

Discovery of Novel Tetrahydro- $\beta$ -carboline Containing Aminopeptidase N Inhibitors  
as Cancer Chemosensitizers

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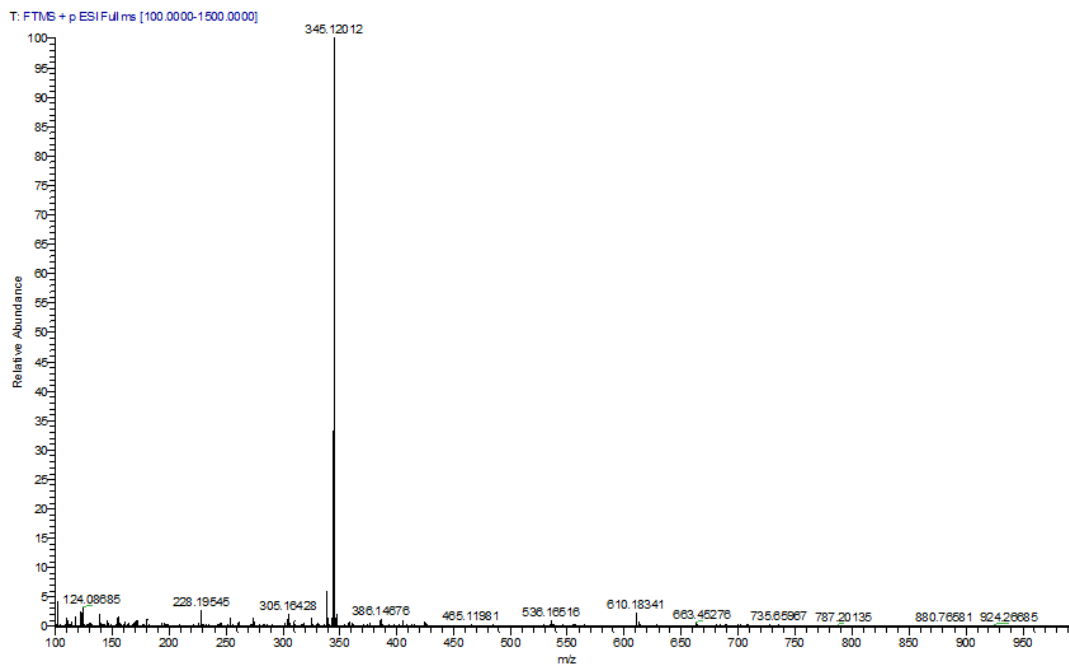
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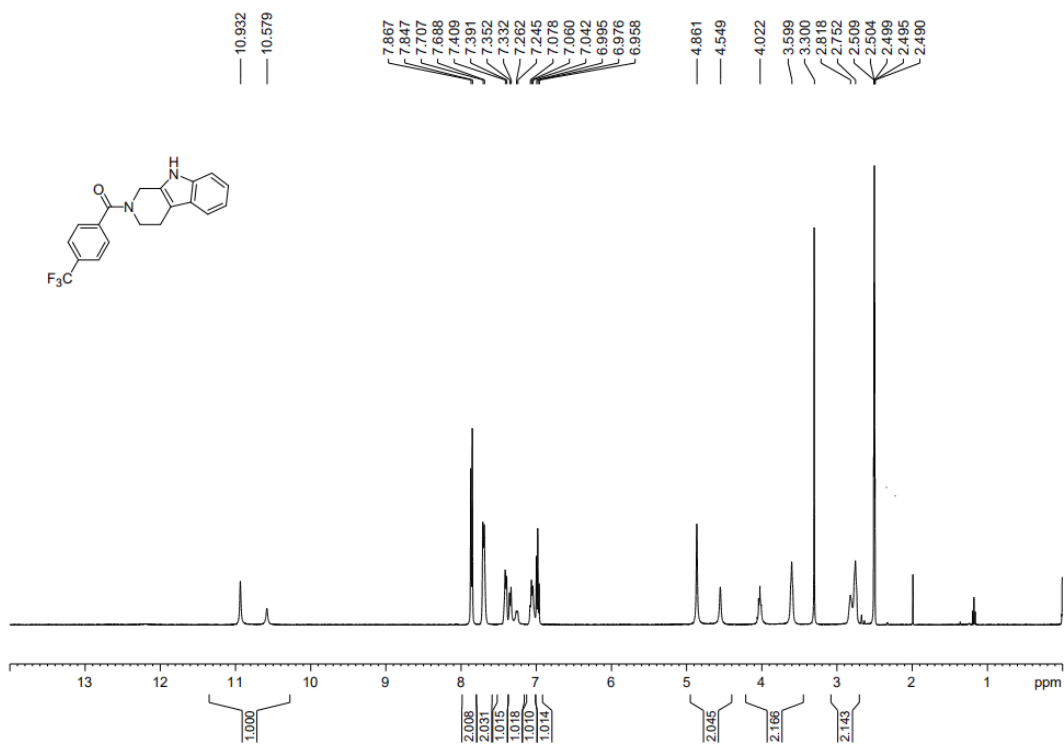
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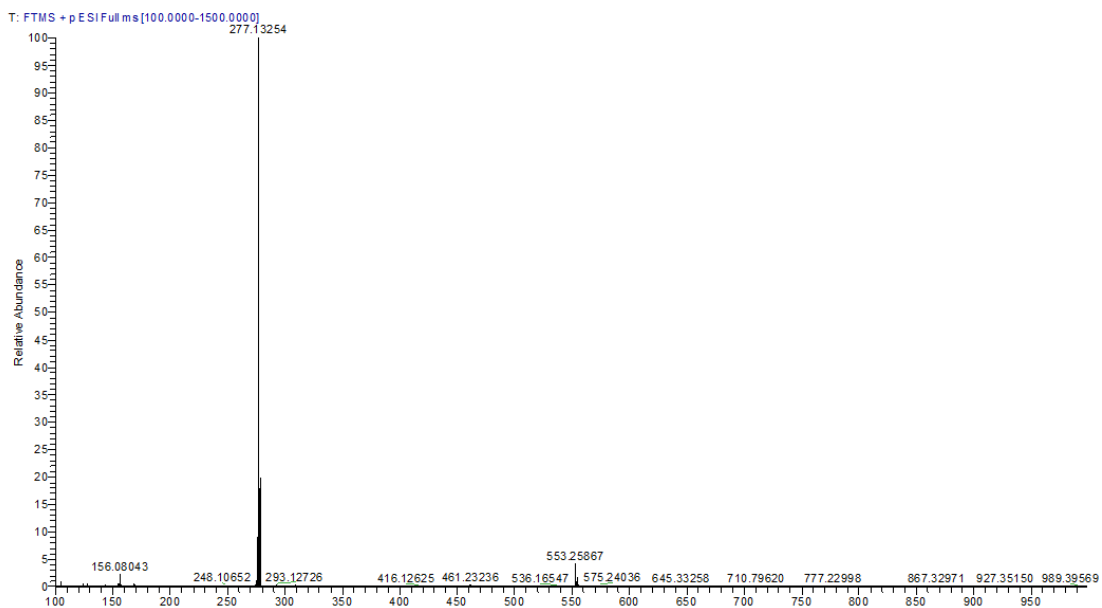
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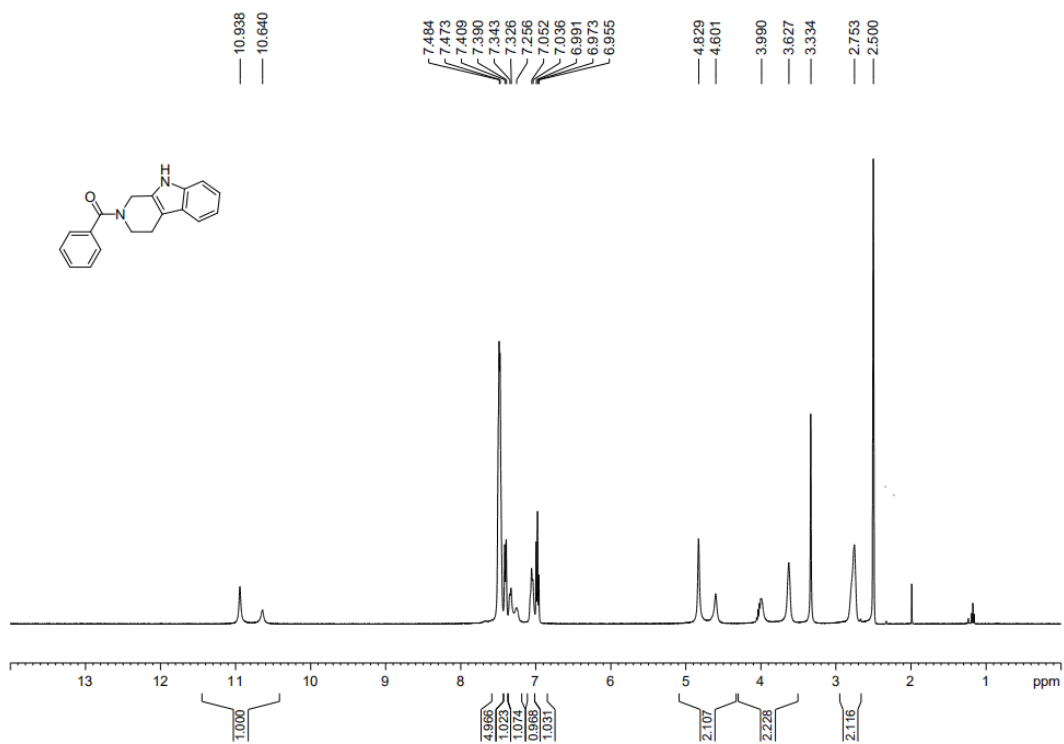
HRMS spectrum of **B1**



$^1\text{H}$  NMR spectrum of **B1**

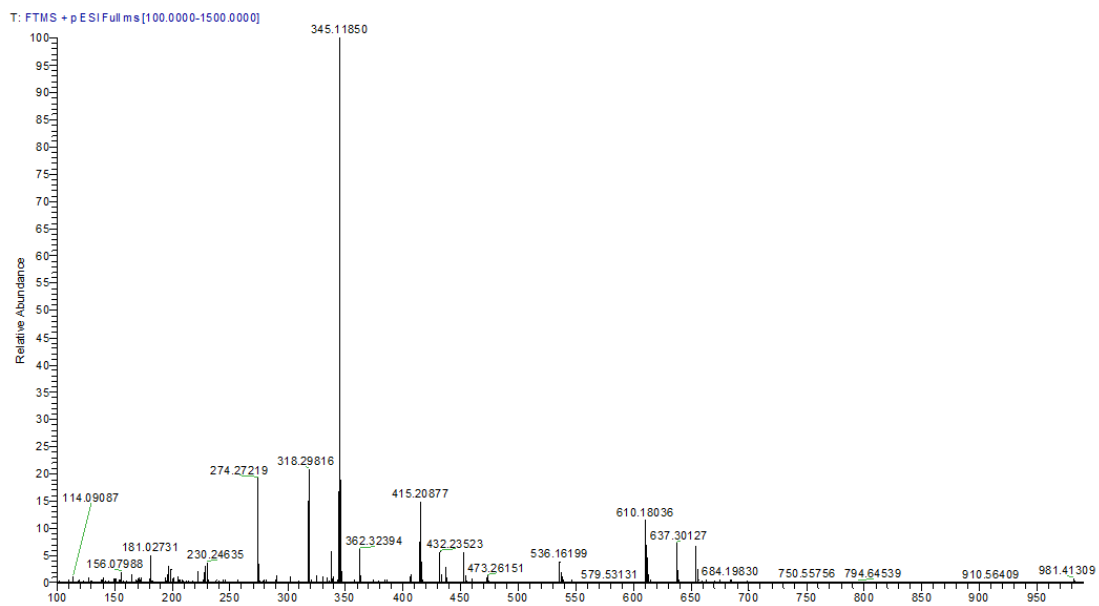


HRMS spectrum of **B2**

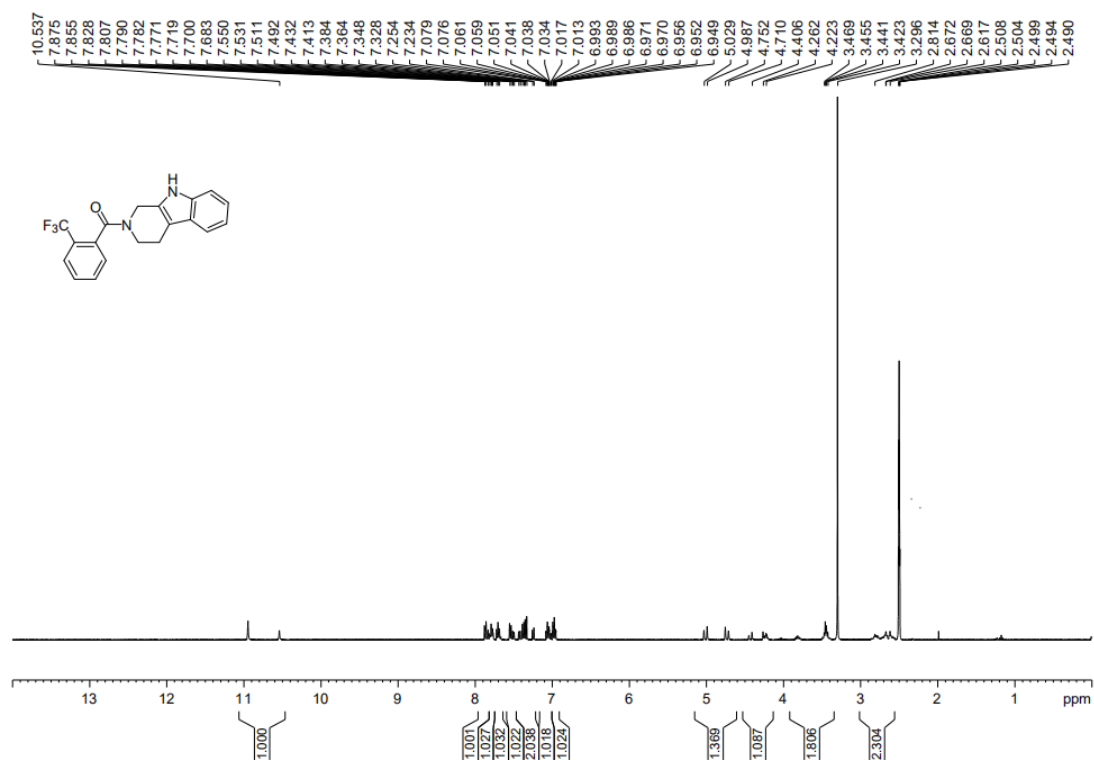


$^1\text{H}$  NMR spectrum of **B2**

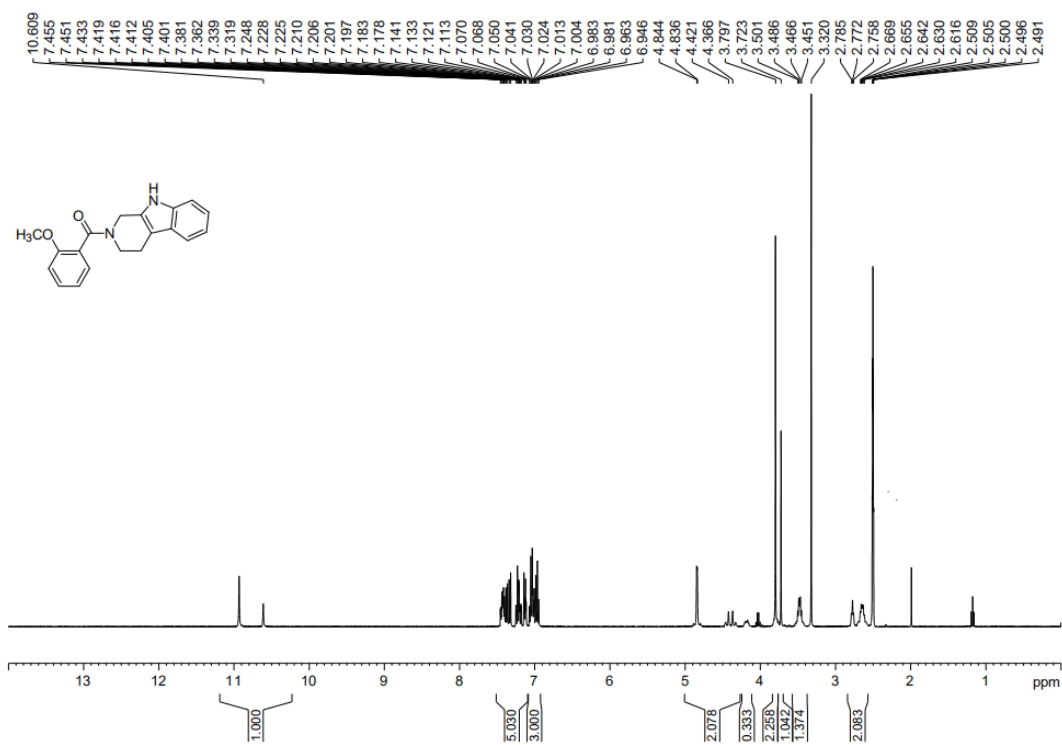
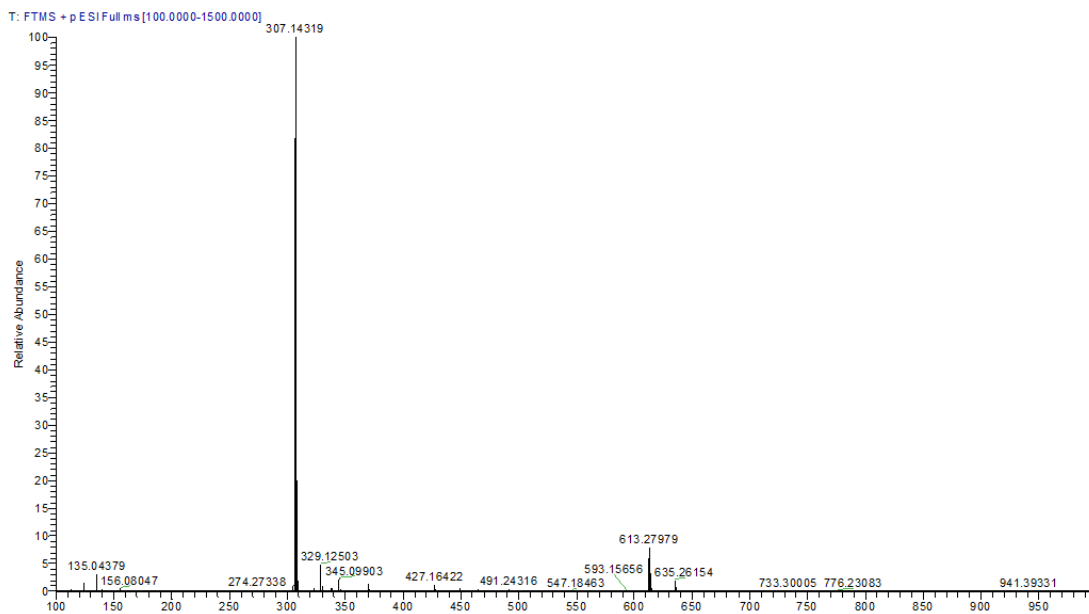


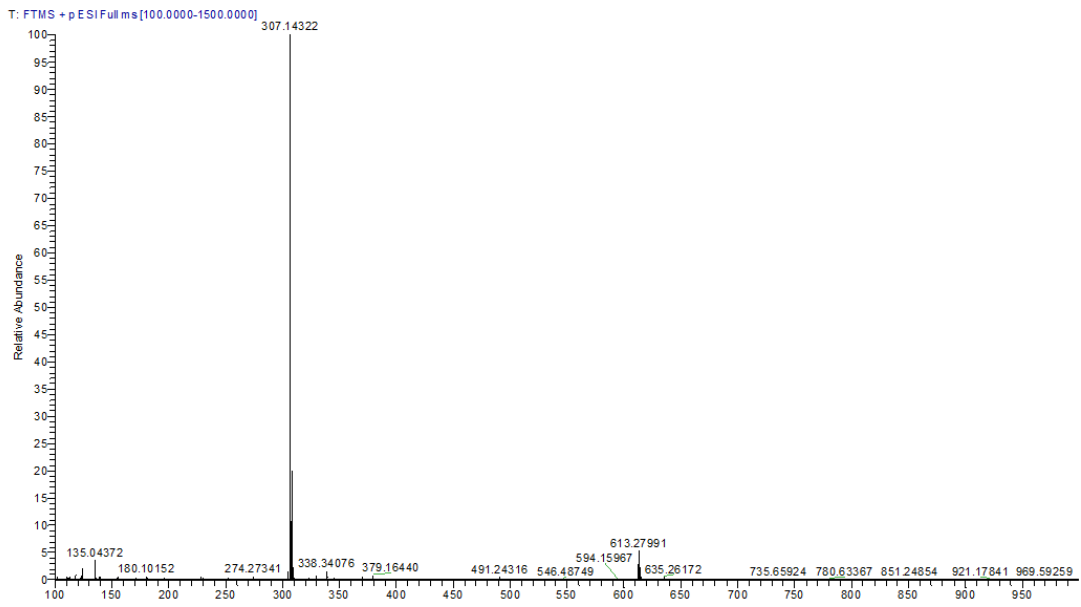


HRMS spectrum of **B3**

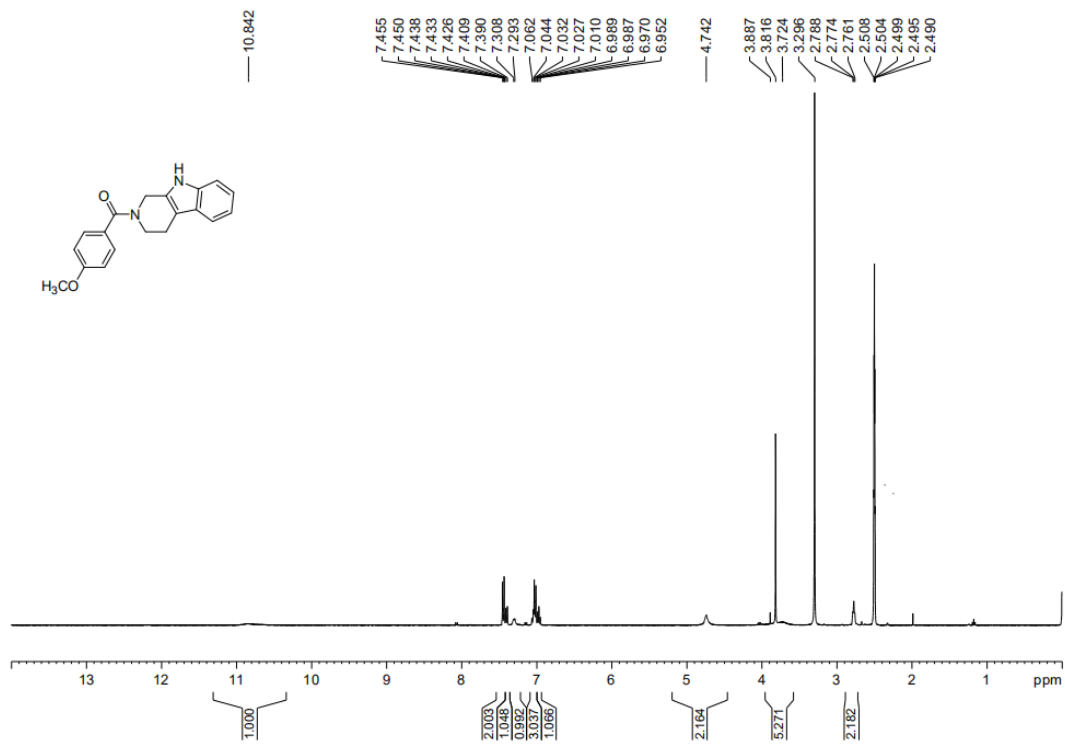


<sup>1</sup>H NMR spectrum of **B3**

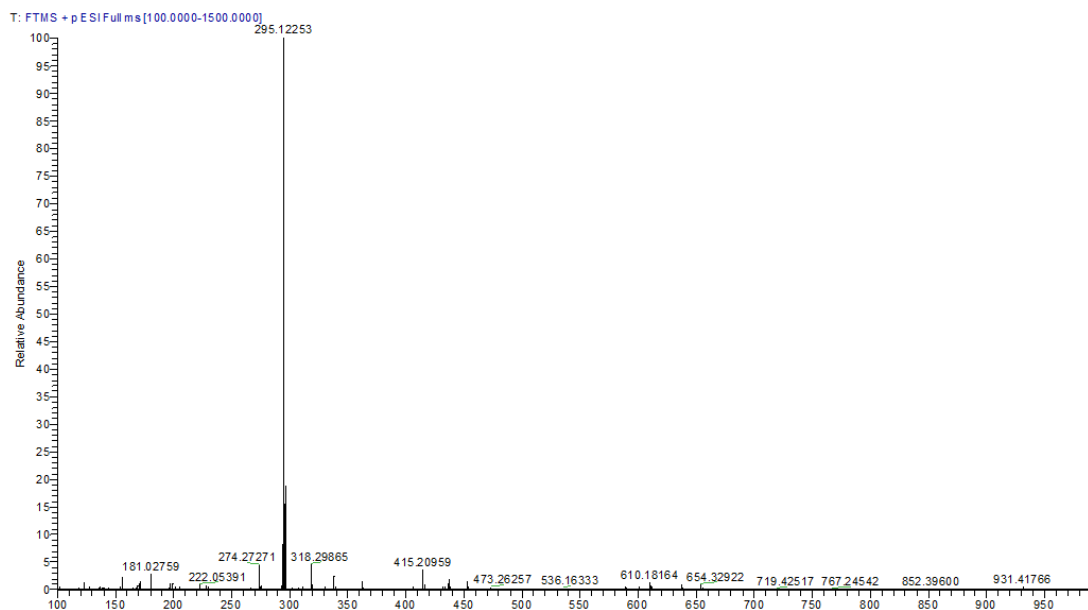




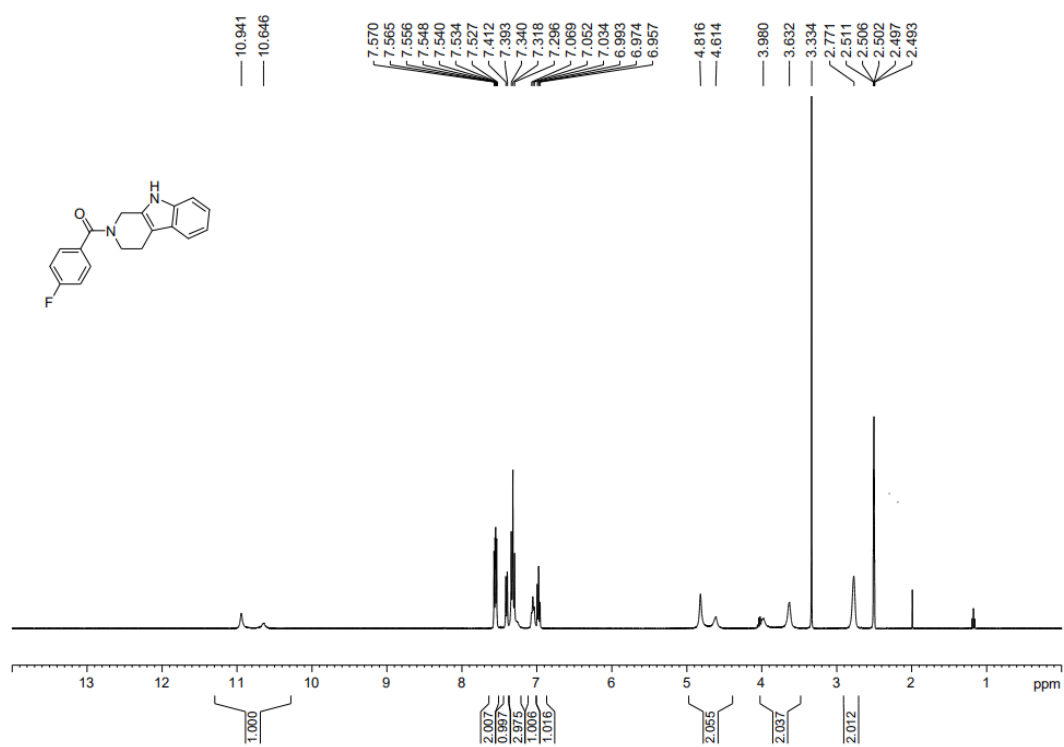
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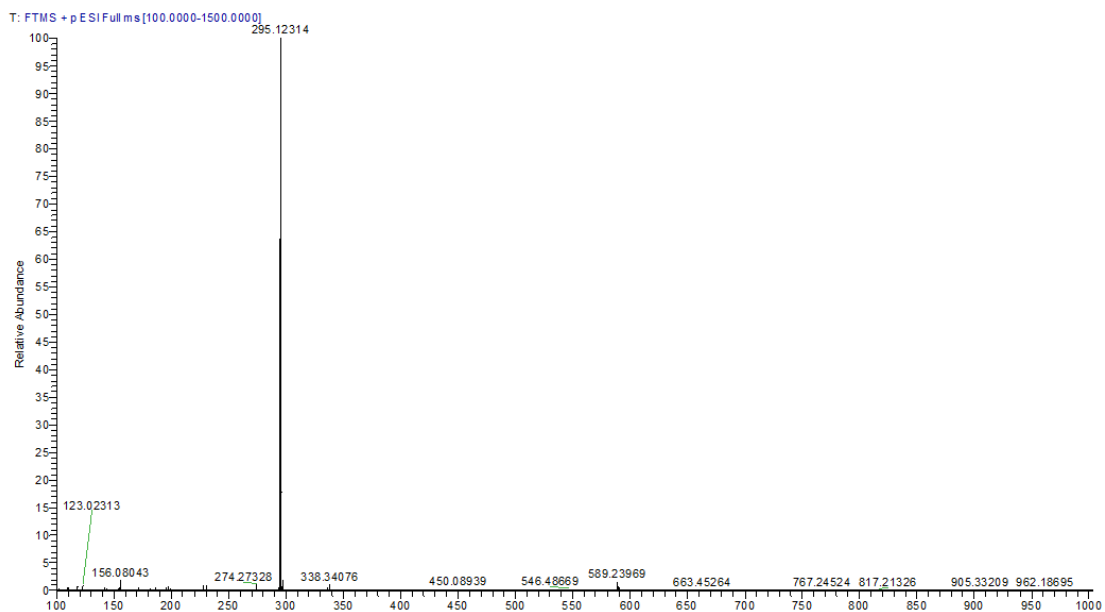
$^1\text{H}$  NMR spectrum of **B5**



