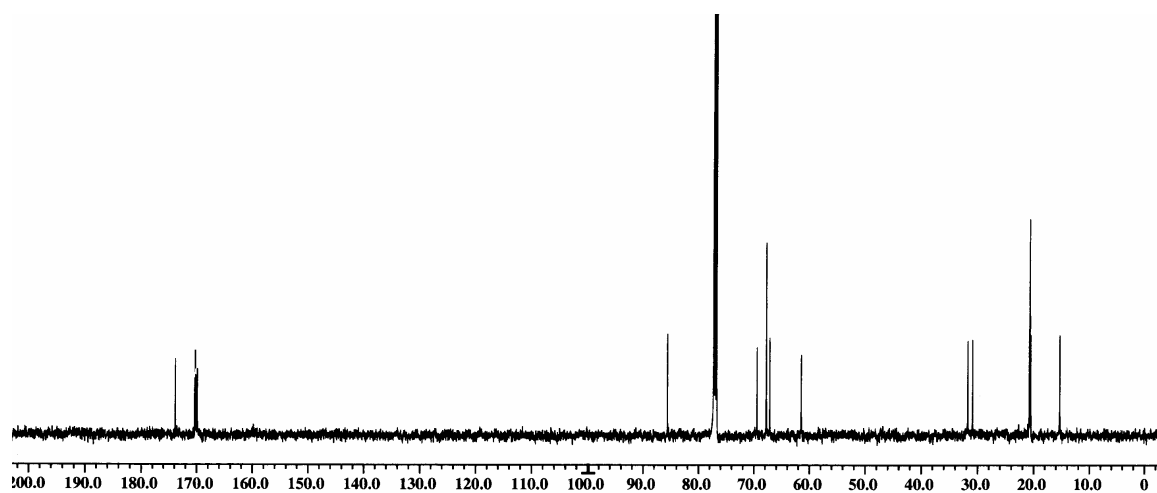


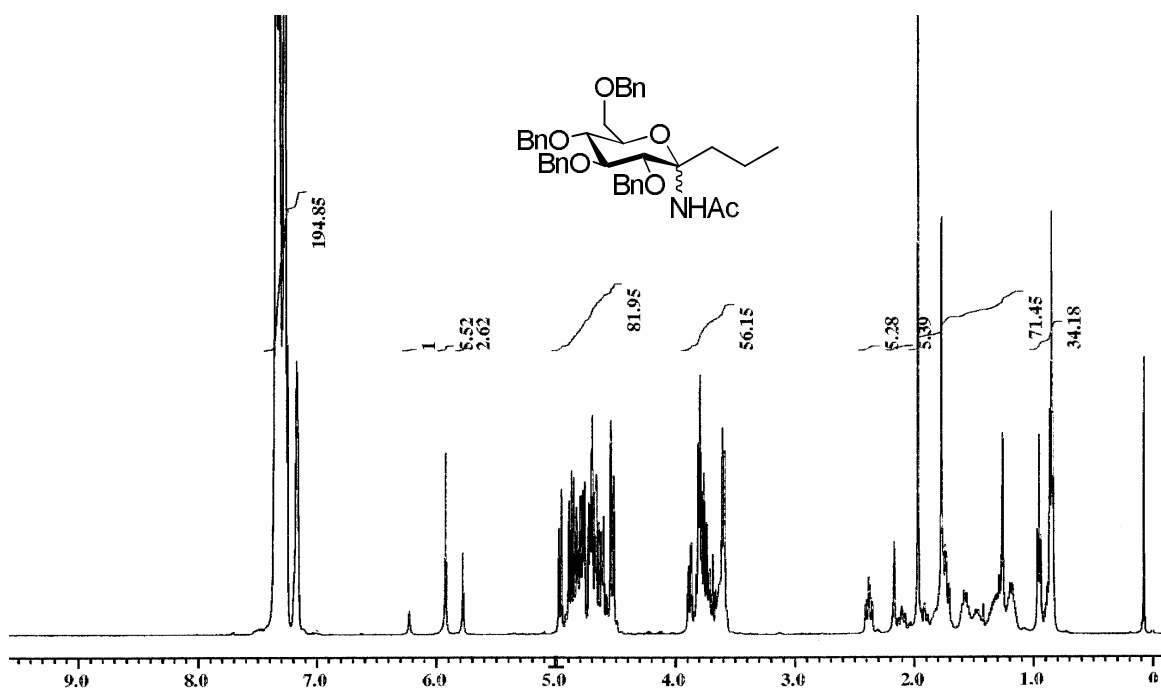
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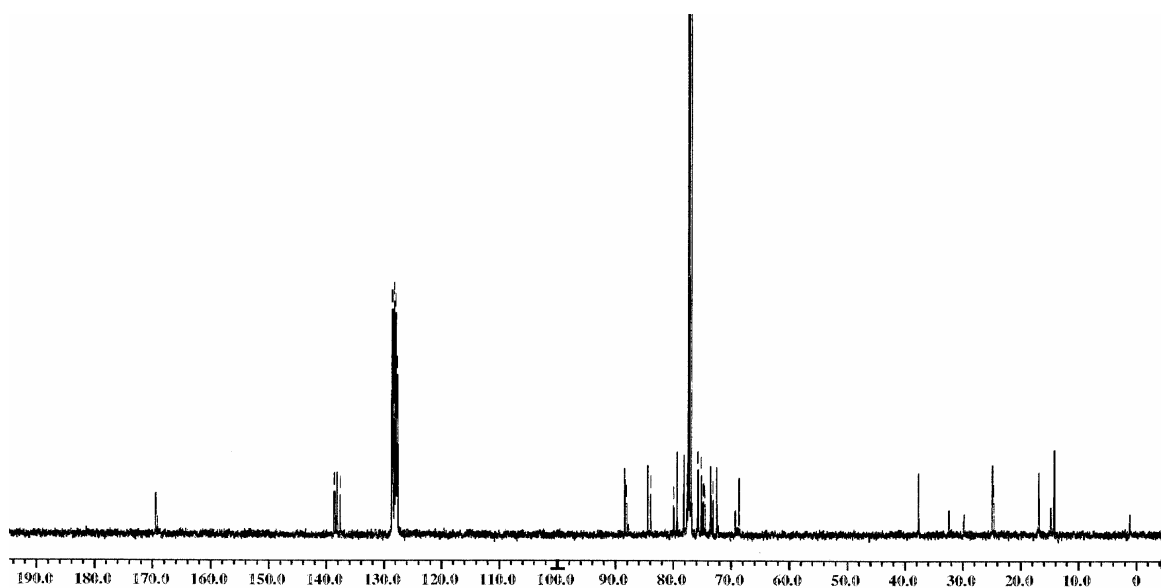
**Figure 41:**  $^1\text{H}$  NMR (500 MHz) spectrum of compound 28a



**Figure 42:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound 28a

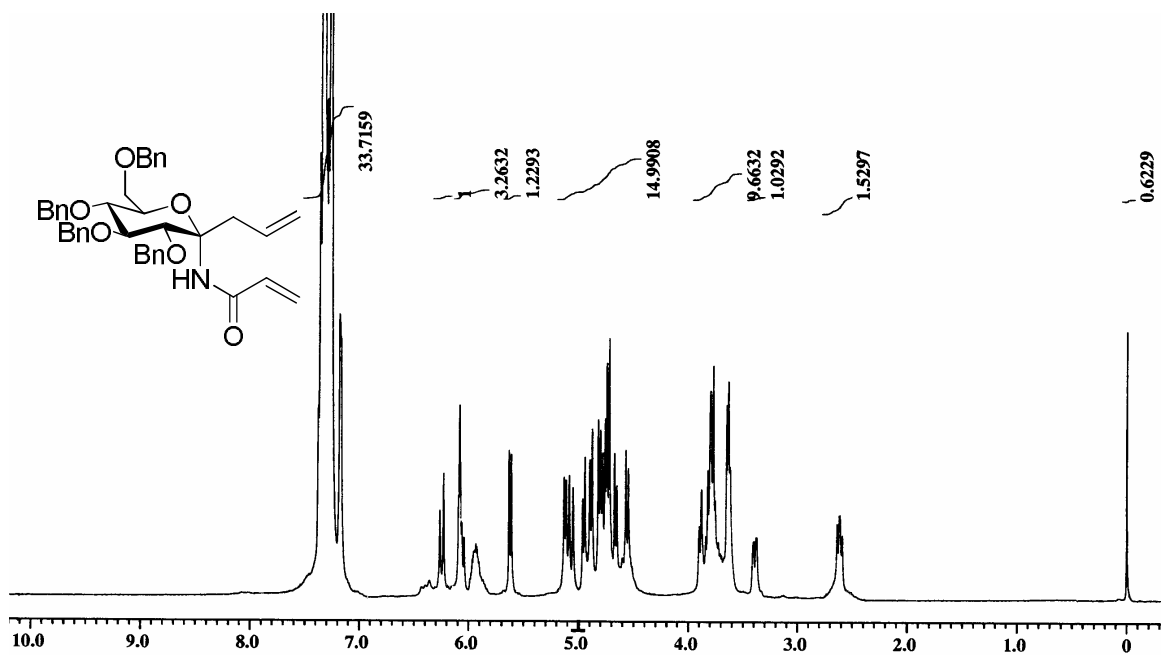


**Figure 43:** <sup>1</sup>H NMR (500 MHz) spectrum of compound **30**

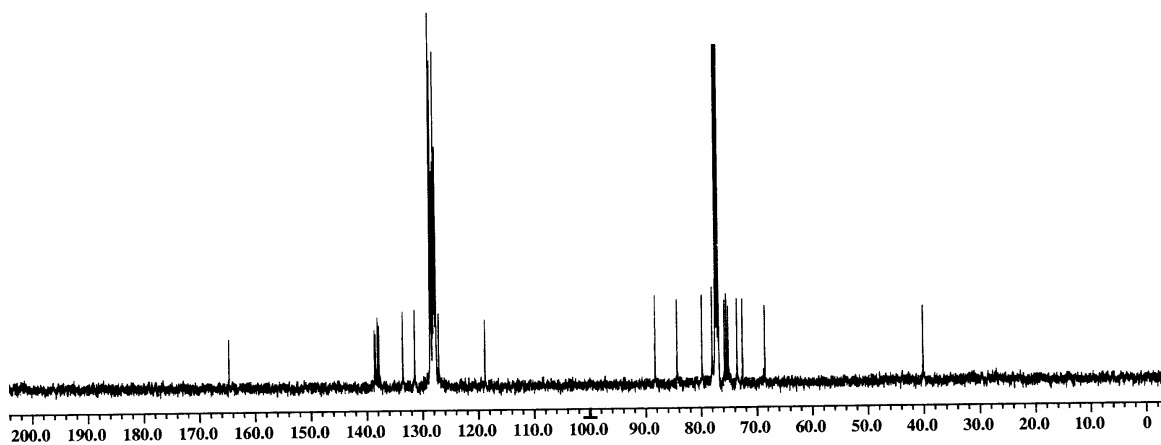


**Figure 44:** <sup>13</sup>C NMR (500 MHz) spectrum of compound **30**

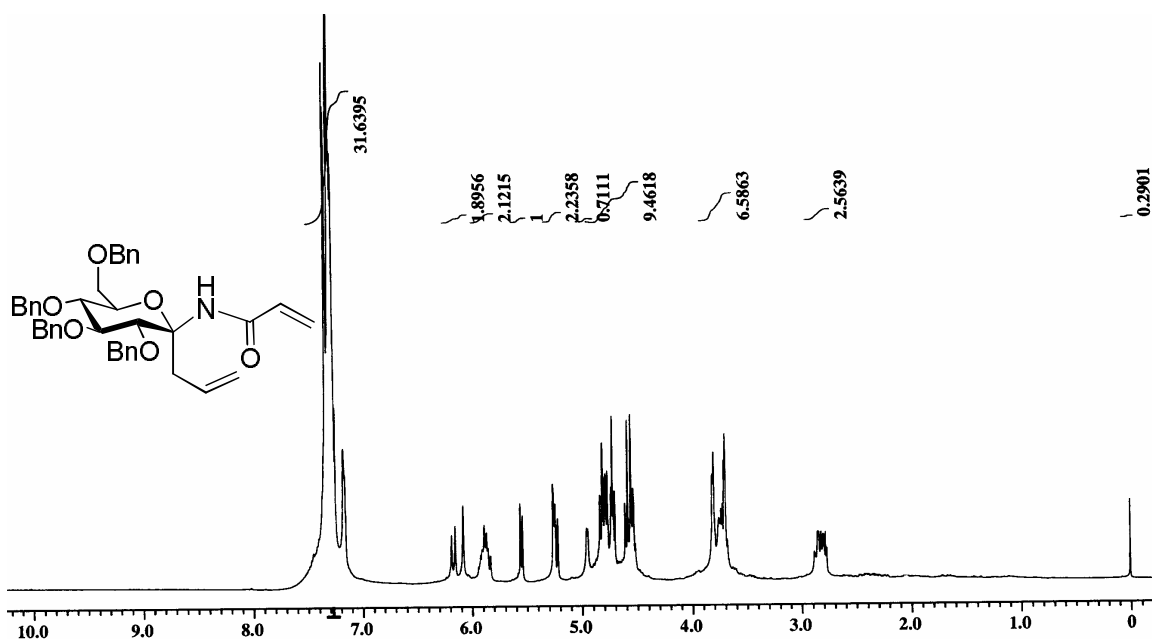




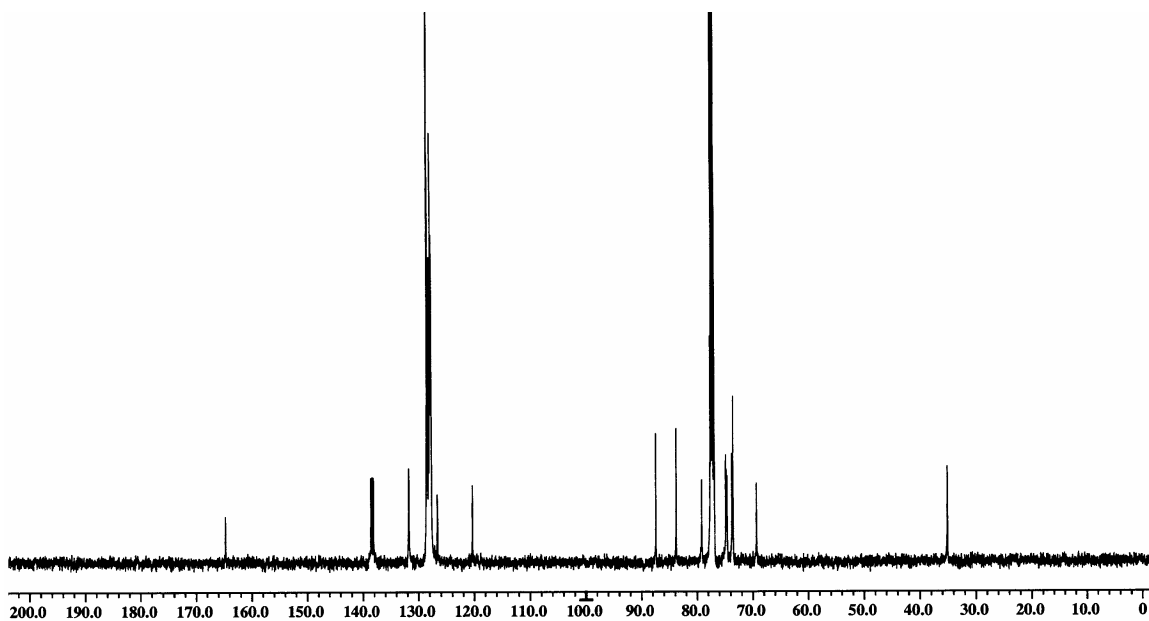
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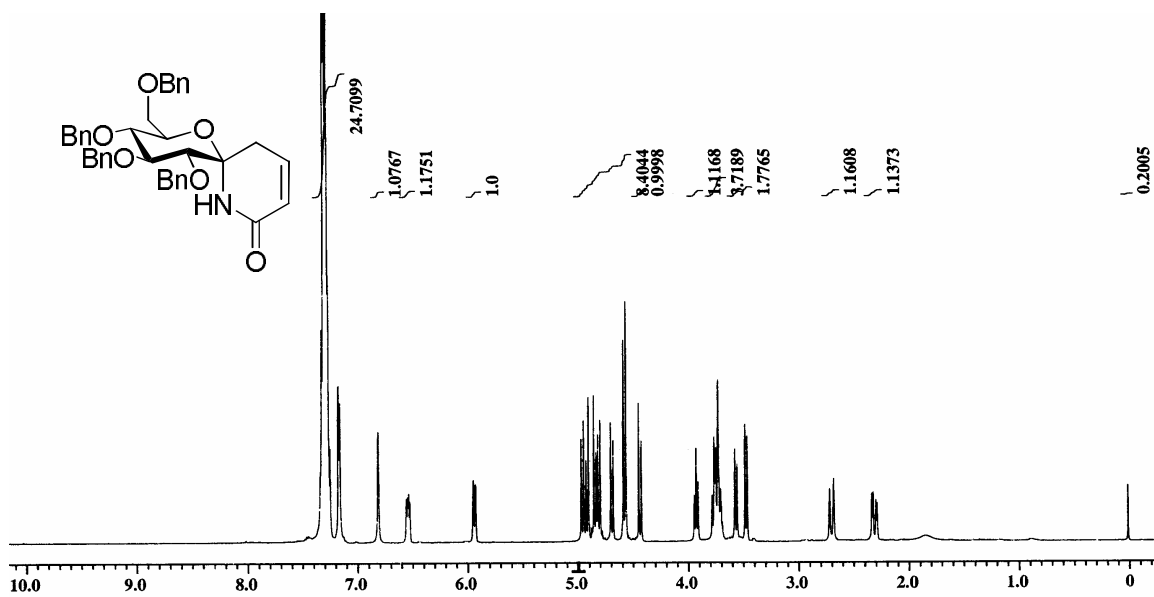
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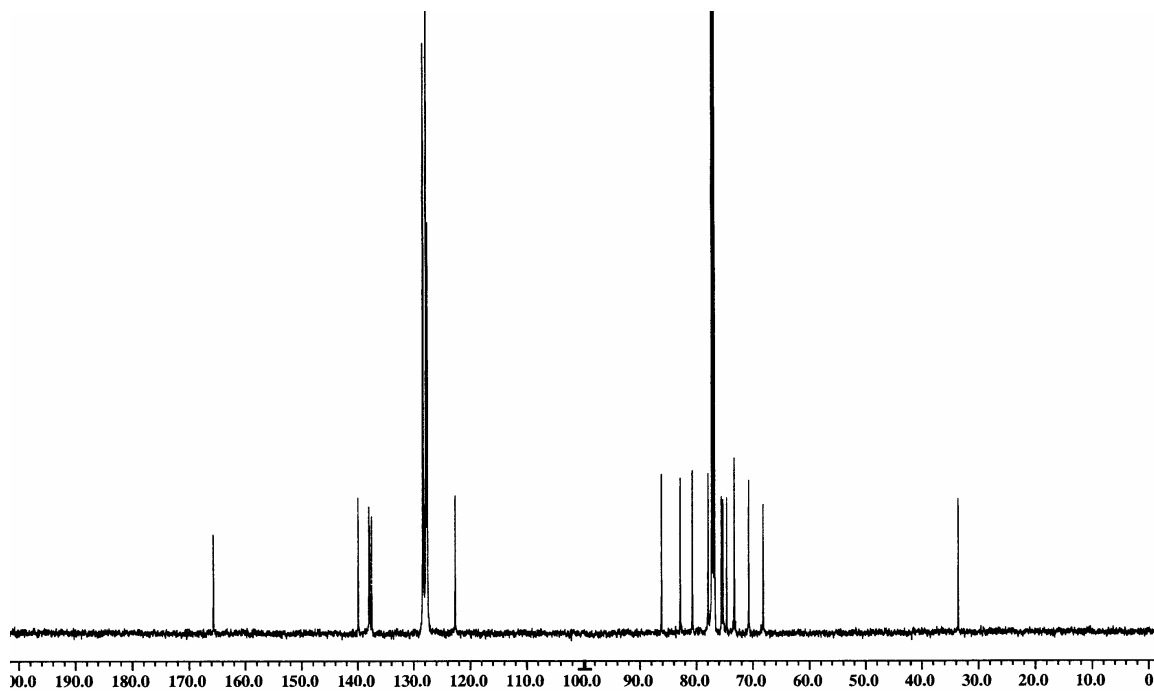
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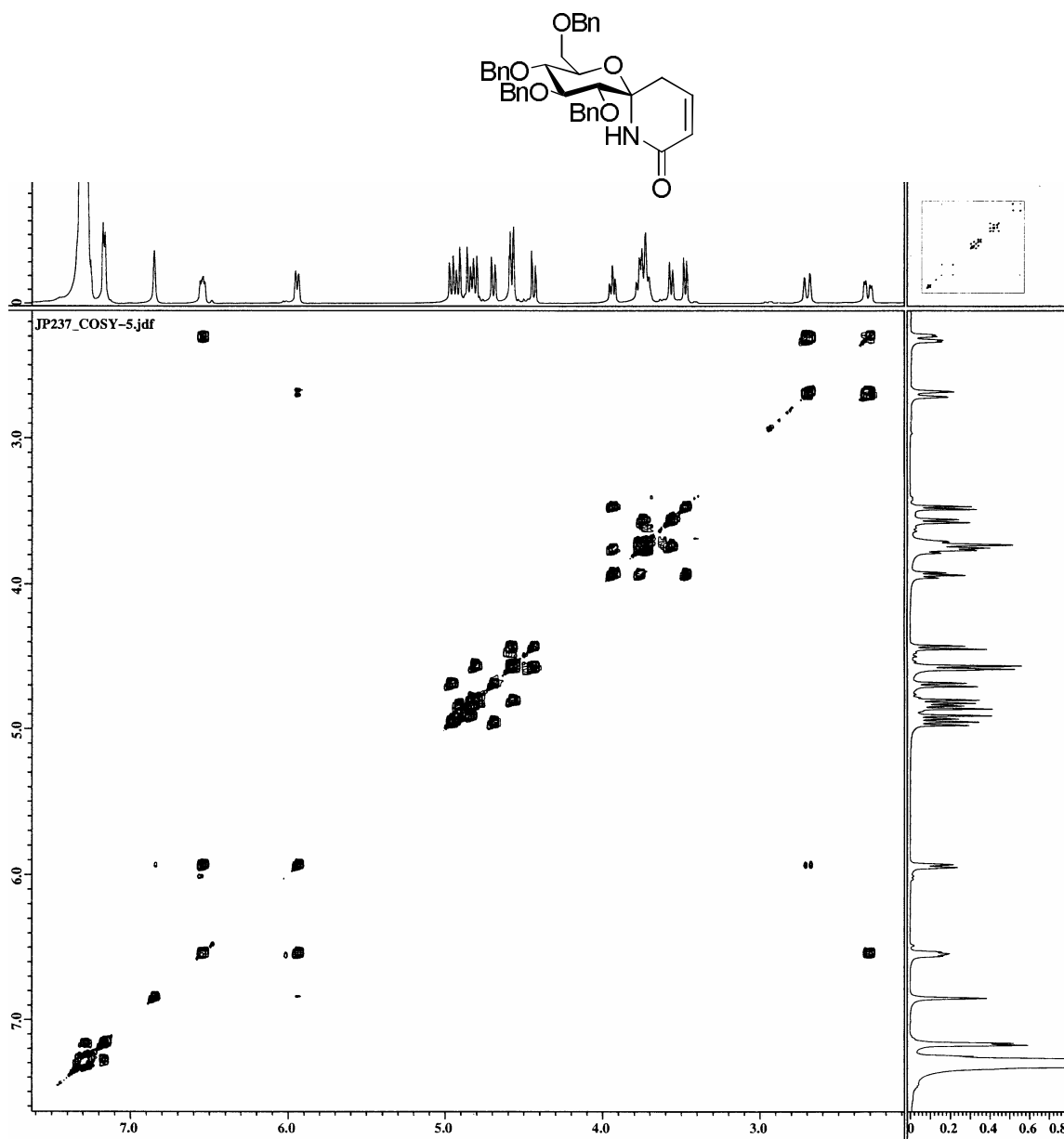
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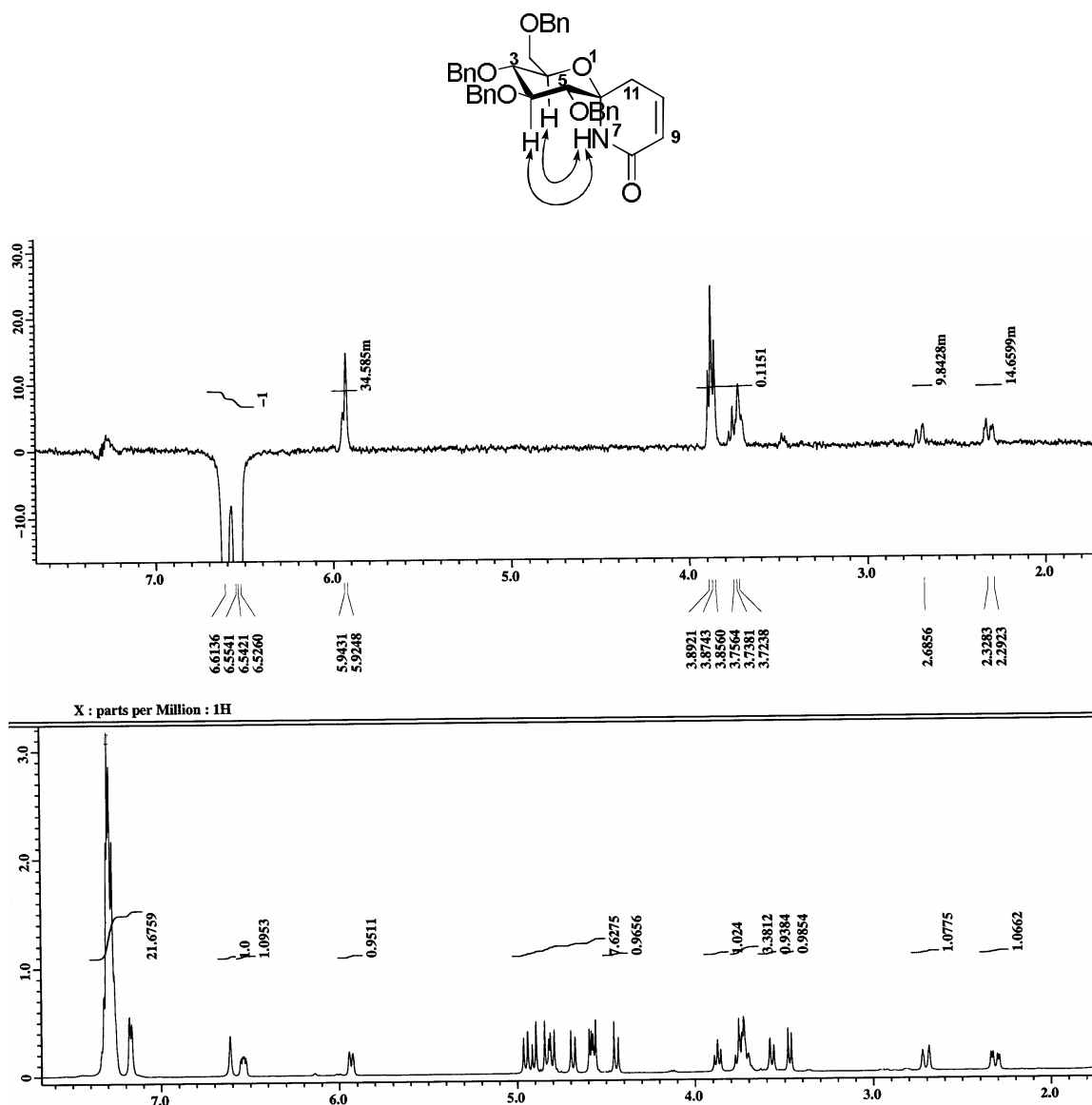
**Figure 49:** <sup>1</sup>H NMR (500 MHz) spectrum of compound 33a



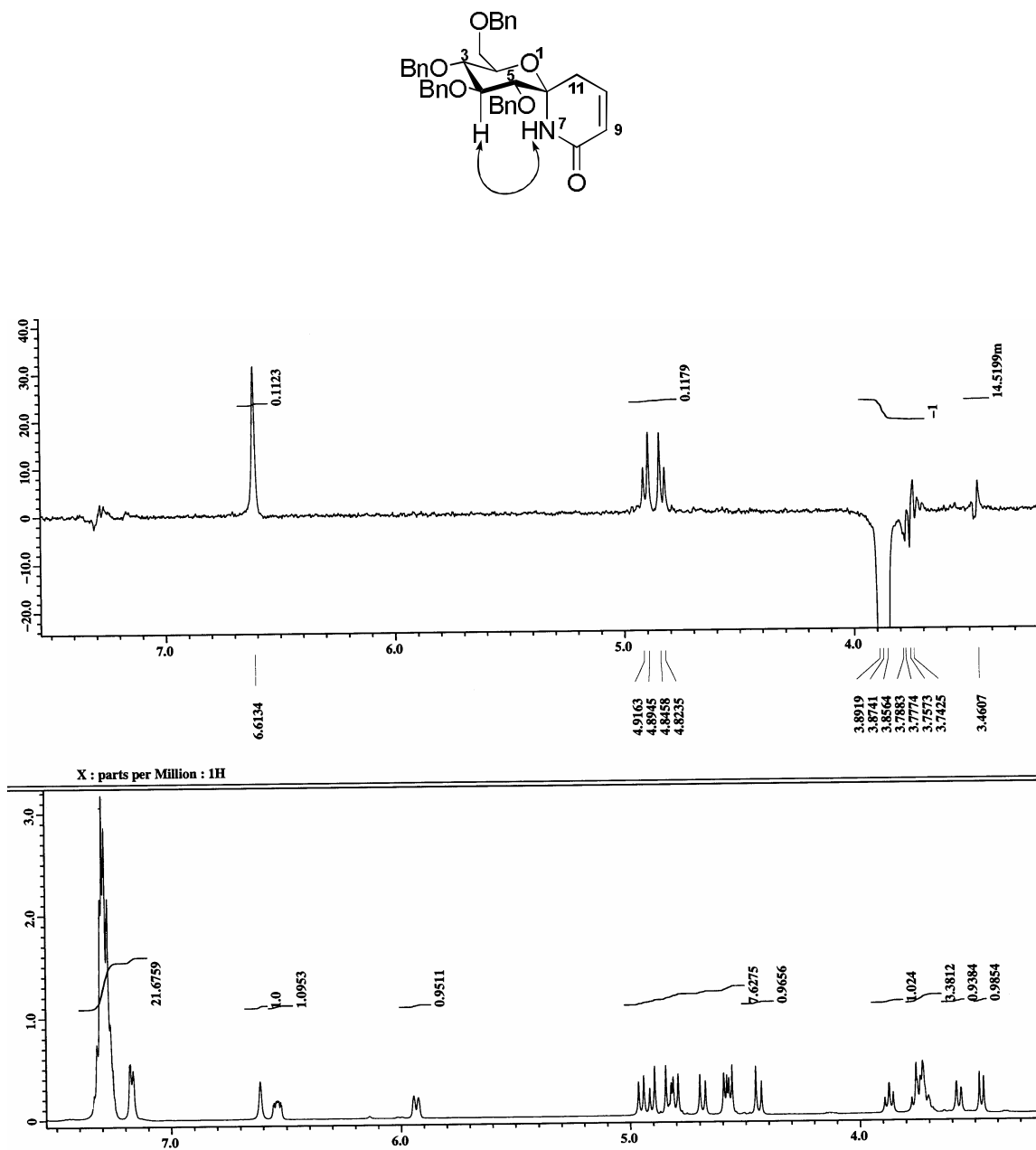
**Figure 50:** <sup>13</sup>C NMR (500 MHz) spectrum of compound 33a