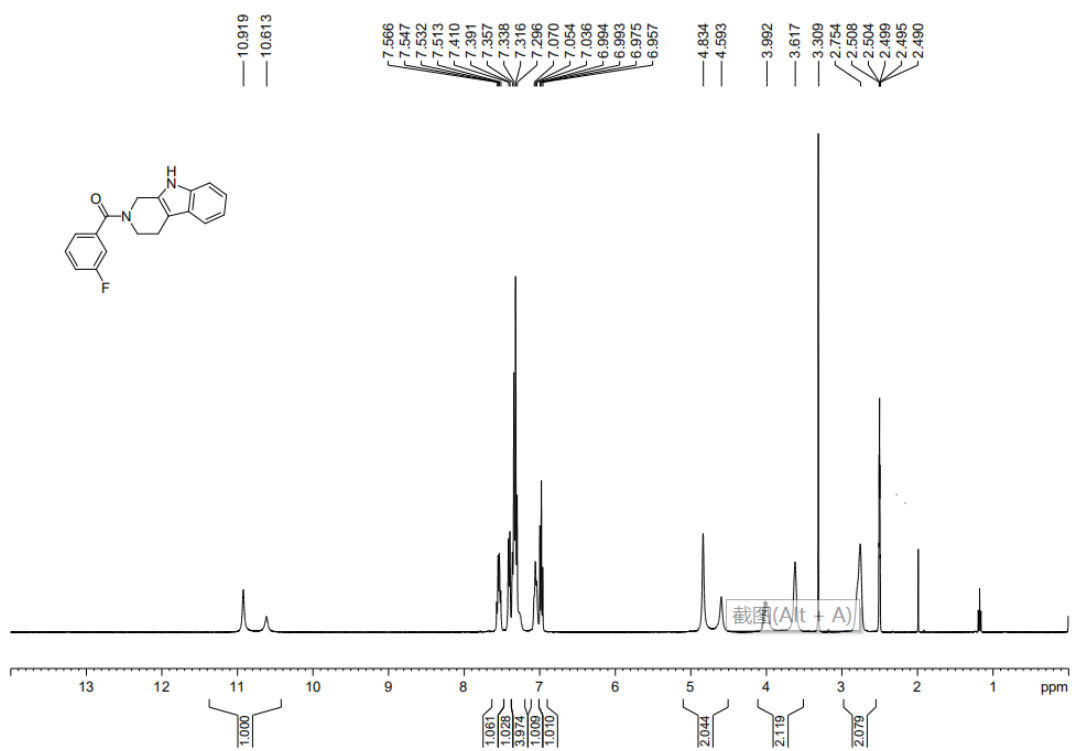
HRMS spectrum of B6



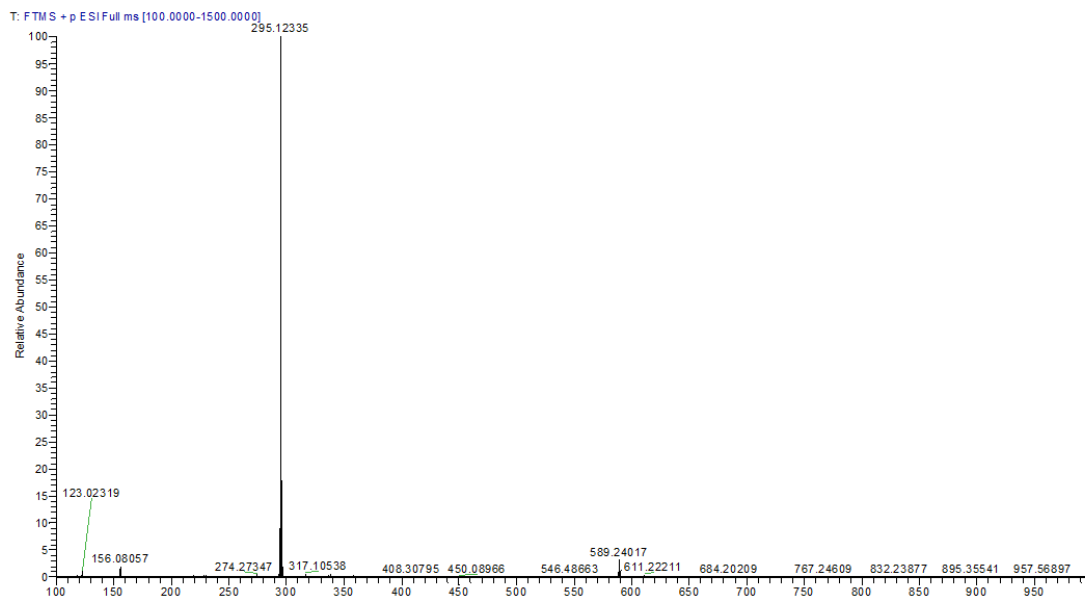
<sup>1</sup>H NMR spectrum of B6



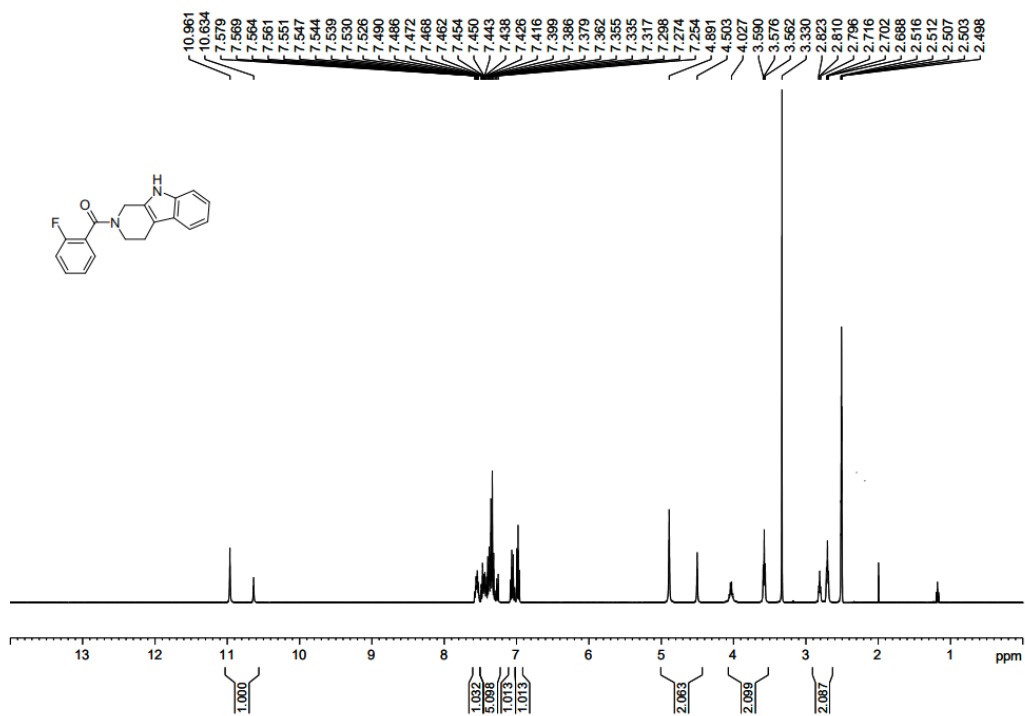
HRMS spectrum of **B7**



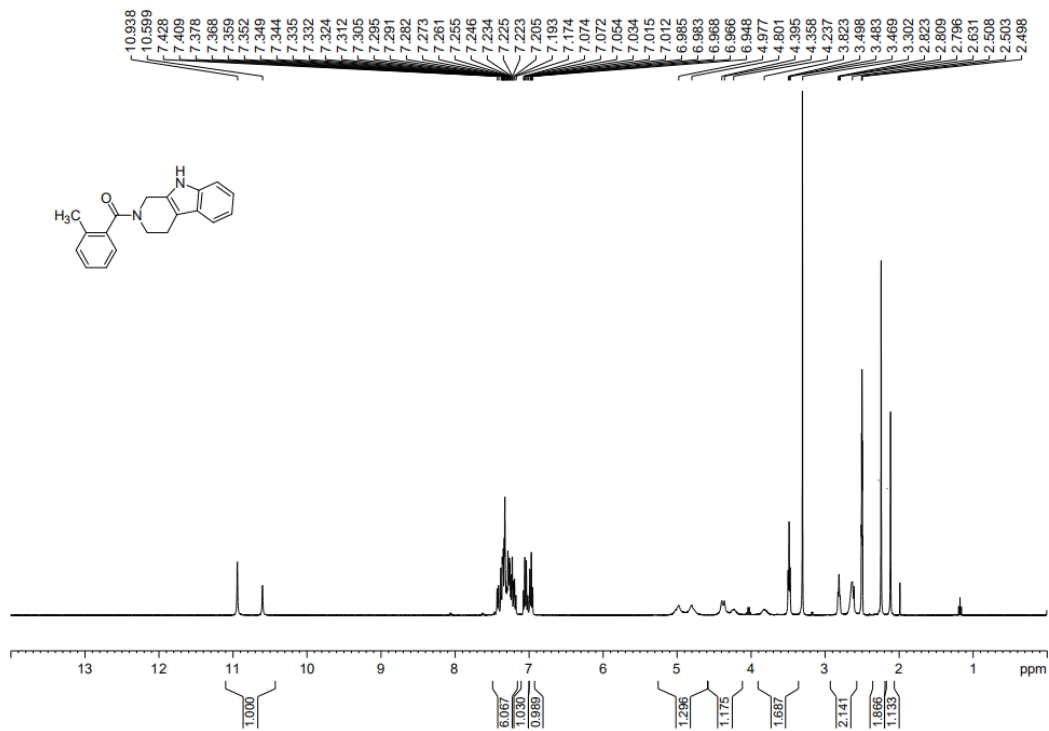
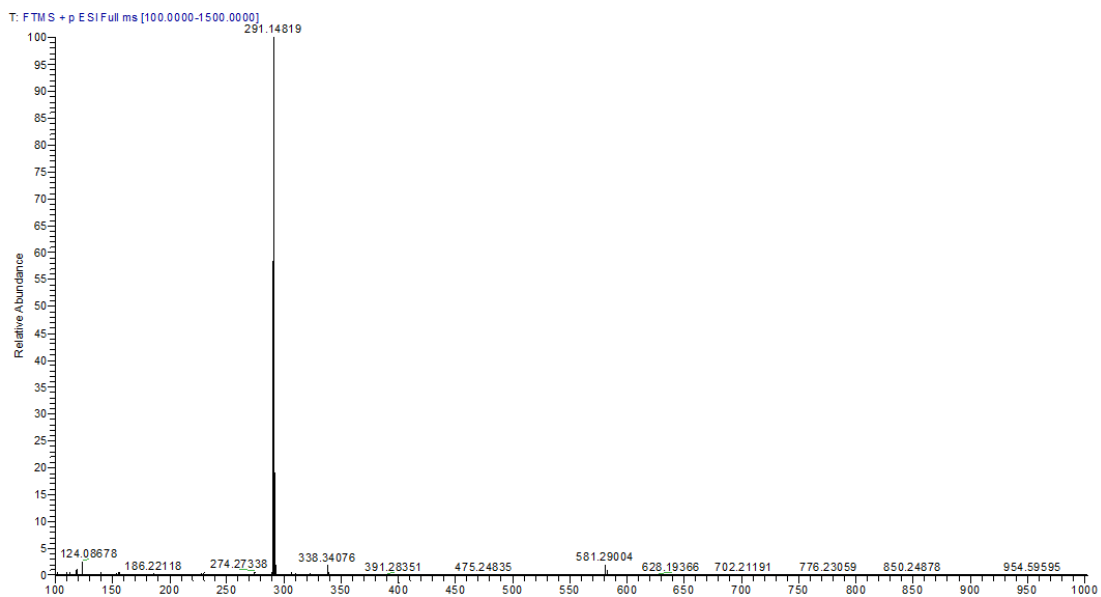
$^1\text{H}$  NMR spectrum of **B7**

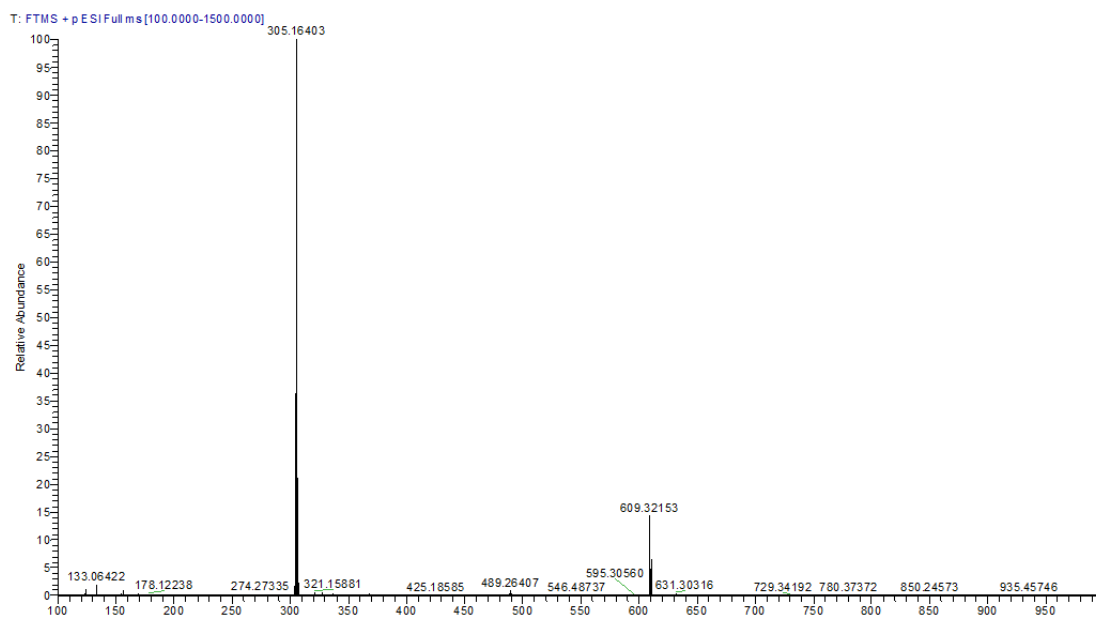


HRMS spectrum of **B8**

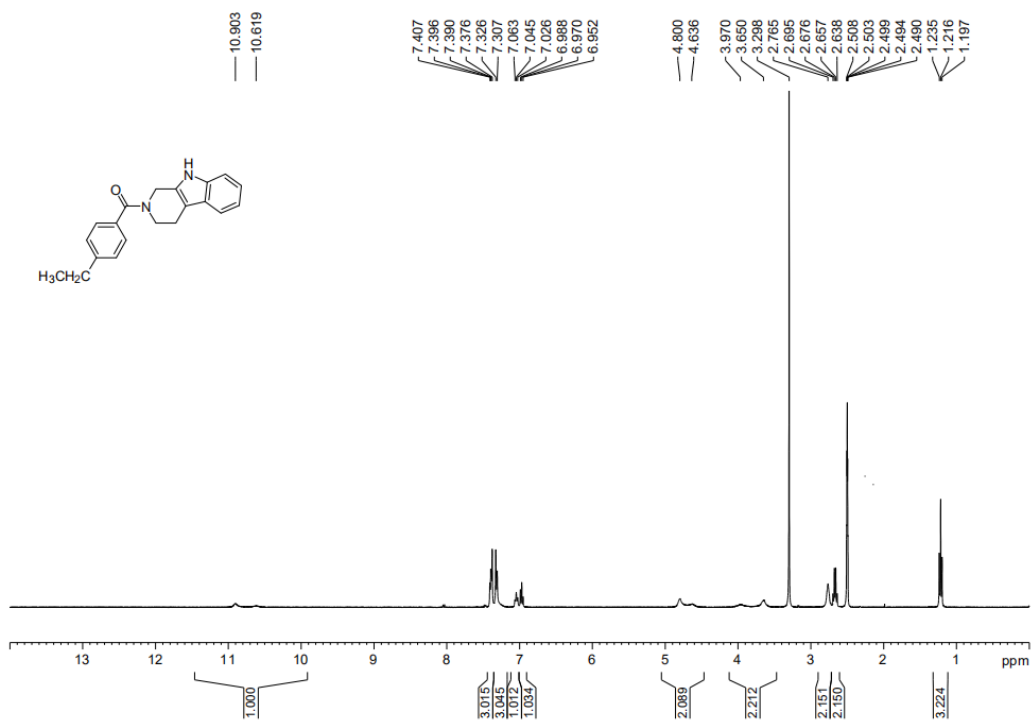


$^1\text{H}$  NMR spectrum of **B8**



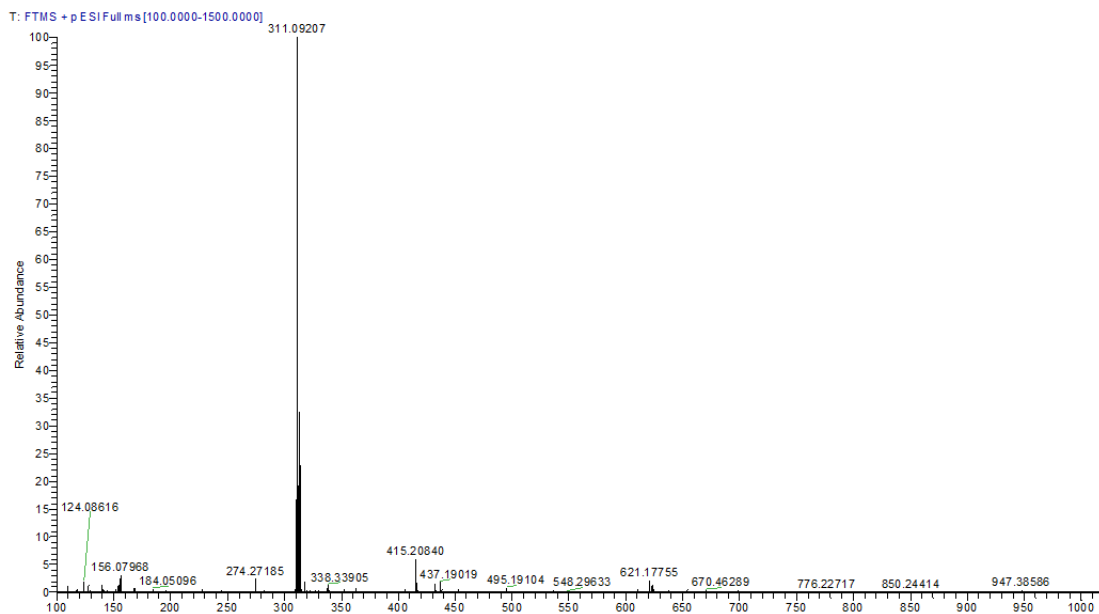


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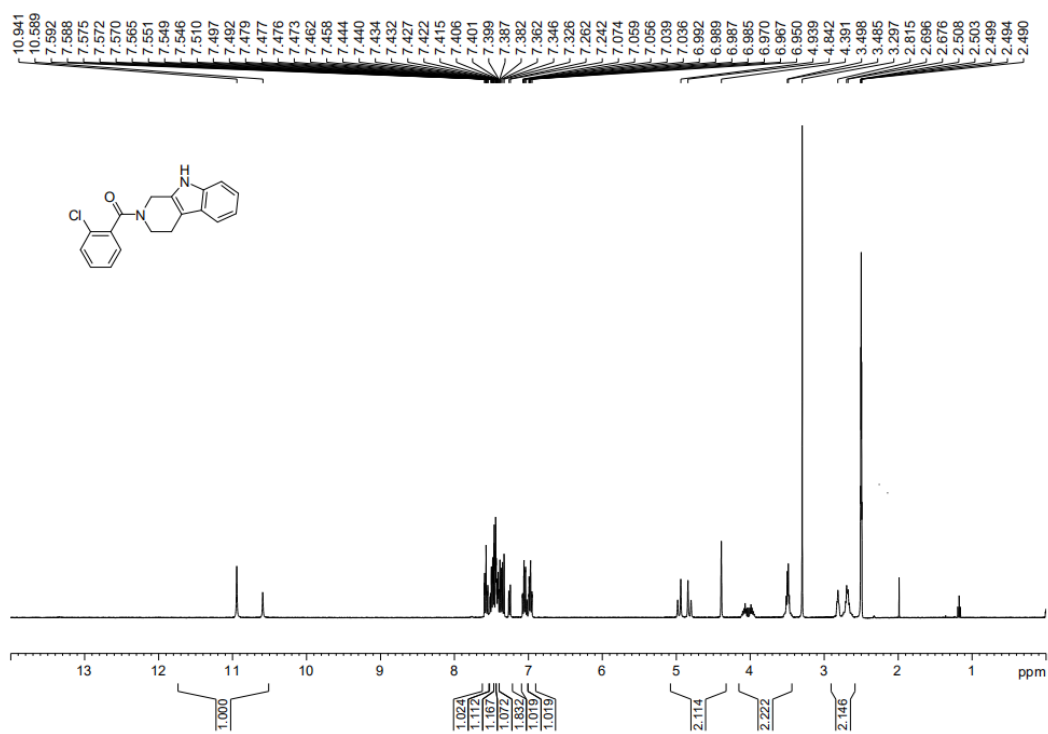


$^1\text{H}$  NMR spectrum of **B10**

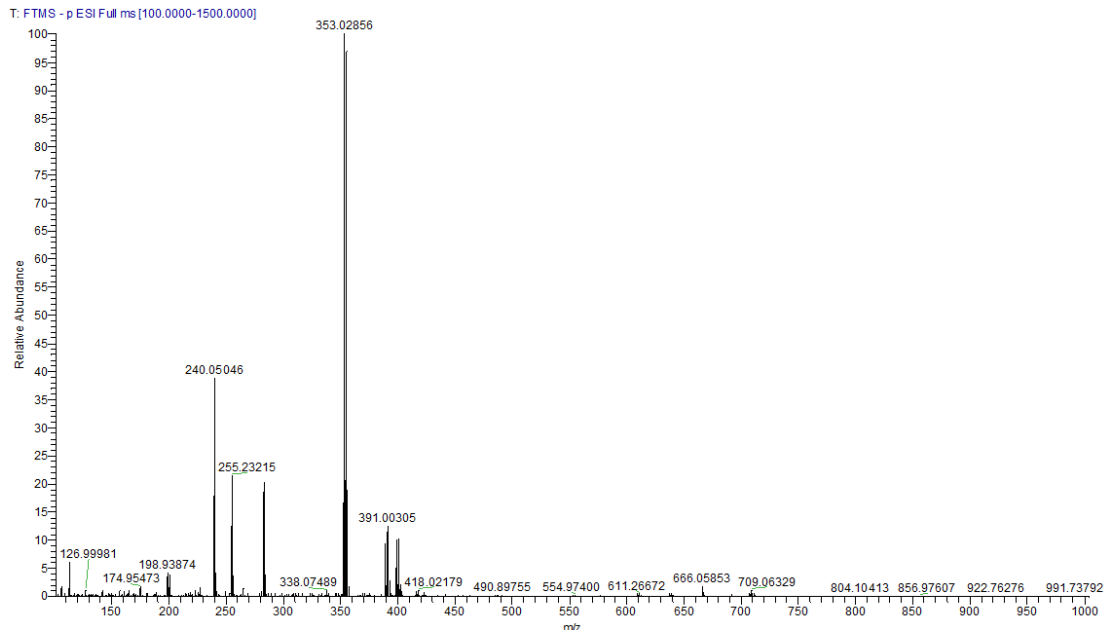




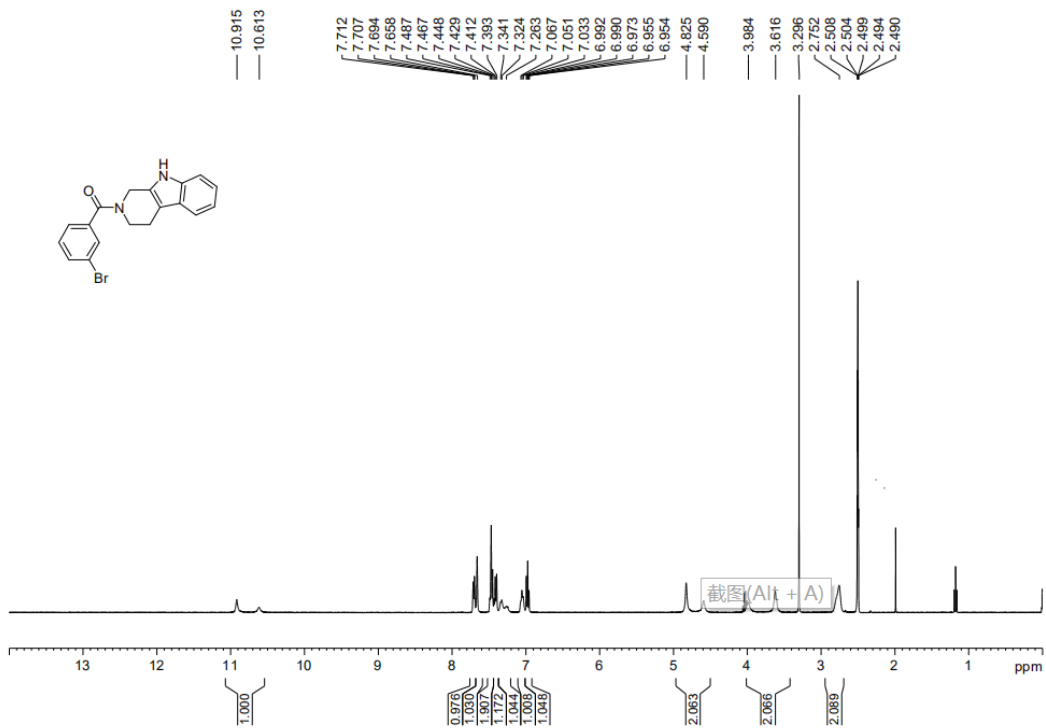
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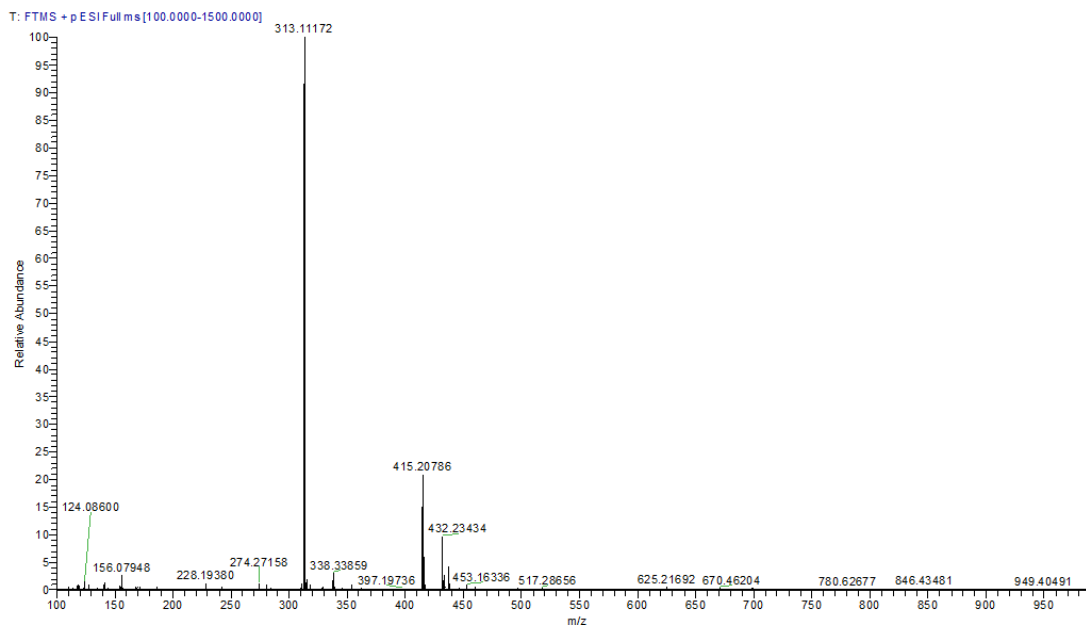
<sup>1</sup>H NMR spectrum of B11



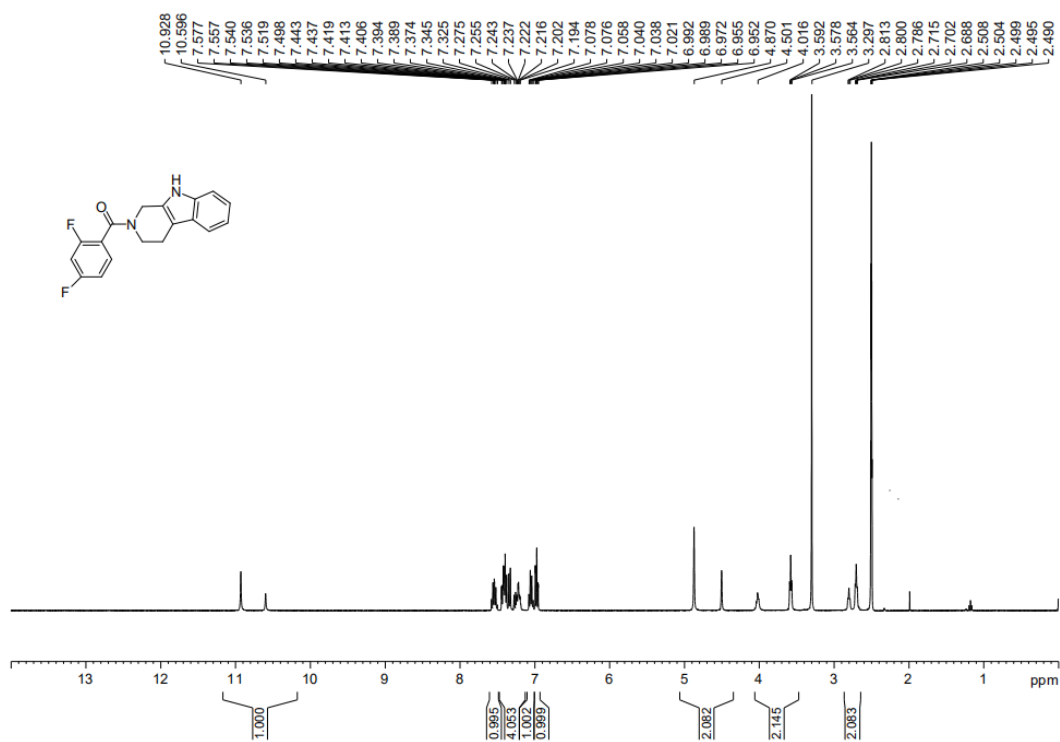
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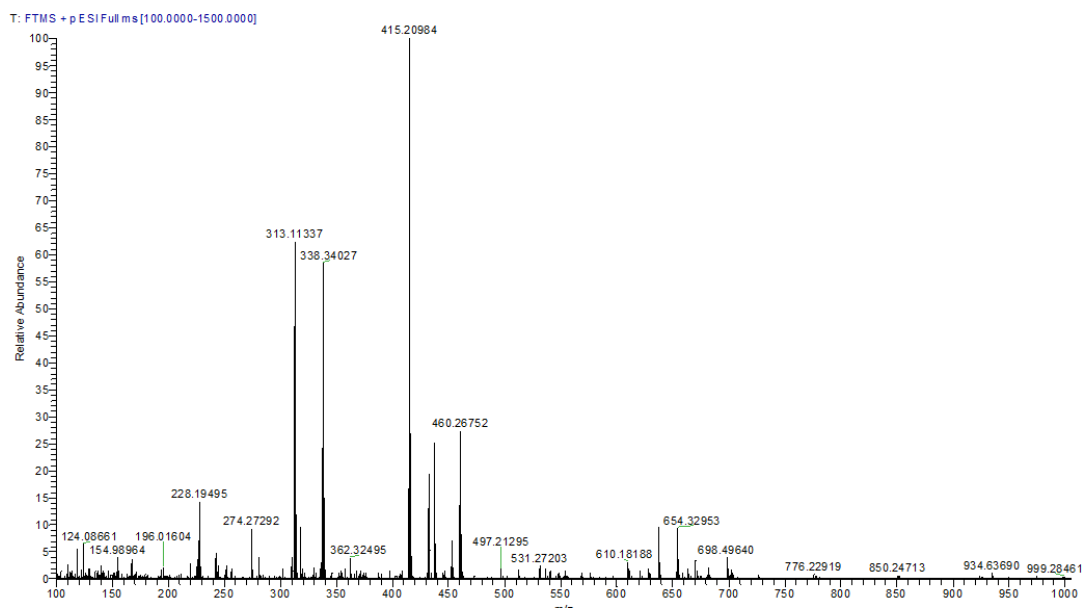
<sup>1</sup>H NMR spectrum of **B12**



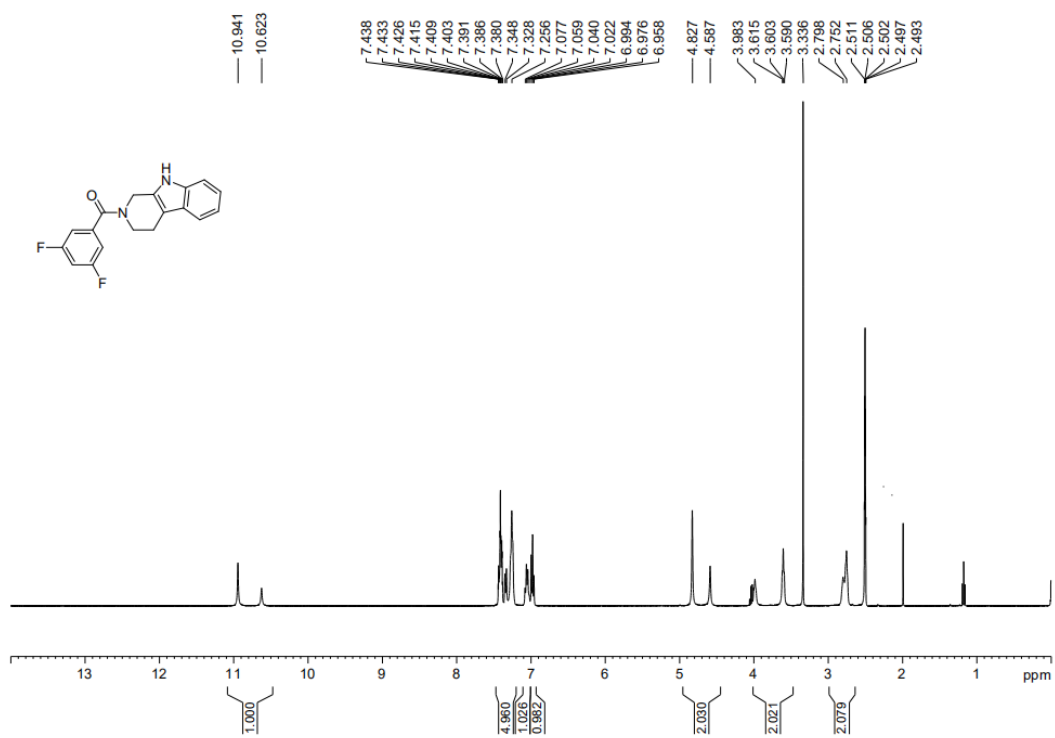
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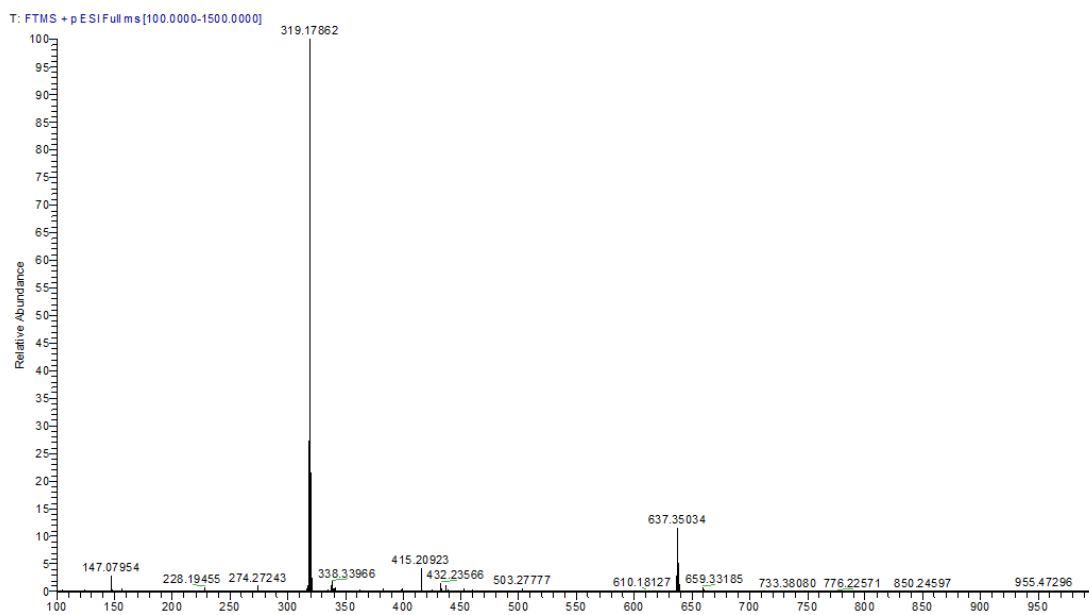
<sup>1</sup>H NMR spectrum of B13



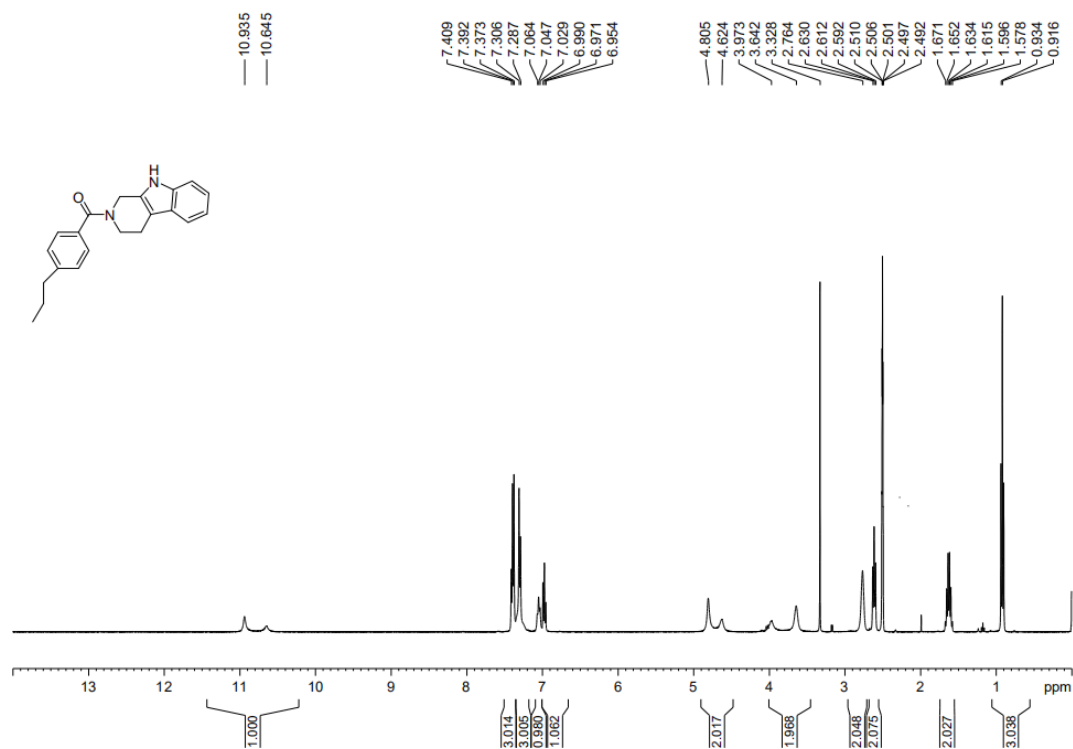
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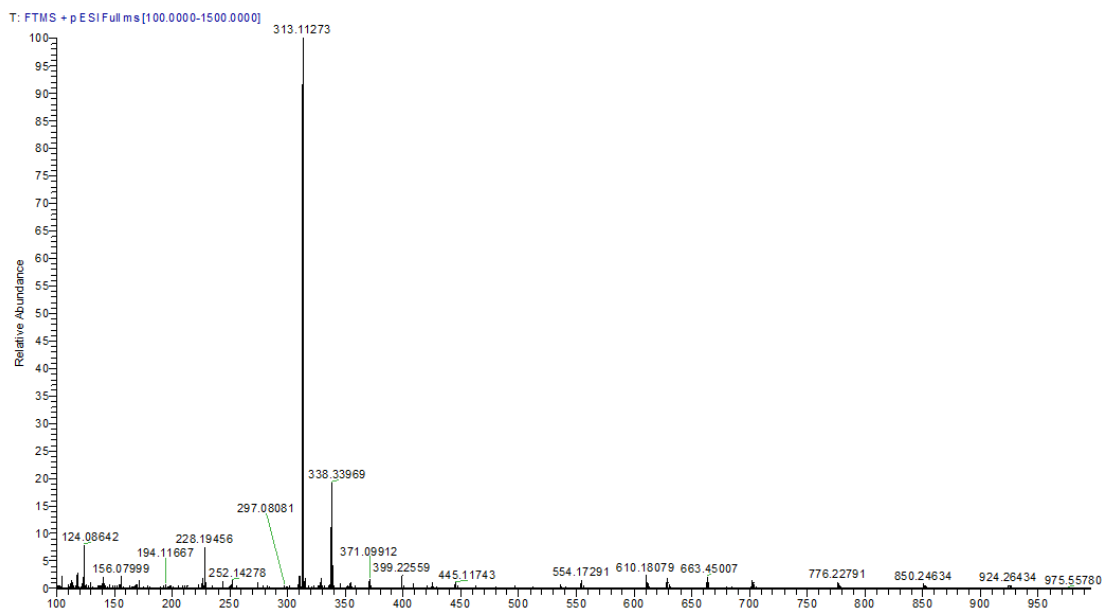
<sup>1</sup>H NMR spectrum of B14



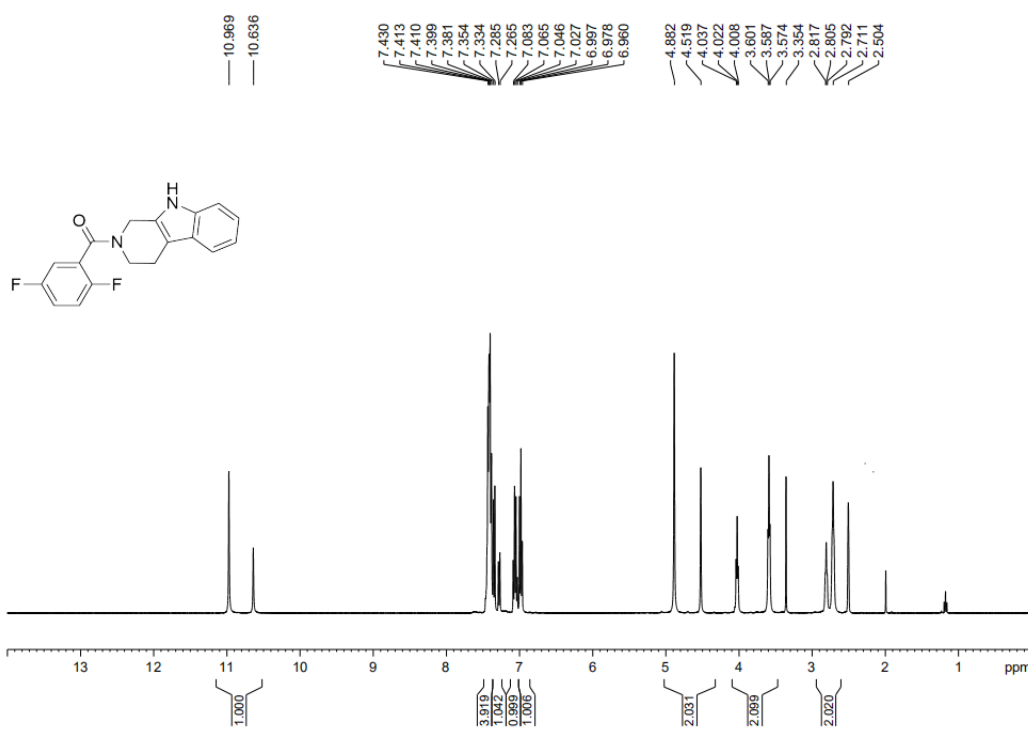
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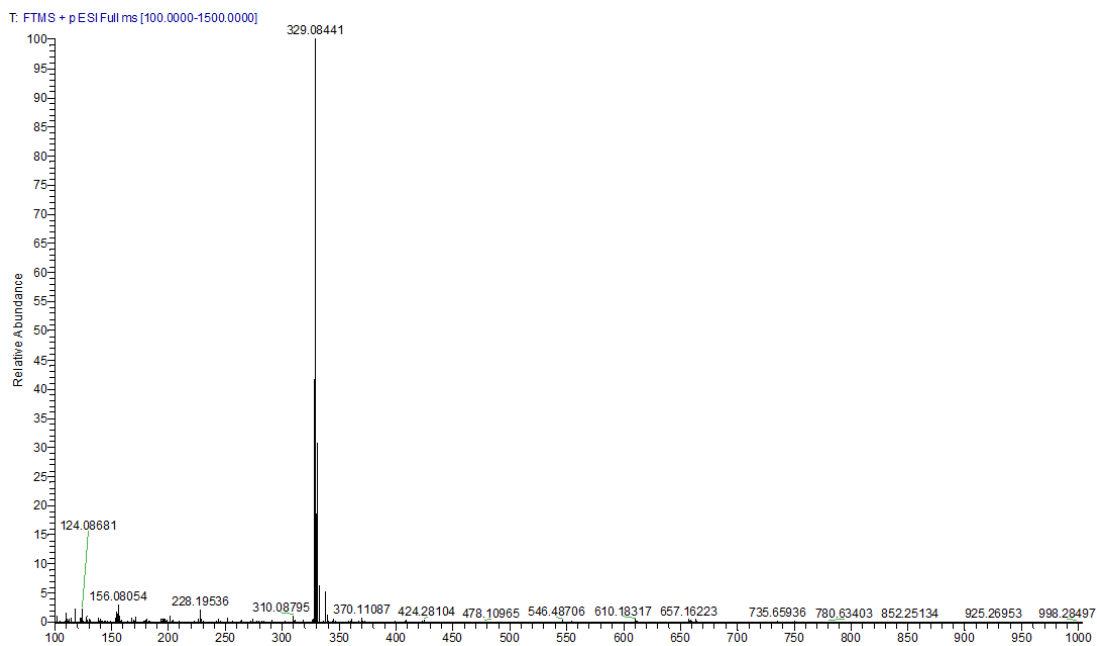
$^1\text{H}$  NMR spectrum of **B15**



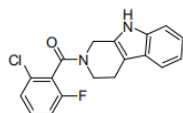
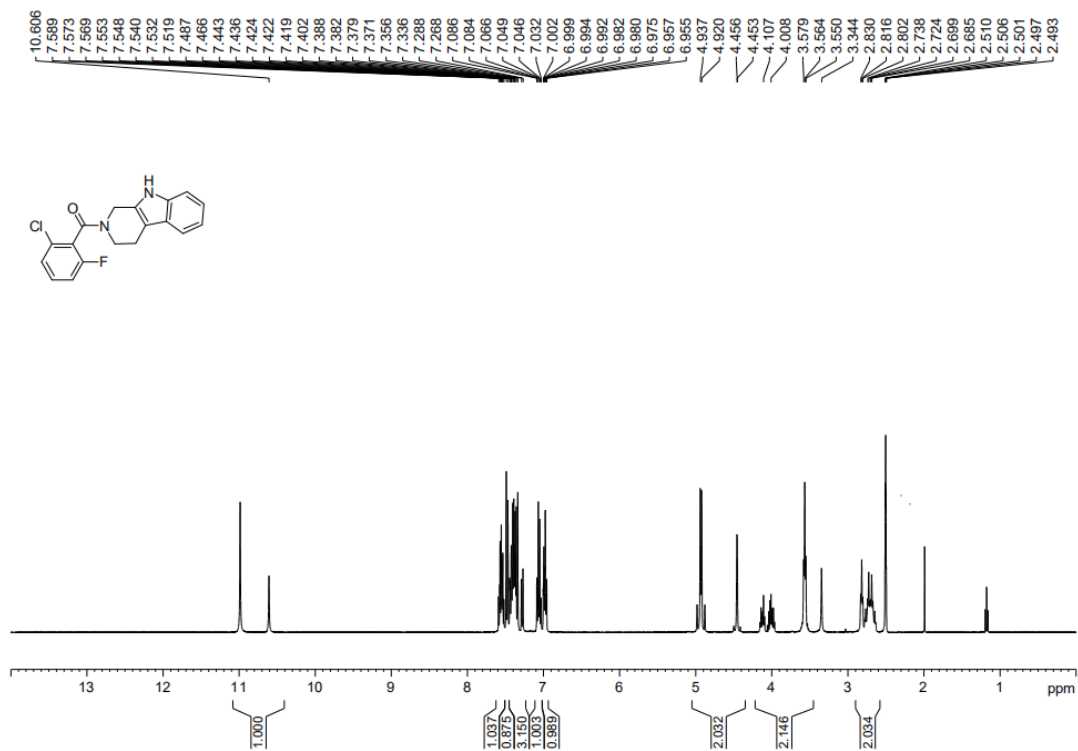
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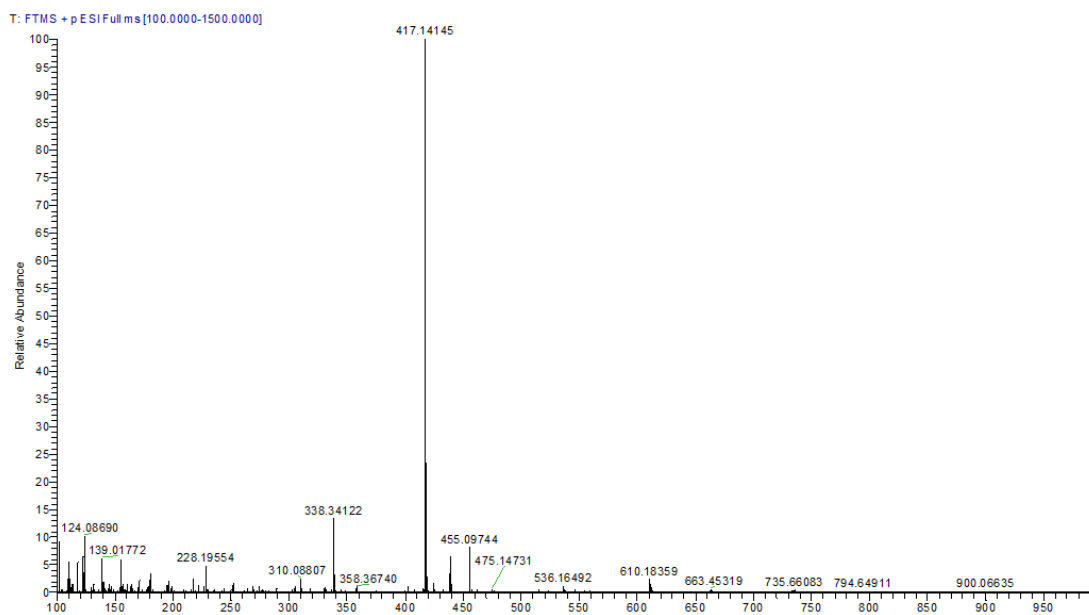
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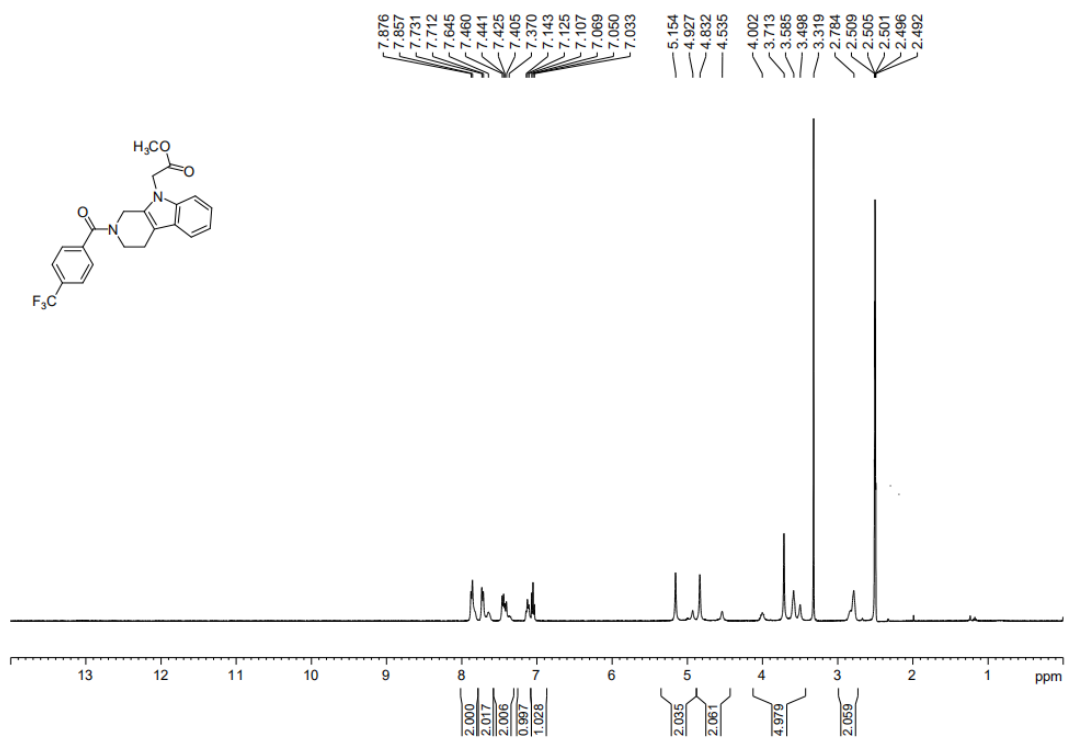
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$^1\text{H}$  NMR spectrum of **B17**

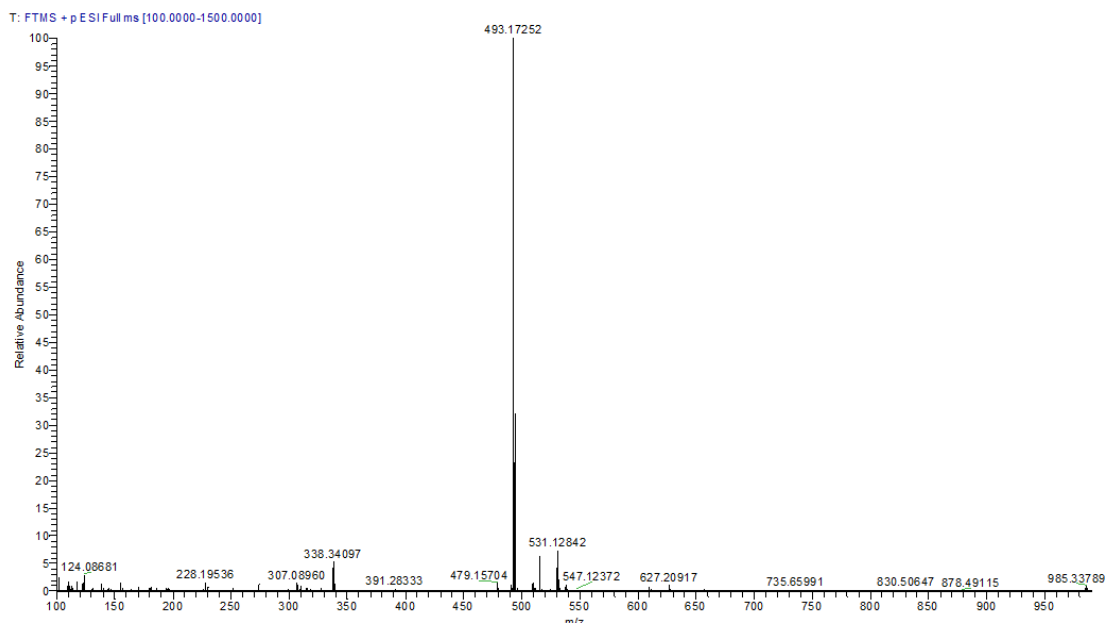


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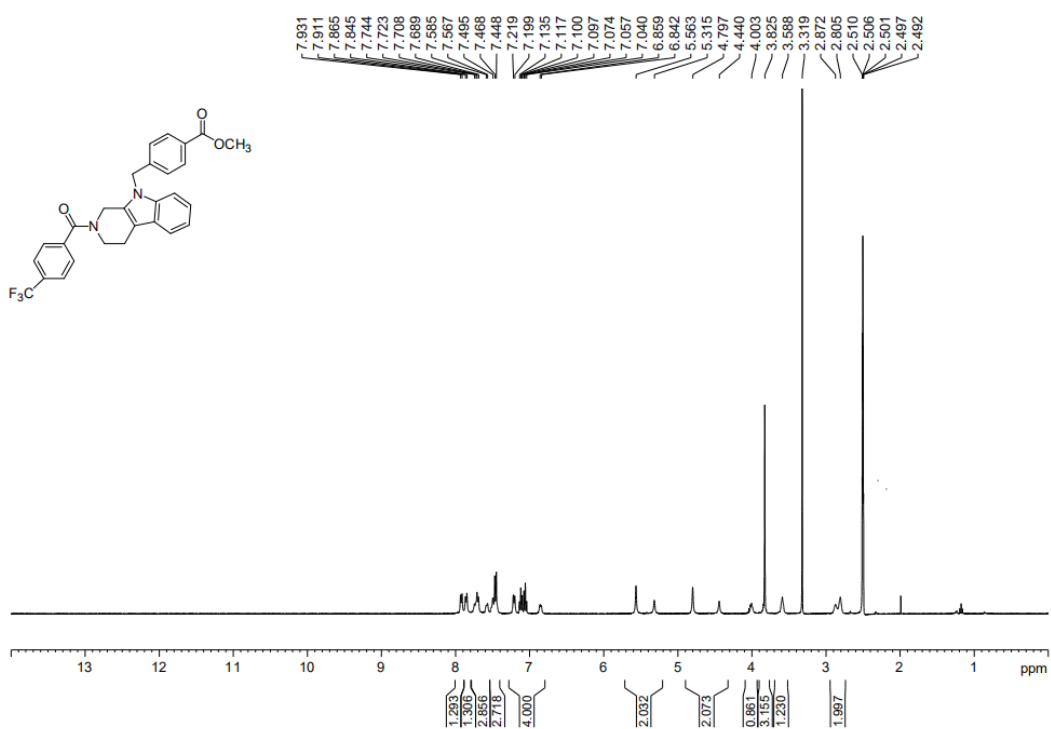


<sup>1</sup>H NMR spectrum of C1

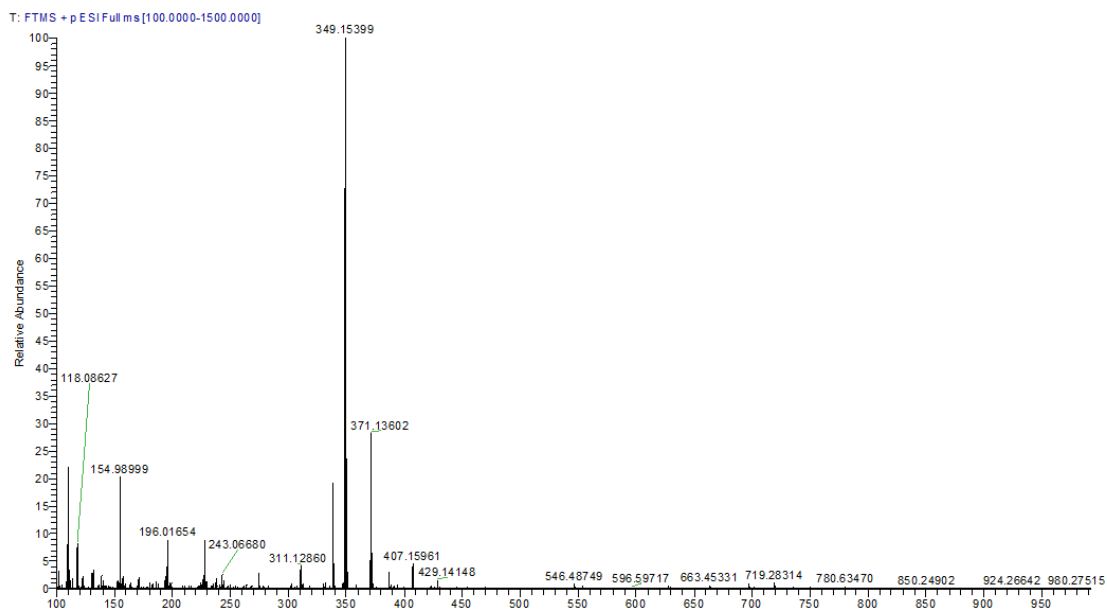




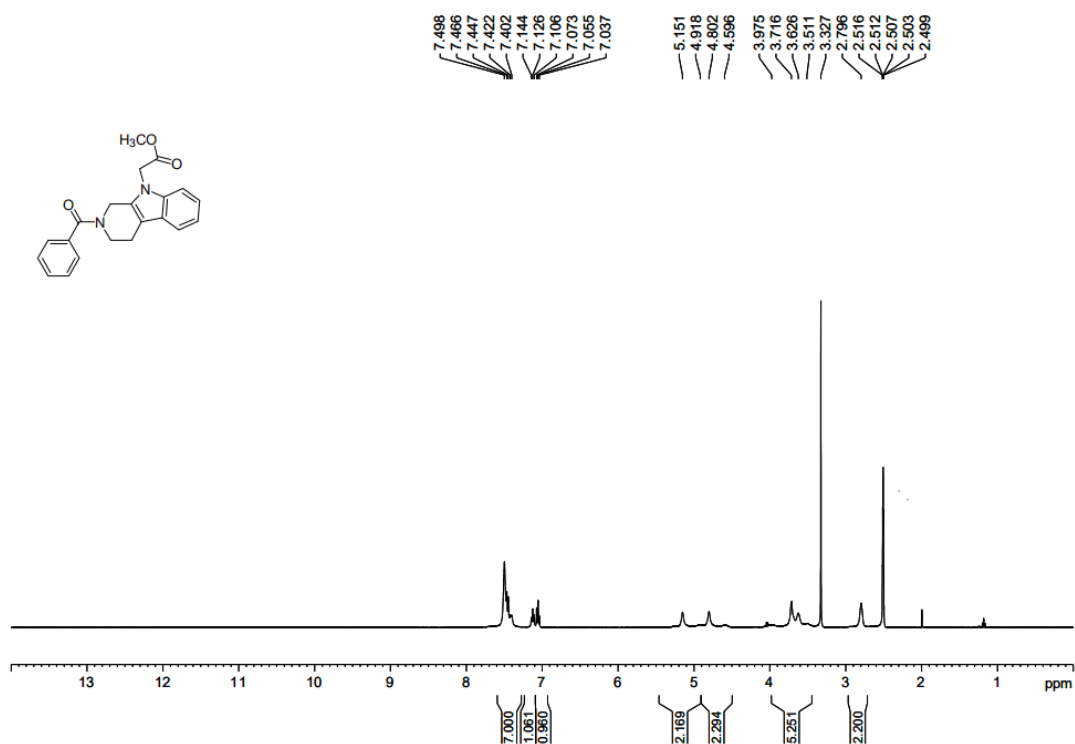
HRMS spectrum of C2



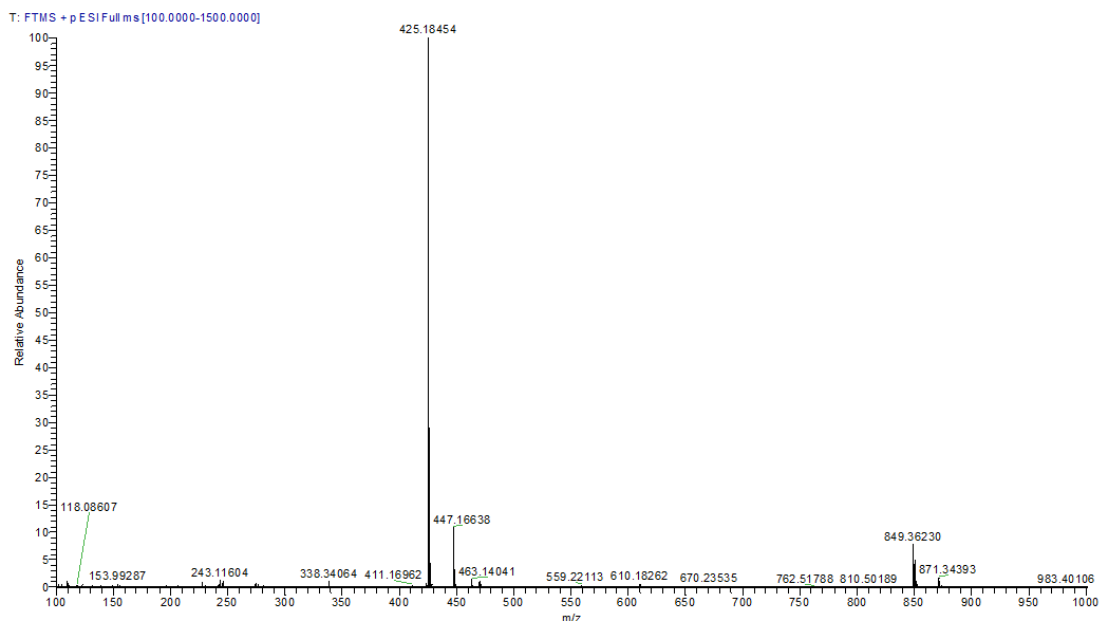
<sup>1</sup>H NMR spectrum of C2



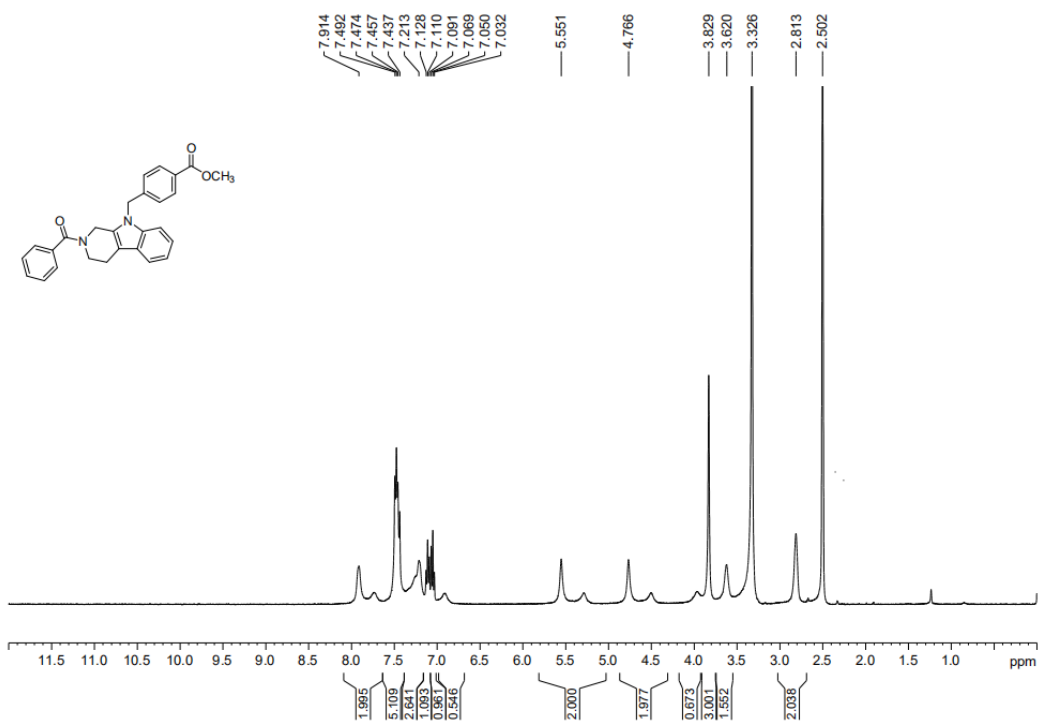
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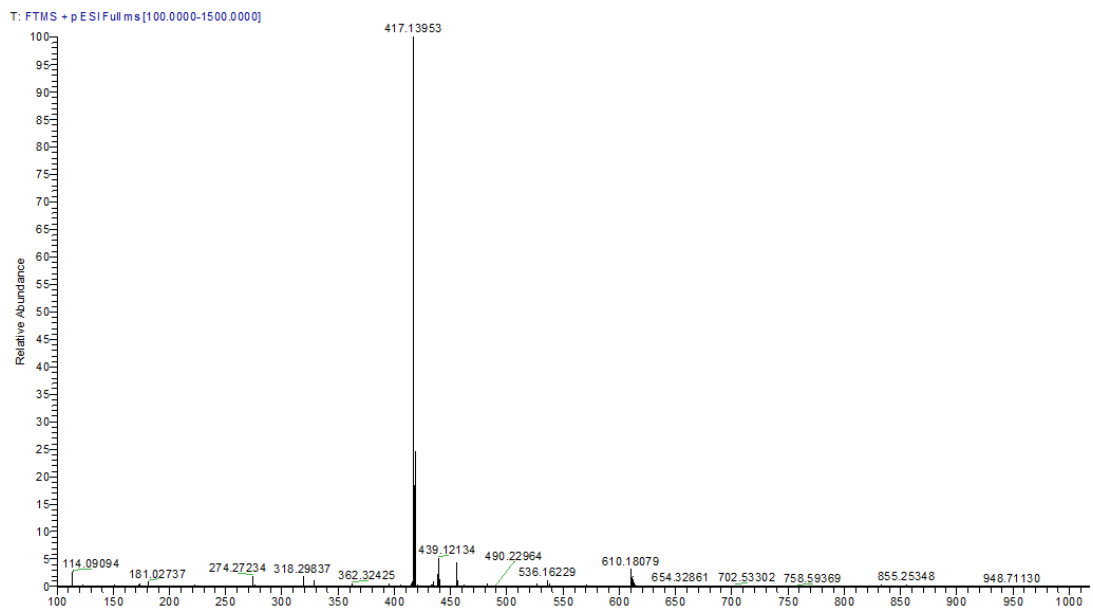
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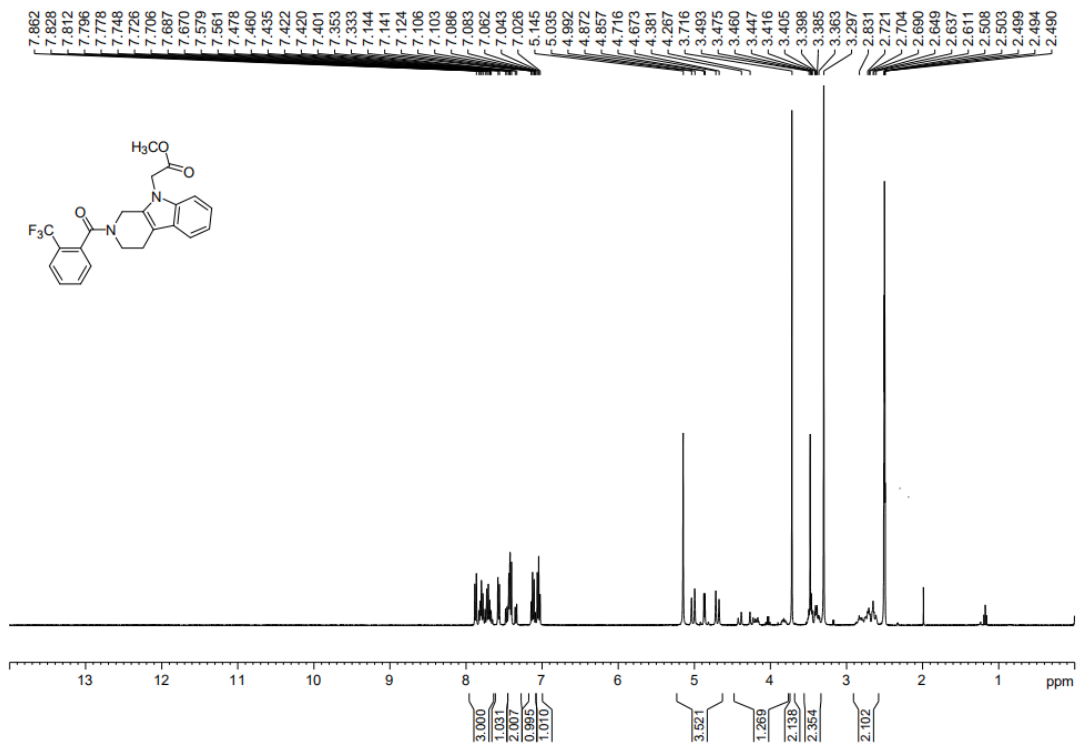
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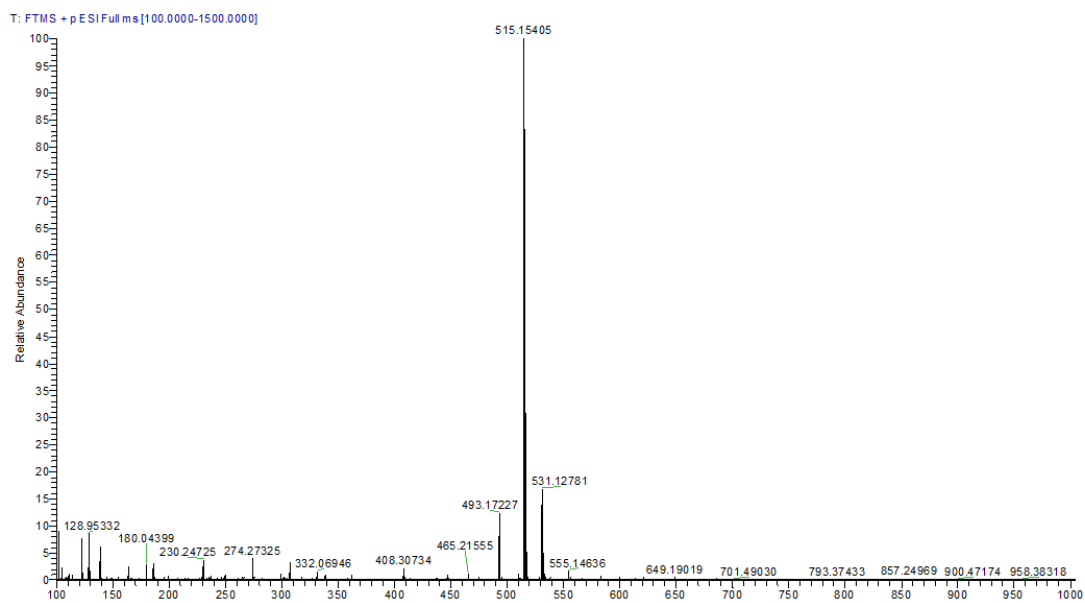
<sup>1</sup>H NMR spectrum of C4