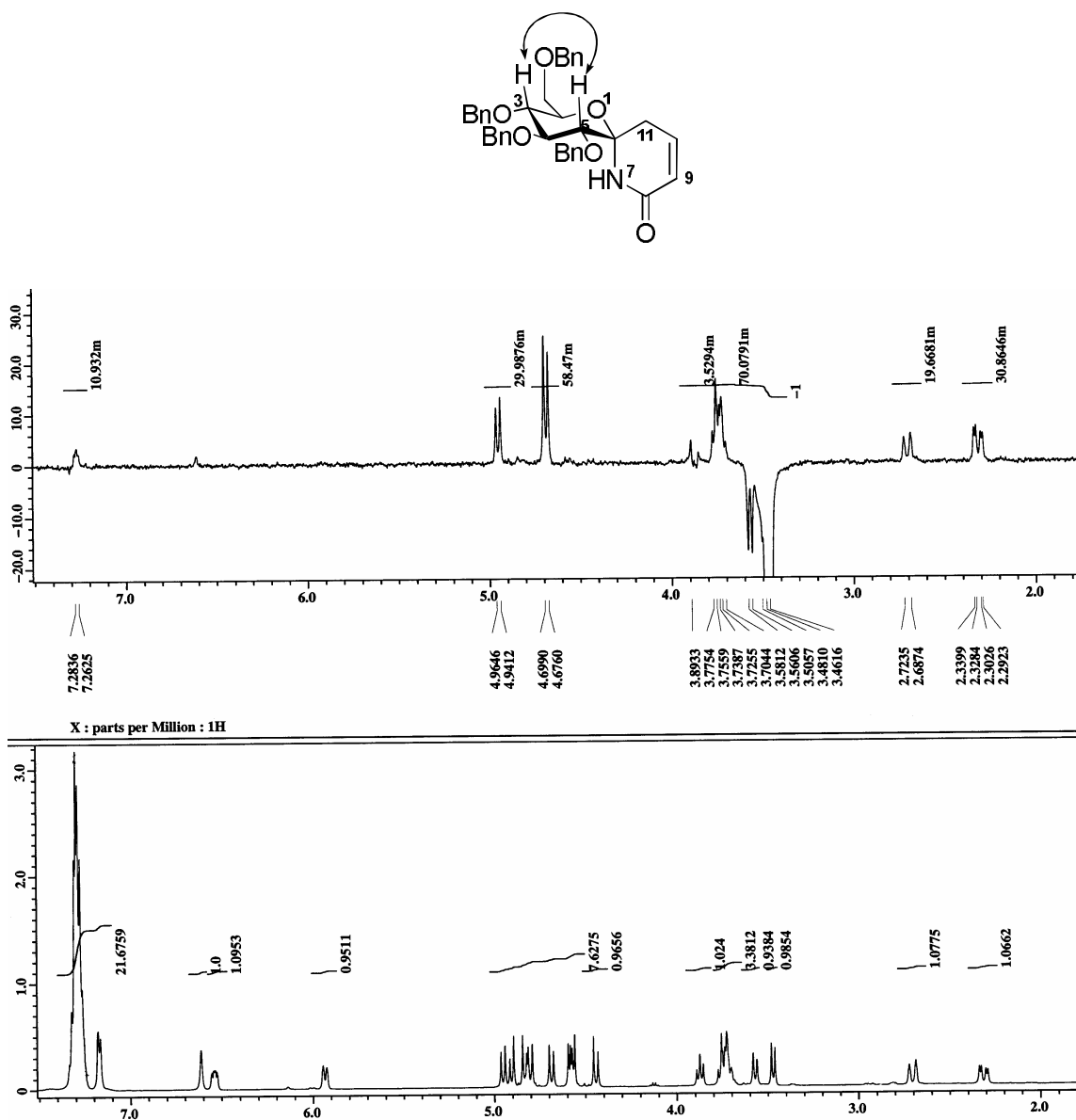
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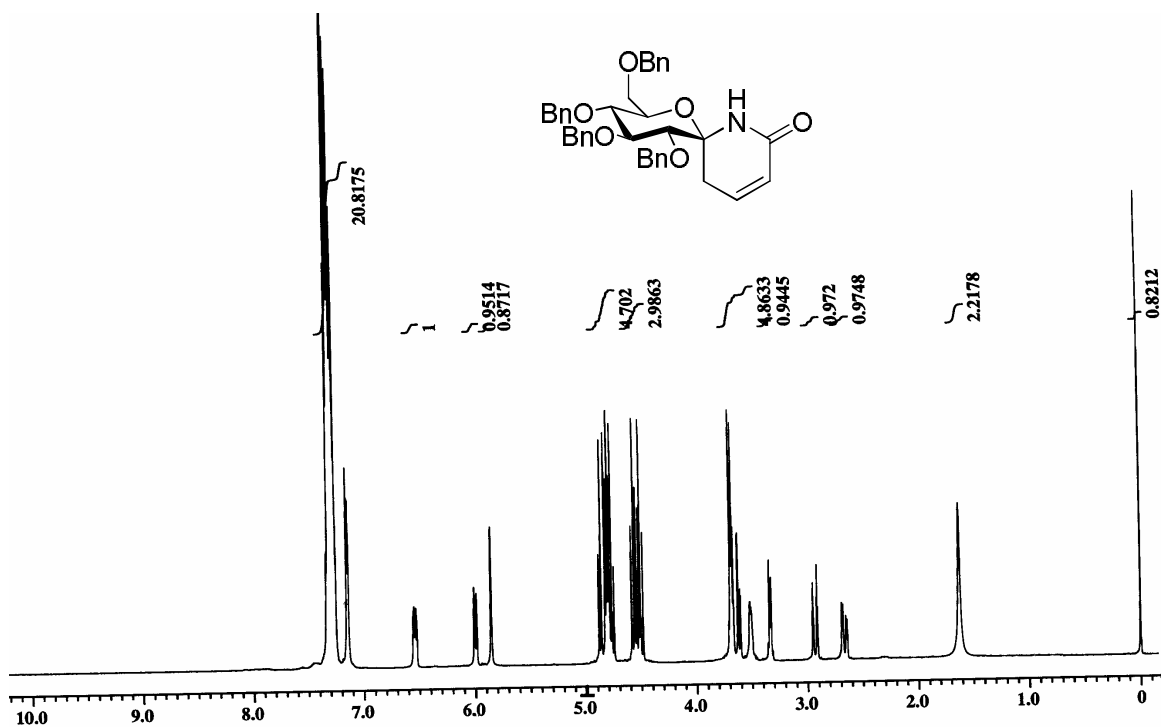
**Figure 52:** nOe (irradiation of -NH) spectrum of compound 33a



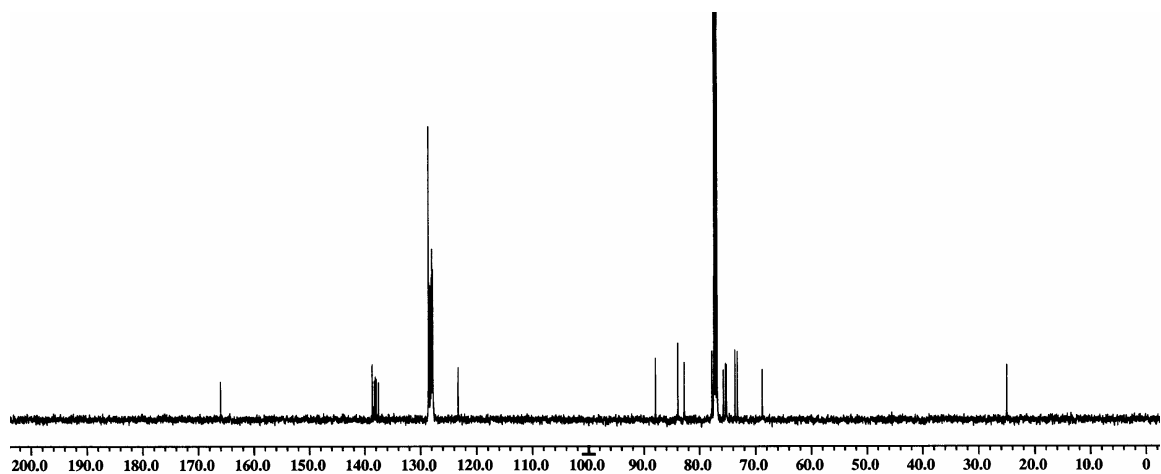
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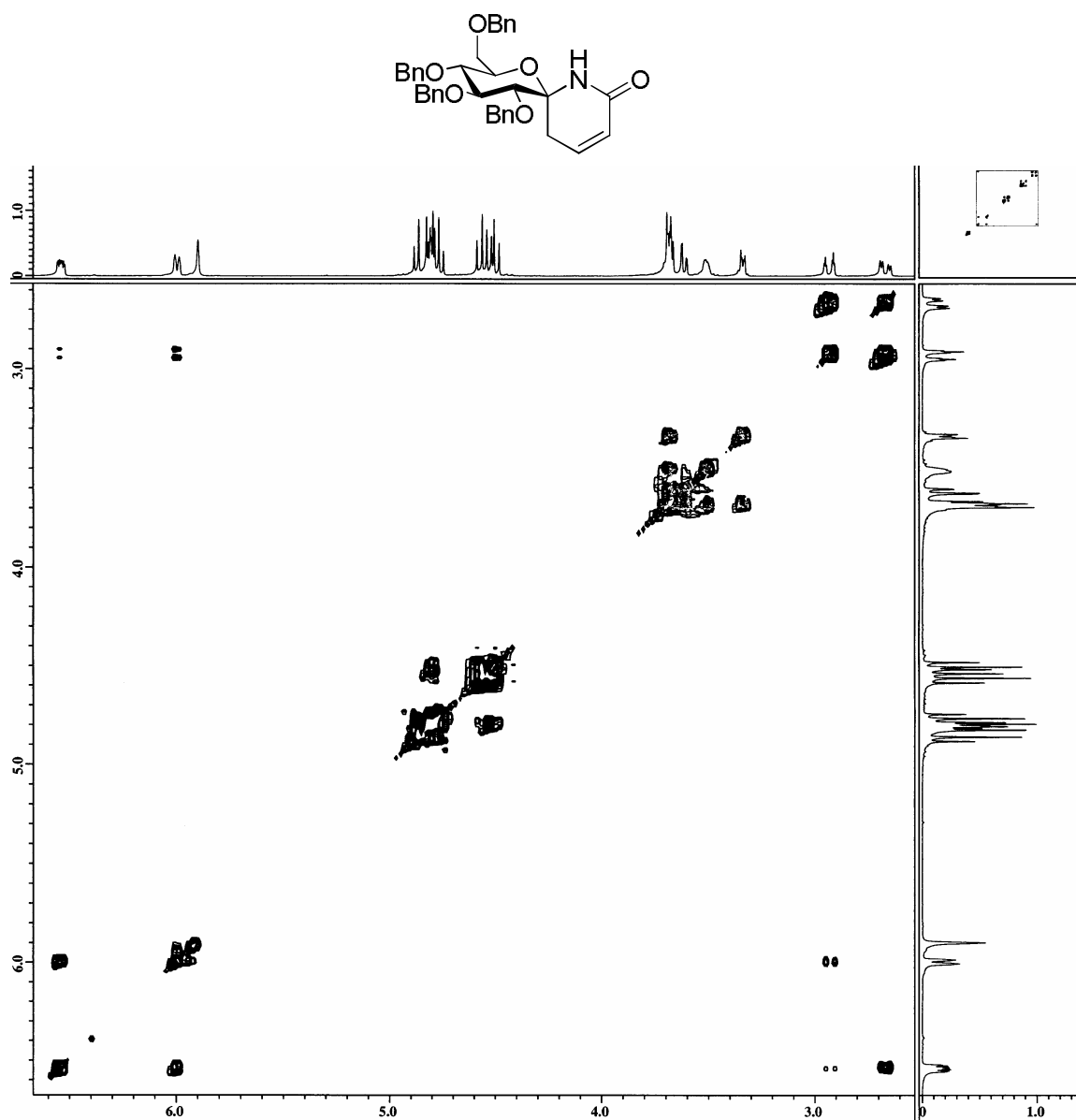