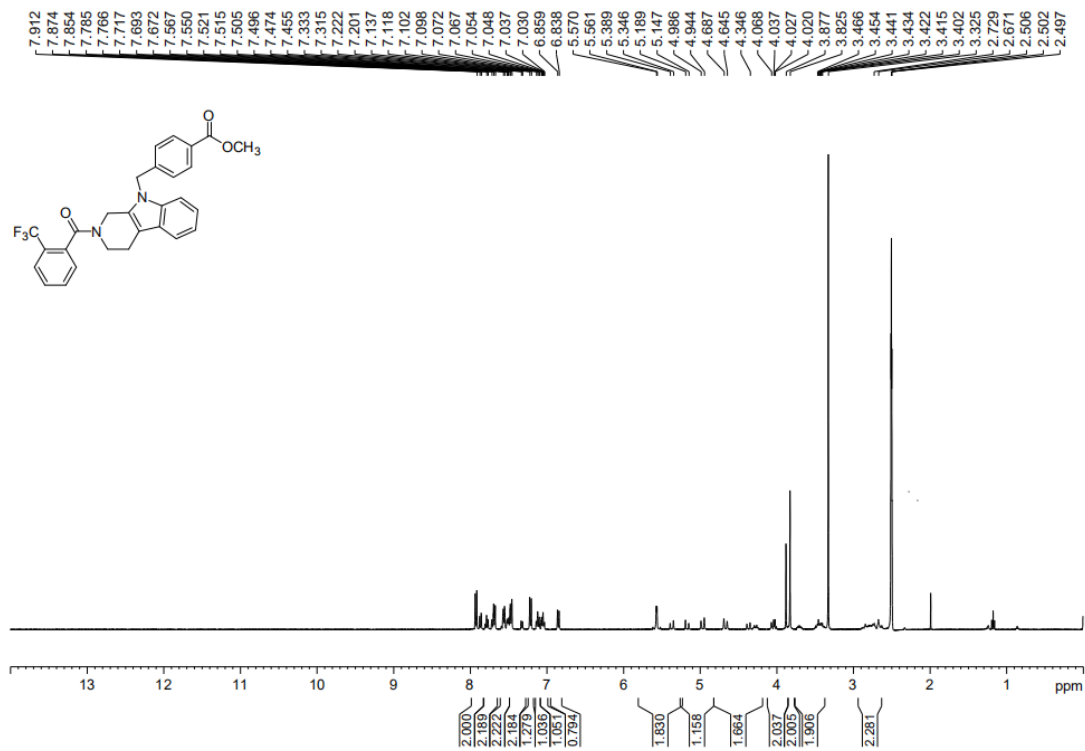
HRMS spectrum of C5



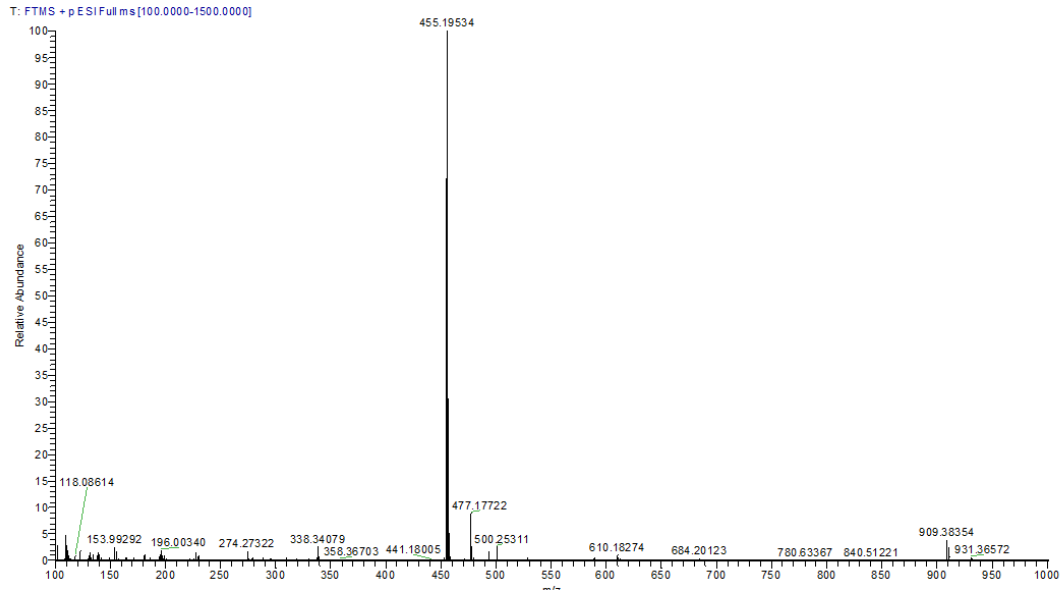
<sup>1</sup>H NMR spectrum of C5



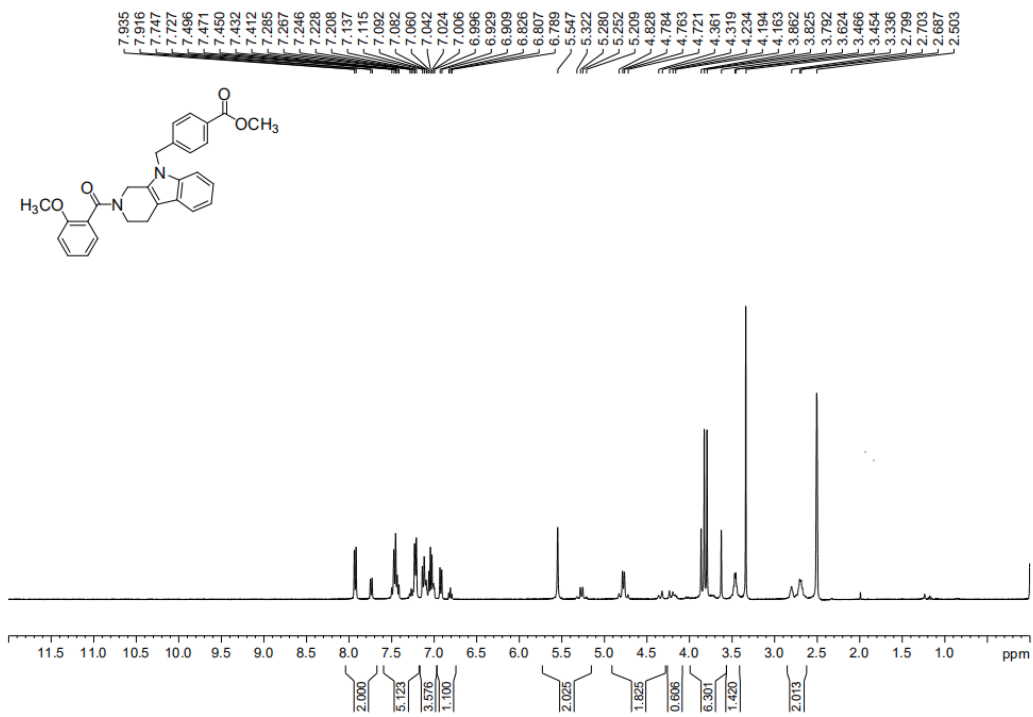
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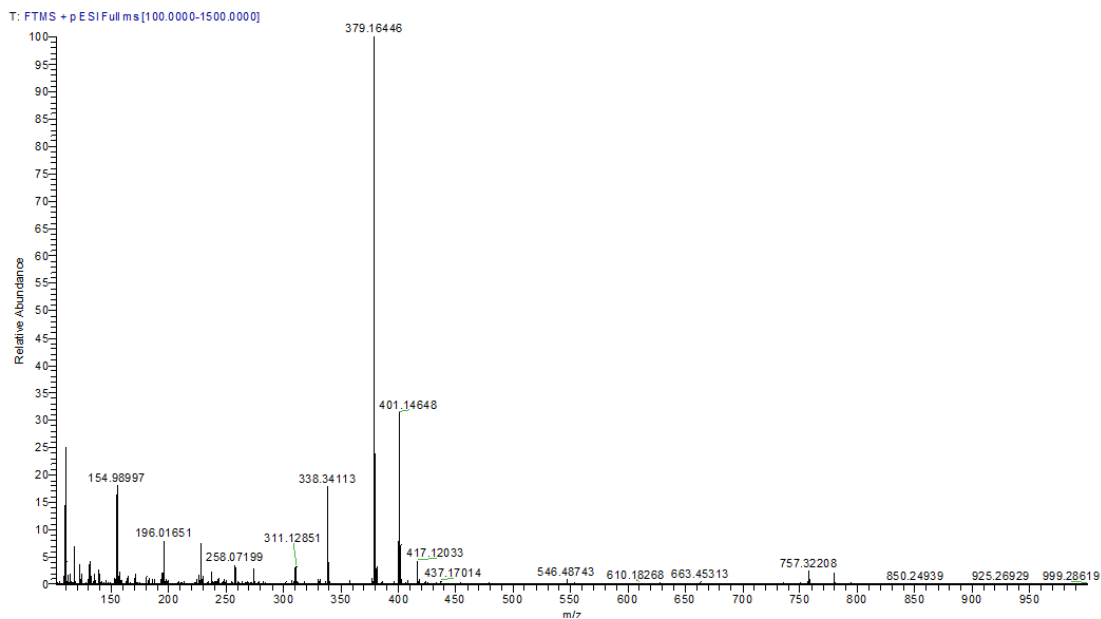
<sup>1</sup>H NMR spectrum of C6



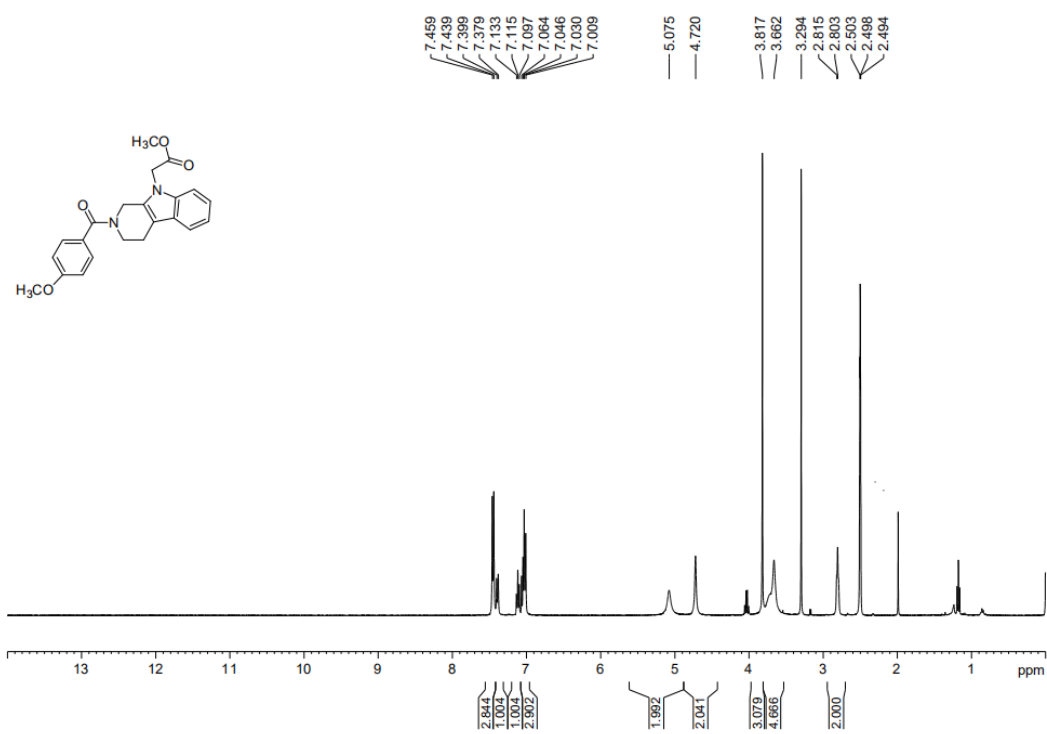
HRMS spectrum of C7



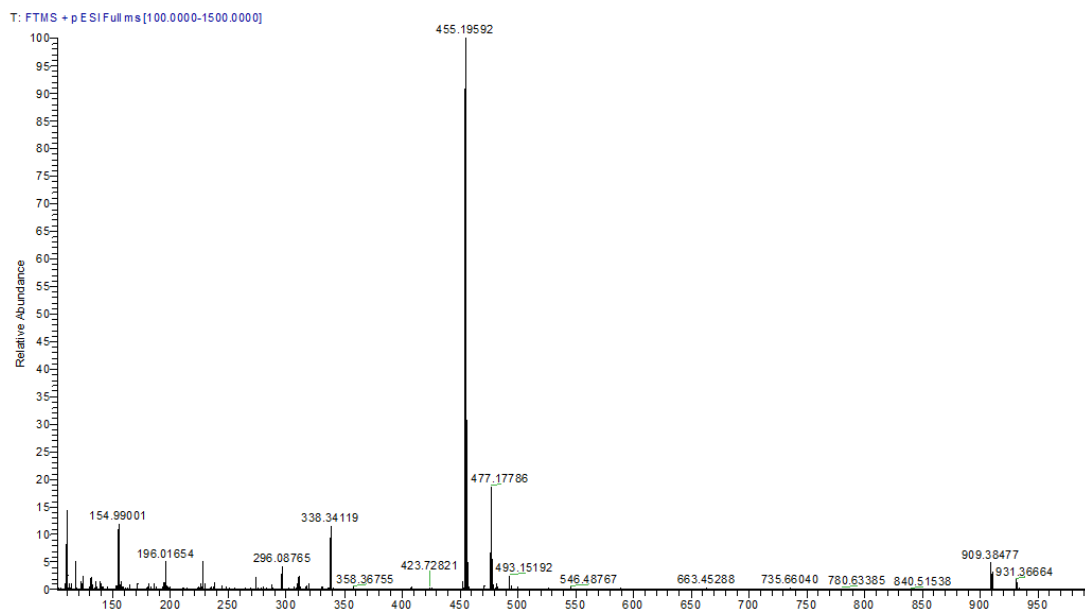
<sup>1</sup>H NMR spectrum of C7



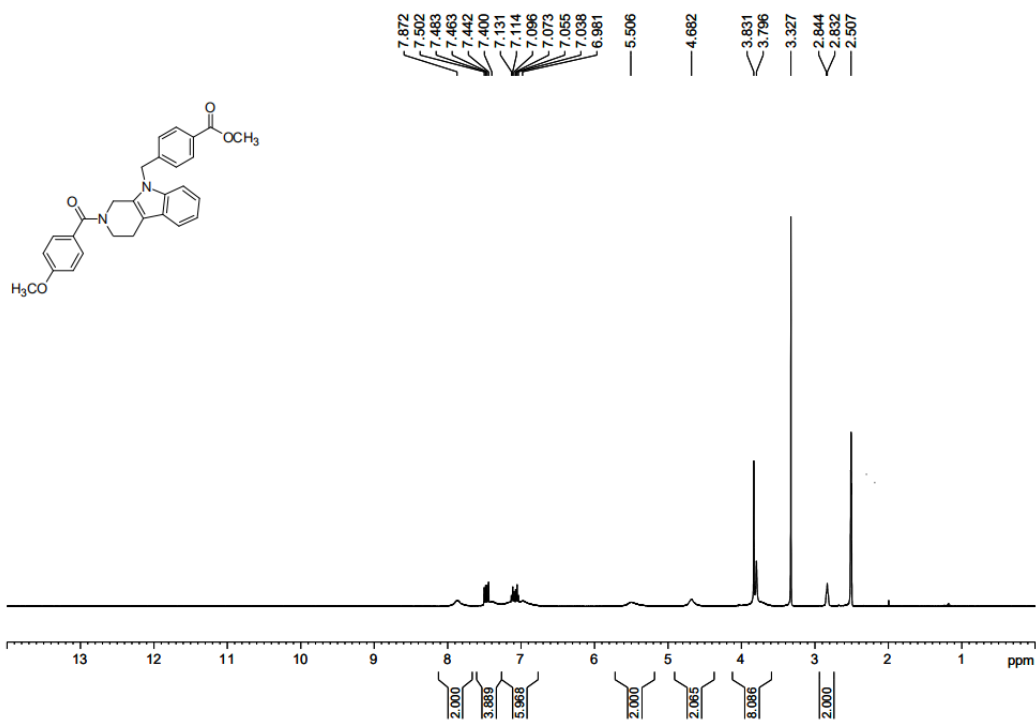
HRMS spectrum of C8



<sup>1</sup>H NMR spectrum of C8

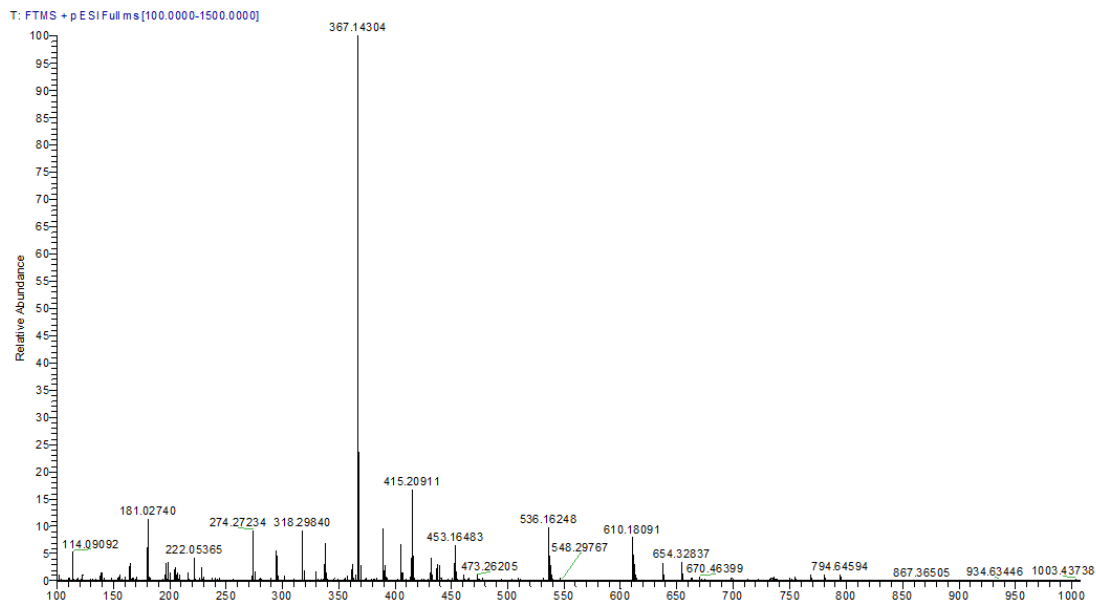


HRMS spectrum of C9

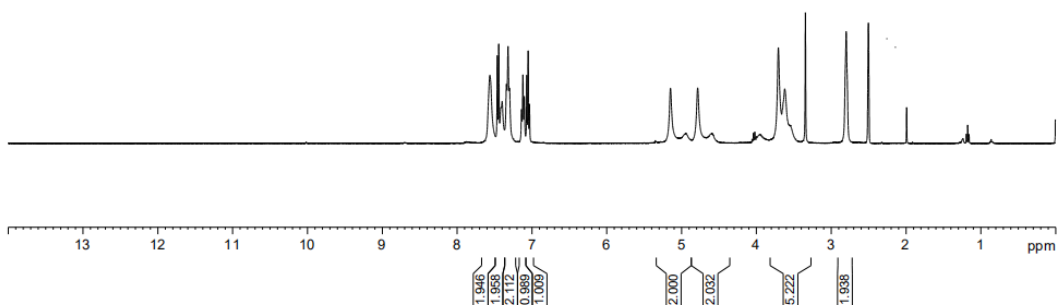
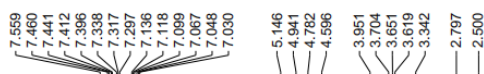
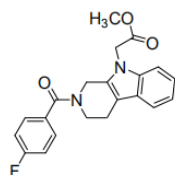


<sup>1</sup>H NMR spectrum of C9



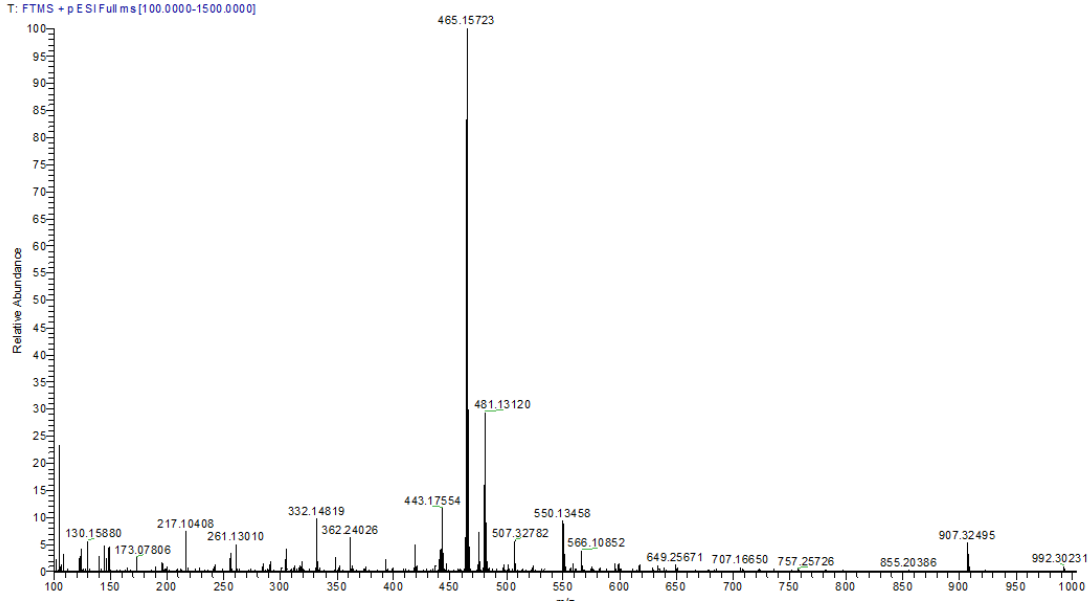


HRMS spectrum of C10

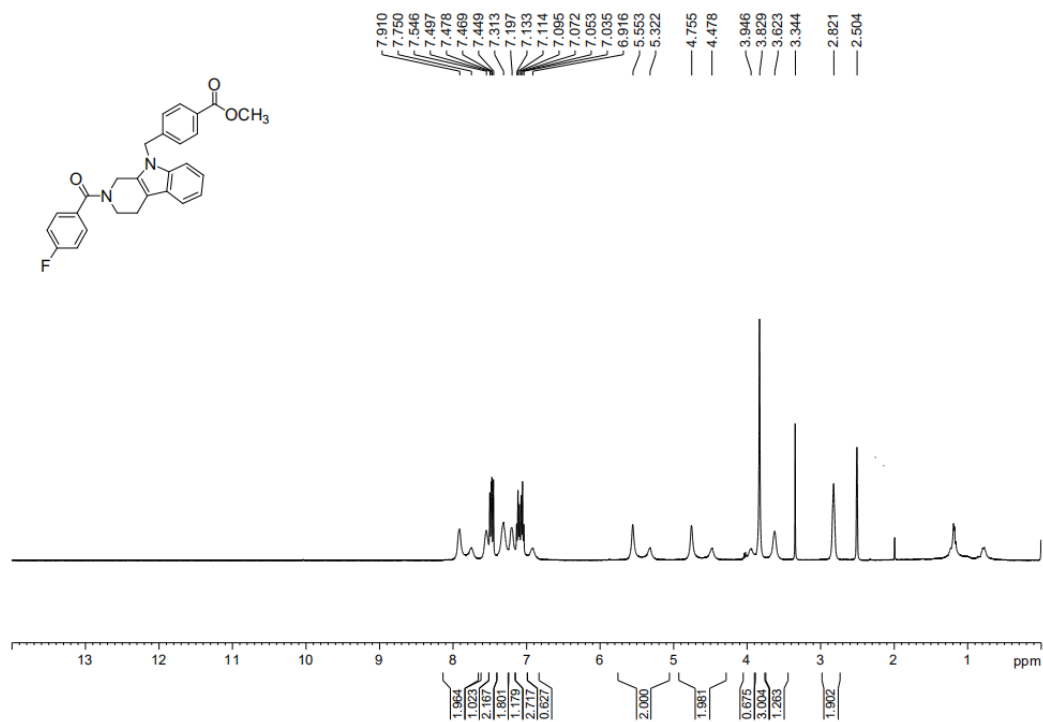
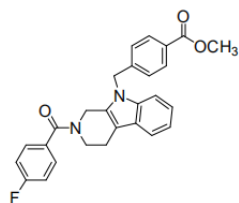


<sup>1</sup>H NMR spectrum of C10

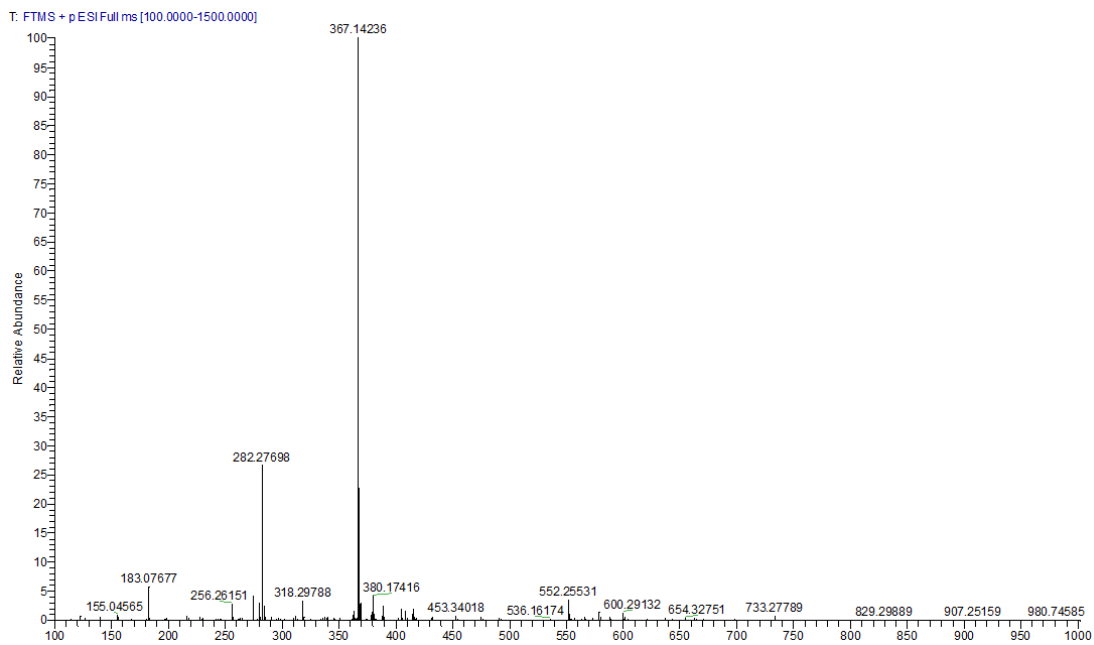
T: FTMS + pESI Full ms [100.0000-1500.0000]



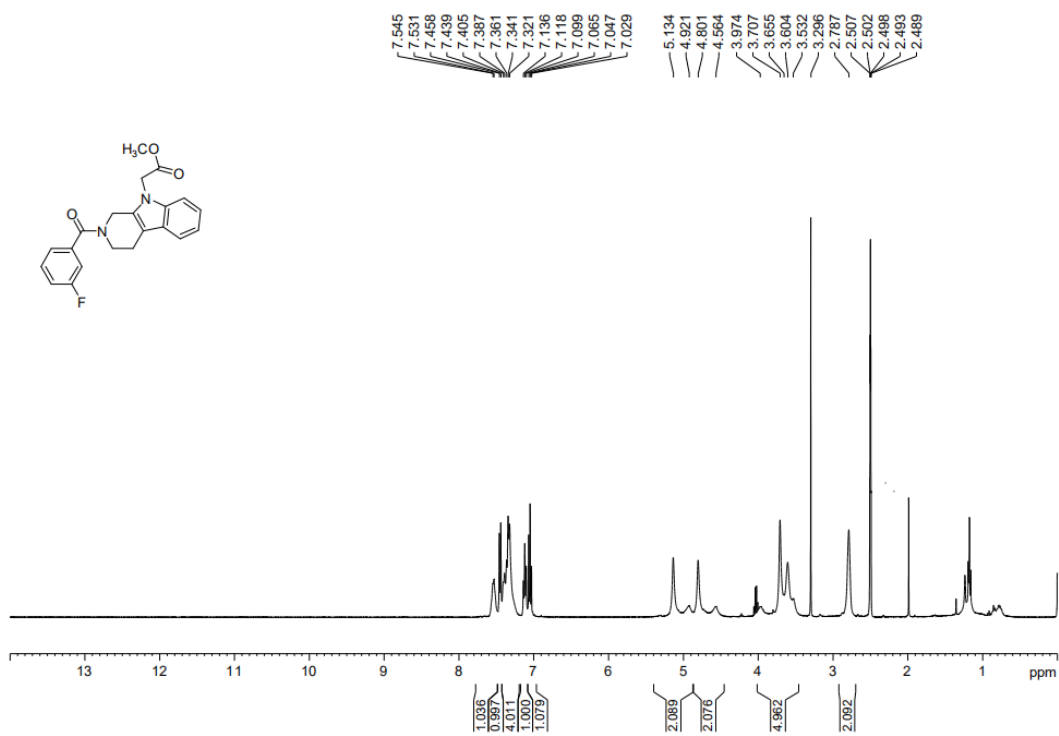
HRMS spectrum of C11



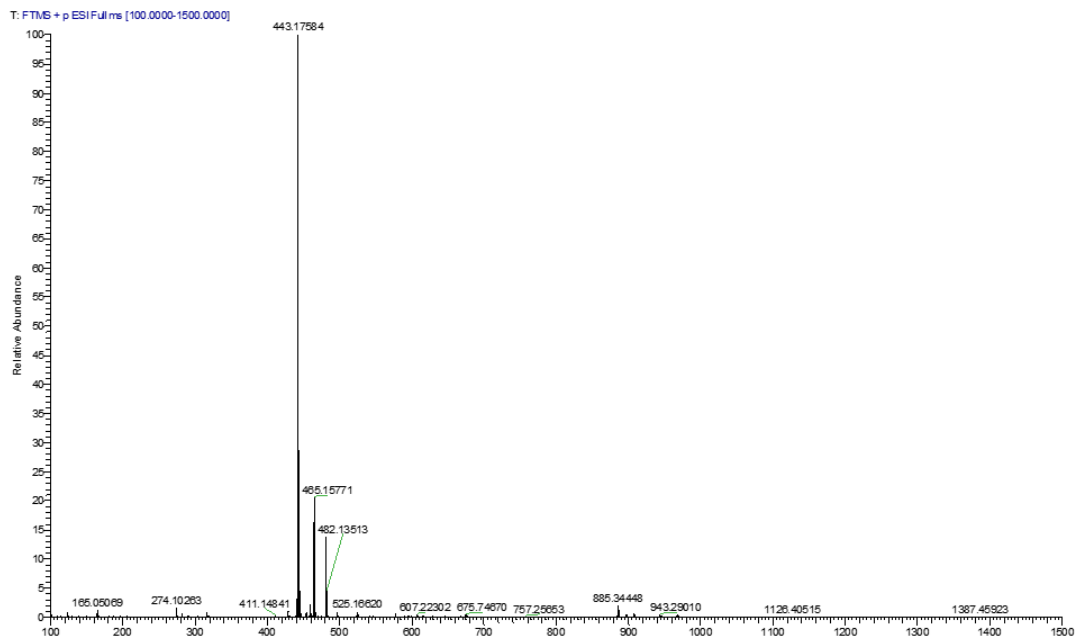
<sup>1</sup>H NMR spectrum of C11



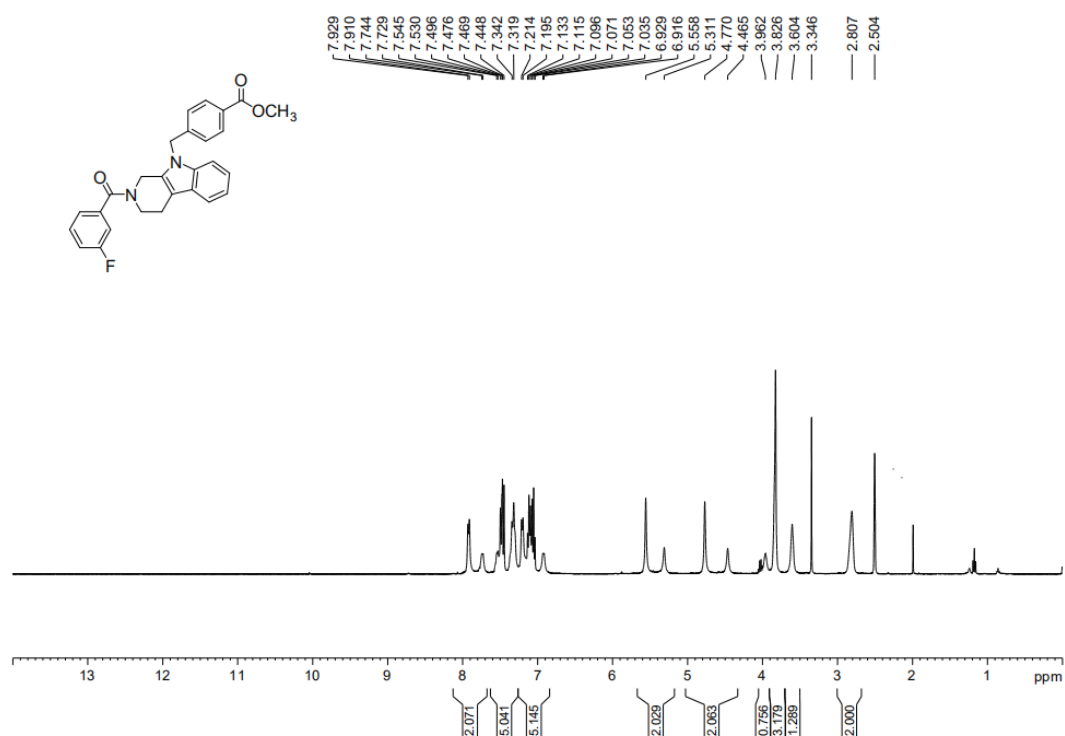
HRMS spectrum of C12



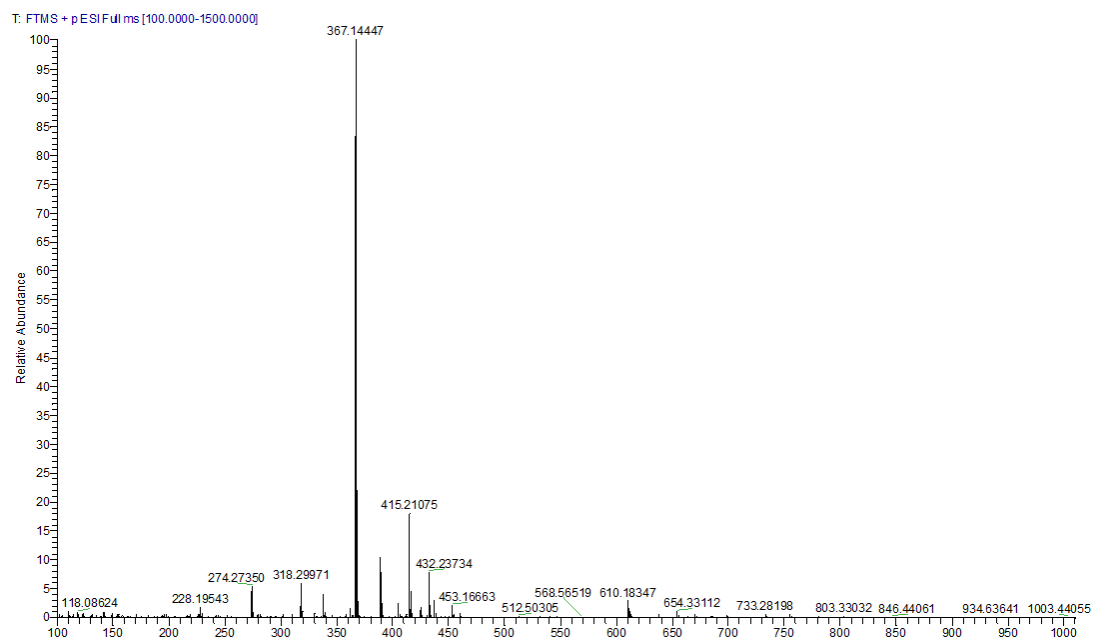
<sup>1</sup>H NMR spectrum of C12



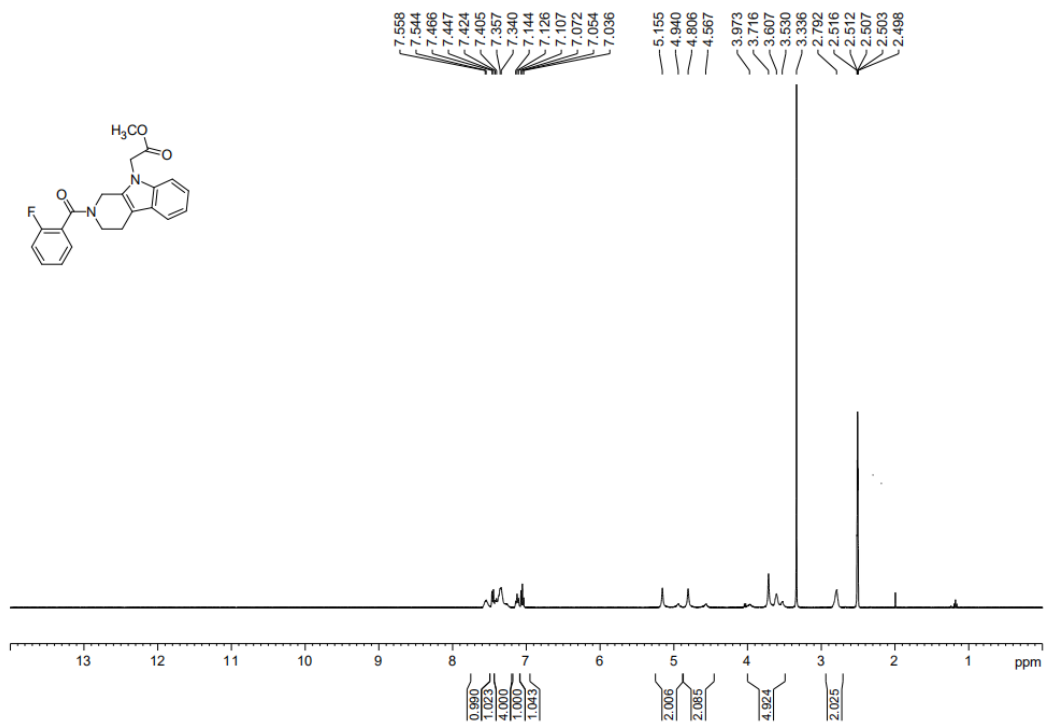
HRMS spectrum of C13



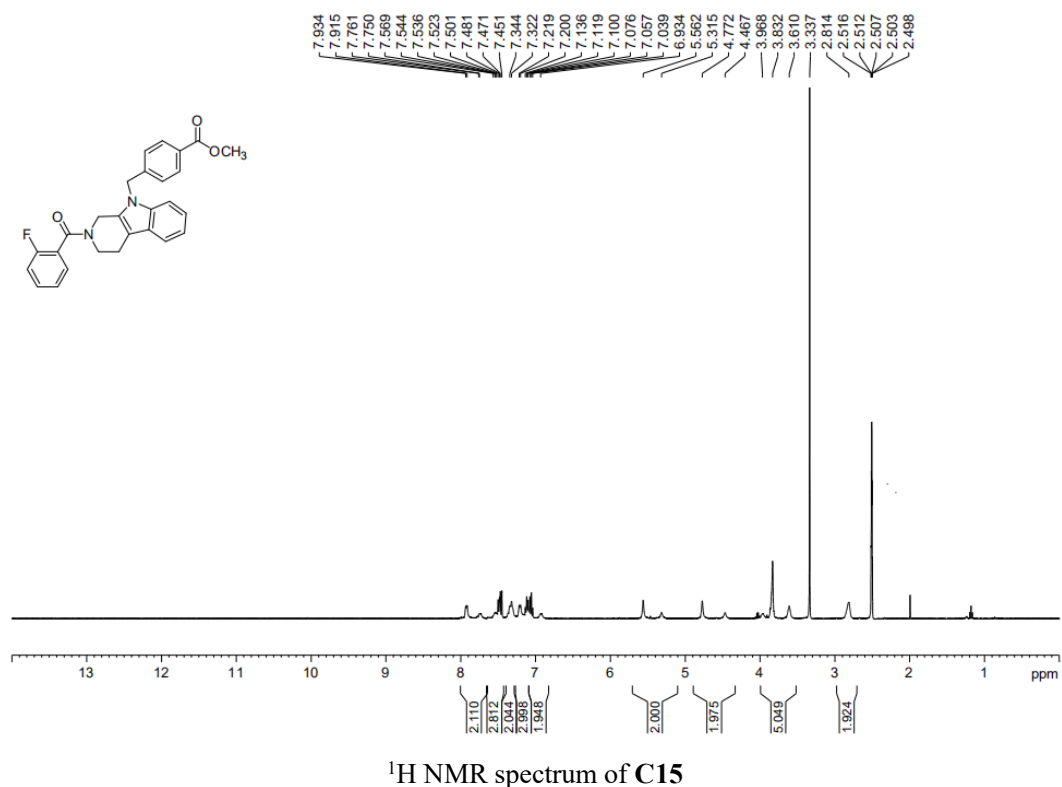
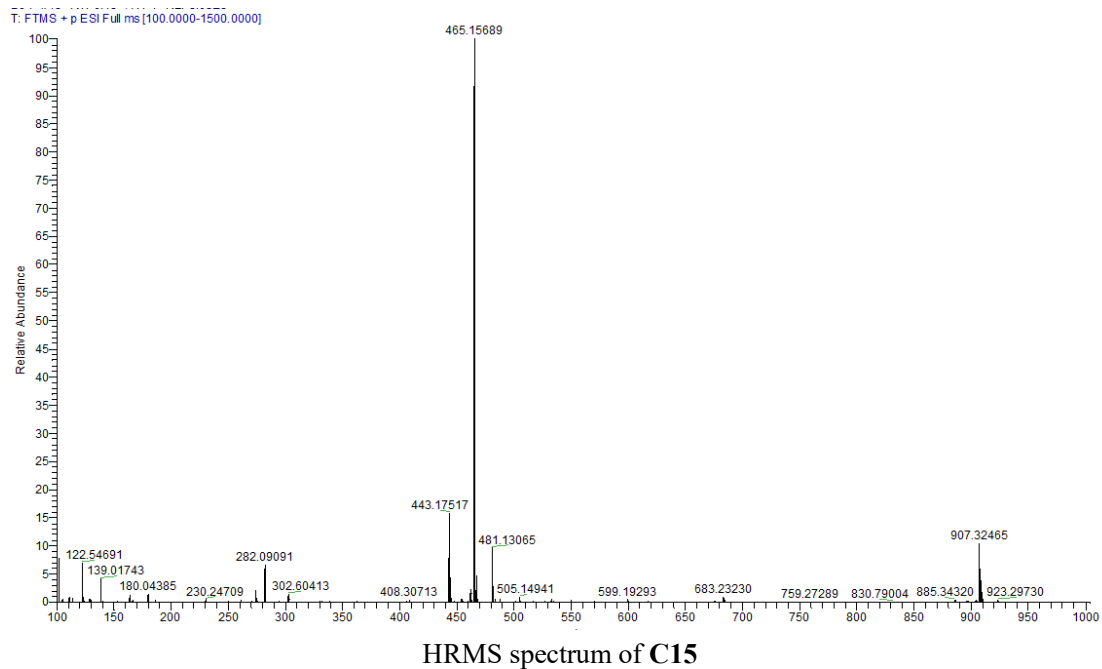
<sup>1</sup>H NMR spectrum of C13