**Figure 55:**  $^1\text{H}$  NMR (500 MHz) spectrum of compound **33b**

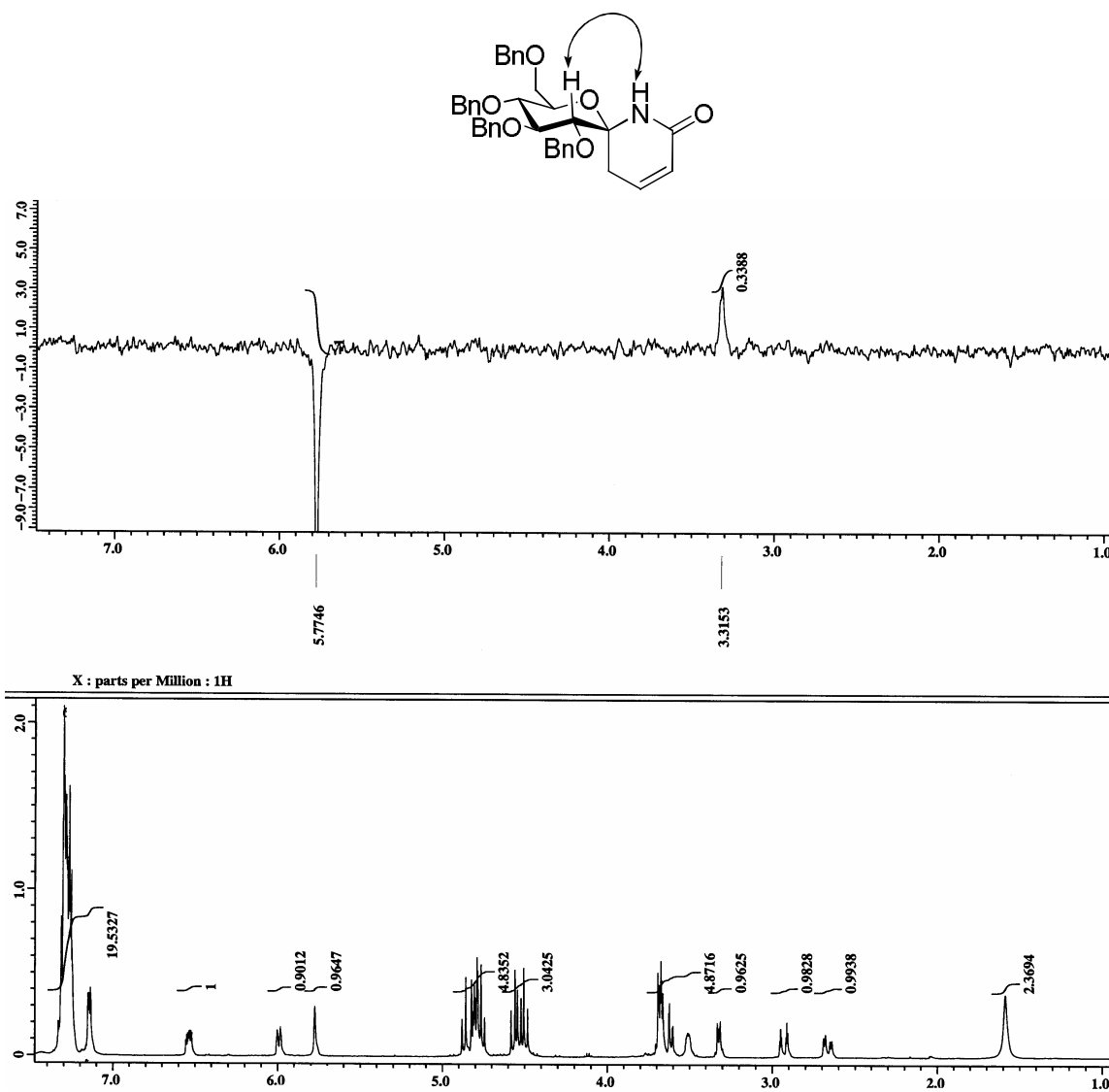


**Figure 56:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound **33b**

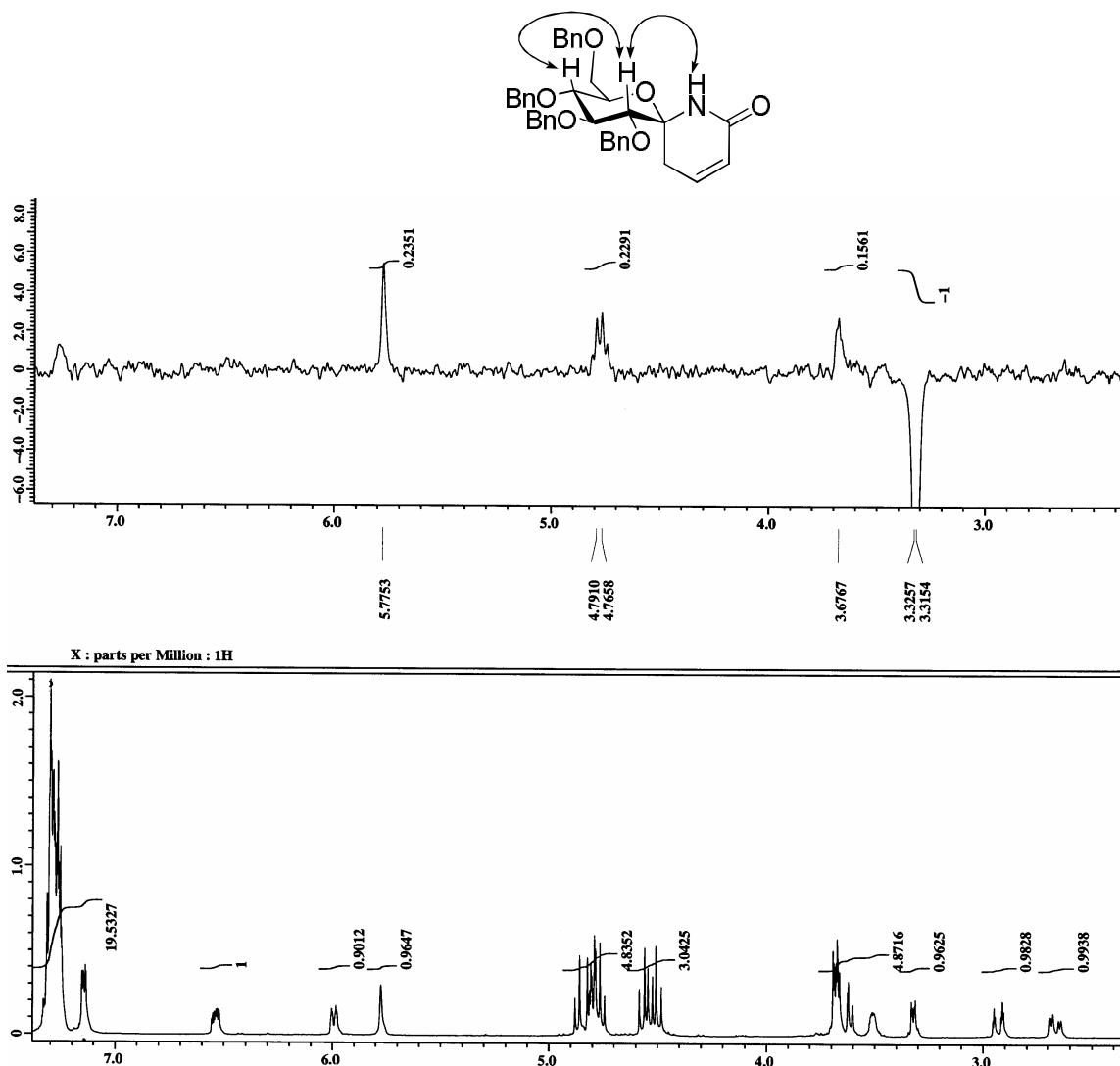




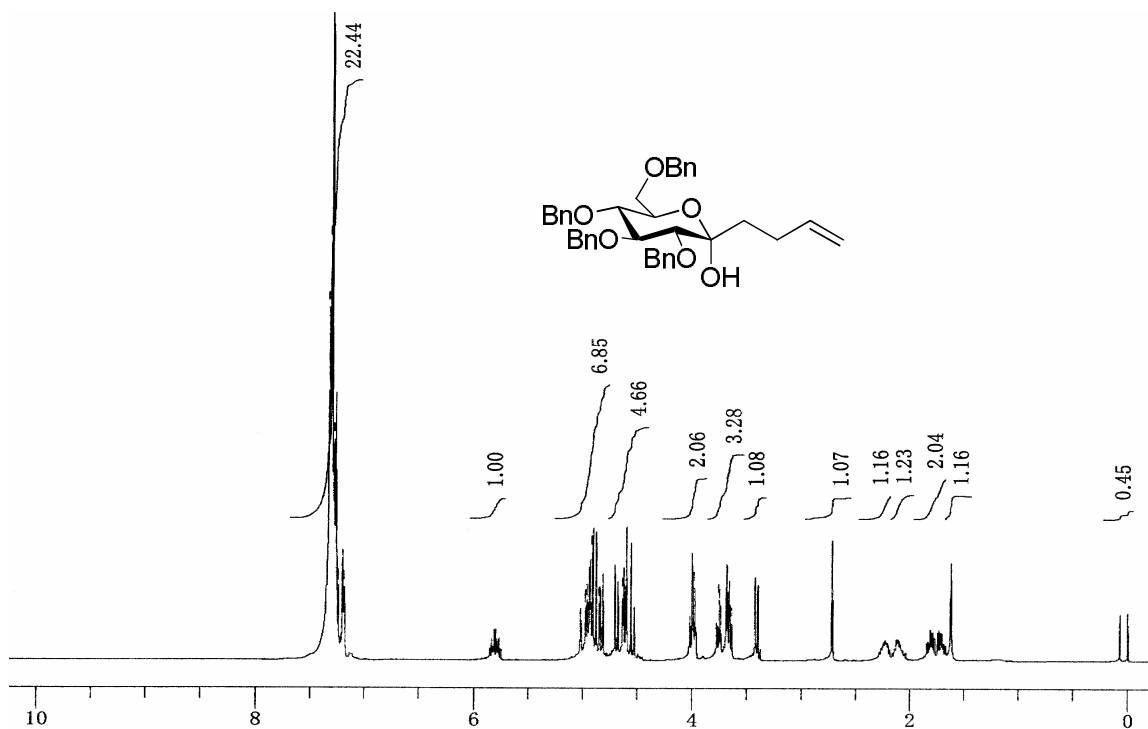
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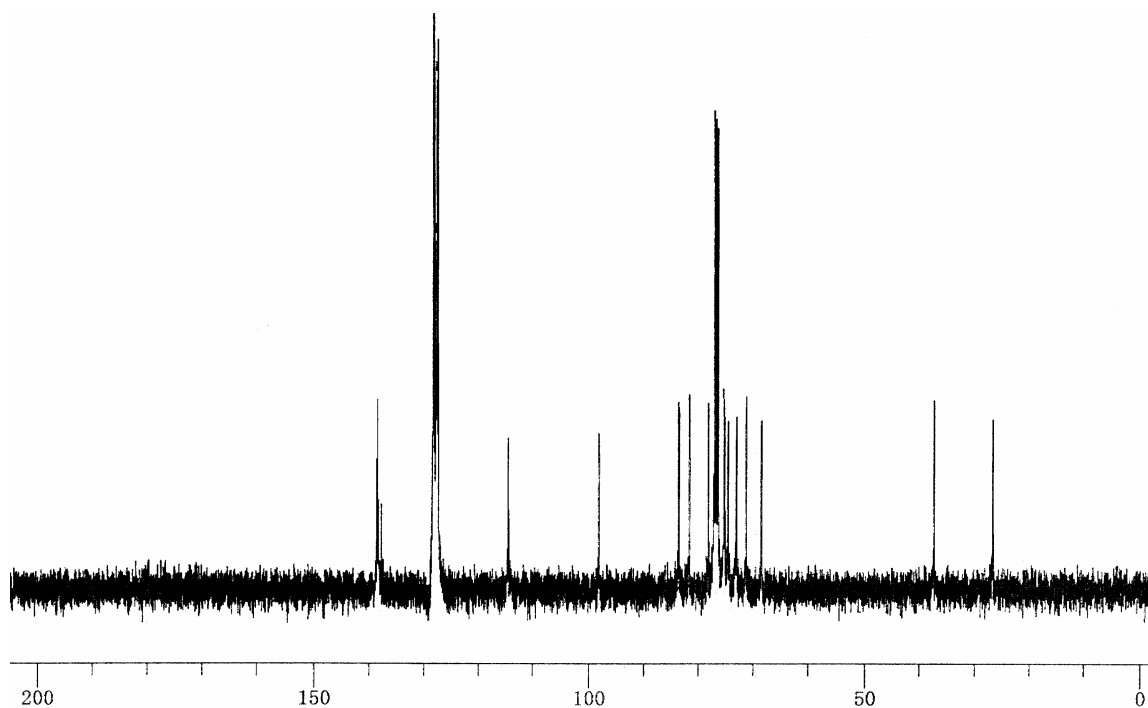
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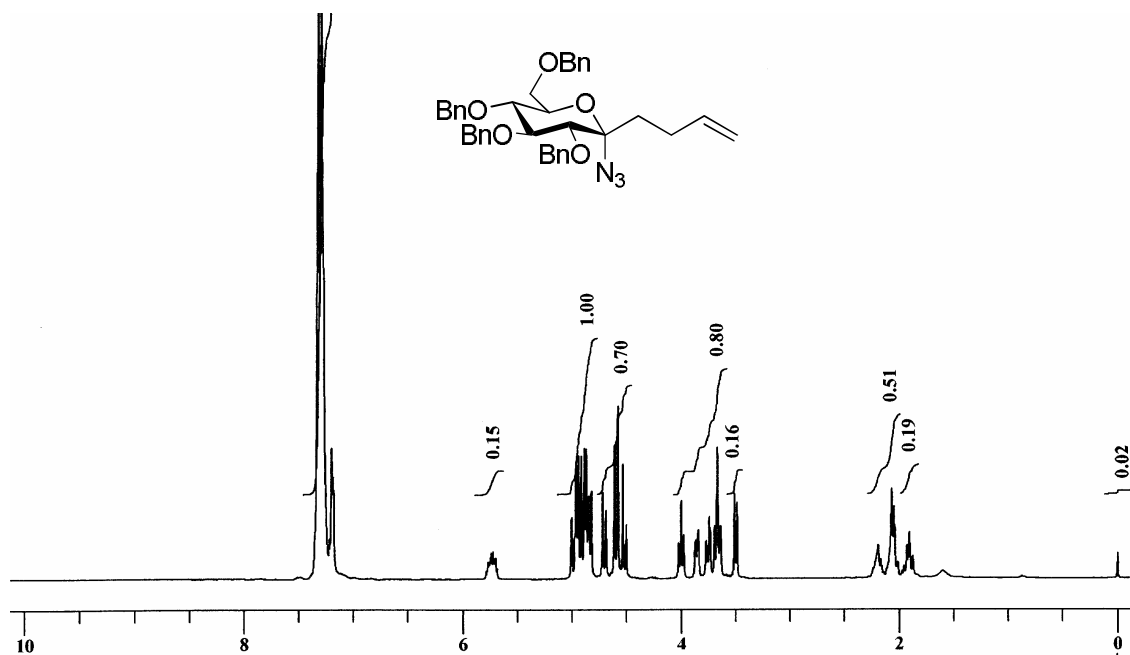
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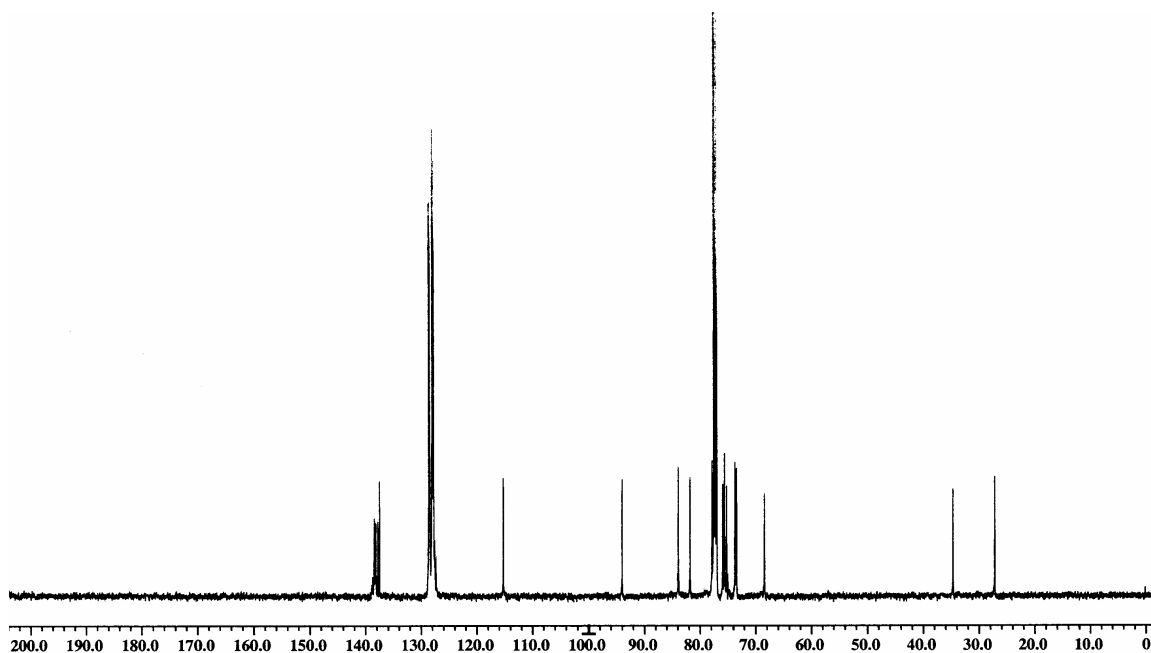
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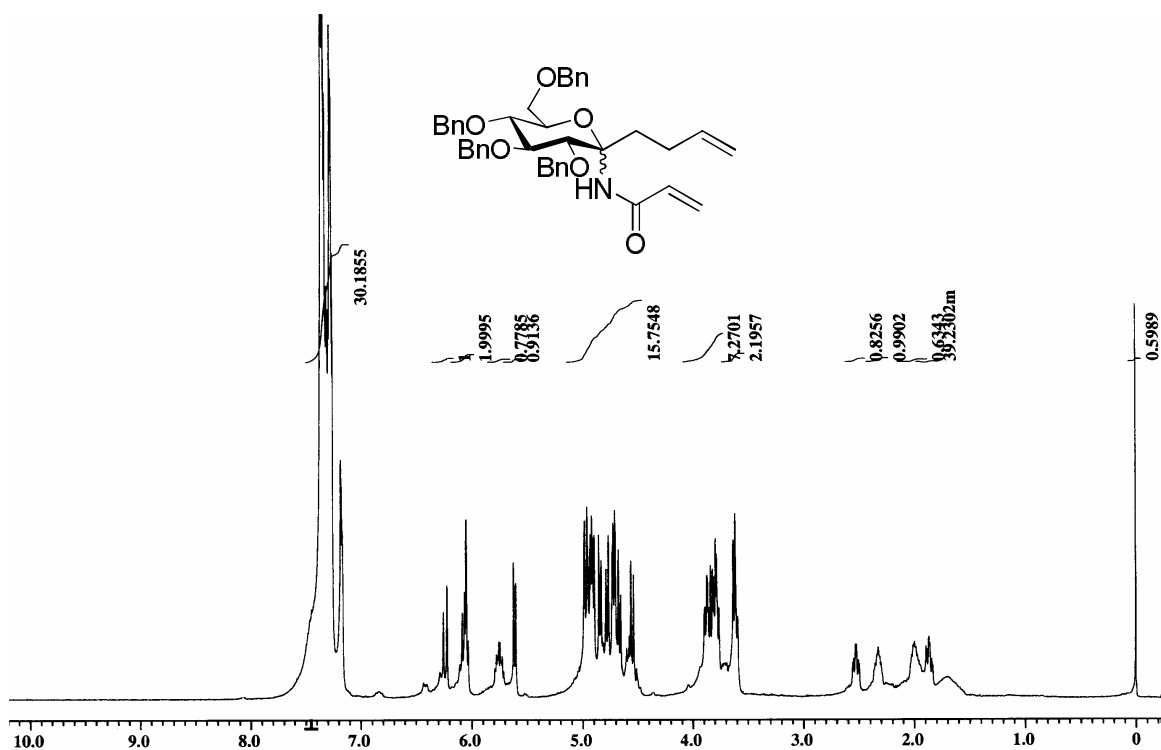
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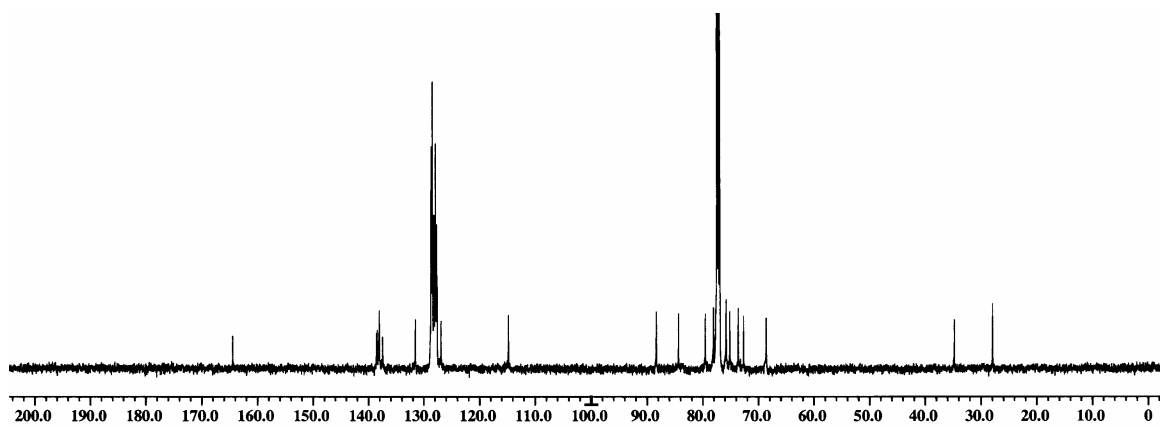
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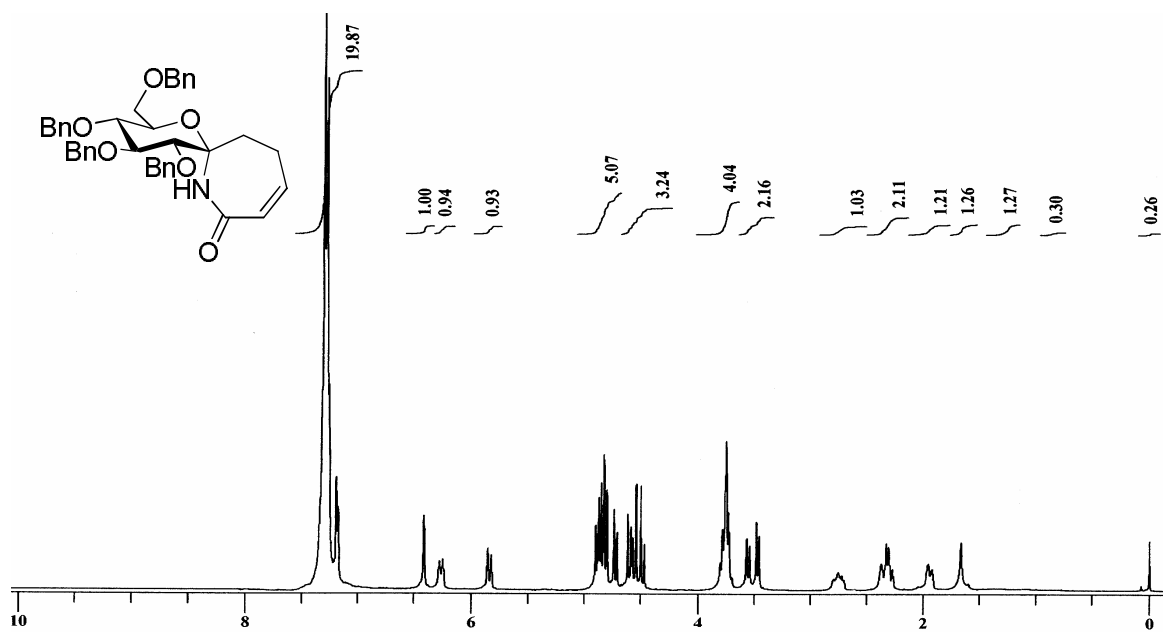
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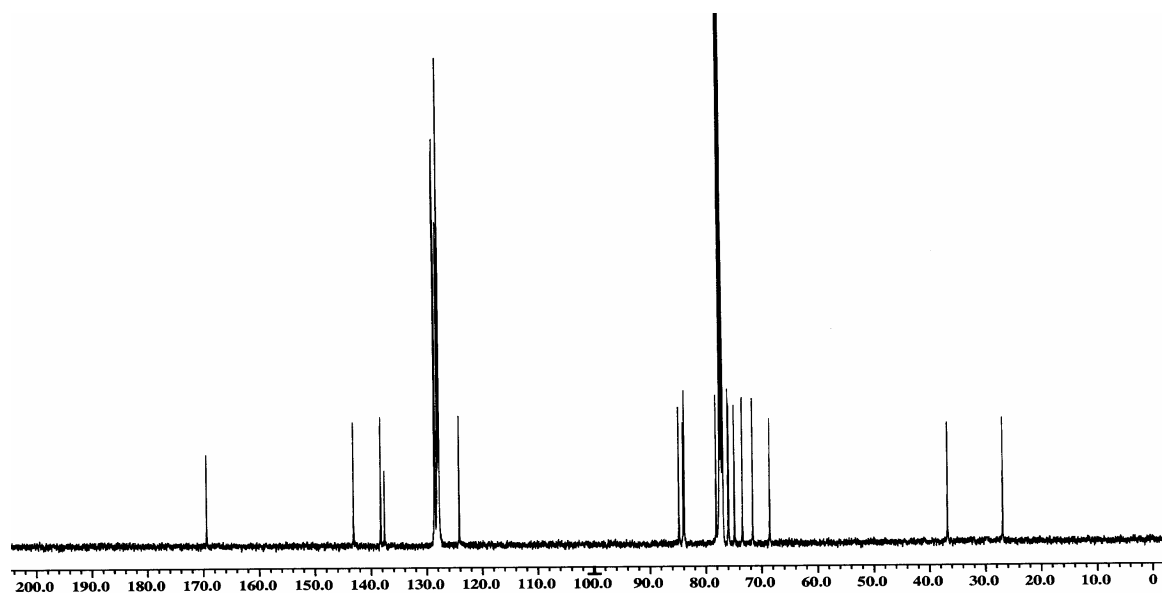
**Figure 64:**  $^1\text{H}$  NMR (500 MHz) spectrum of compound 36



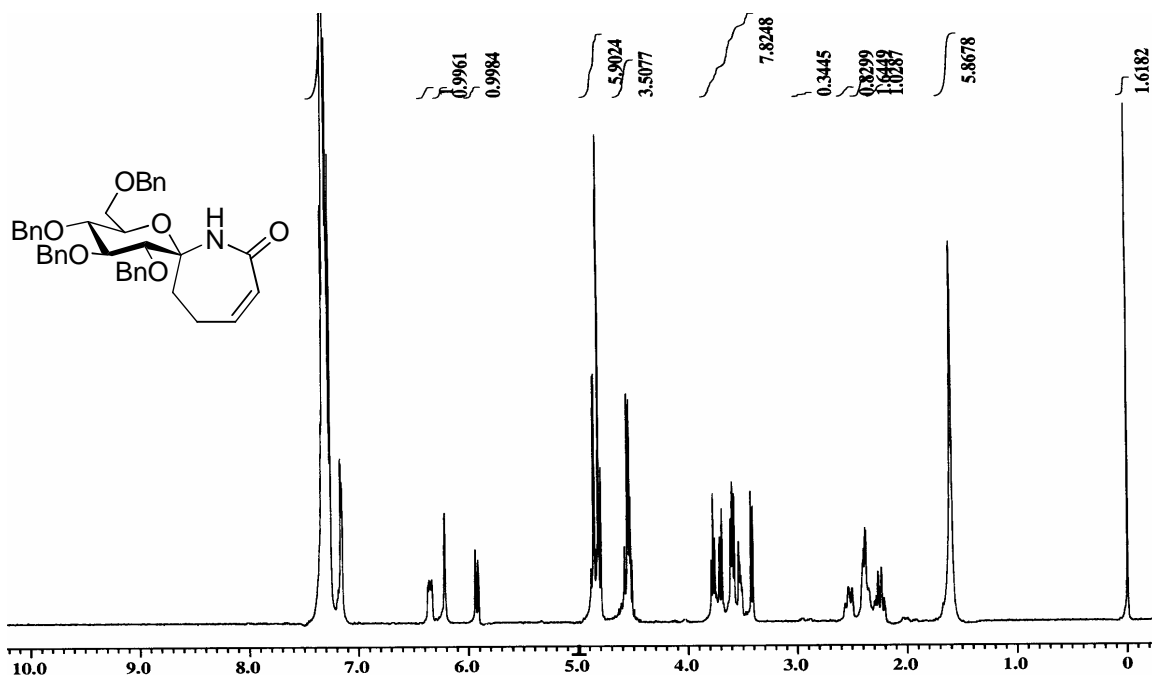
**Figure 65:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound 36



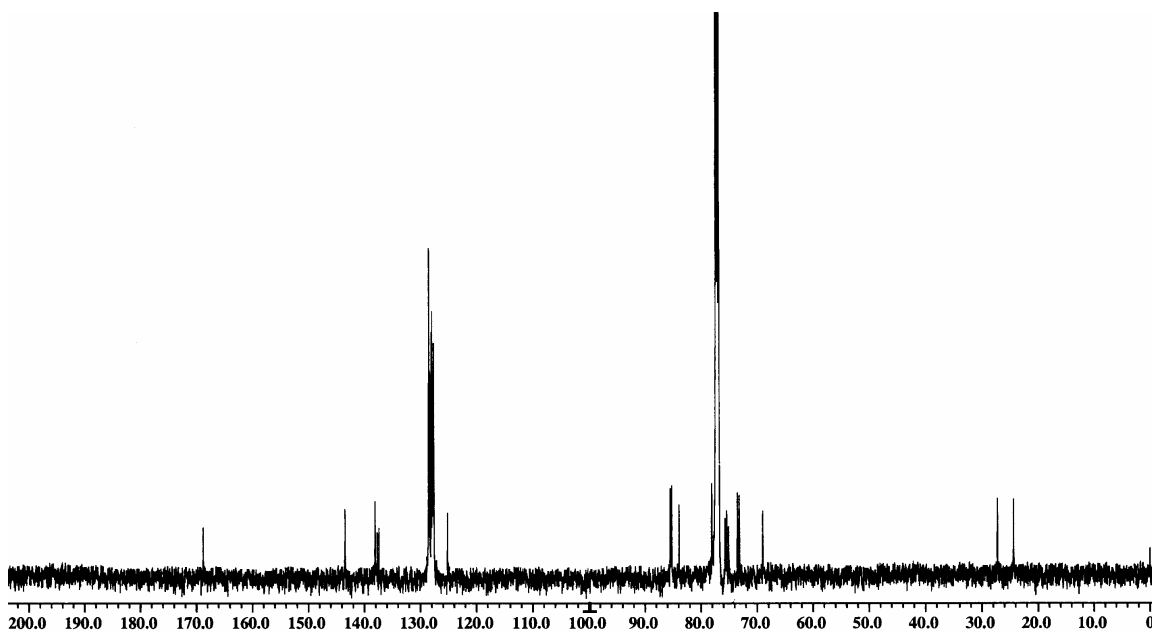
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**Figure 67:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound **37a**

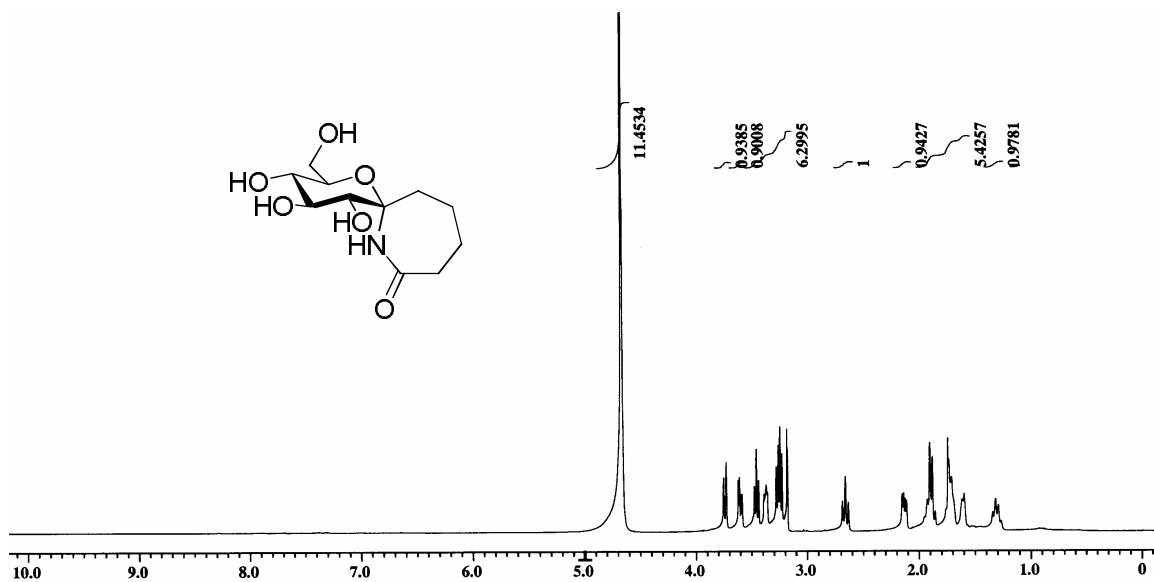


**Figure 68:**  $^1\text{H}$  NMR (400 MHz) spectrum of compound **37b**

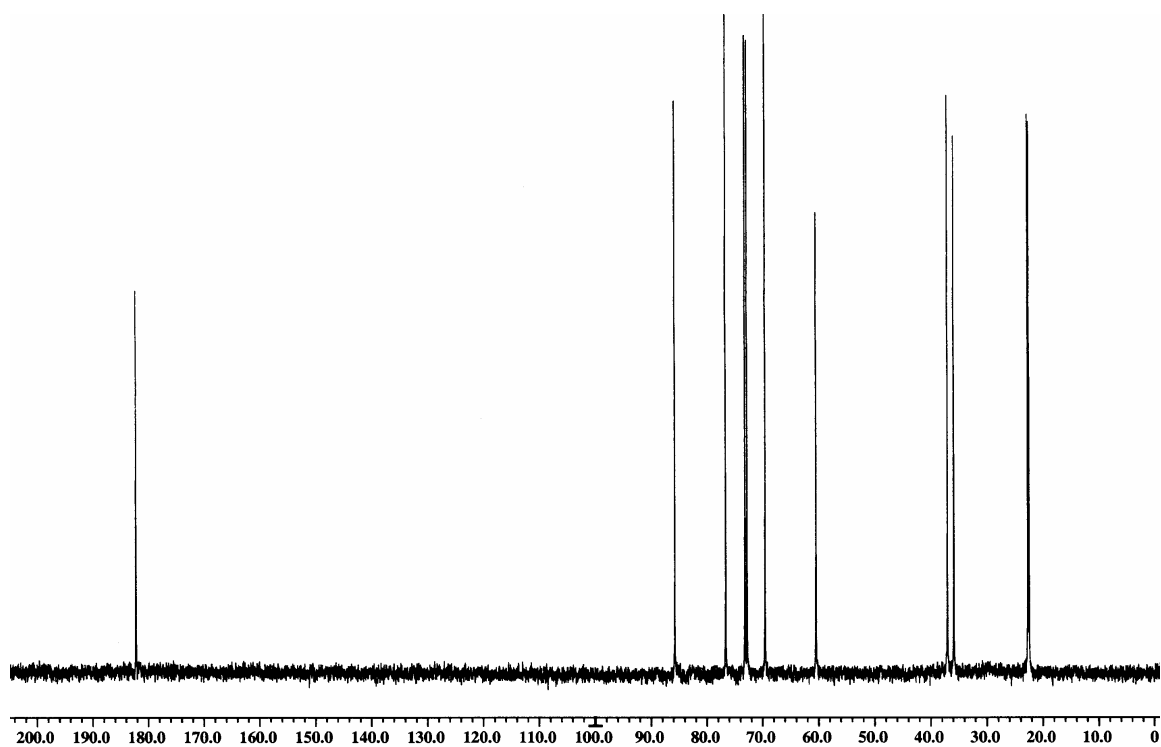


**Figure 69:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound **37b**

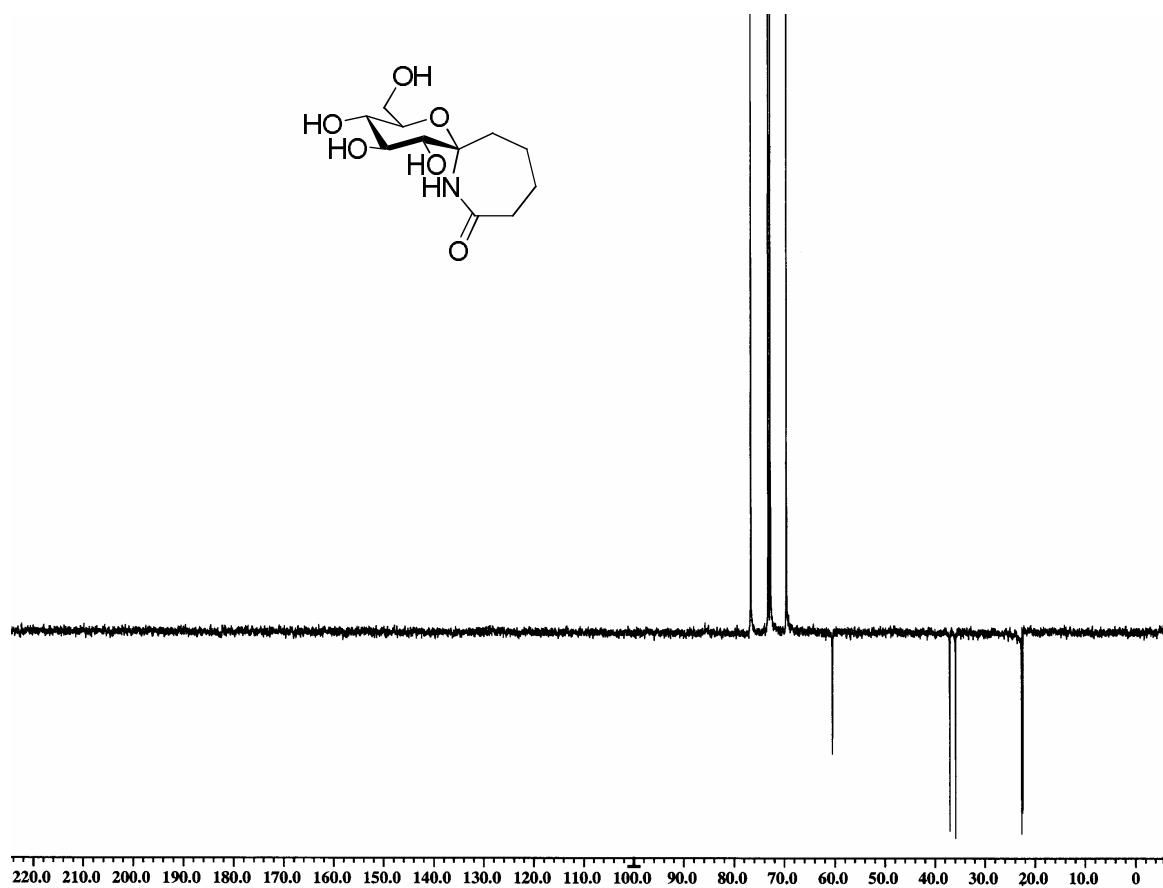




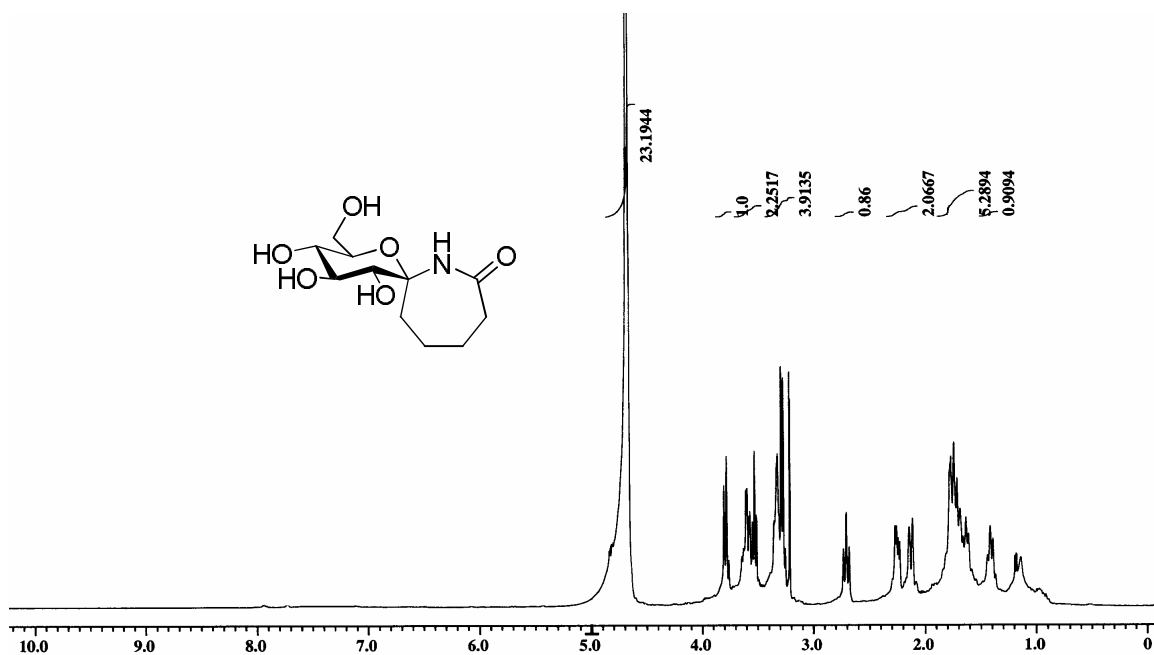
**Figure 70:** <sup>1</sup>H NMR (500 MHz) spectrum of compound 38a