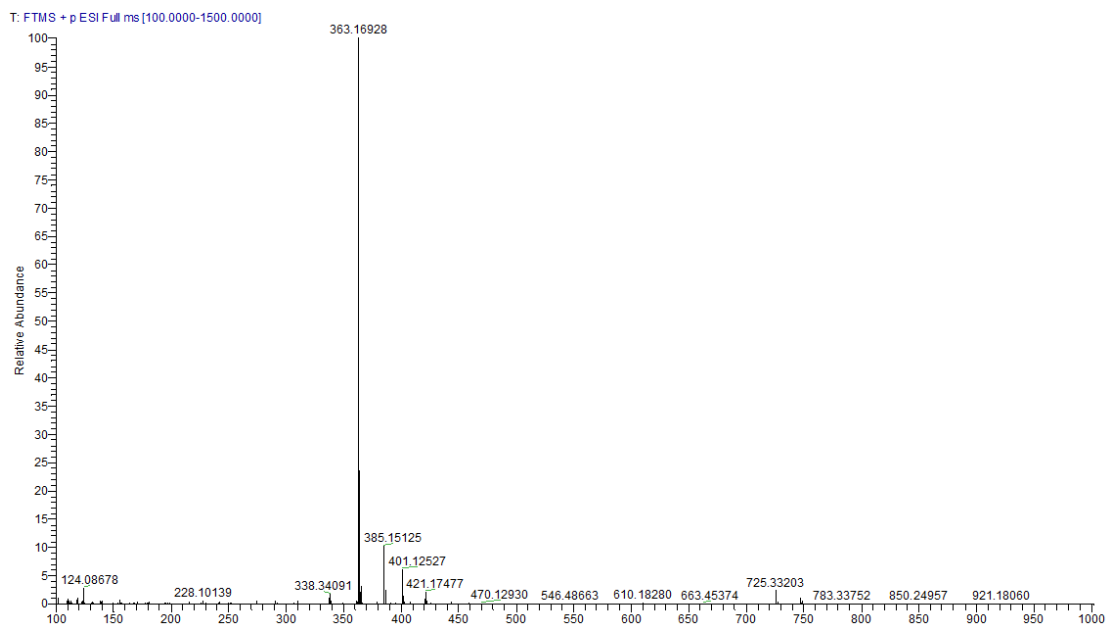


HRMS NMR spectrum of C14

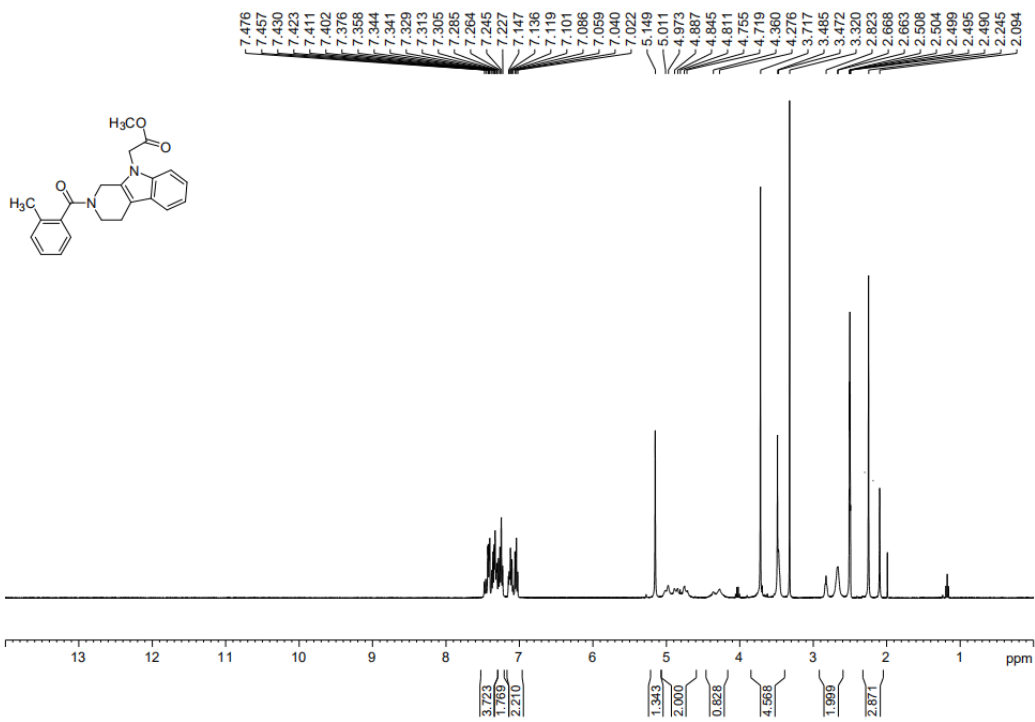


<sup>1</sup>H NMR spectrum of C14

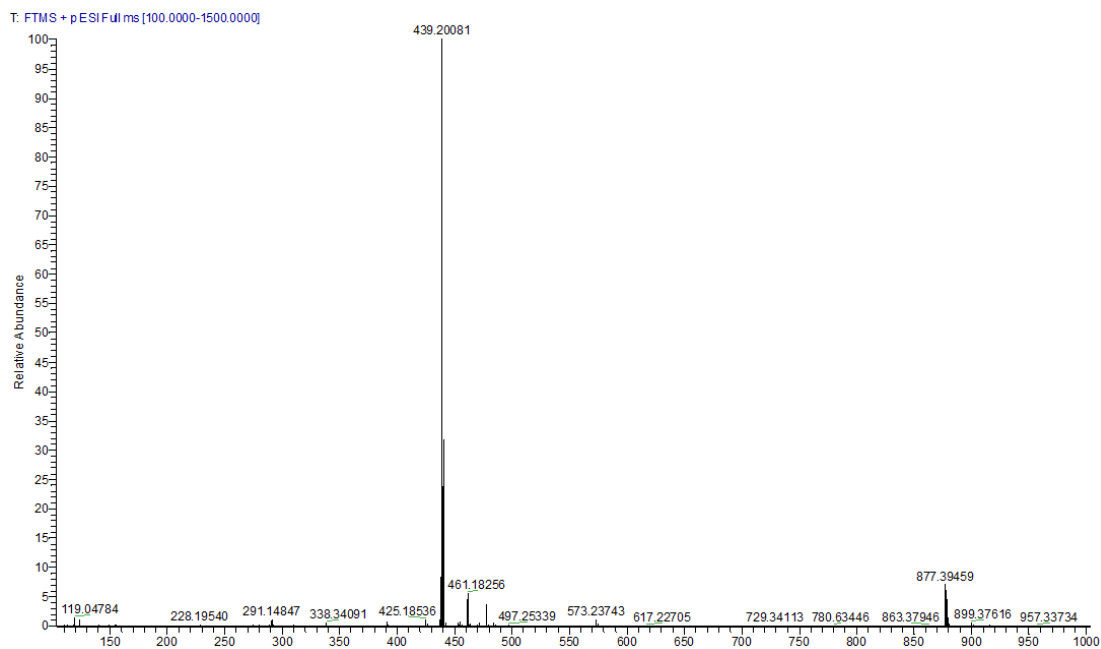




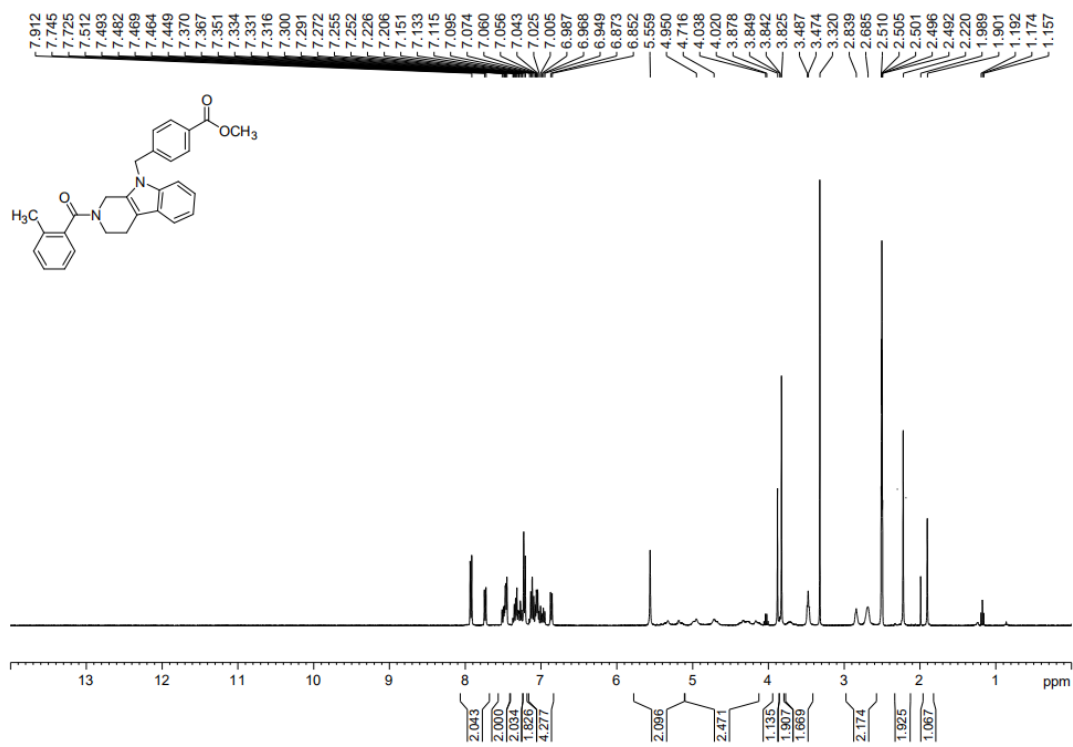
HRMS spectrum of C16



<sup>1</sup>H NMR spectrum of C16

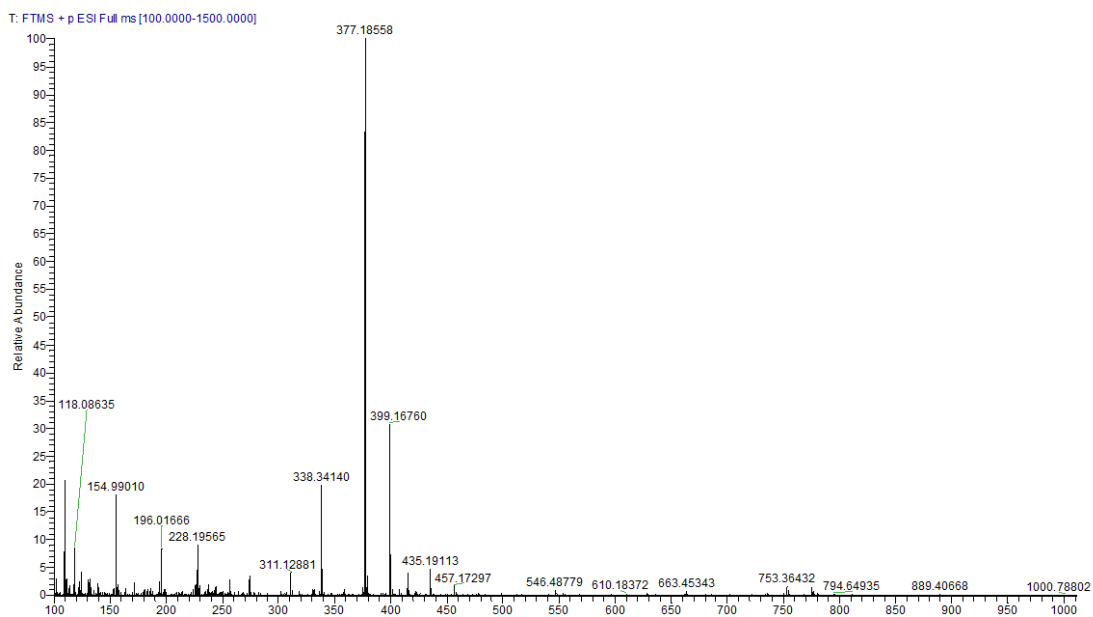


HRMS spectrum of C17

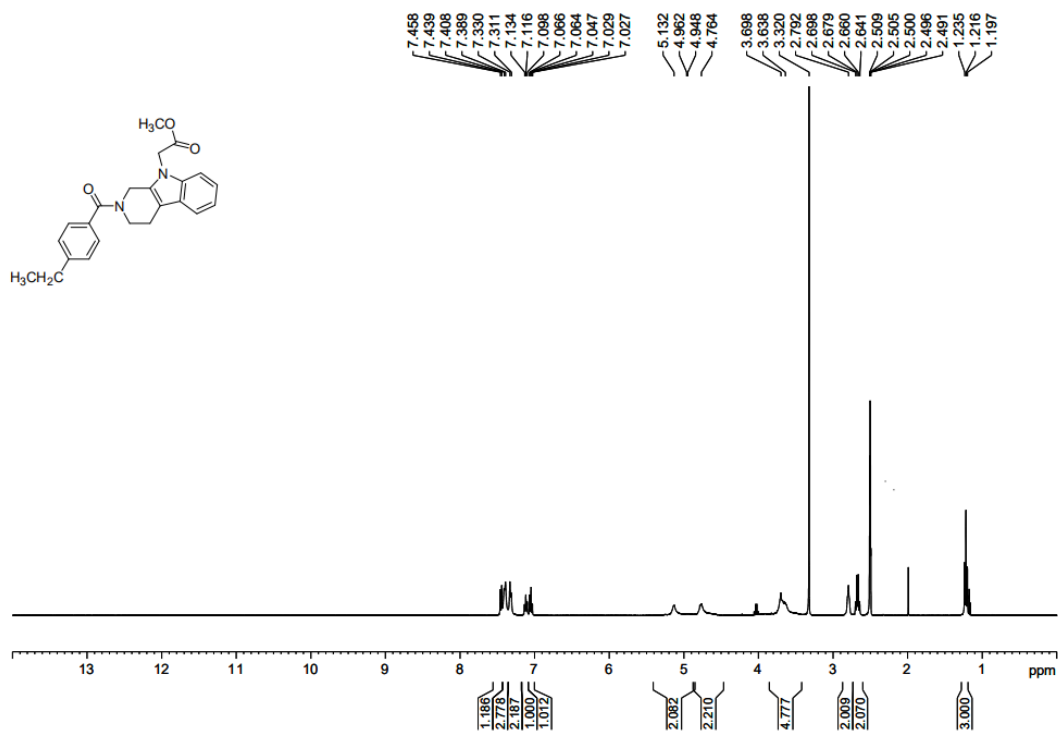


<sup>1</sup>H NMR spectrum of C17



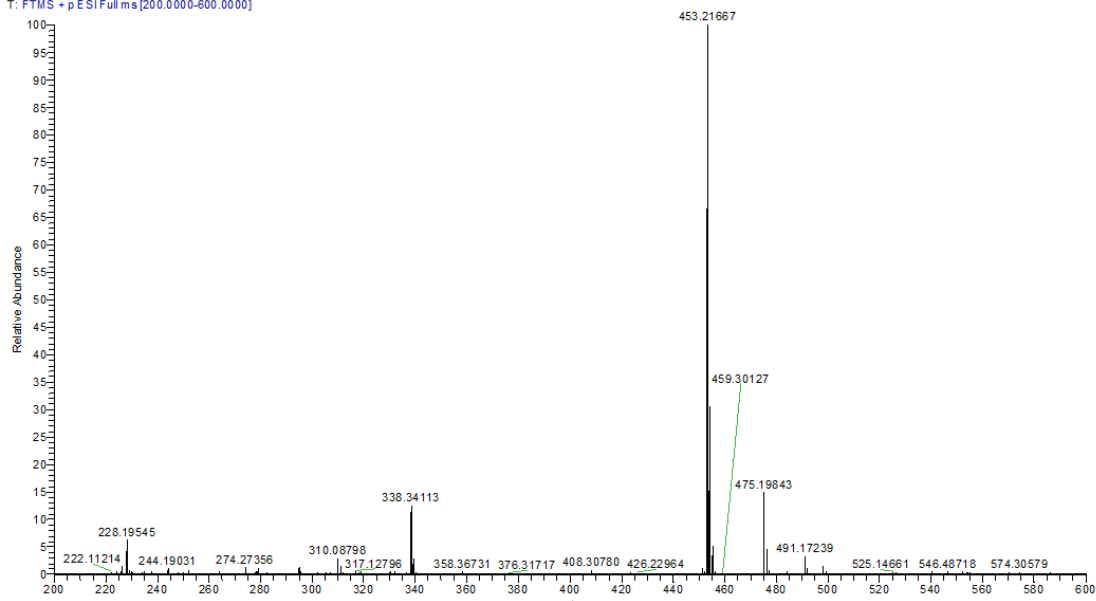


HRMS spectrum of C18

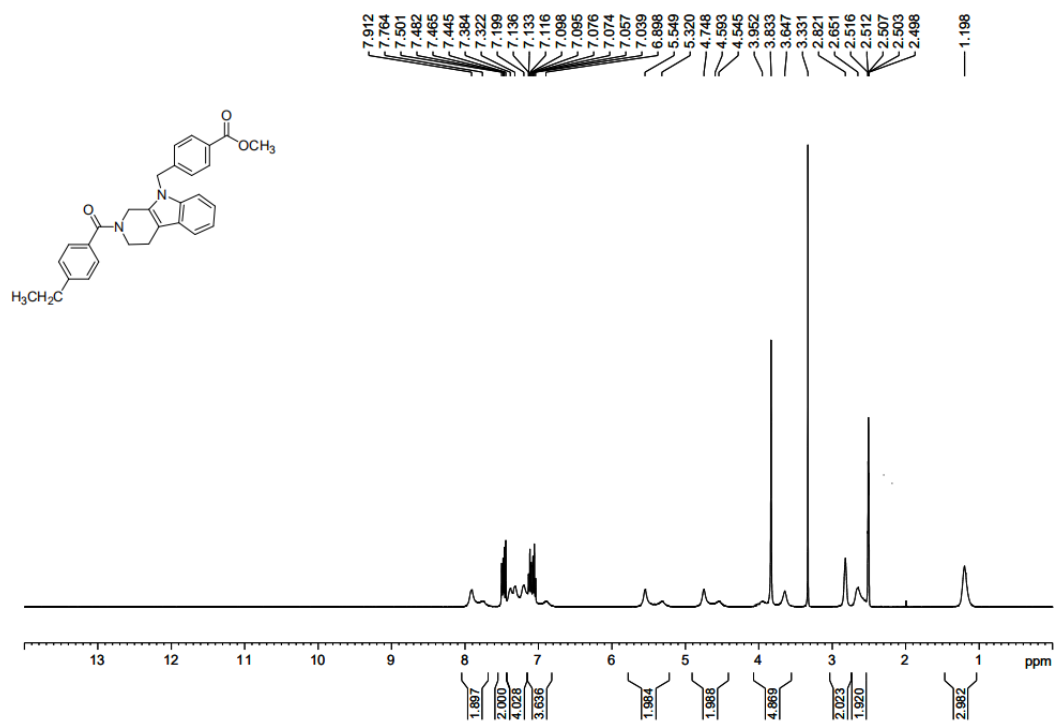


$^1H$  NMR spectrum of C18

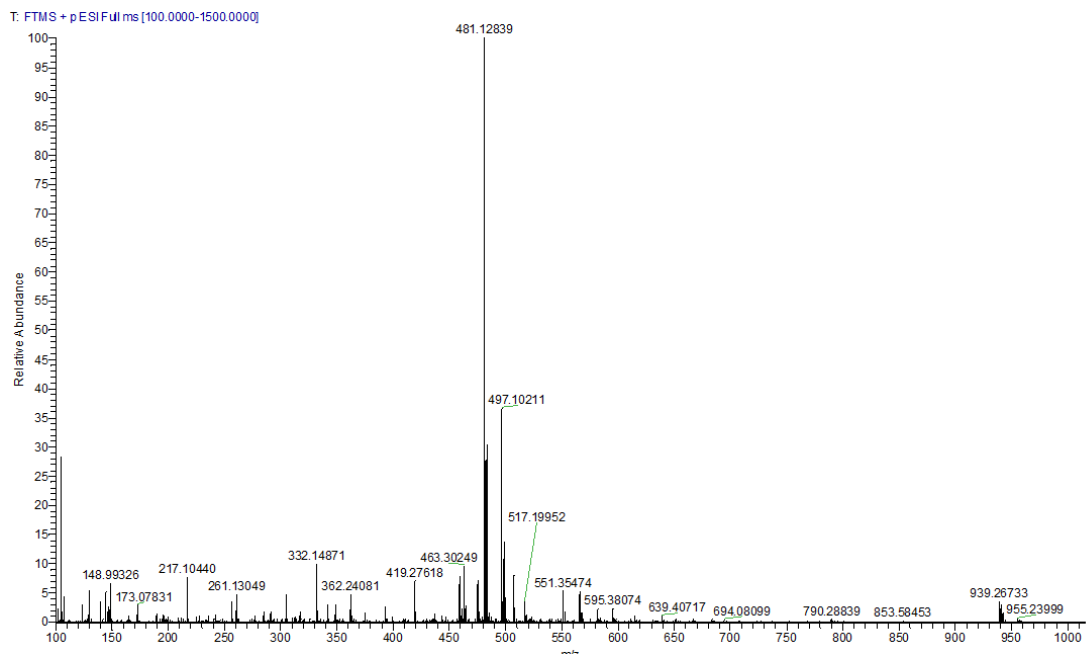
T: FTMS - p ESI Full ms [200.0000-600.0000]