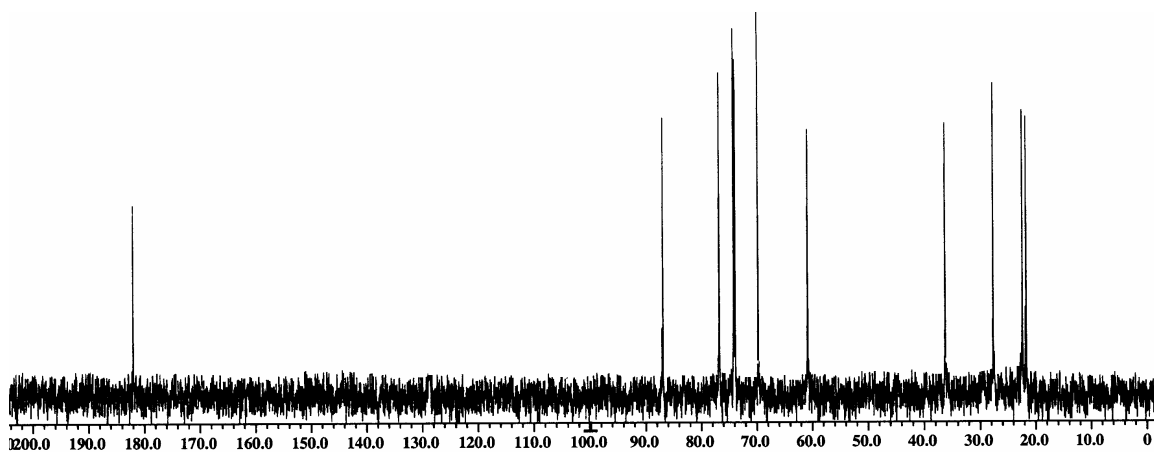
**Figure 71:** <sup>13</sup>C NMR (500 MHz) spectrum of compound 38a



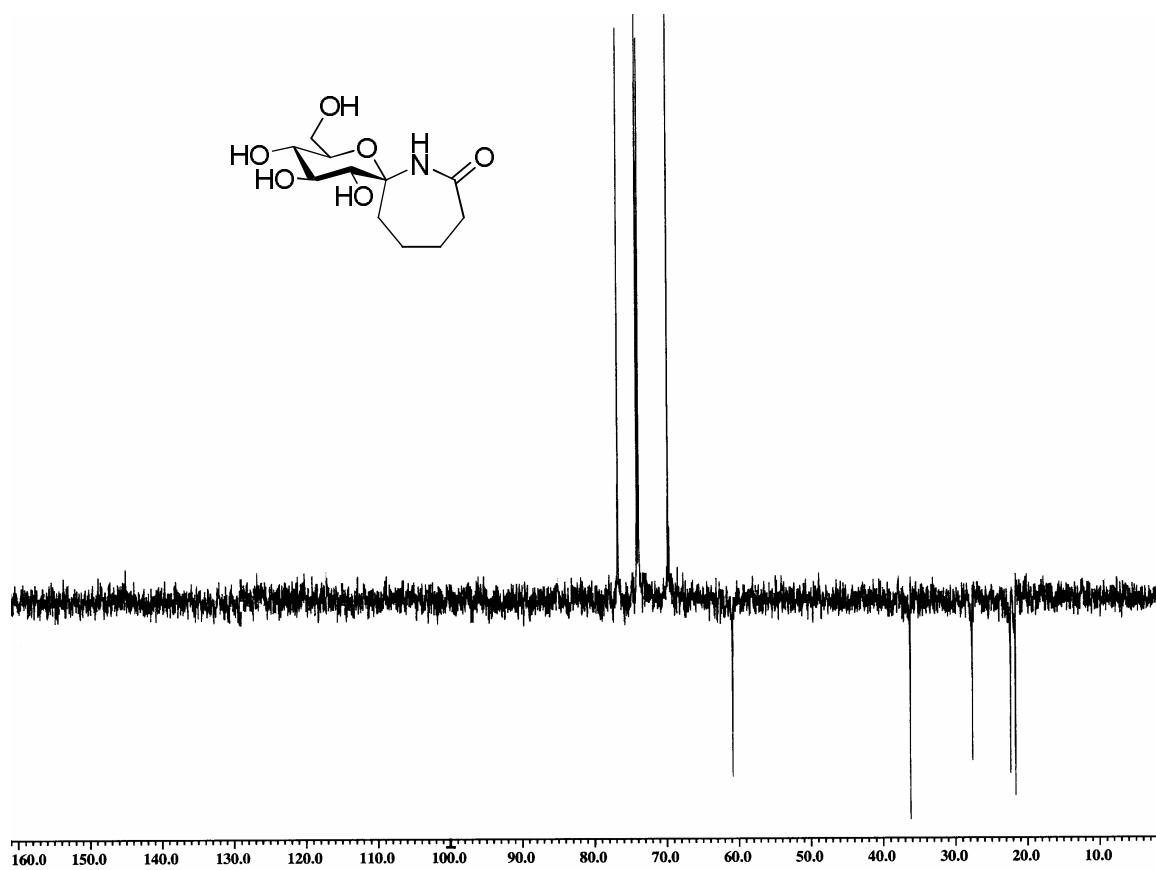
**Figure 72:** DEPT-135 (500 MHz) spectrum of compound **38a**



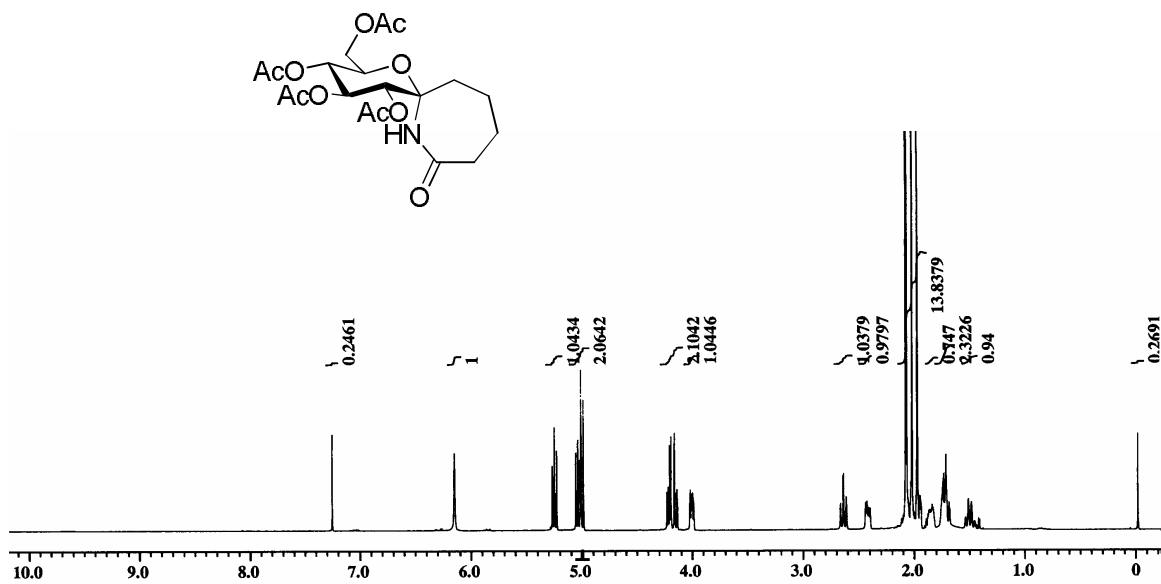
**Figure 73:**  $^1\text{H}$  NMR (500 MHz) spectrum of compound **38b**



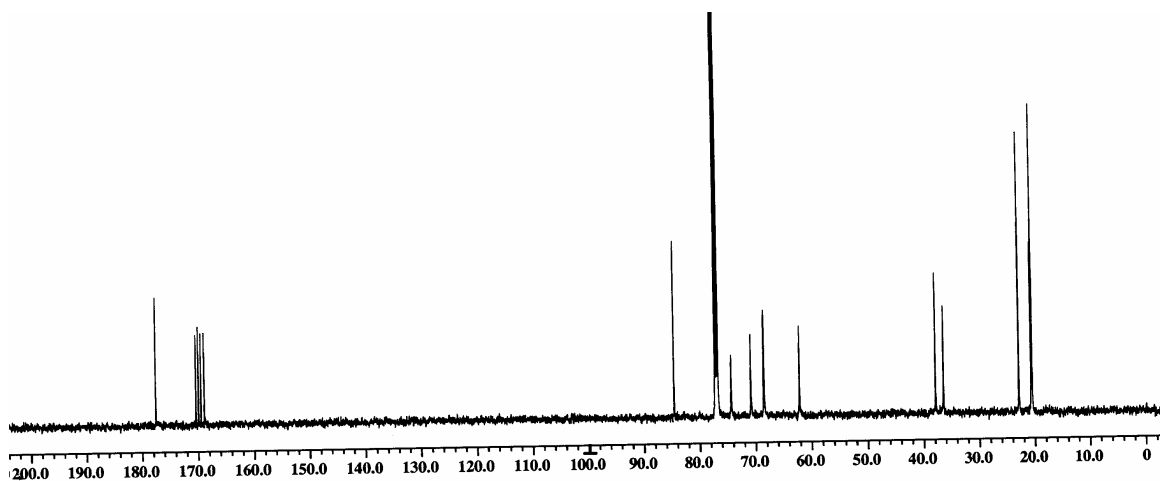
**Figure 74:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound **38b**



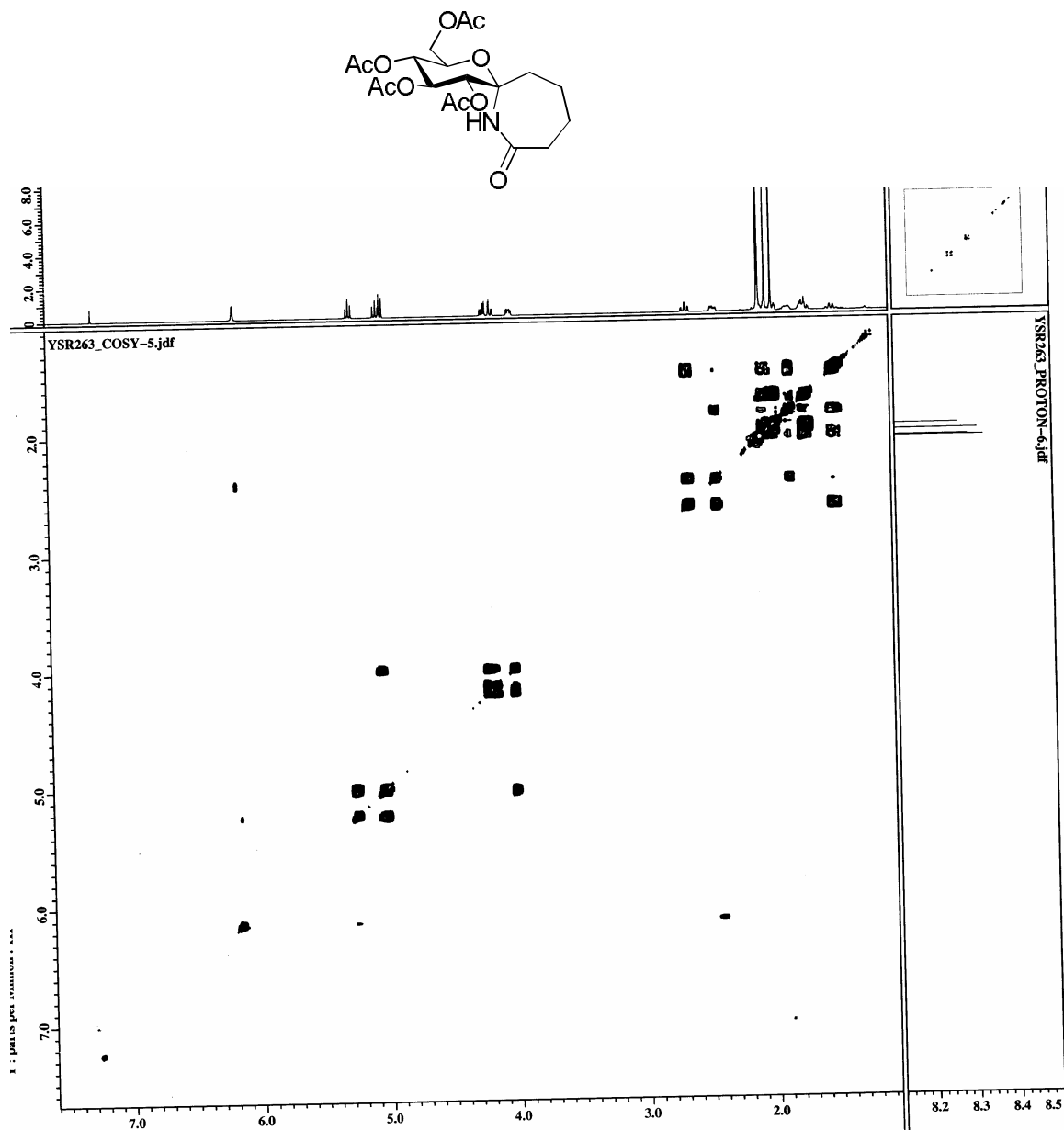
**Figure 75:** DEPT-135 (500 MHz) spectrum of compound **38b**



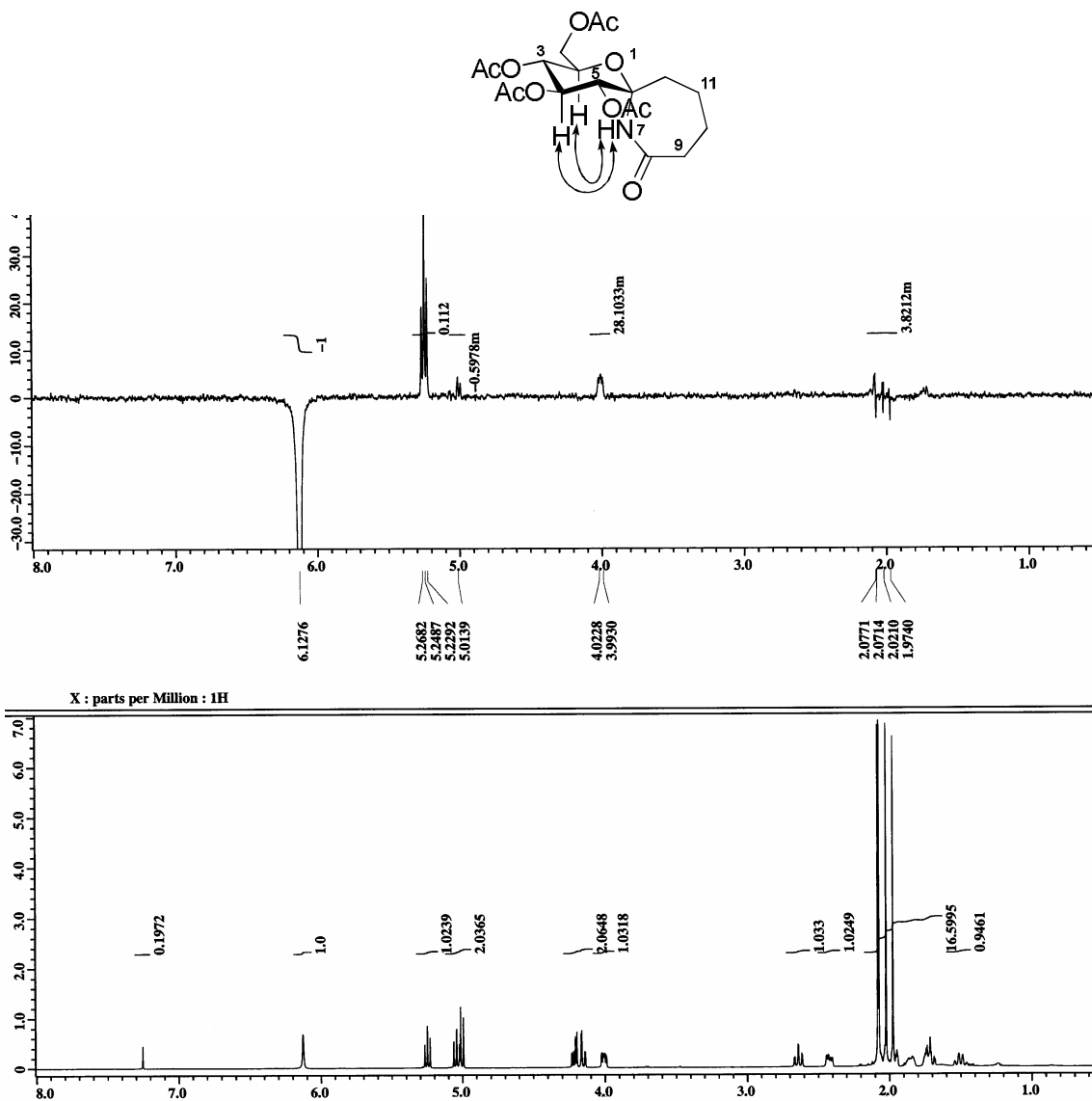
**Figure 76:** <sup>1</sup>H NMR (500 MHz) spectrum of compound 39a



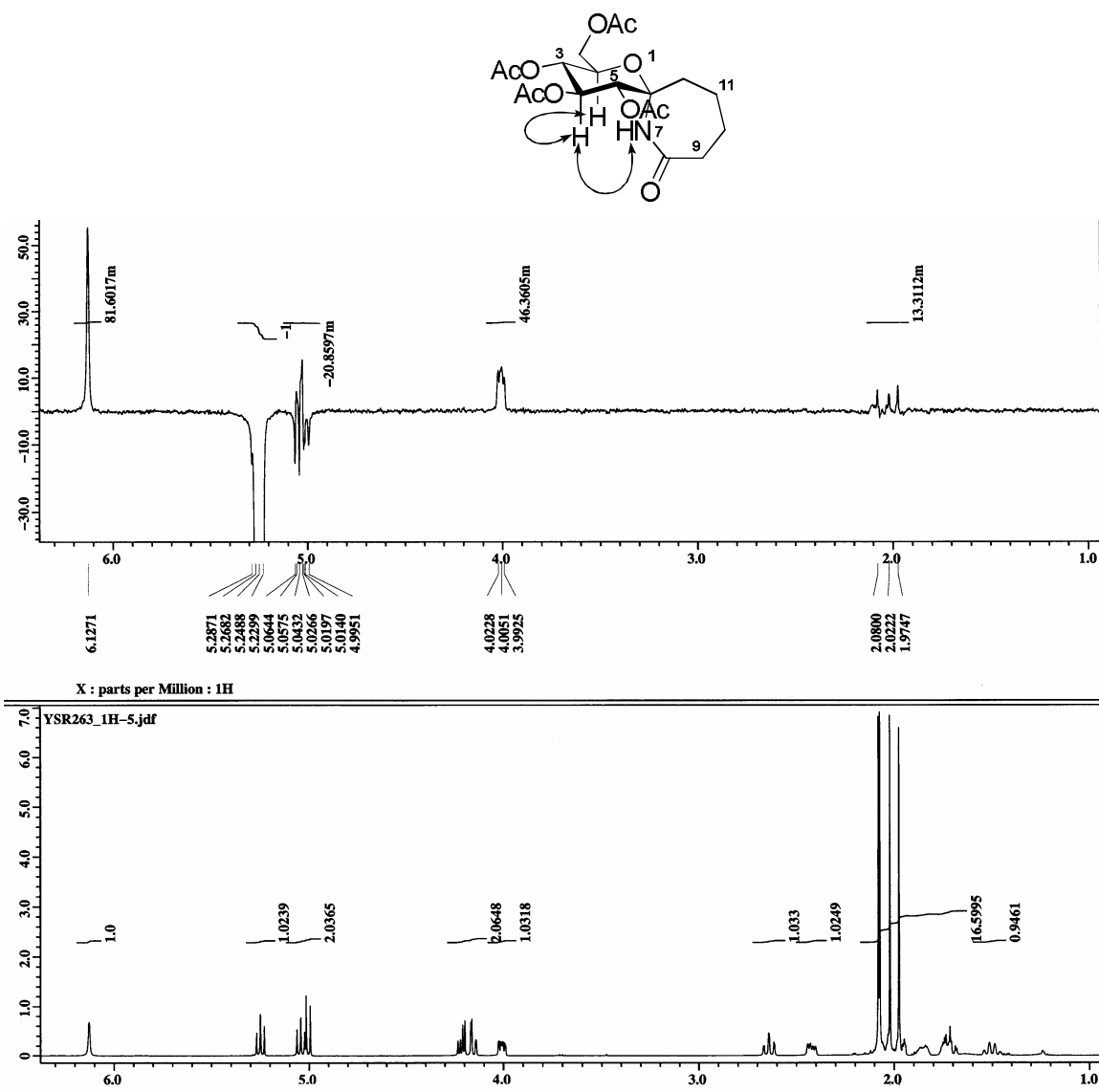
**Figure 77:** <sup>13</sup>C NMR (500 MHz) spectrum of compound 39a



**Figure 78:** <sup>1</sup>H-<sup>1</sup>H COSY (500 MHz) spectrum of compound **39a**

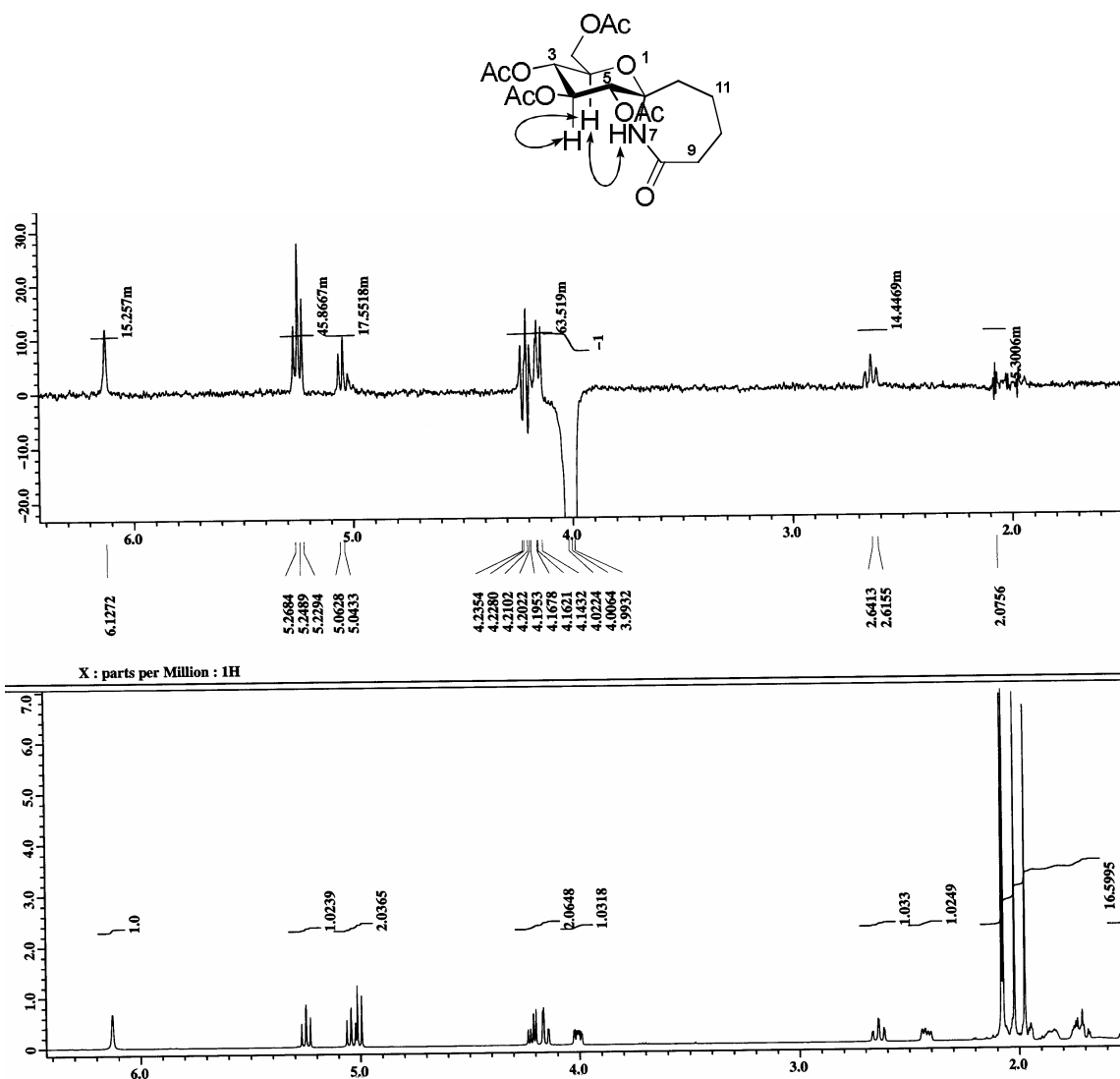


**Figure 79:** nOe (irradiation of -NH) spectrum of compound **39a**

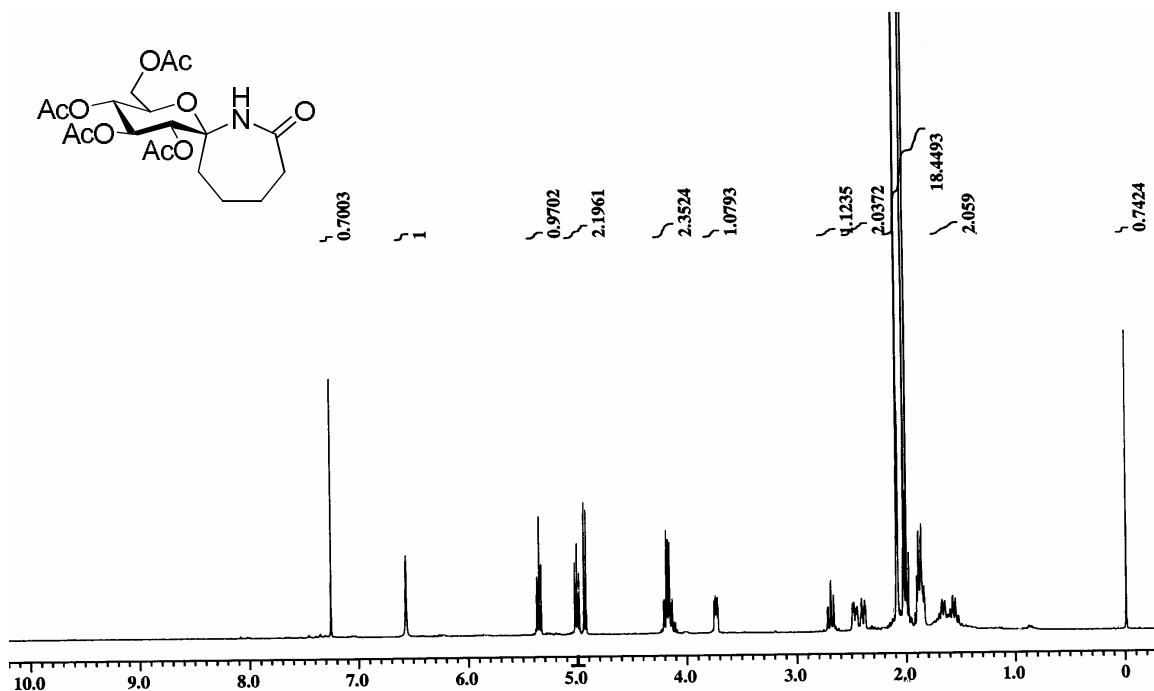


**Figure 80:** nOe (irradiation of H-4) spectrum of compound 39a

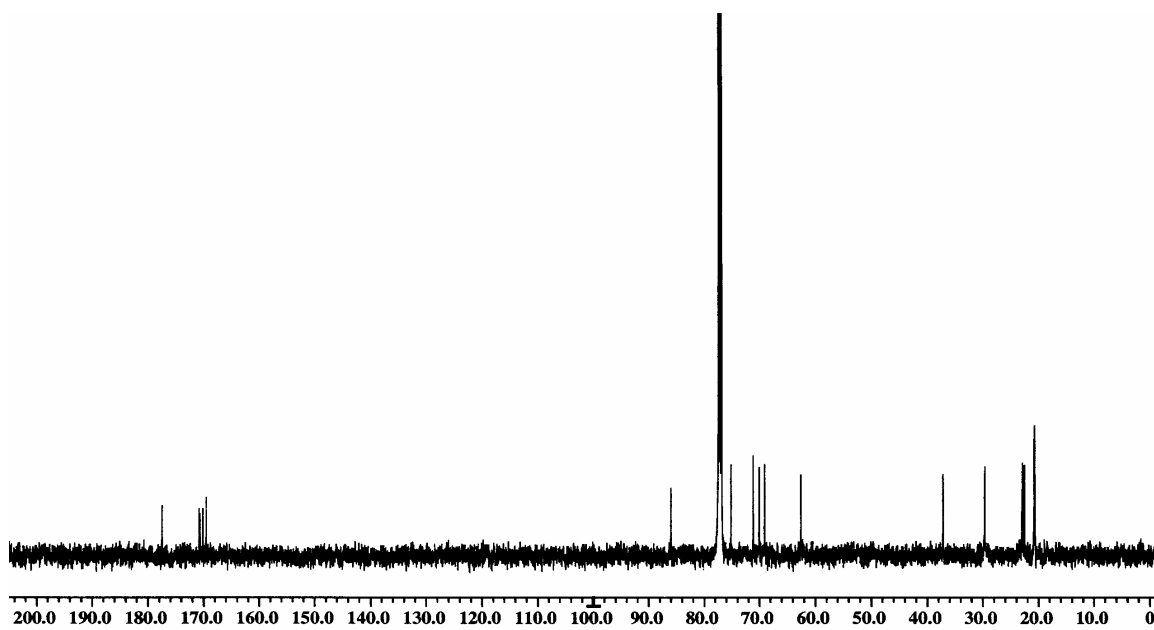




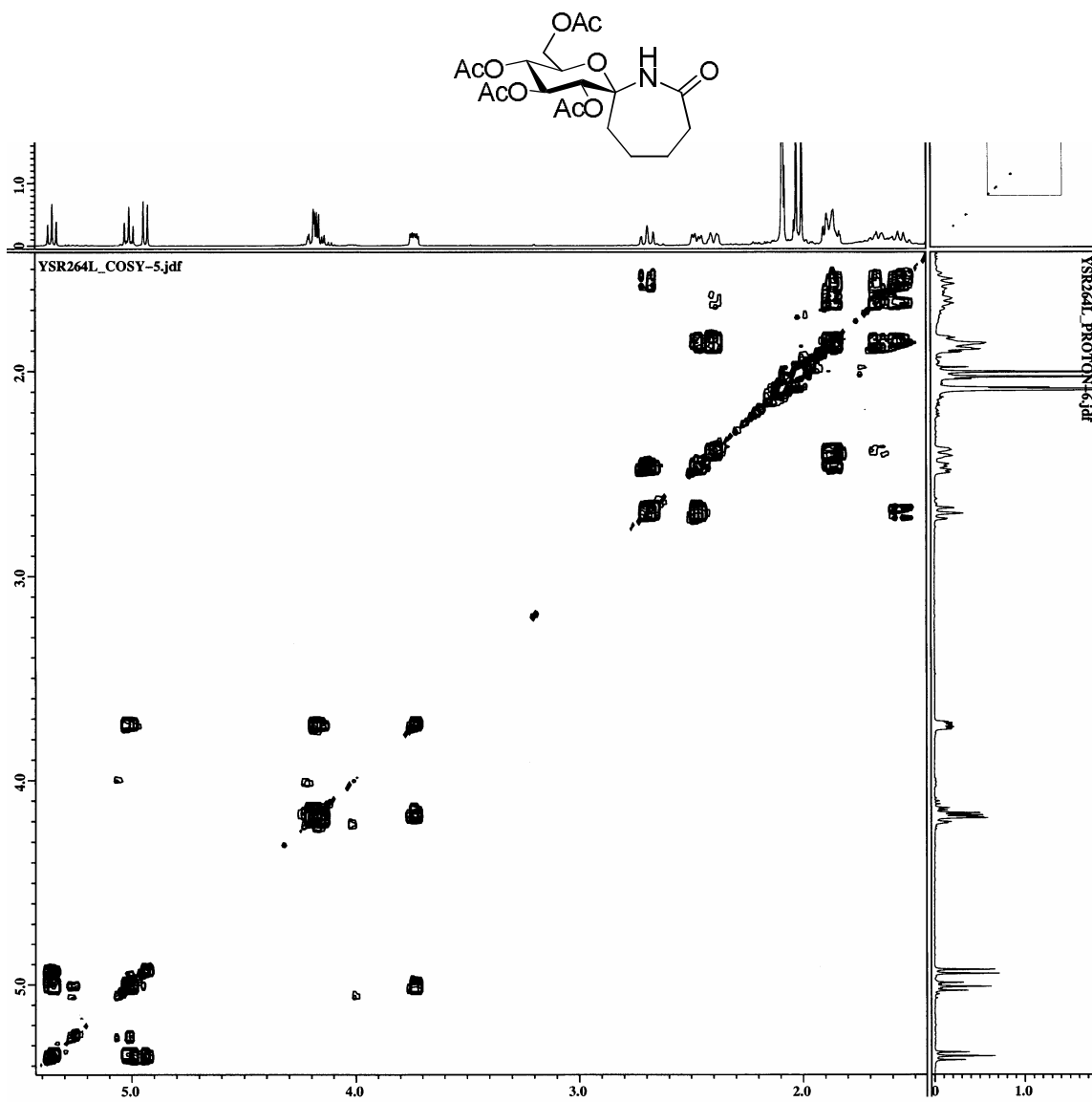
**Figure 81:** nOe (irradiation of H-2) spectrum of compound **39a**  
(Vicinal enhancements were not highlighted in the structure)