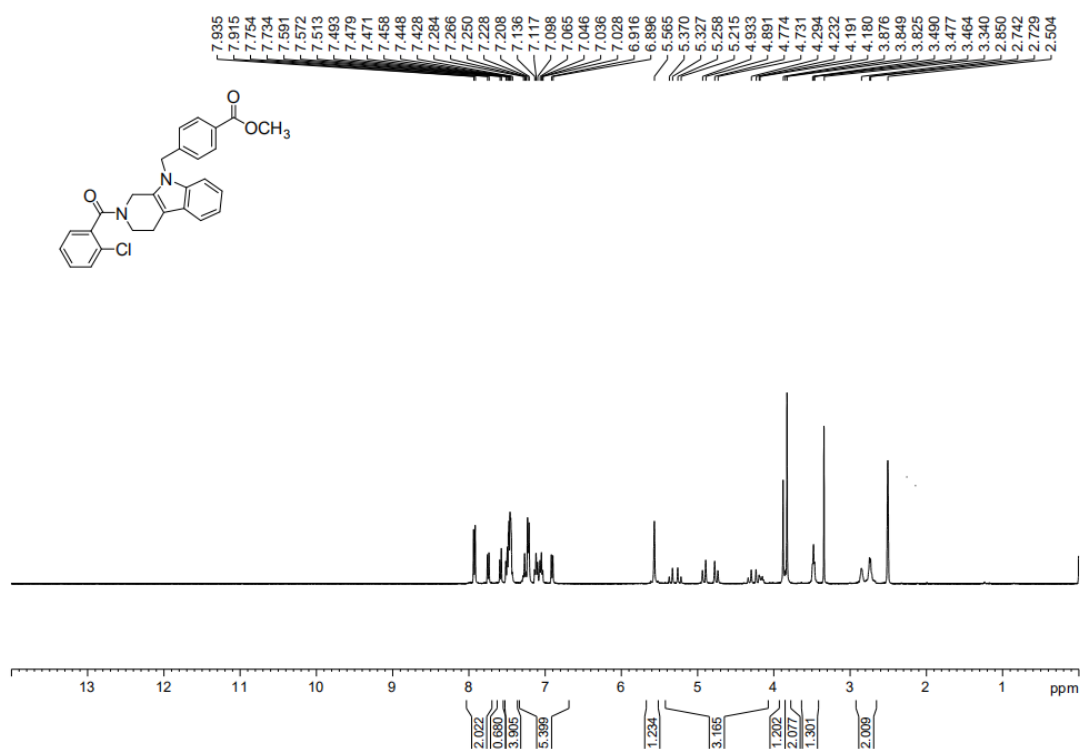
HRMS spectrum of C19



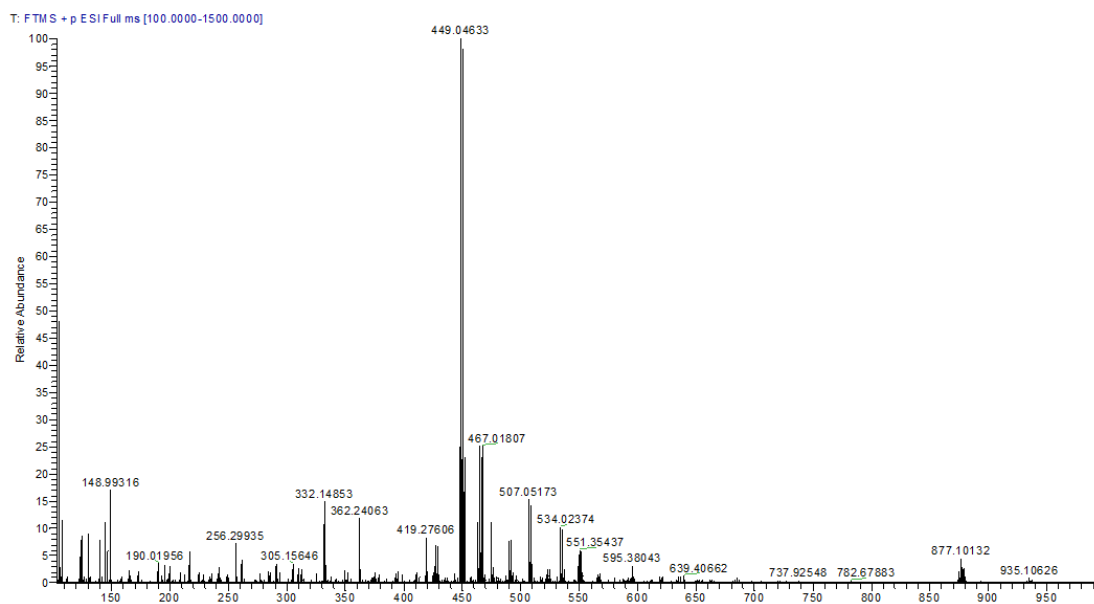
<sup>1</sup>H NMR spectrum of C19



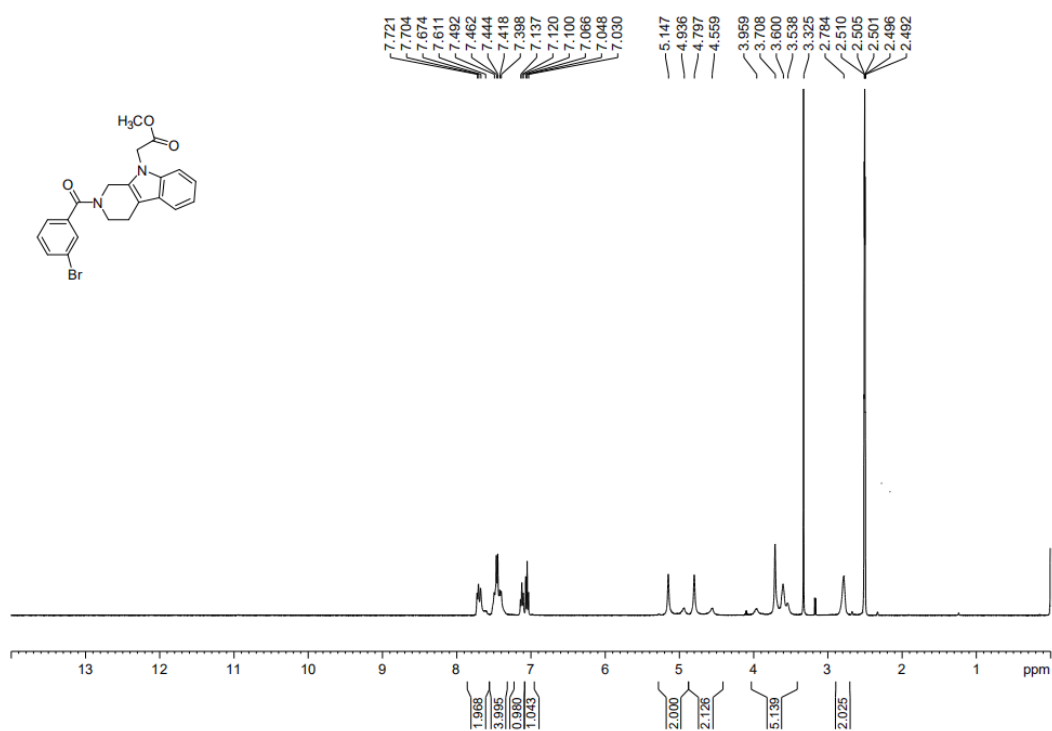
HRMS spectrum of C20



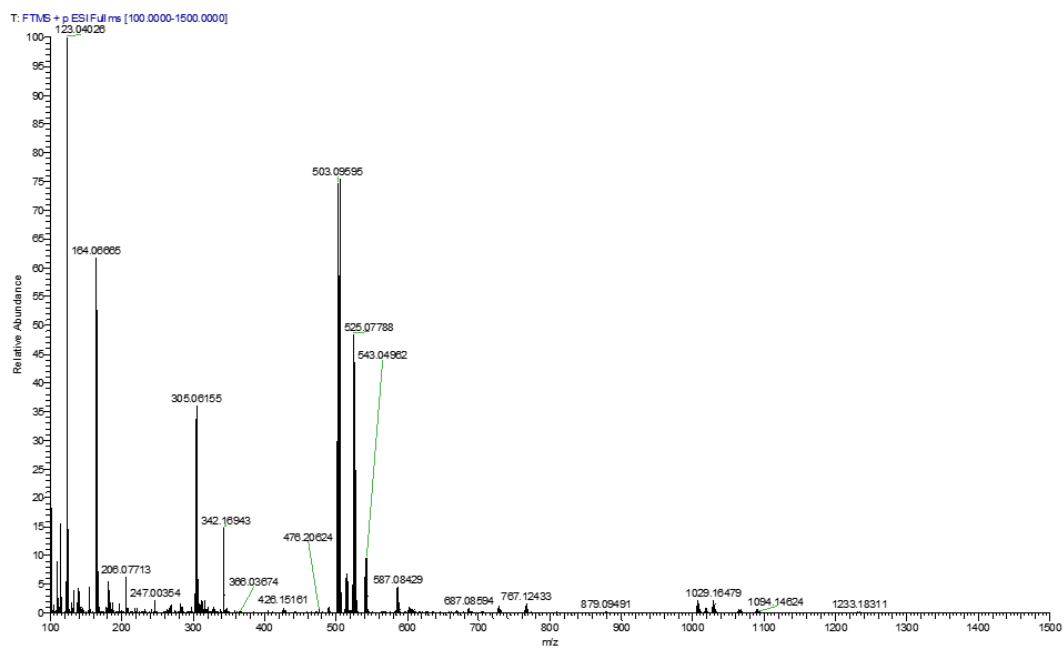
<sup>1</sup>H NMR spectrum of C20



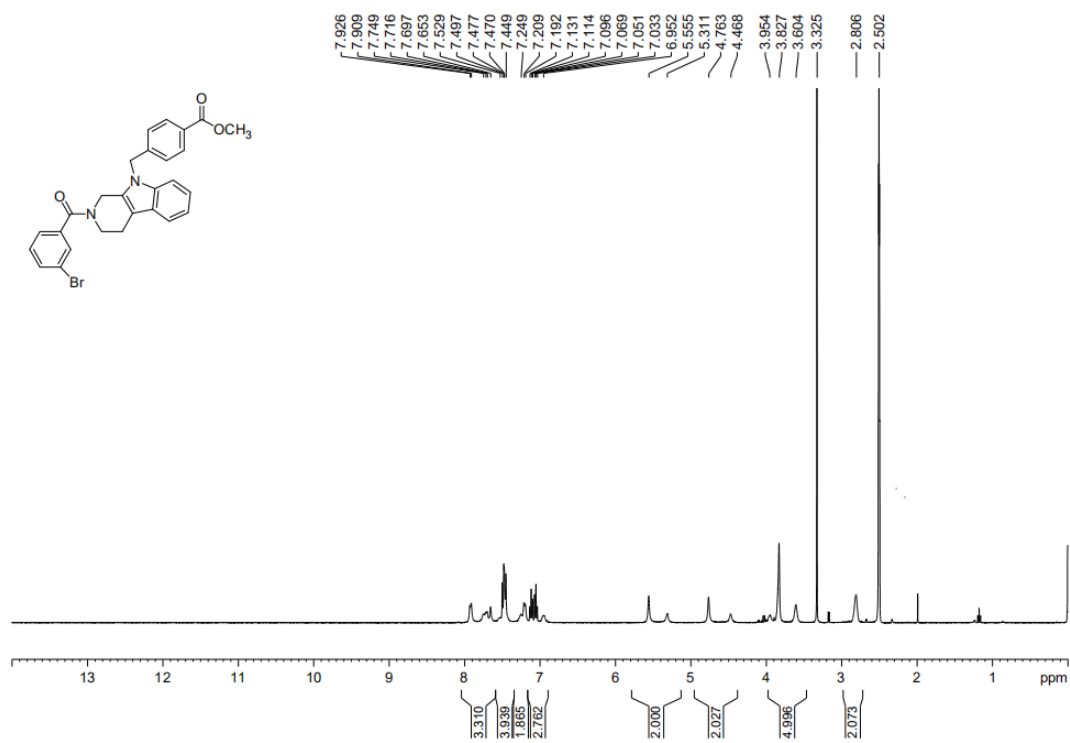
HRMS spectrum of C21



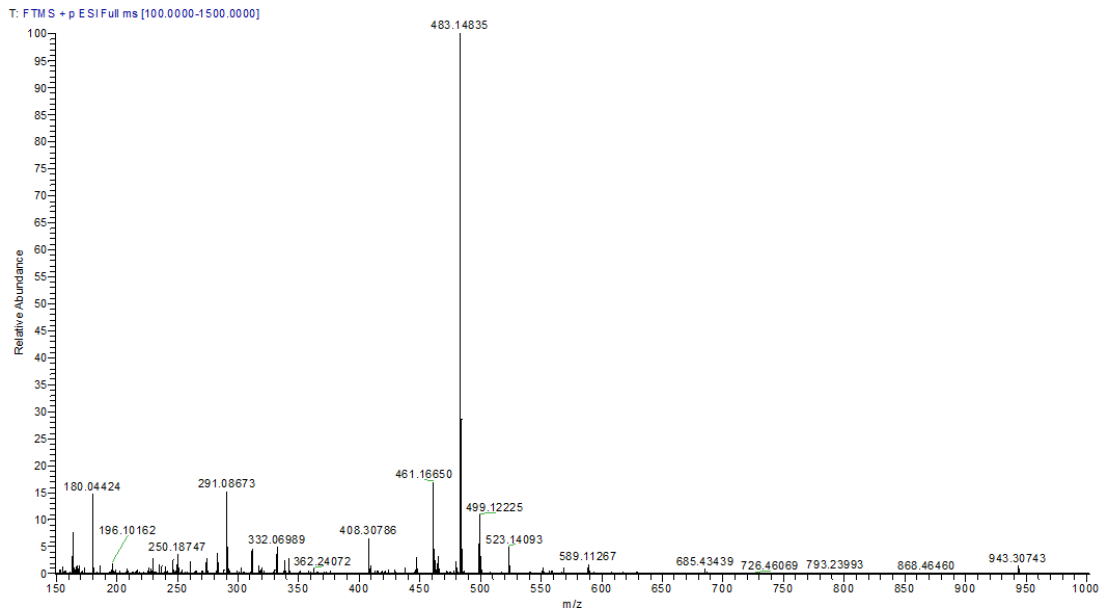
<sup>1</sup>H NMR spectrum of C21



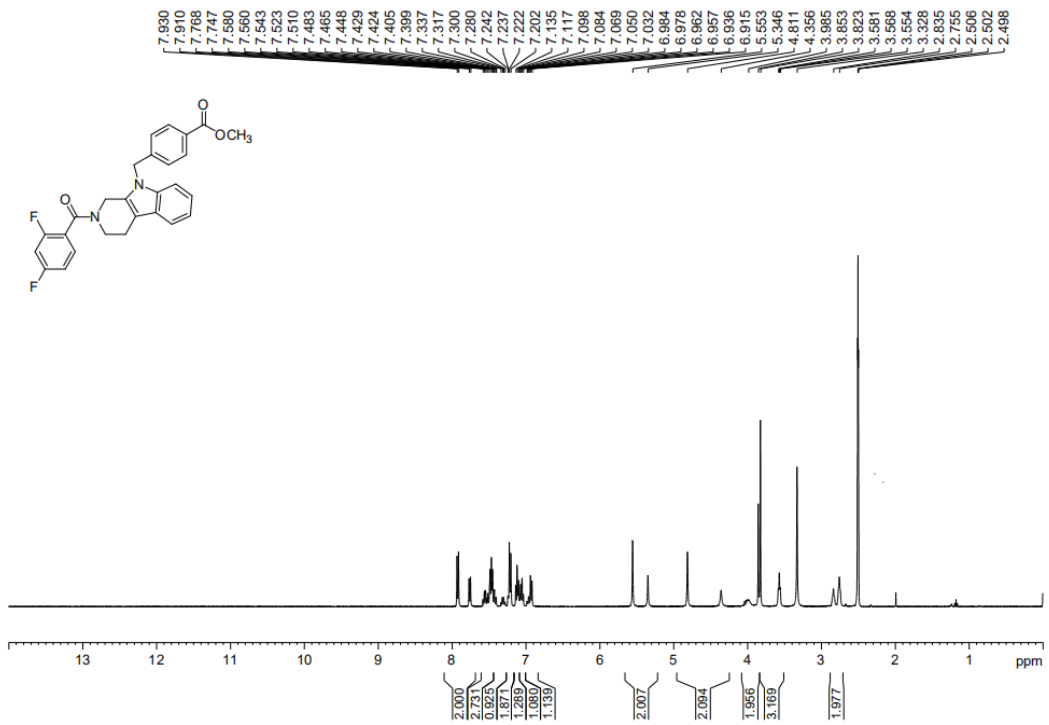
HRMS spectrum of C22



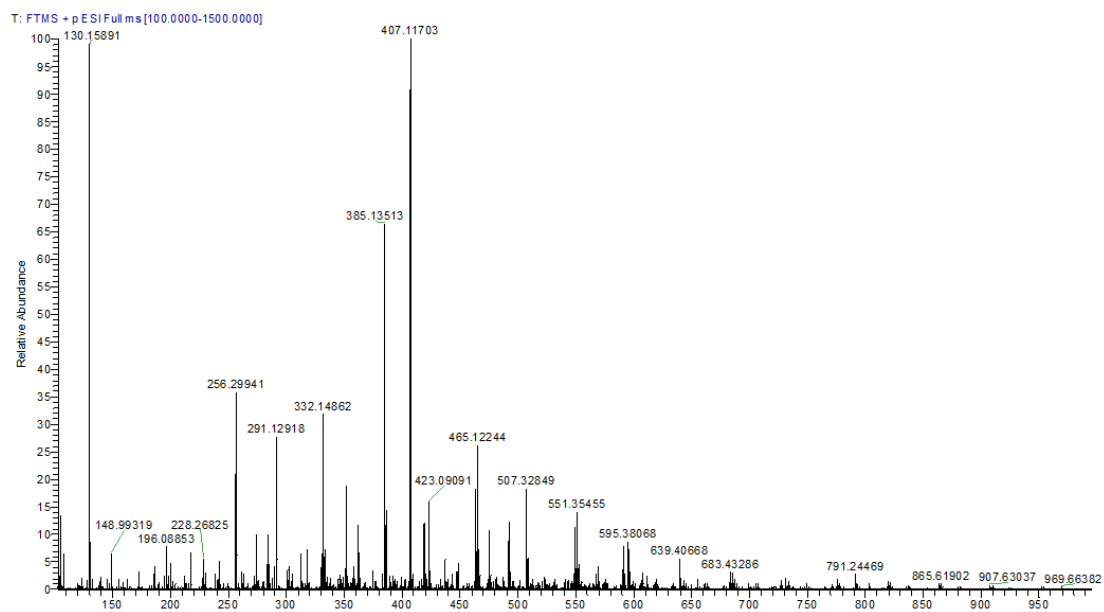
<sup>1</sup>H NMR spectrum of C22



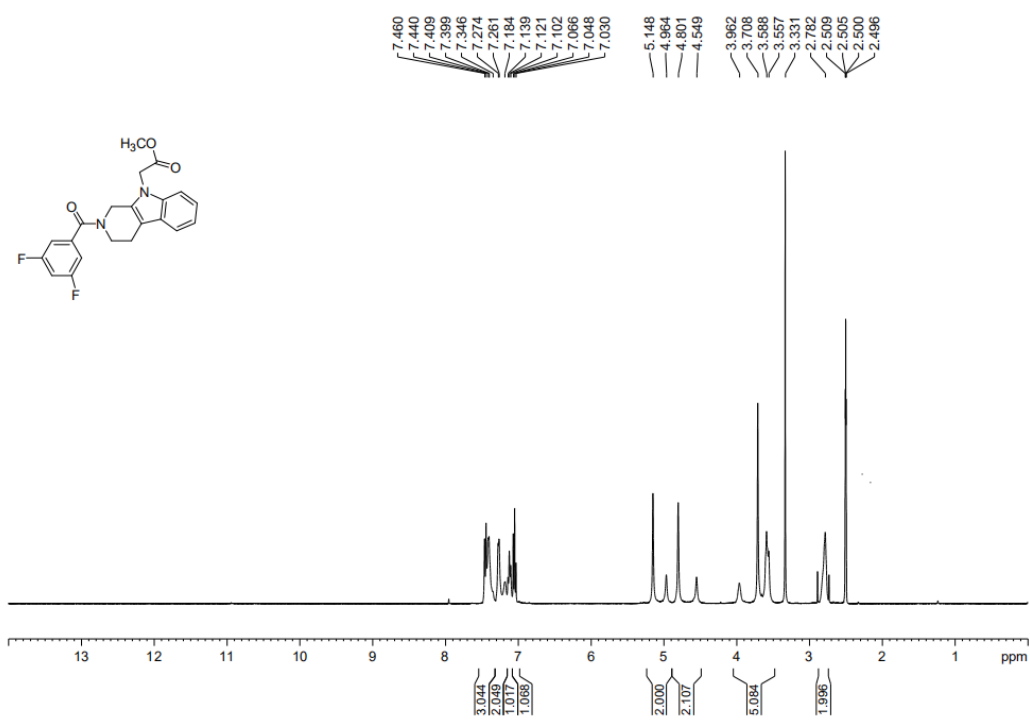
HRMS spectrum of C23



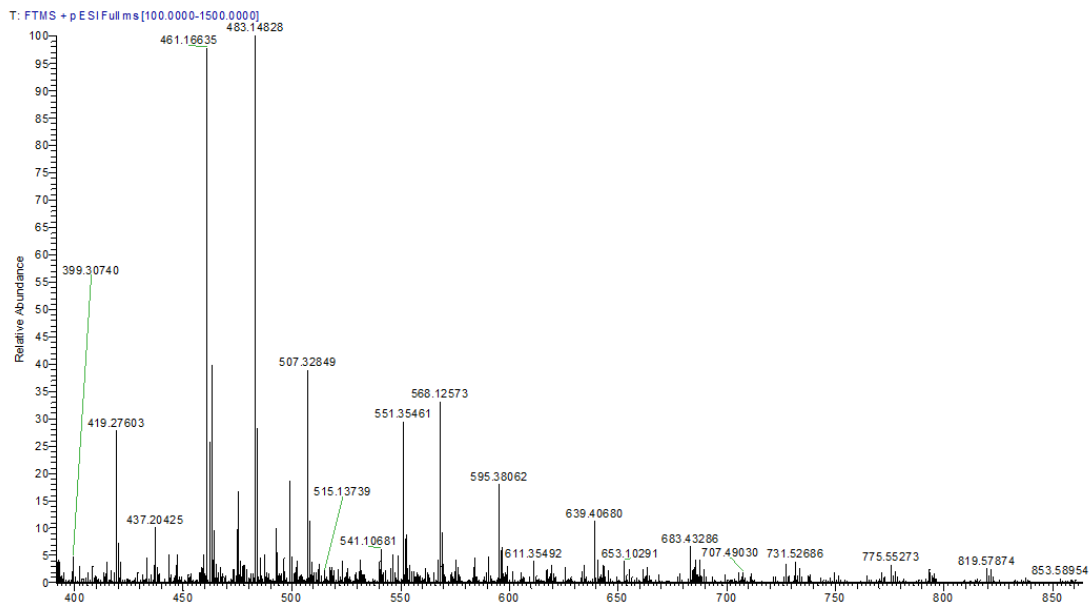
<sup>1</sup>H NMR spectrum of C23



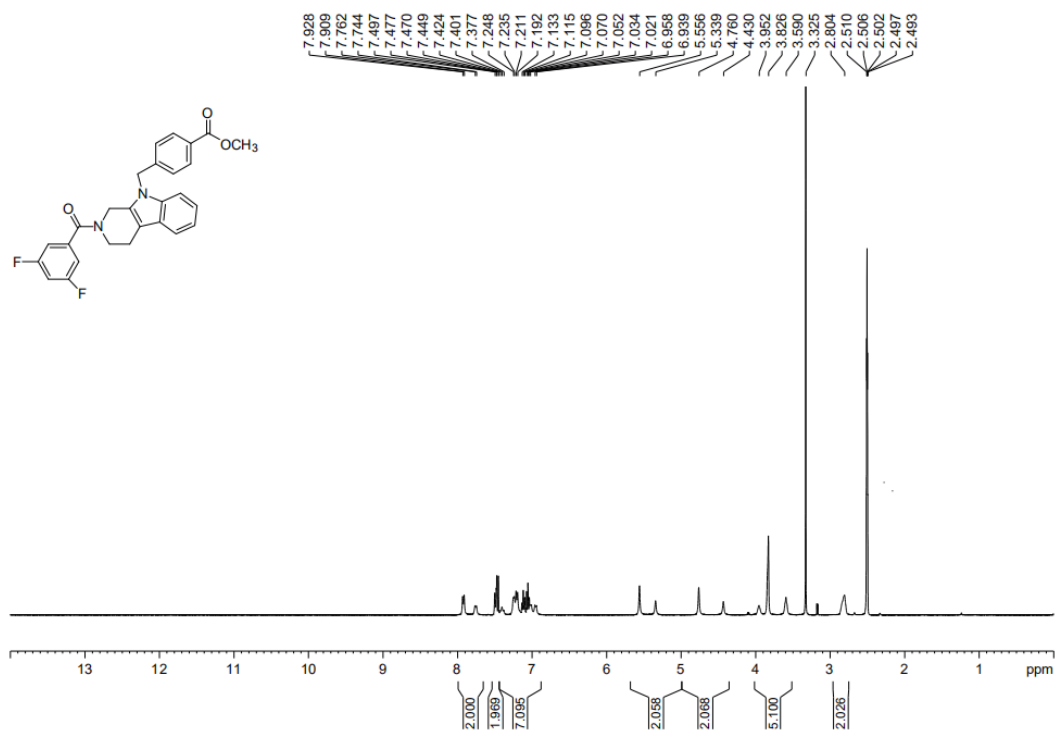
HRMS spectrum of C24



<sup>1</sup>H NMR spectrum of C24

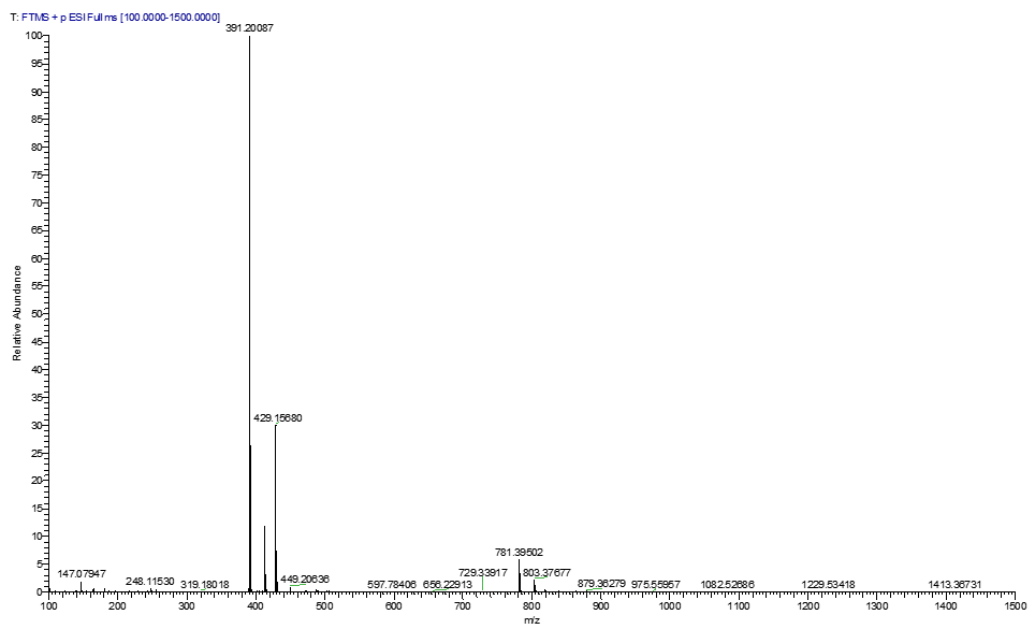


HRMS spectrum of C25

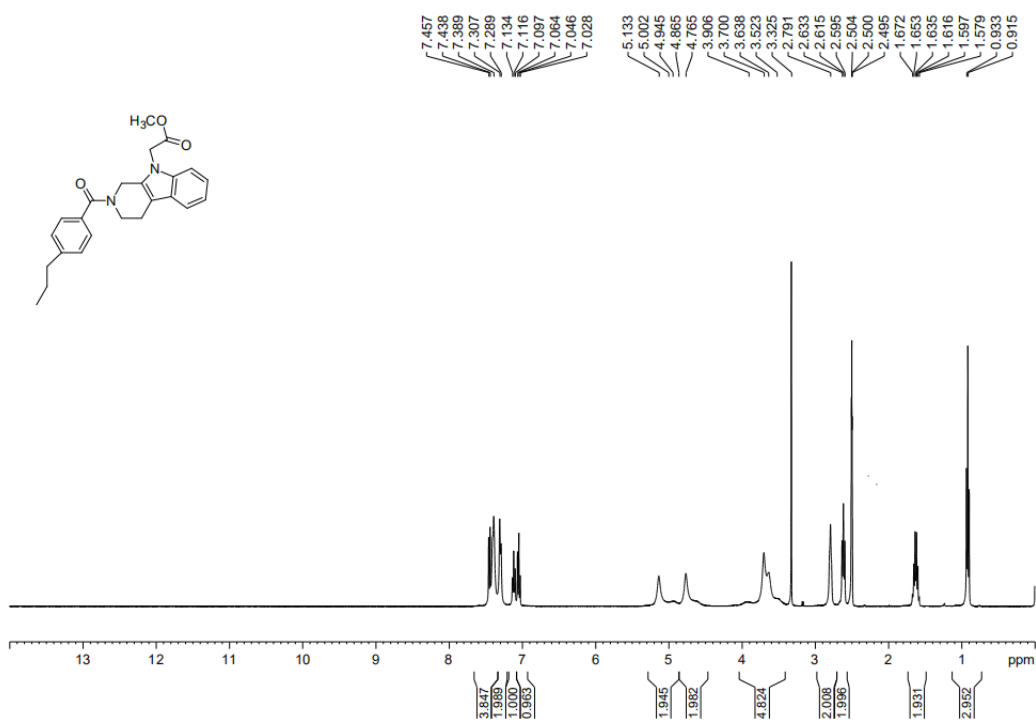


<sup>1</sup>H NMR spectrum of C25

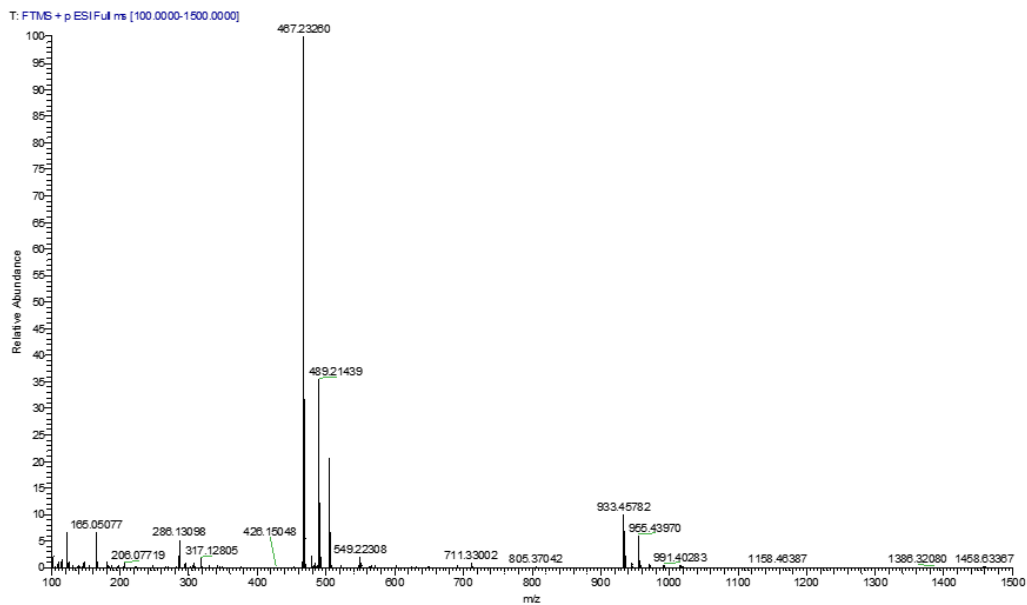




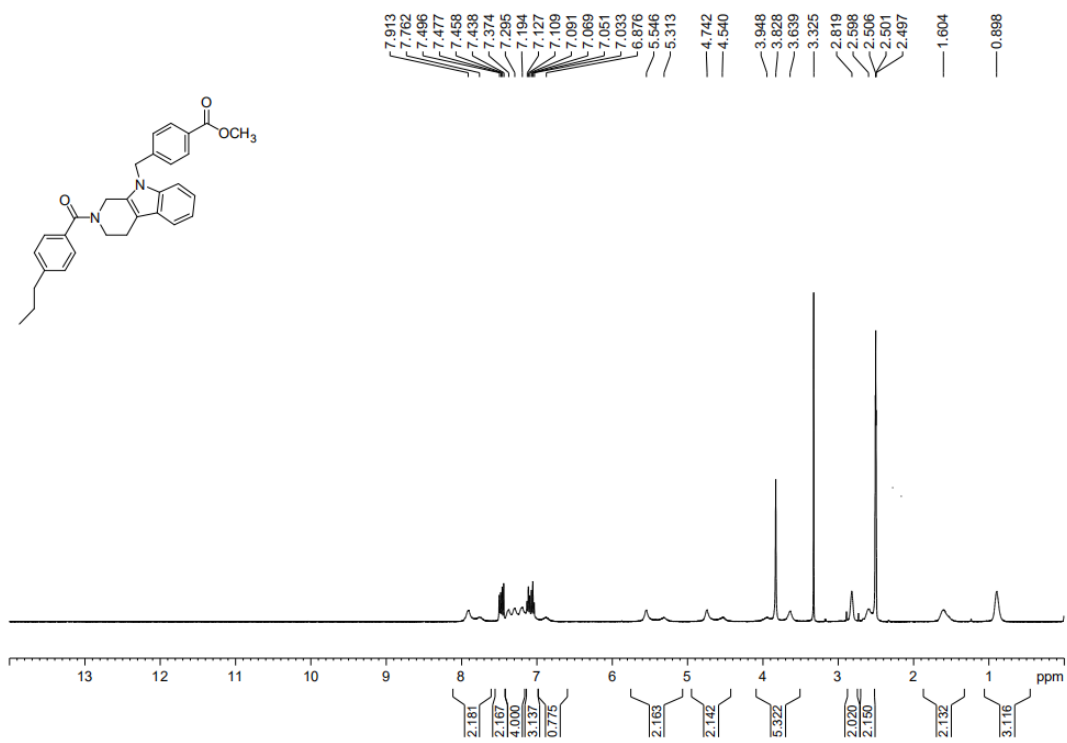
HRMS spectrum of C26



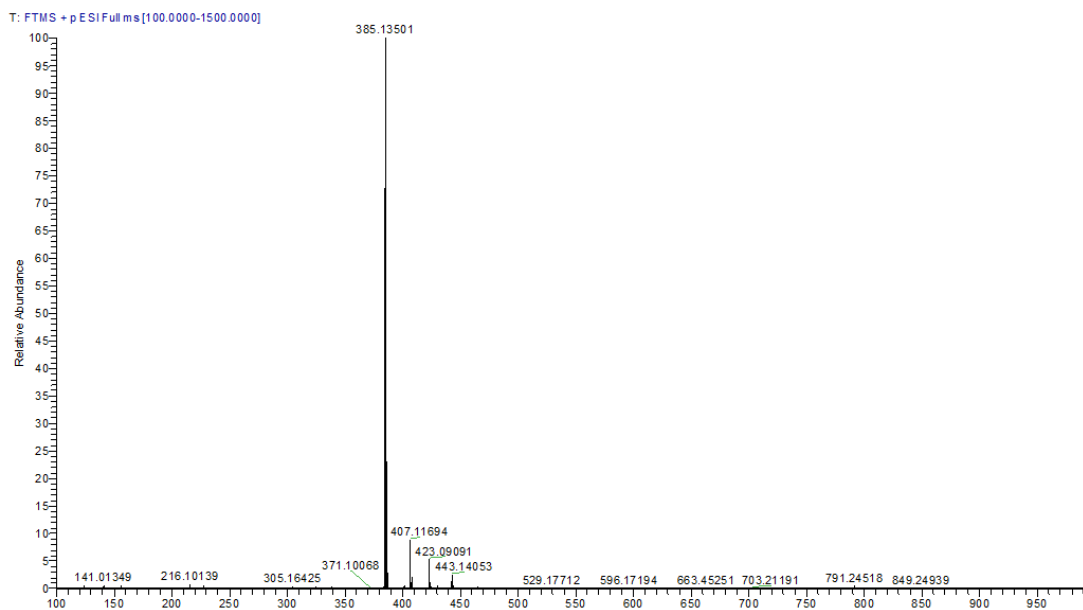
<sup>1</sup>H NMR spectrum of C26



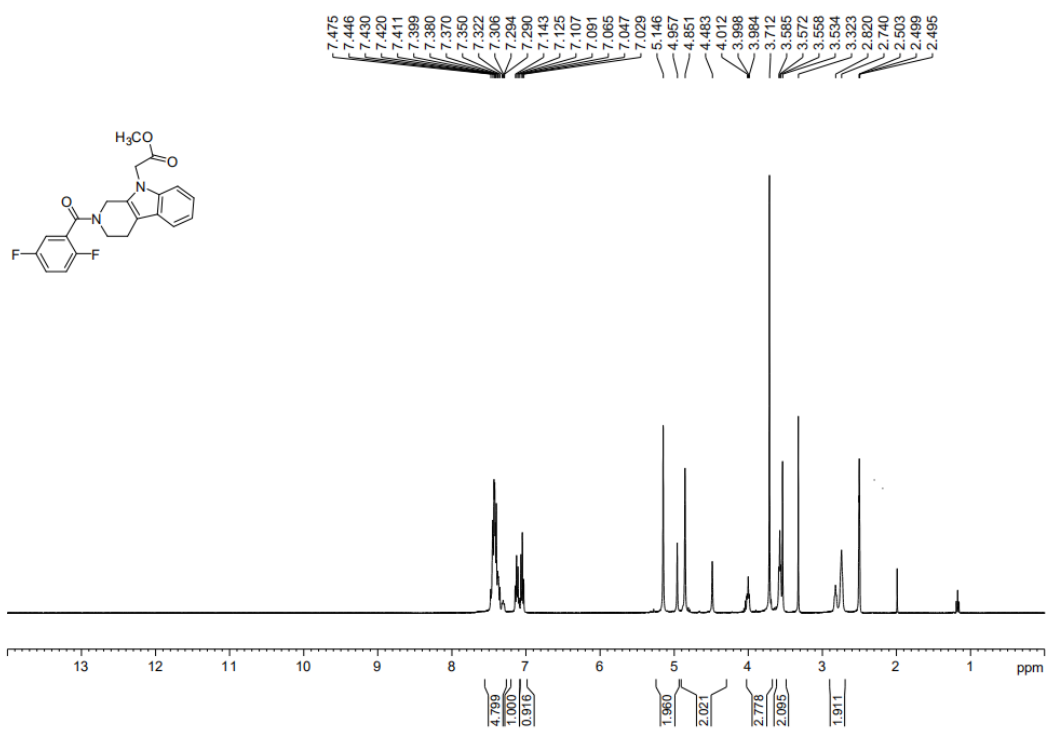
HRMS spectrum of C27



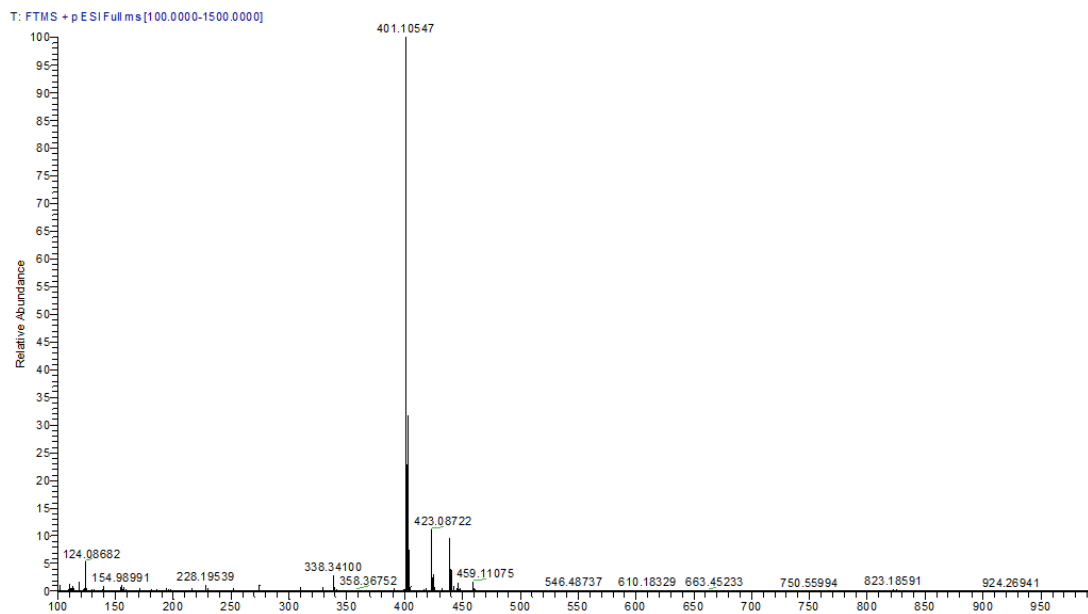
<sup>1</sup>H NMR spectrum of C27



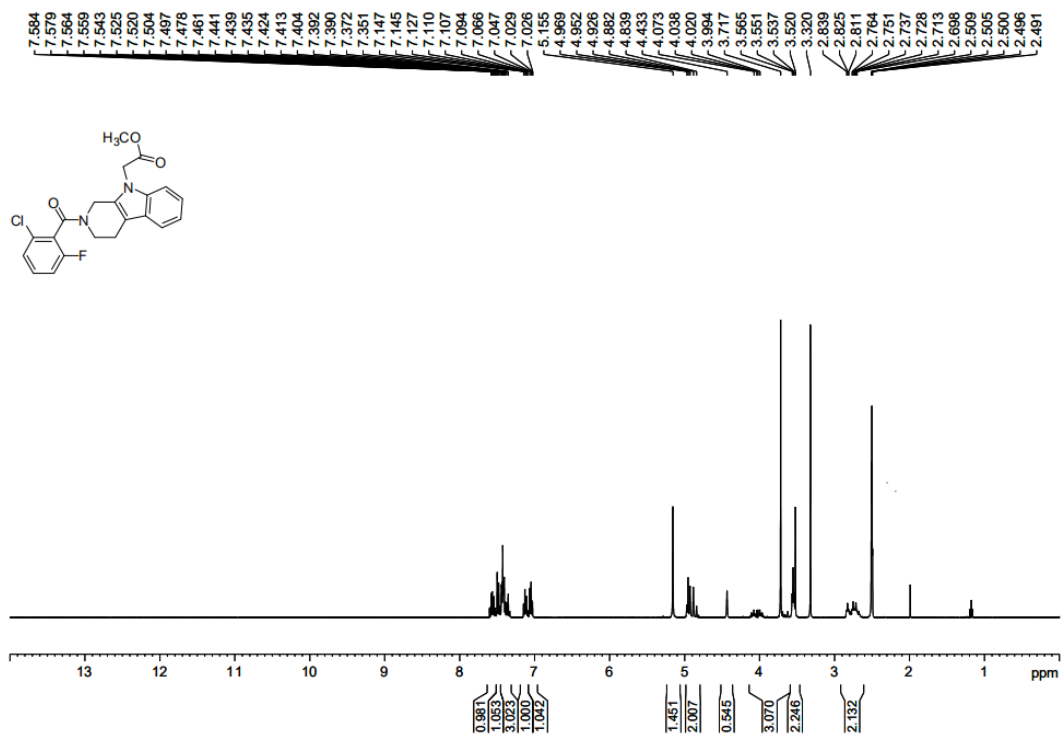
HRMS spectrum of C28



<sup>1</sup>H NMR spectrum of C28

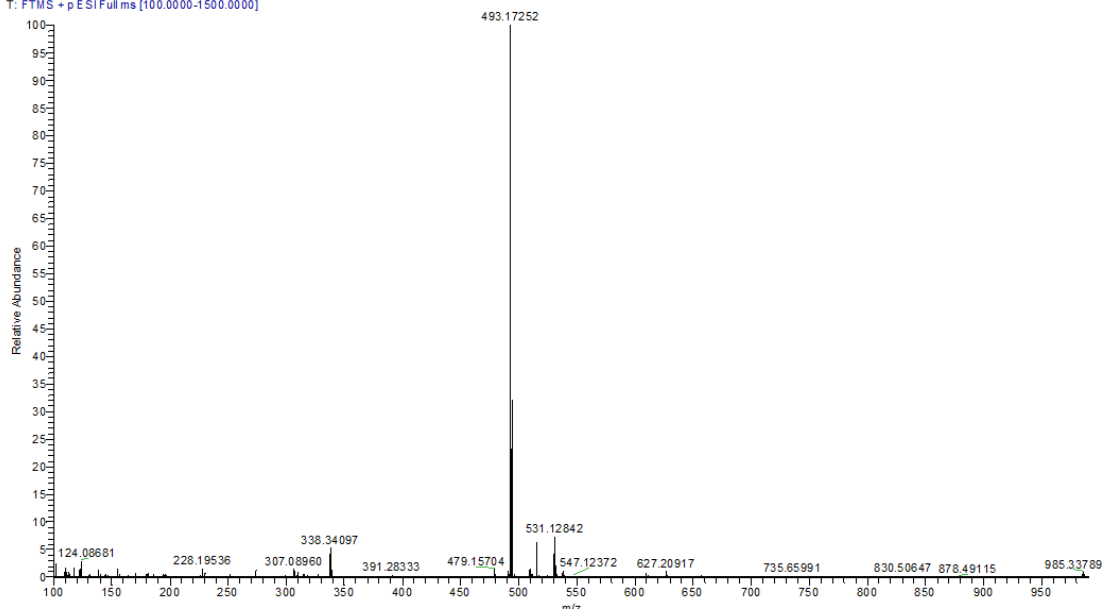


HRMS spectrum of C29

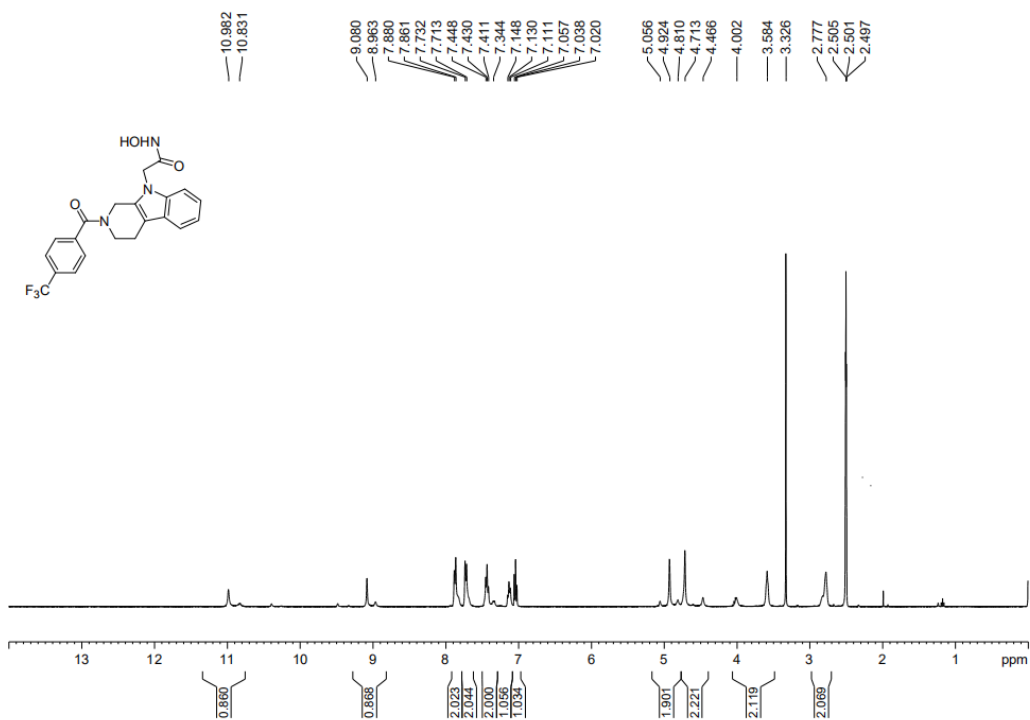


<sup>1</sup>H NMR spectrum of C29

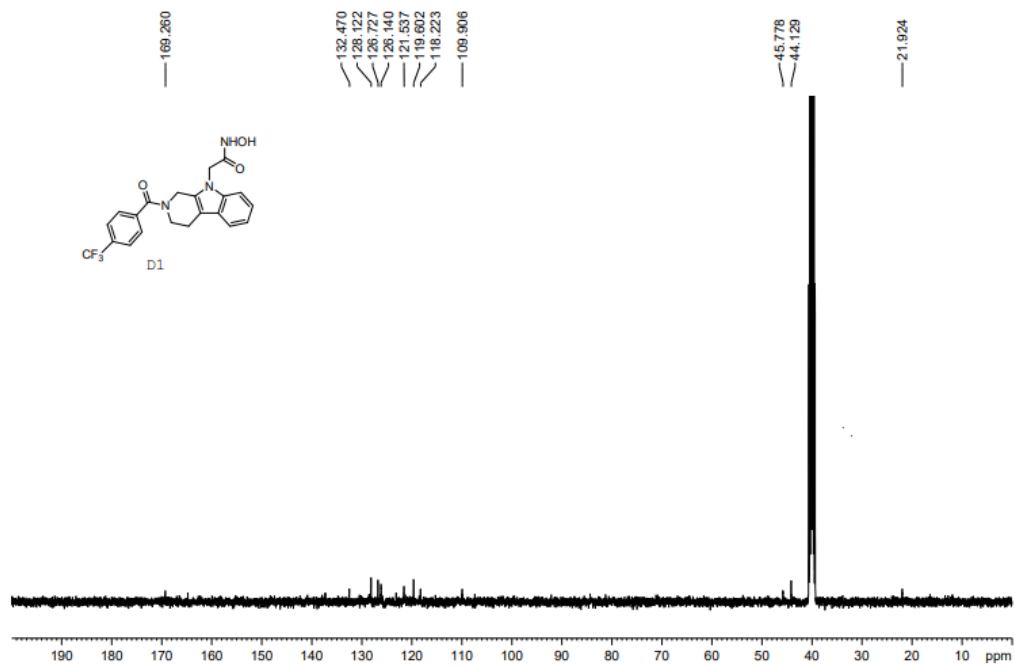
T: FTMS + p ESI Full ms [100.0000-1500.0000]



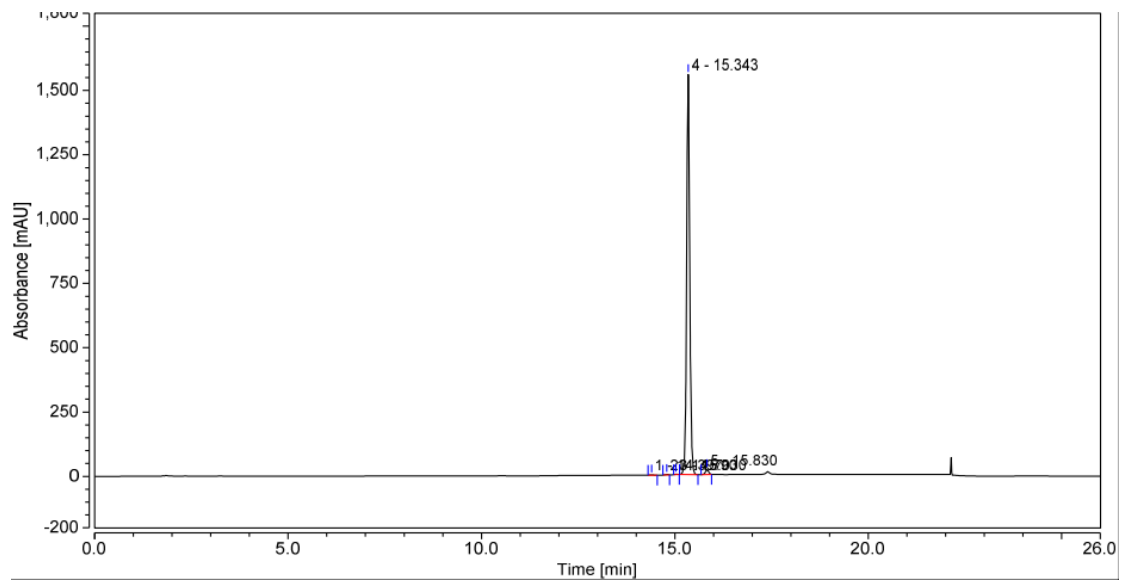
HRMS spectrum of D1



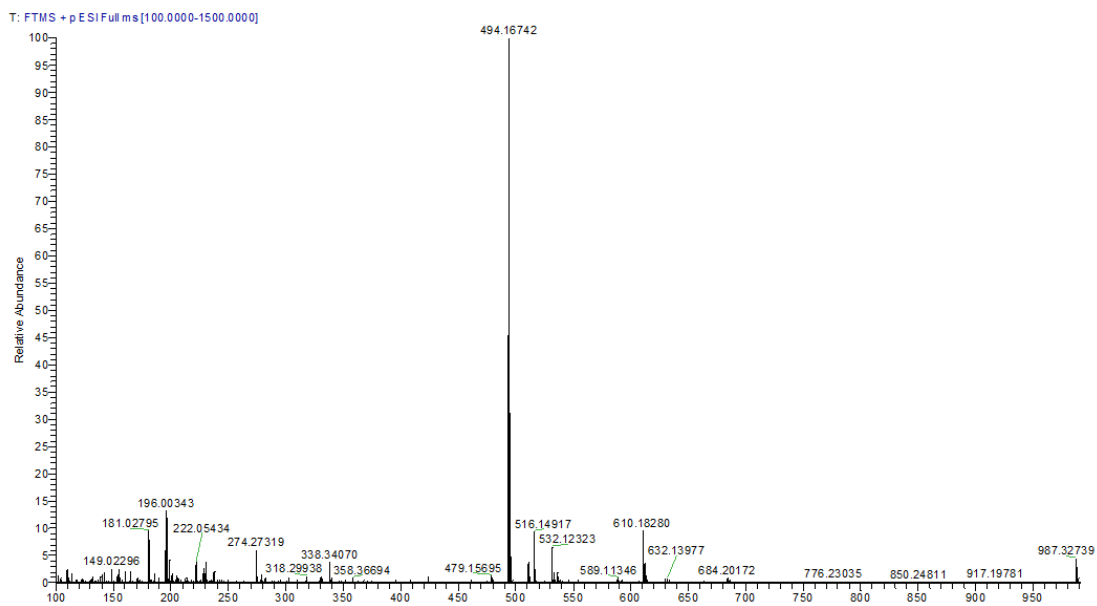
<sup>1</sup>H NMR spectrum of D1



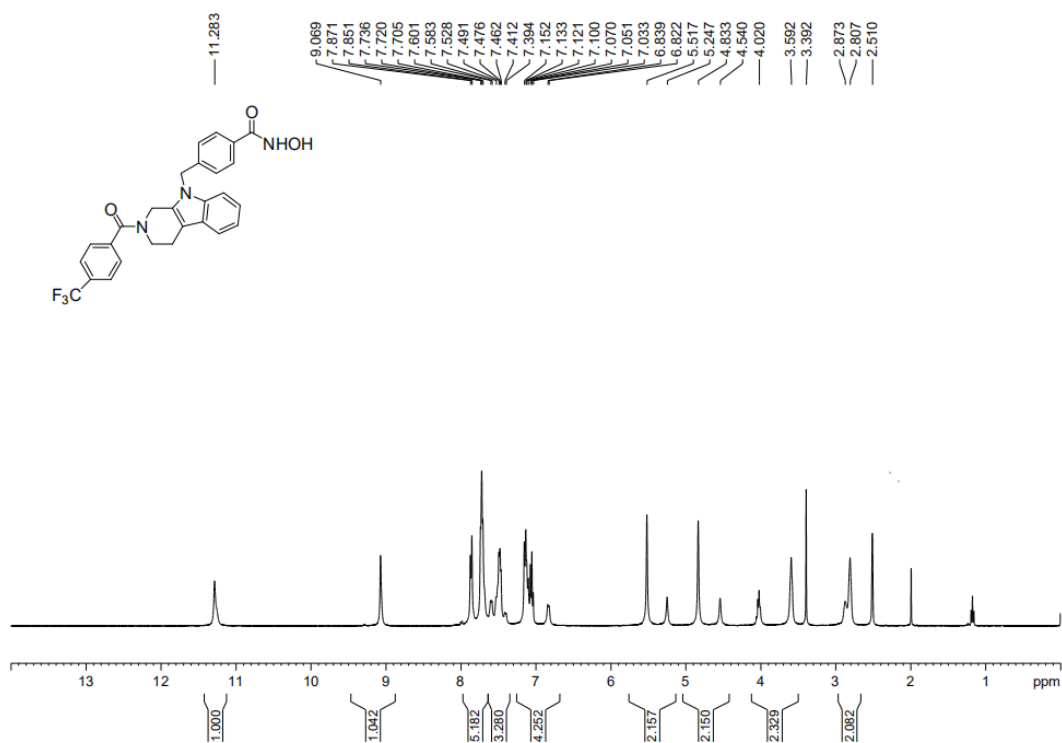
<sup>13</sup>C NMR spectrum of **D1**



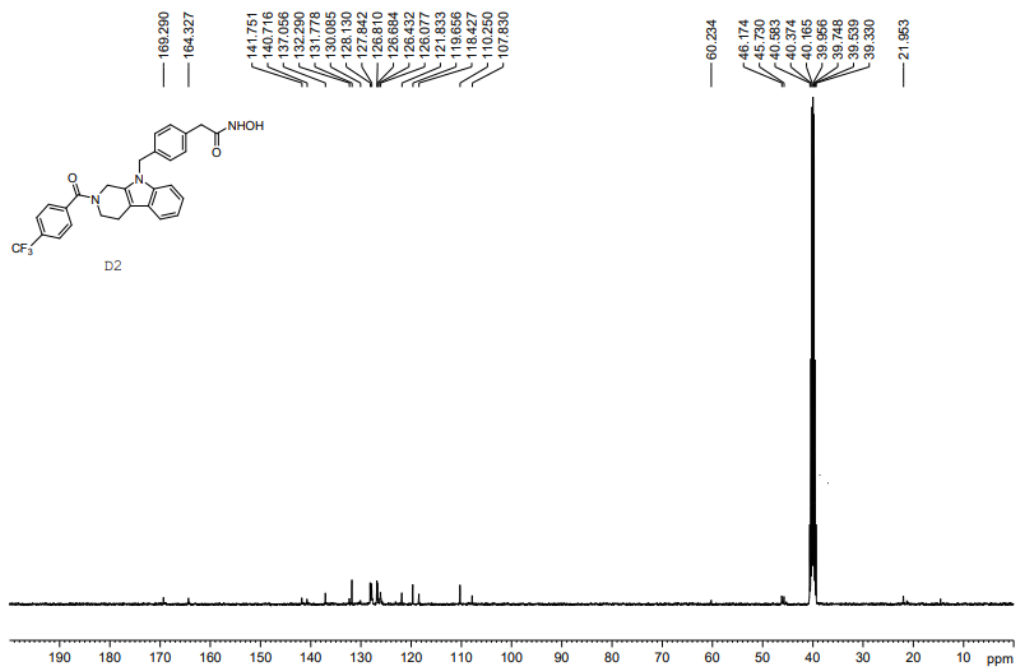
HPLC spectrum of **D1**



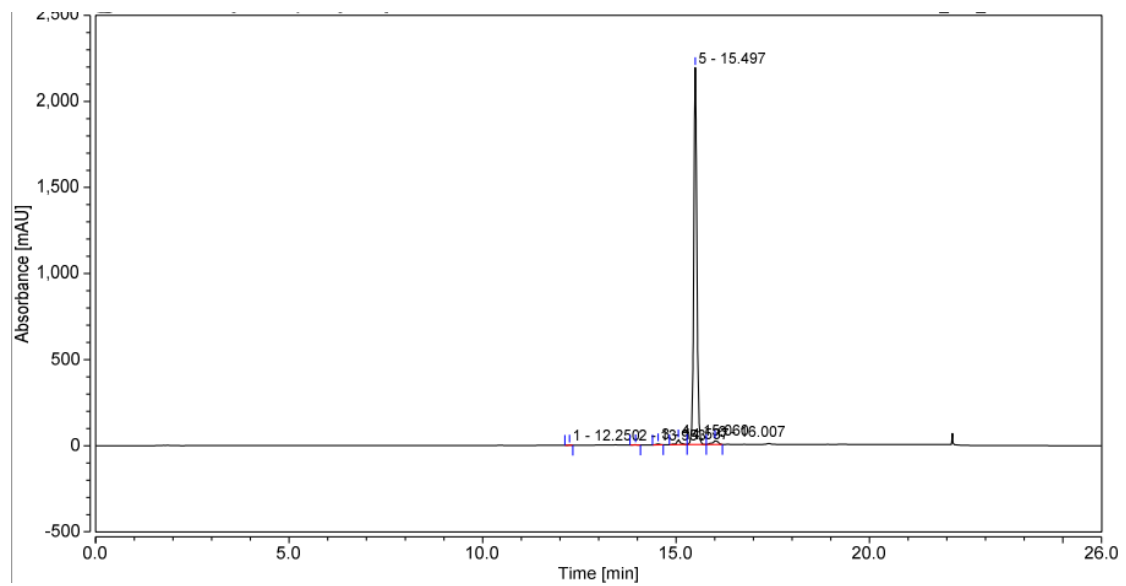
HRMS spectrum of **D2**



$^1\text{H}$  NMR spectrum of **D2**

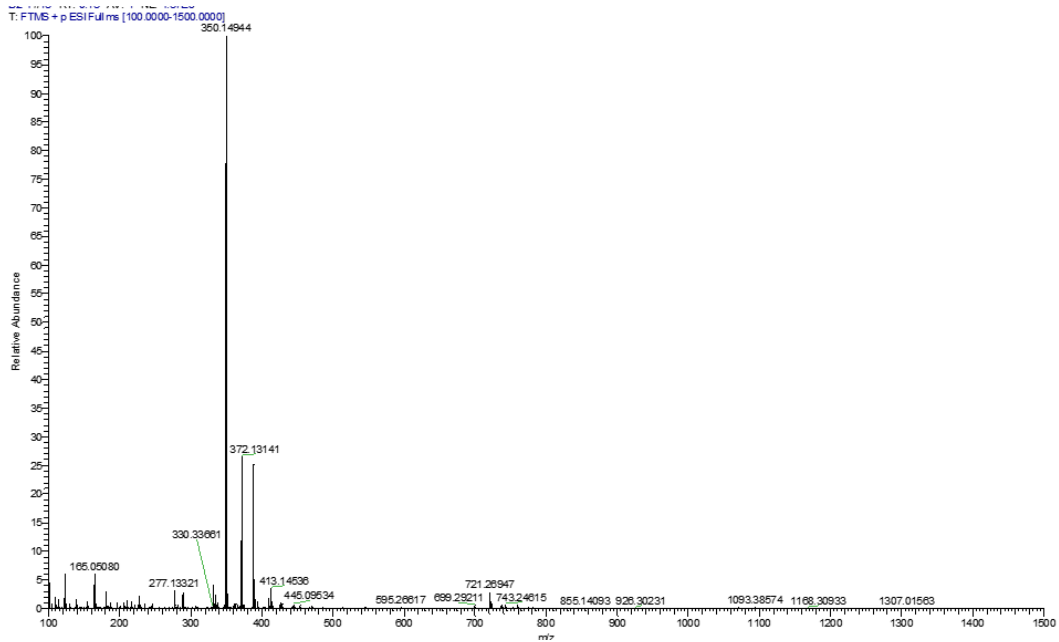


<sup>13</sup>C NMR spectrum of **D2**

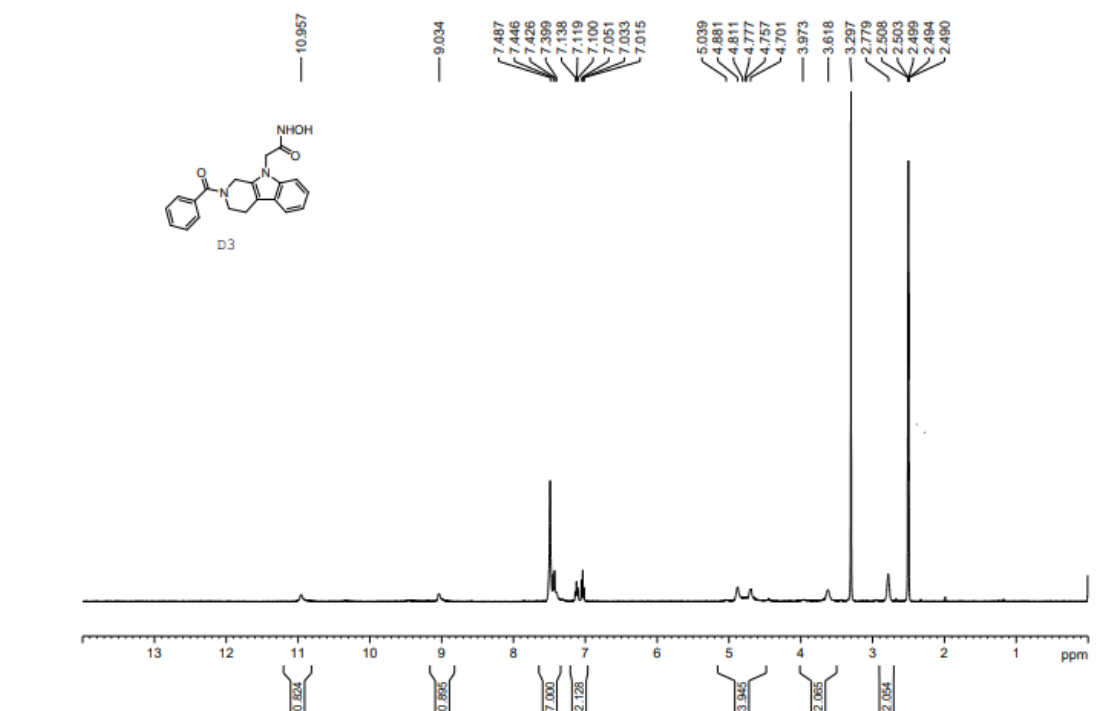


HPLC spectrum of **D2**

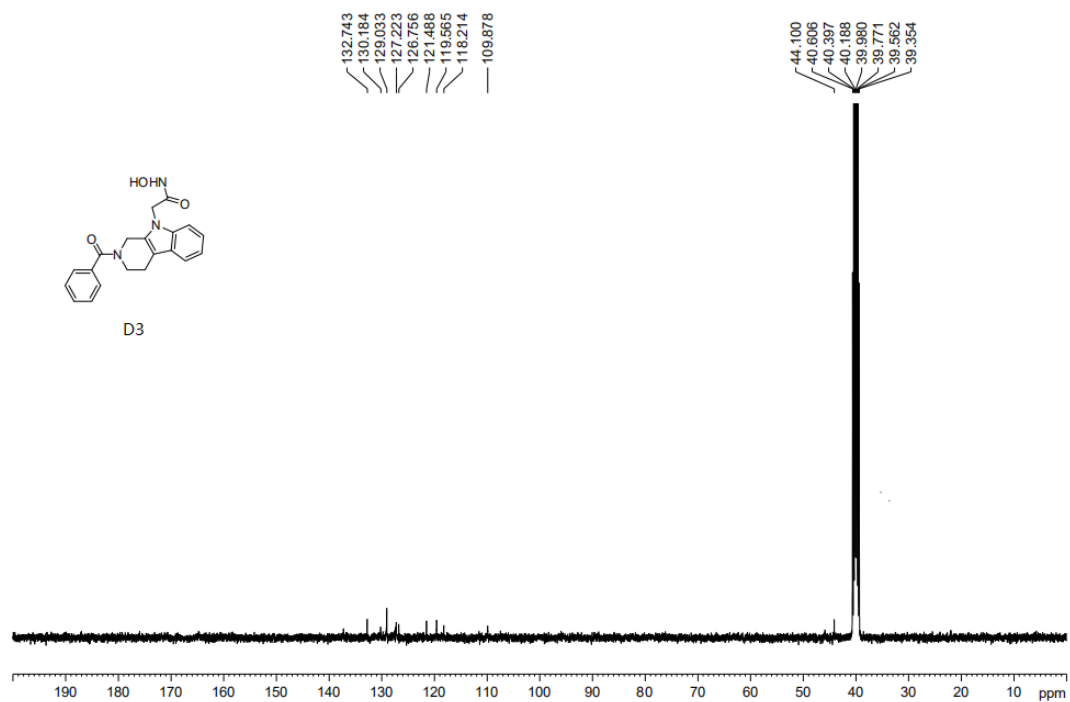




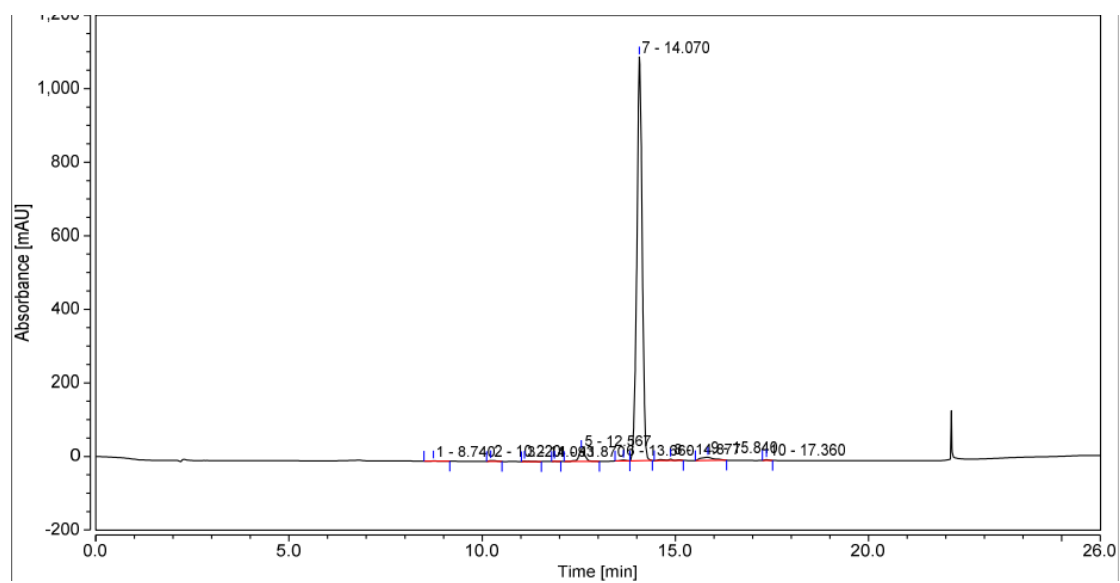
HRMS spectrum of D3



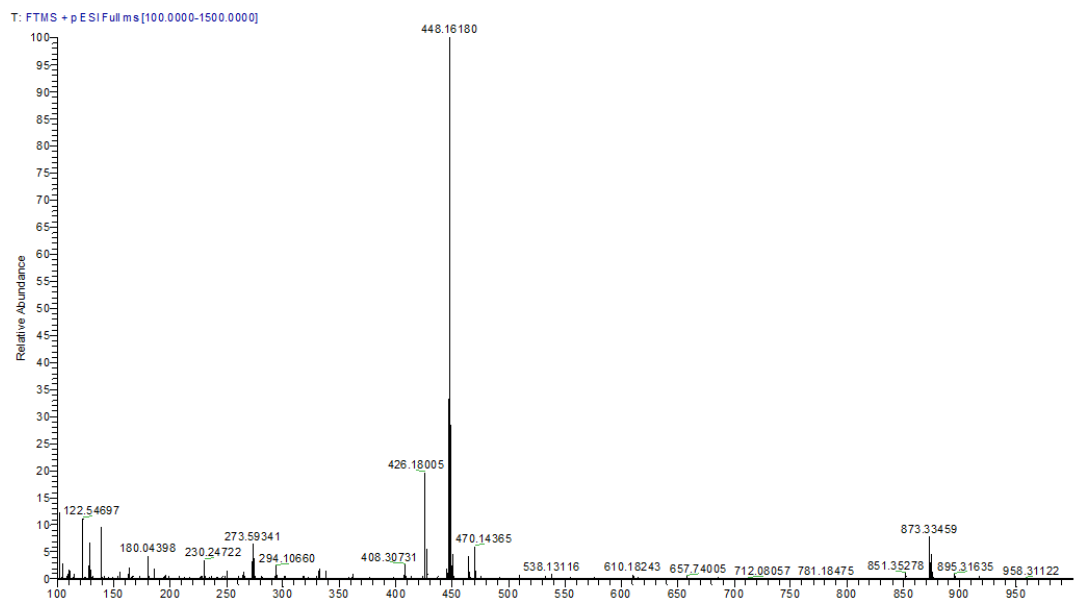
<sup>1</sup>H NMR spectrum of D3



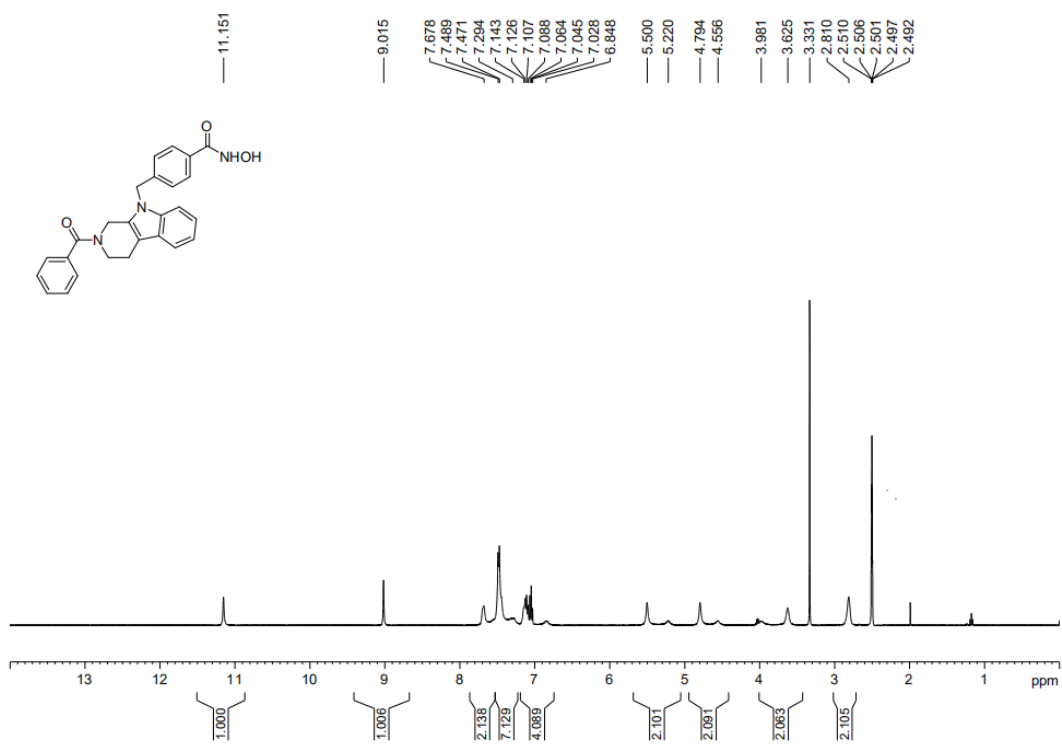
<sup>13</sup>C NMR spectrum of D3



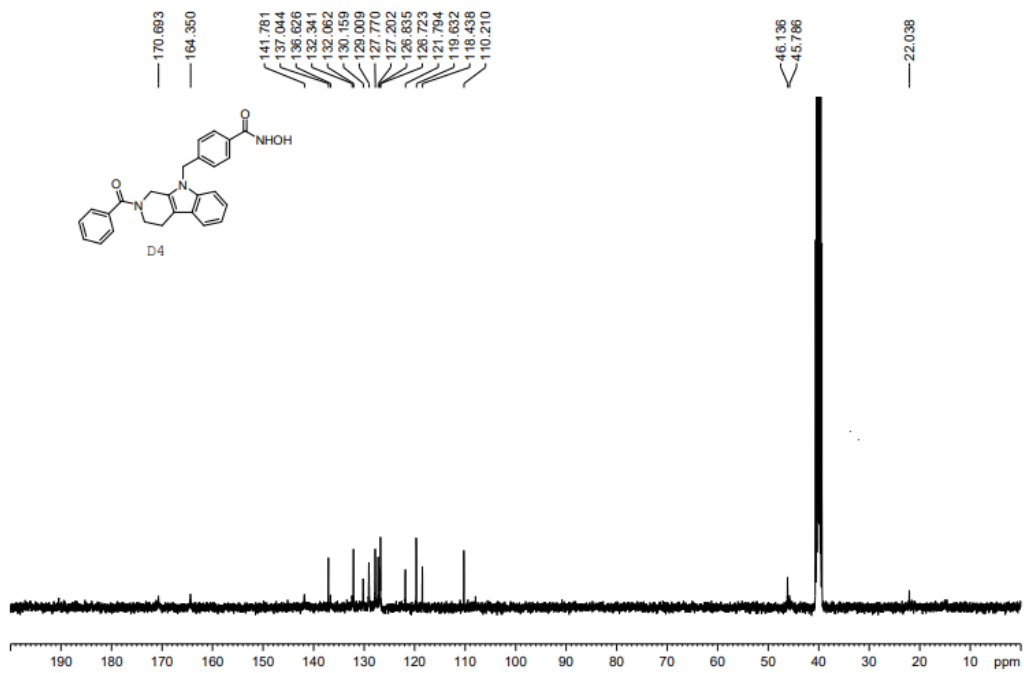
HPLC spectrum of D3



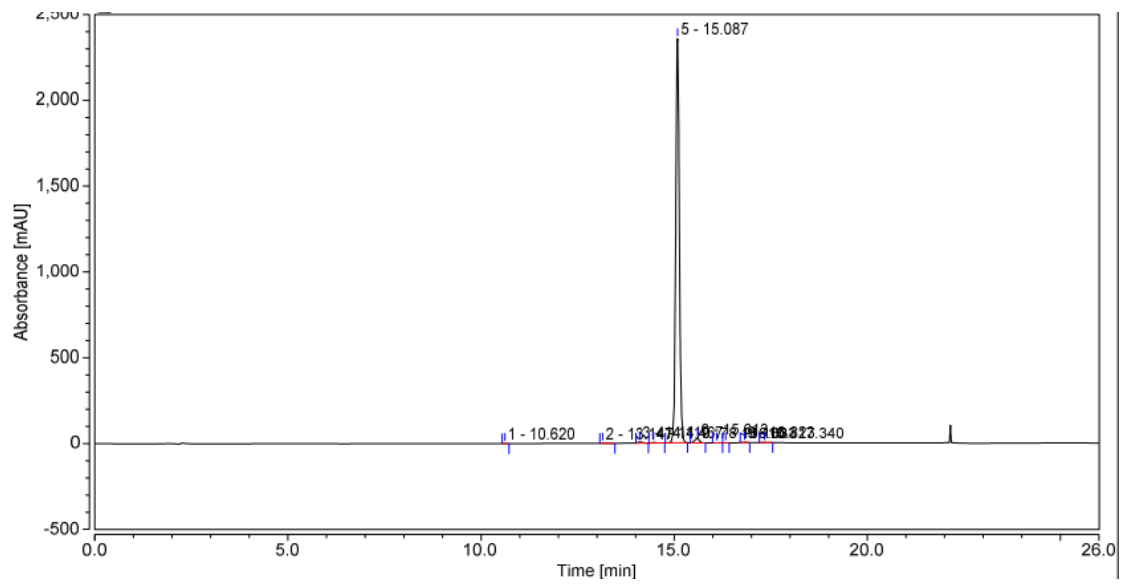
HRMS spectrum of D4



<sup>1</sup>H NMR spectrum of D4

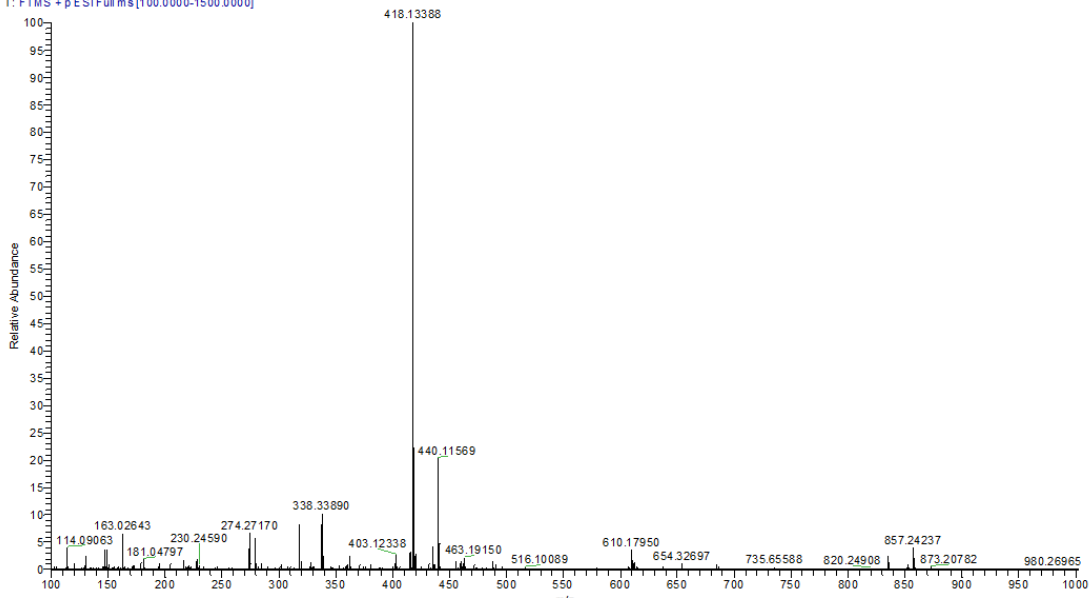


<sup>13</sup>C NMR spectrum of D4

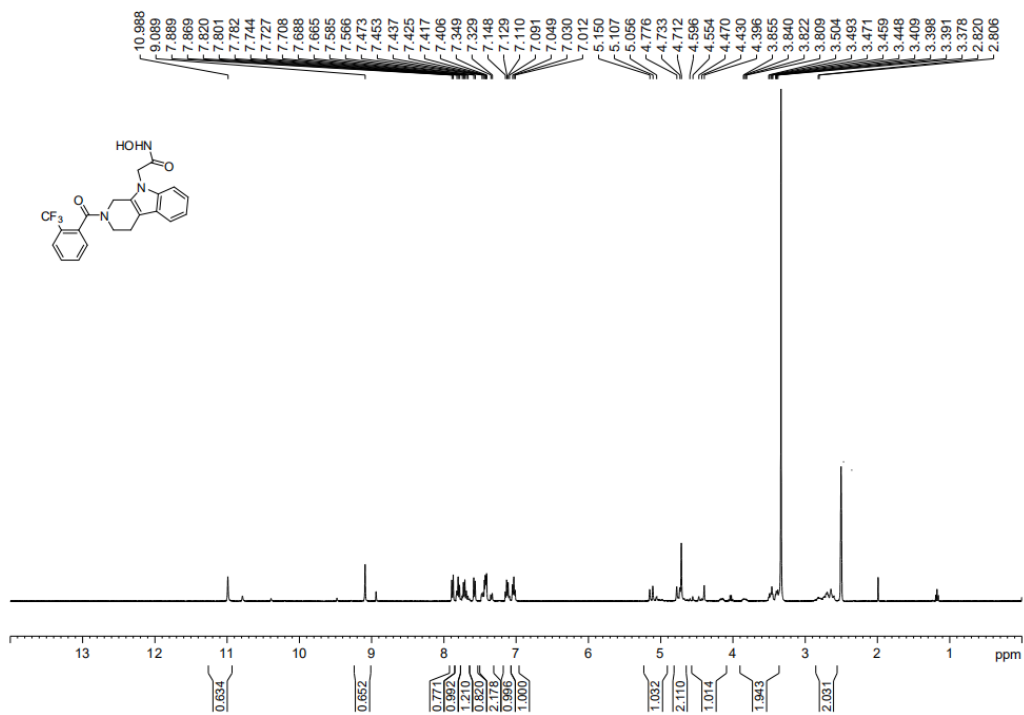


HPLC spectrum of D4

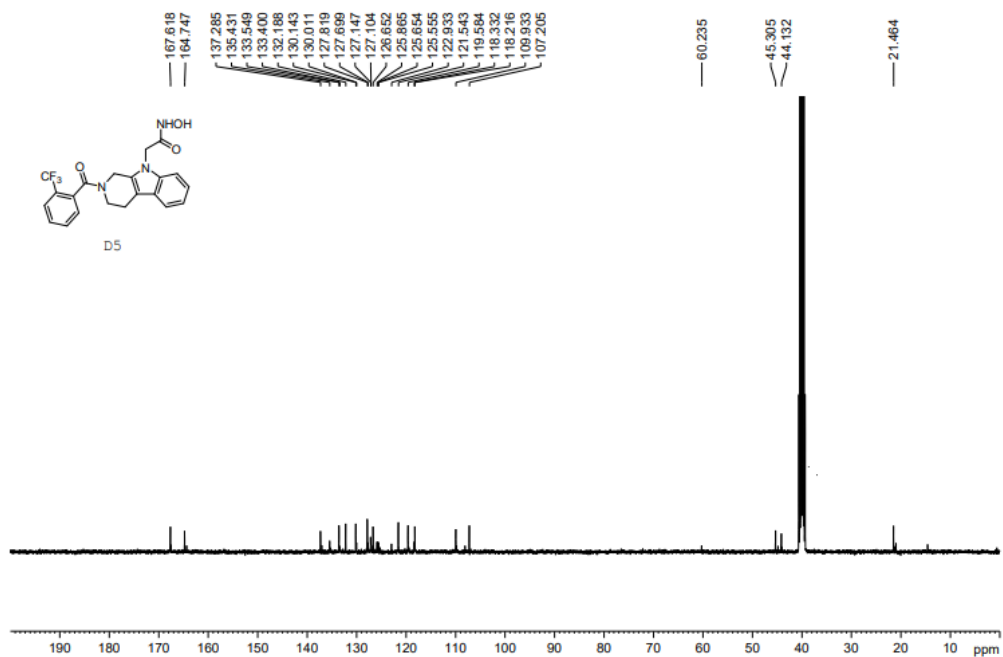
T: FTMS + pESI Full ms [100.0000-1500.0000]