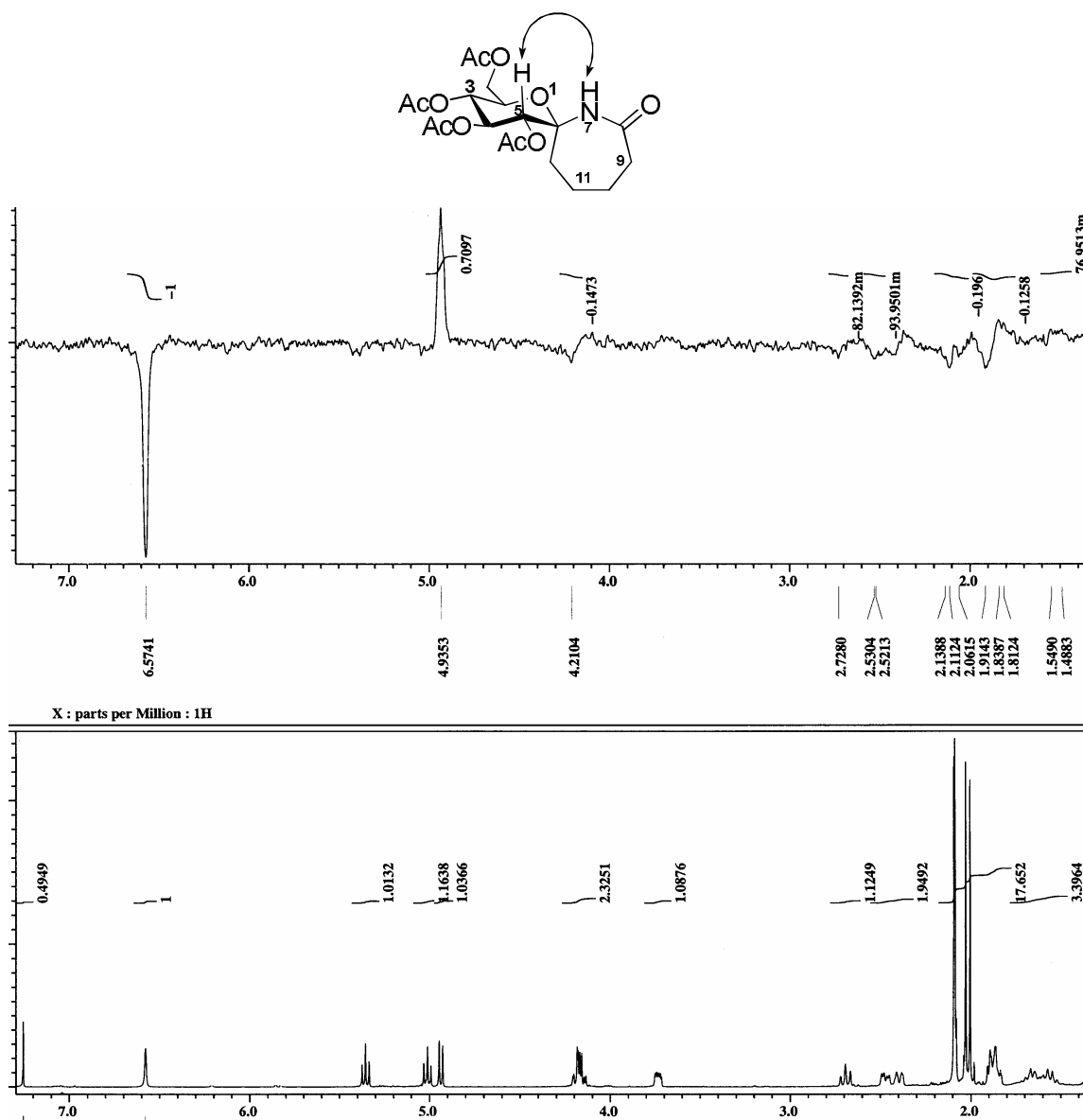
**Figure 82:**  $^1\text{H}$  NMR (500 MHz) spectrum of compound **39b**



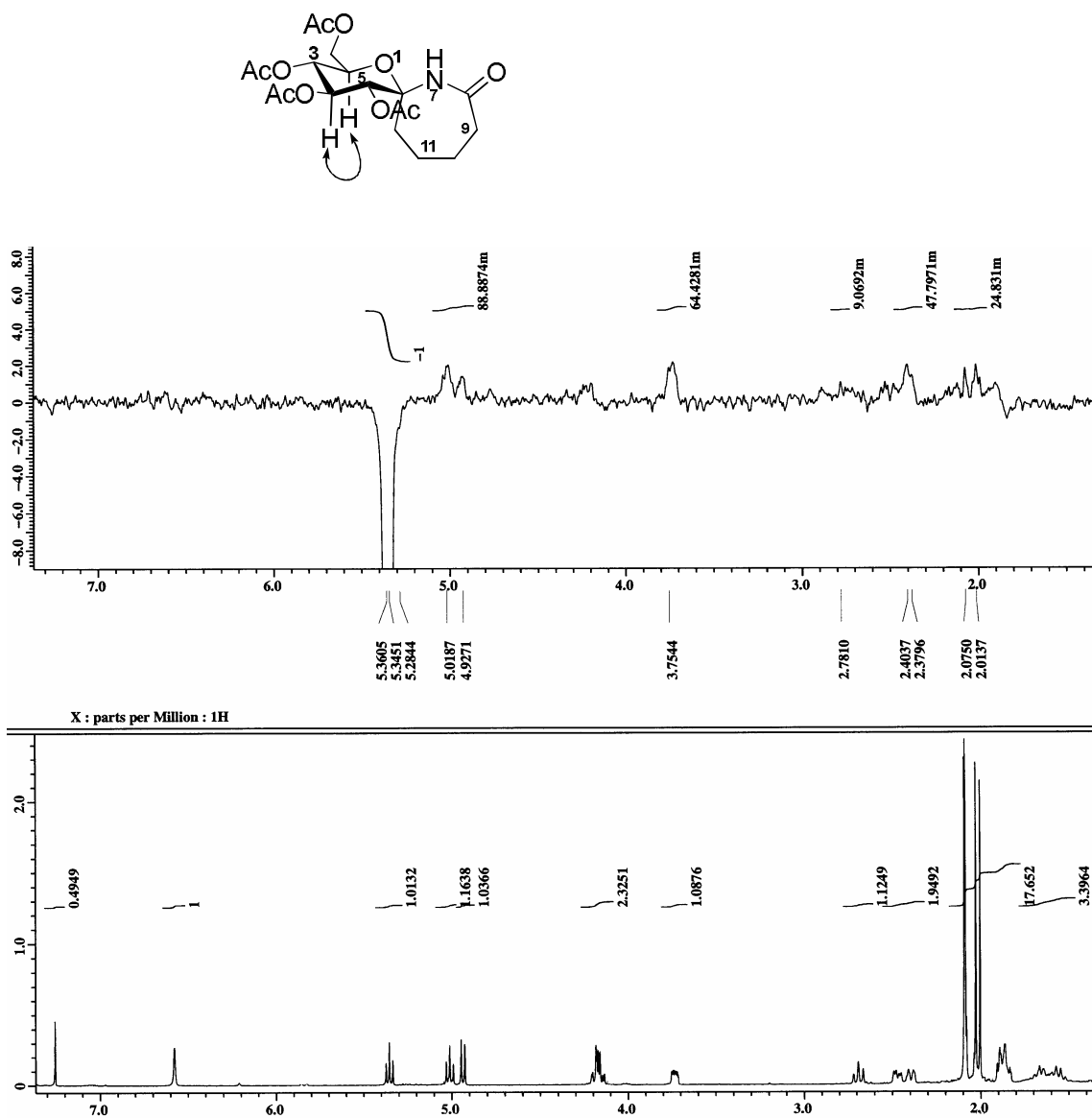
**Figure 83:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound **39b**



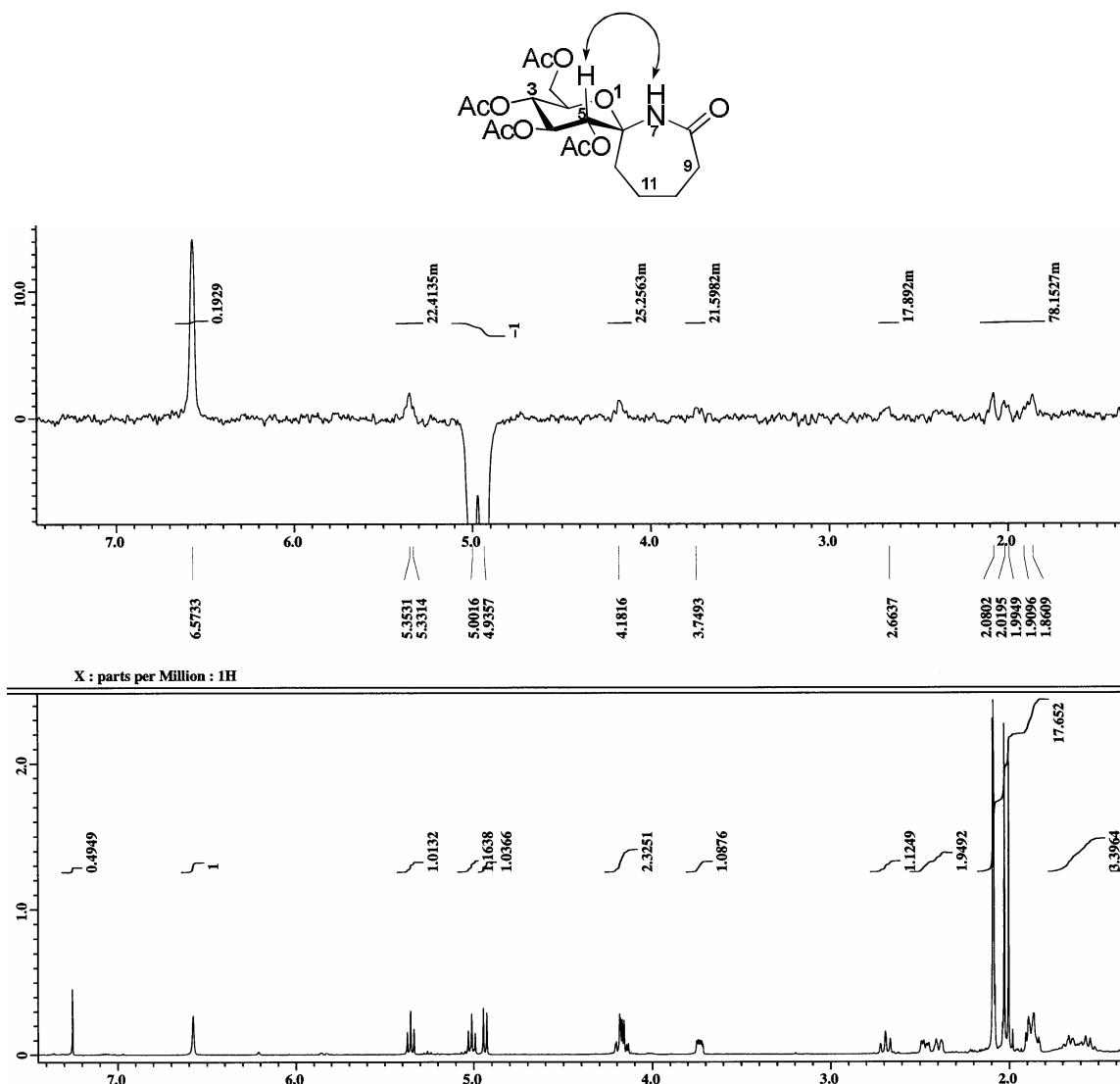
**Figure 84:**  $^1\text{H}$ - $^1\text{H}$  COSY (500 MHz) spectrum of compound **39b**



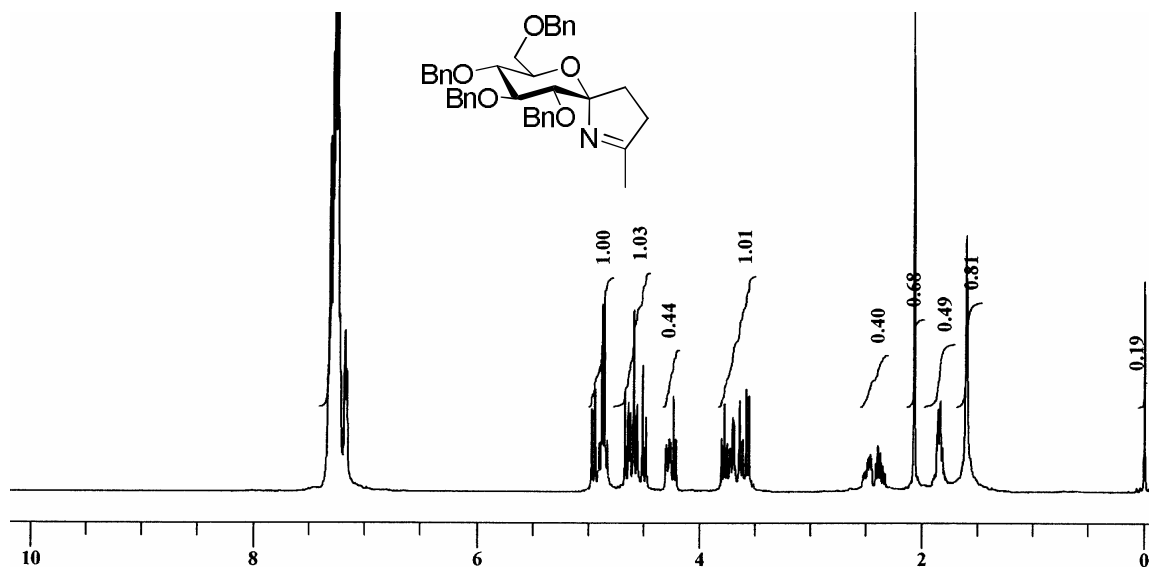
**Figure 85:** nOe (irradiation of -NH) spectrum of compound **39b**



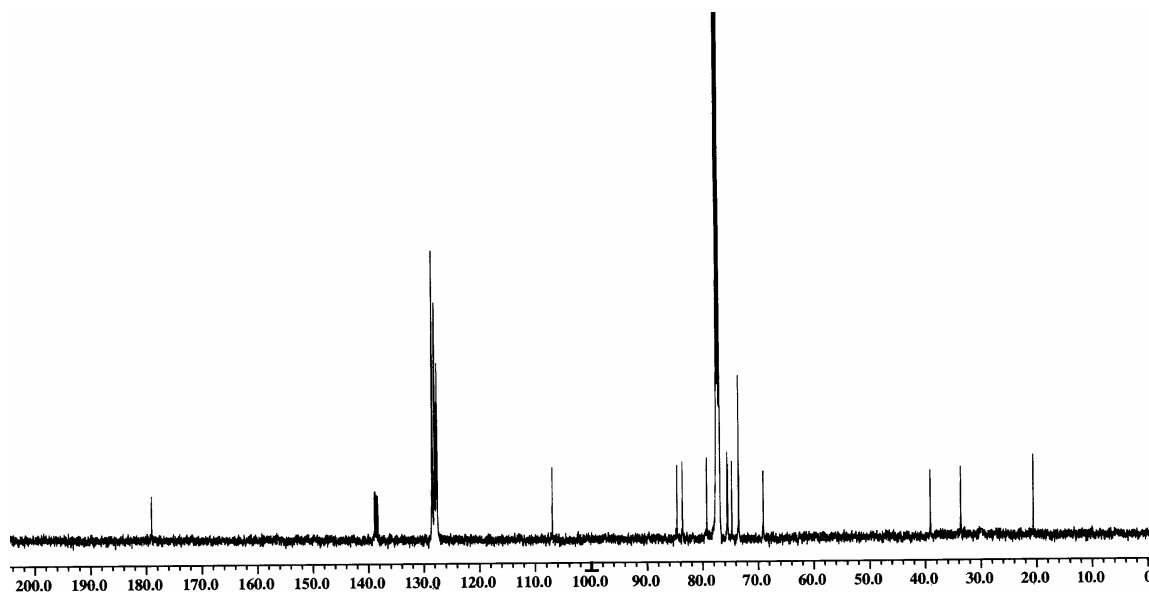
**Figure 85:** nOe (irradiation of H-4) spectrum of compound **39b**



**Figure 85:** nOe (irradiation of H-5) spectrum of compound **39b**



**Figure 86:**  $^1\text{H}$  NMR (400 MHz) spectrum of compound 40



**Figure 87:**  $^{13}\text{C}$  NMR (500 MHz) spectrum of compound 40