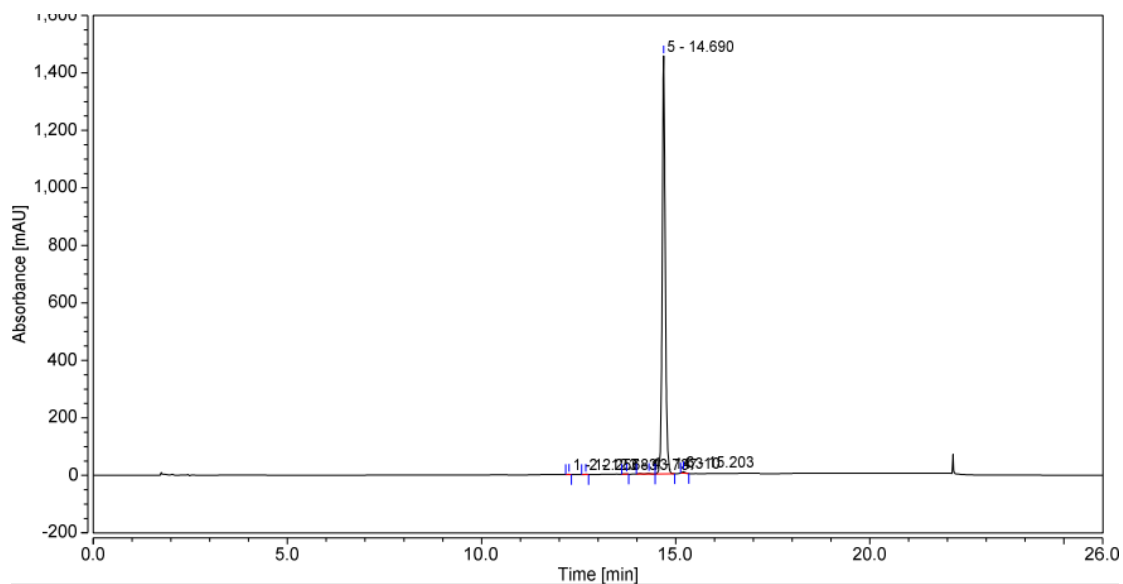
HRMS spectrum of D5



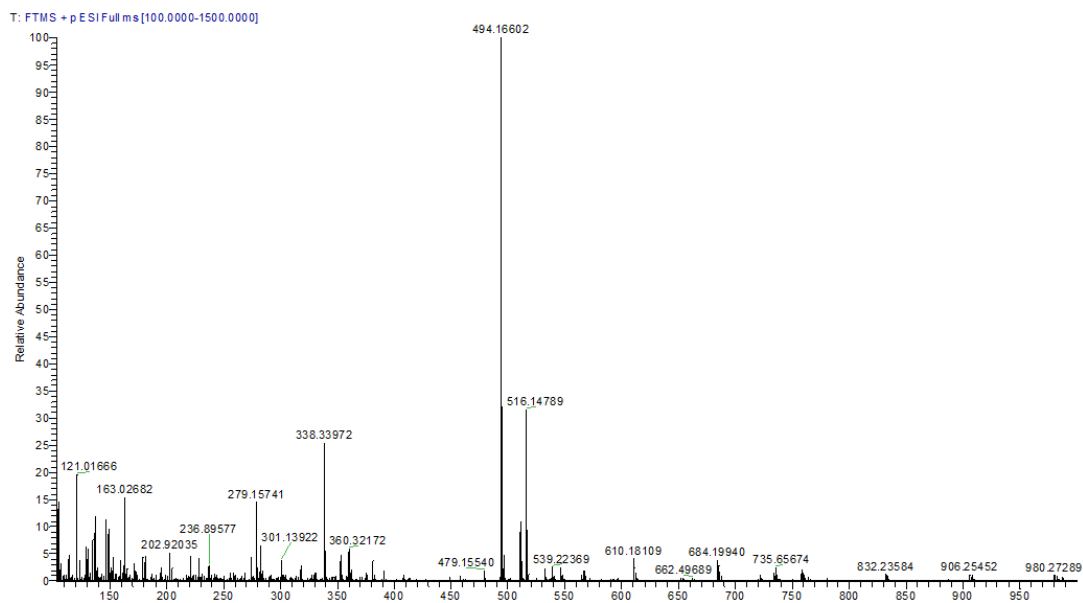
<sup>1</sup>H NMR spectrum of D5



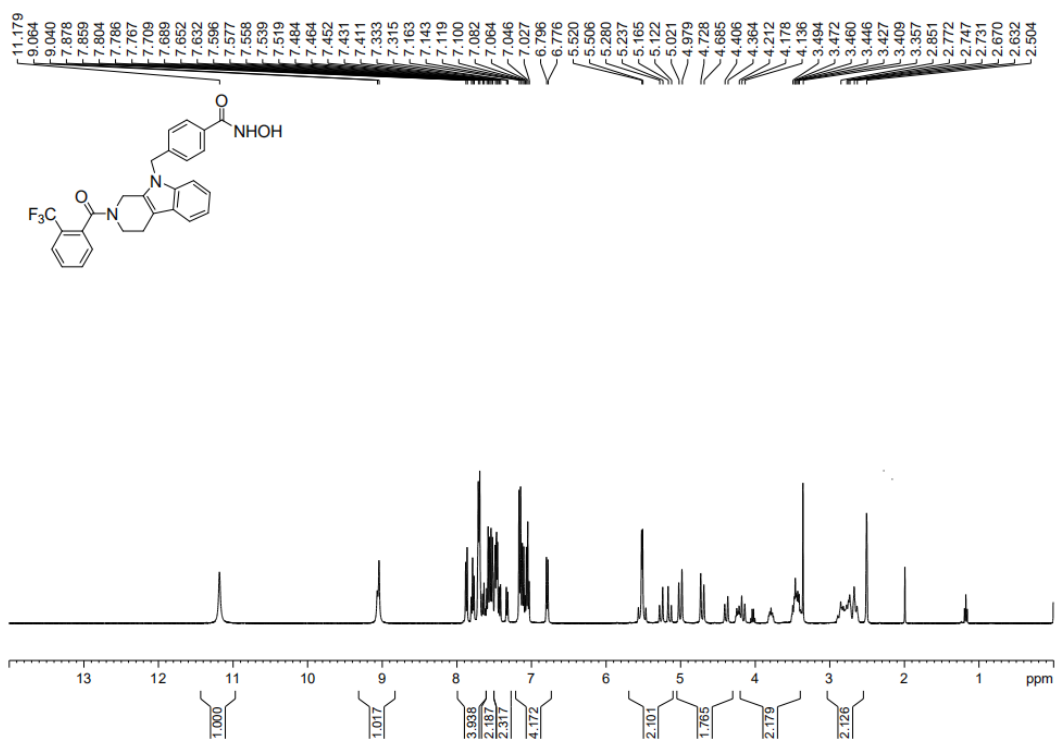
$^{13}\text{C}$  NMR spectrum of **D5**



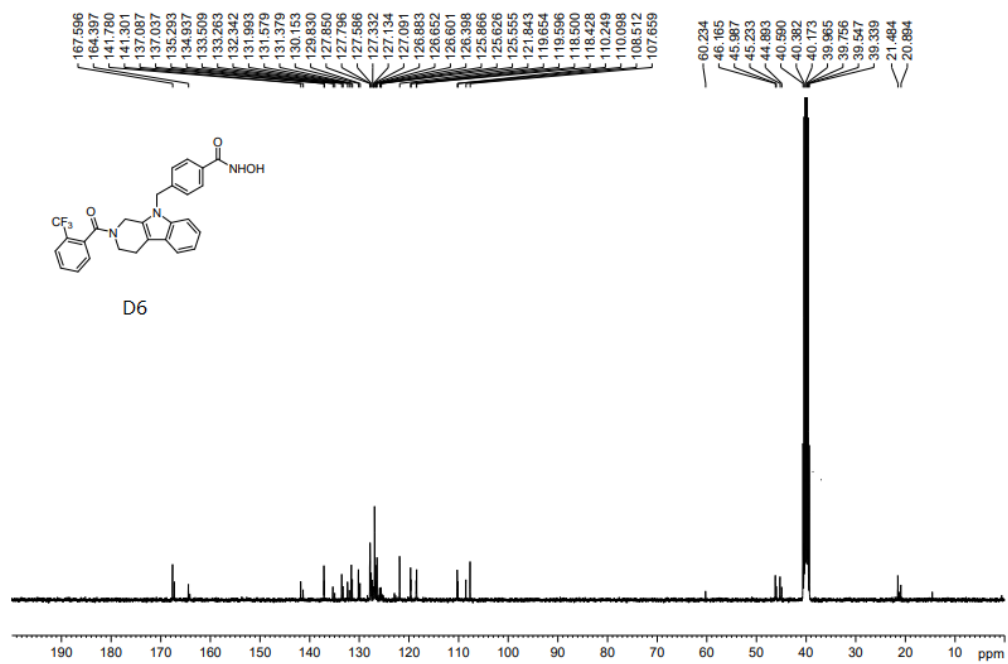
HPLC spectrum of **D5**



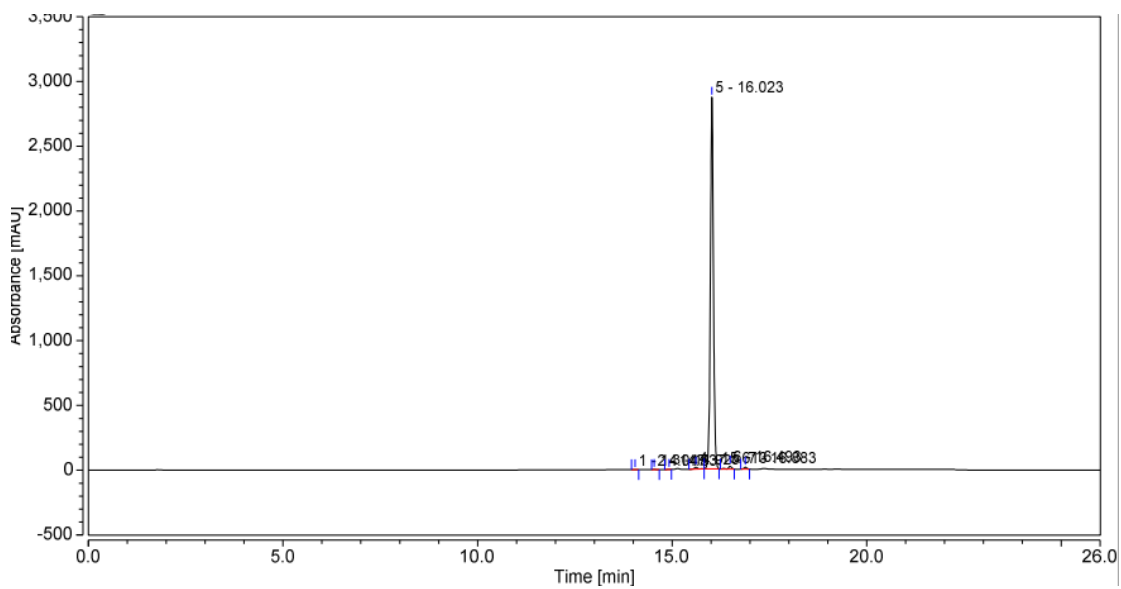
HRMS spectrum of D6



<sup>1</sup>H NMR spectrum of D6

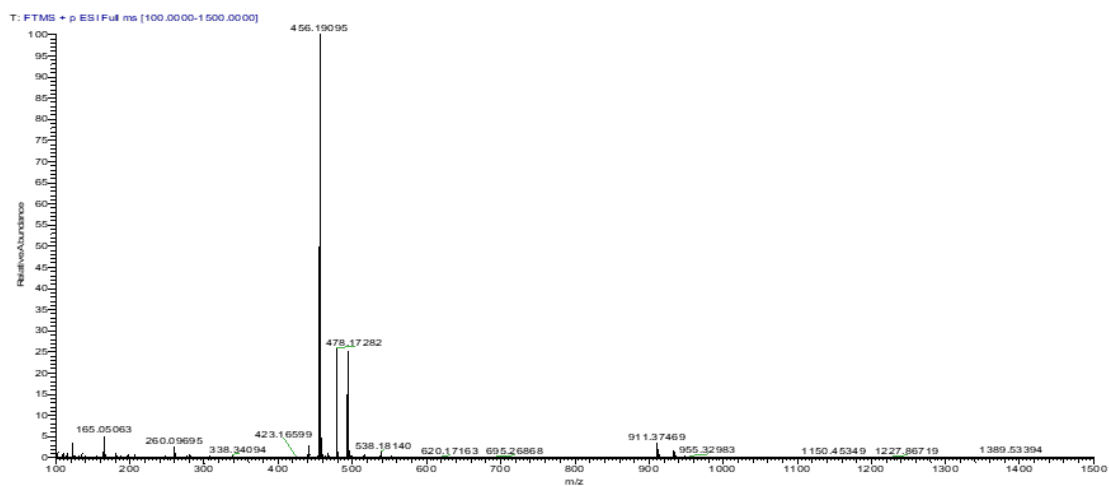


$^{13}\text{C}$  NMR spectrum of **D6**

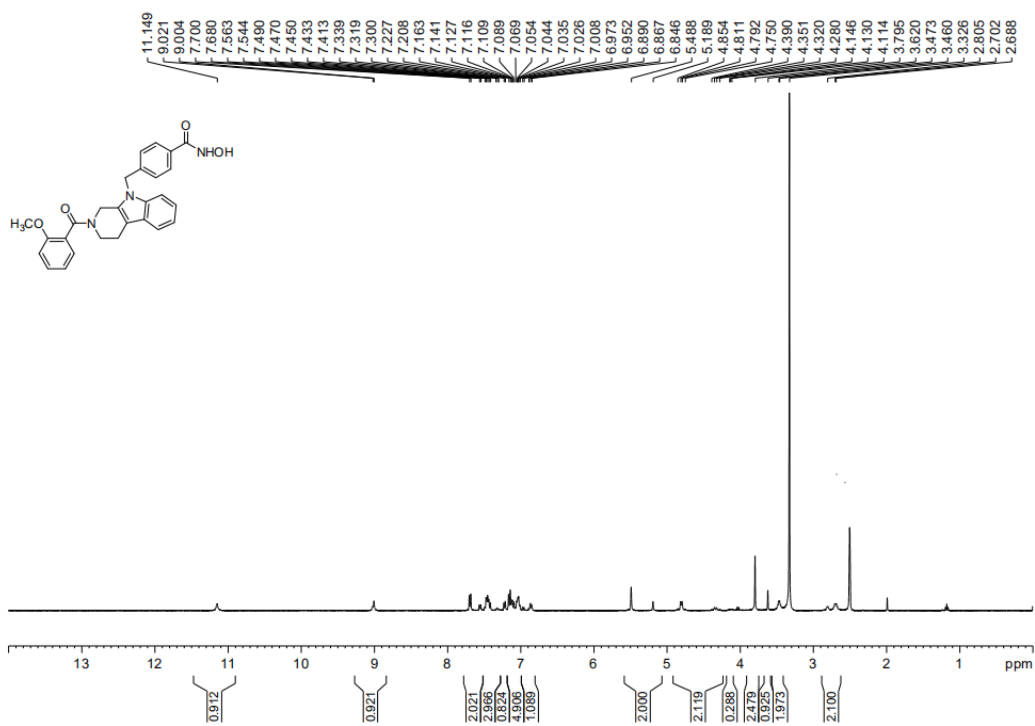


HPLC spectrum of **D6**

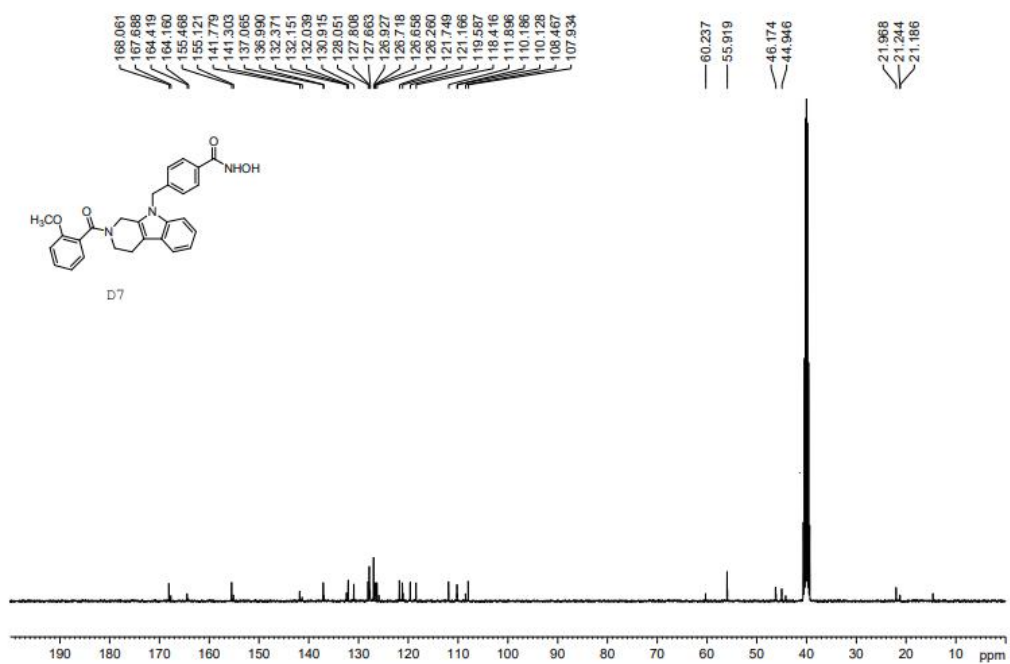




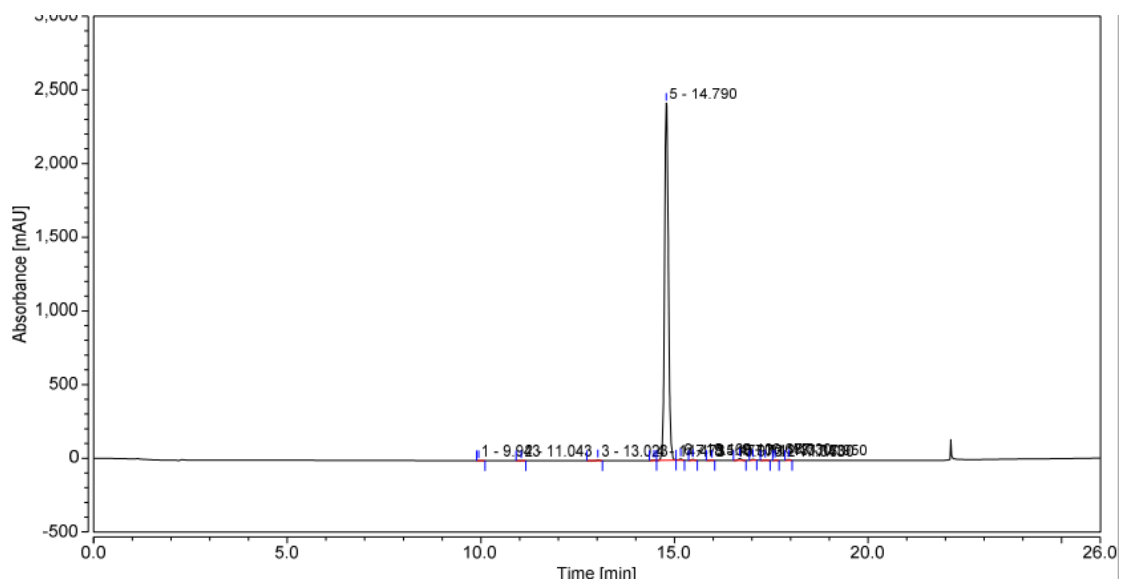
HRMS spectrum of **D7**



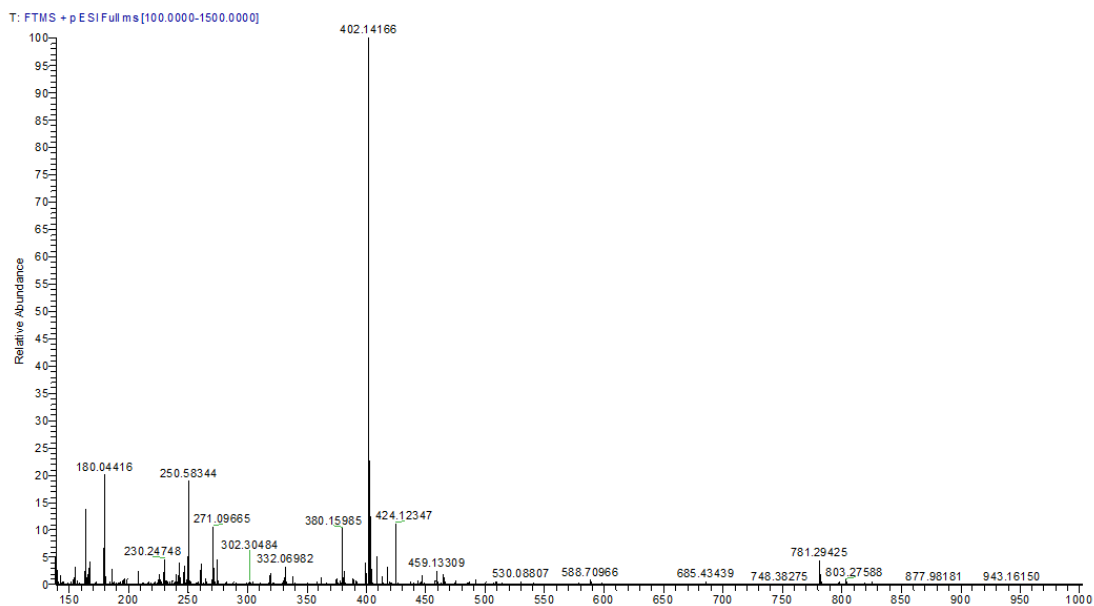
$^1\text{H}$  NMR spectrum of **D7**



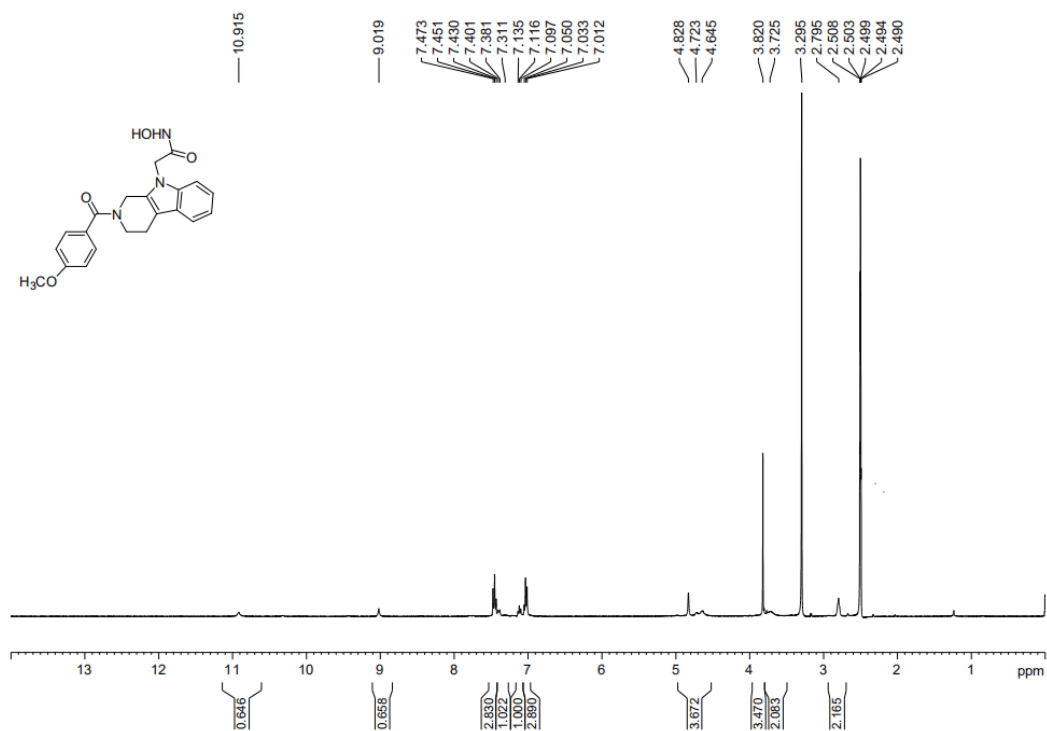
$^{13}\text{C}$  NMR spectrum of **D7**



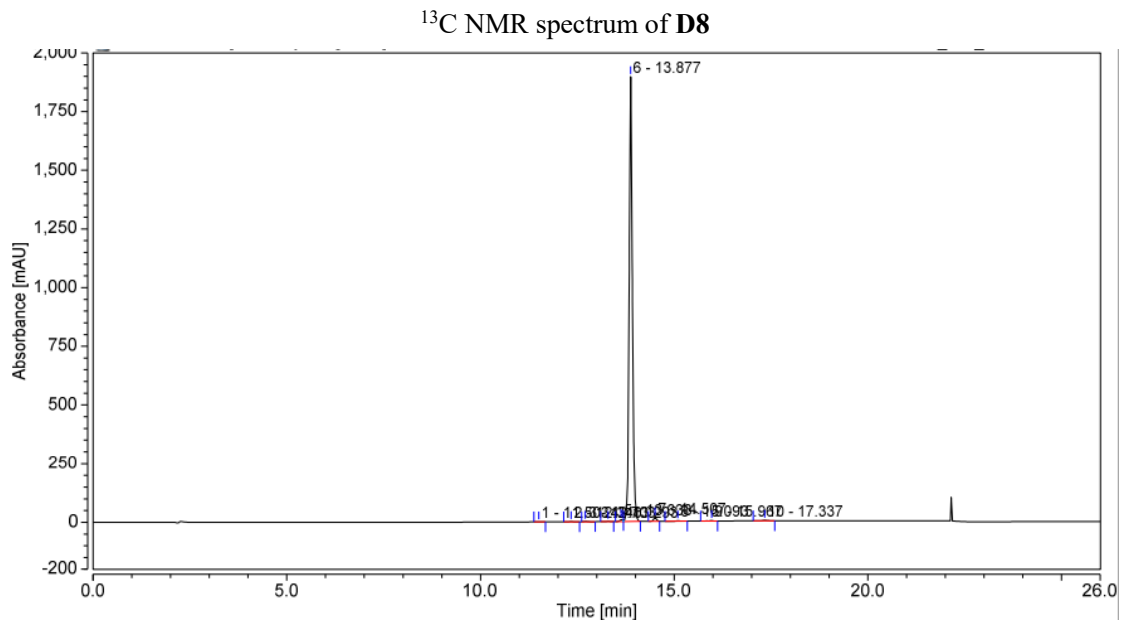
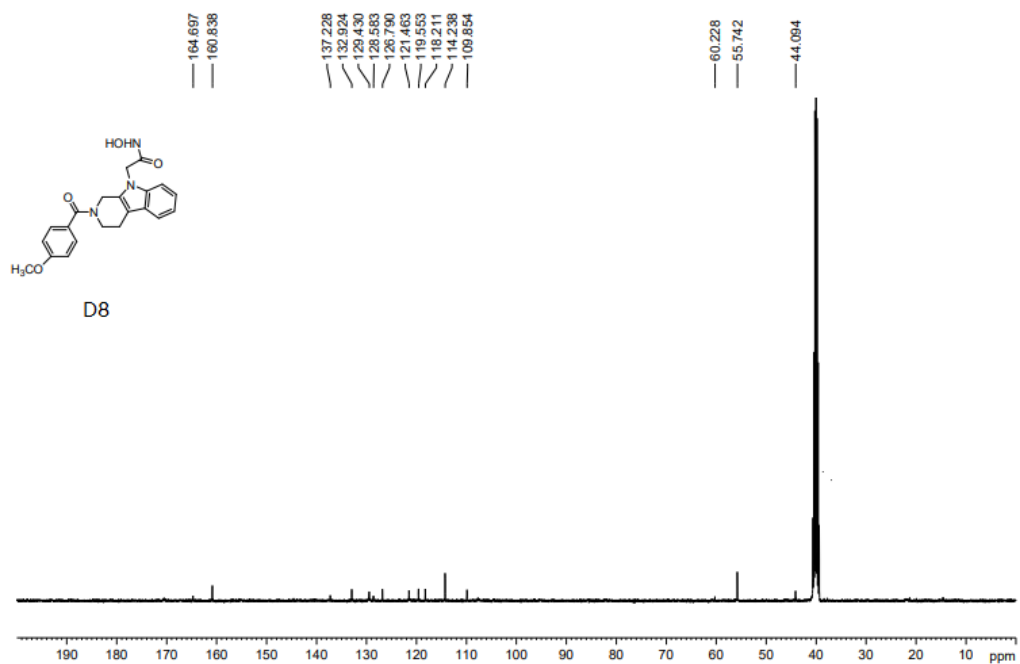
HPLC spectrum of **D7**

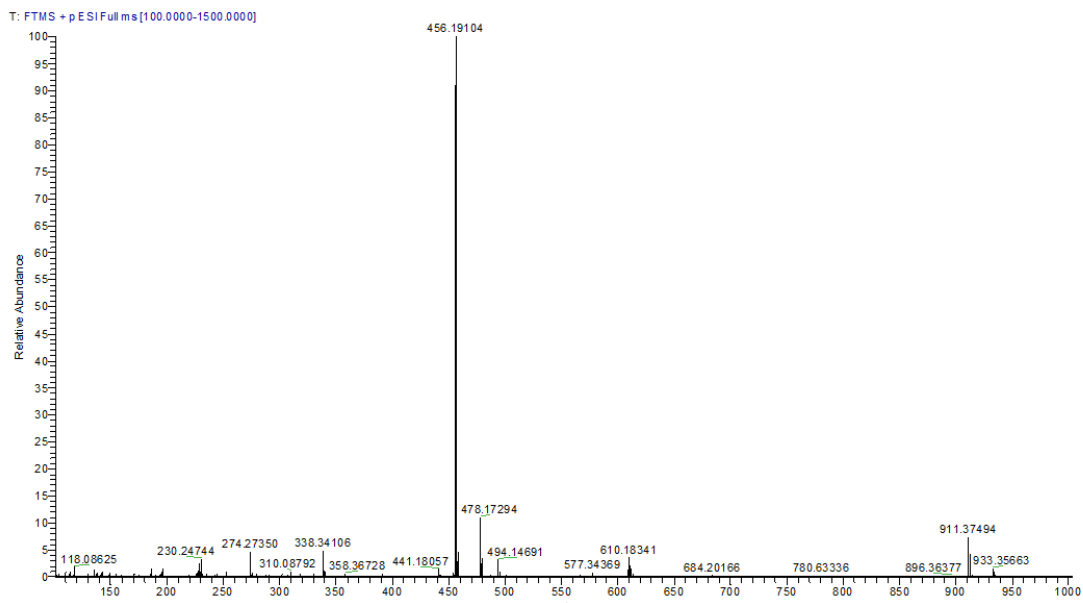


HRMS spectrum of **D8**

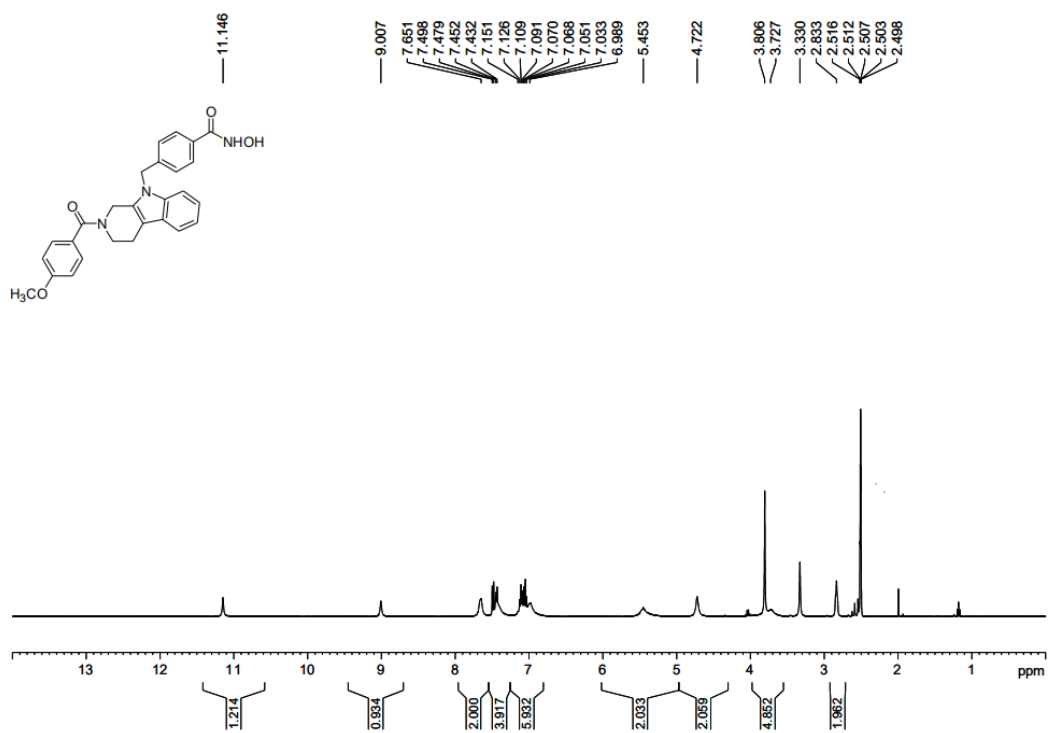


$^1\text{H}$  NMR spectrum of **D8**

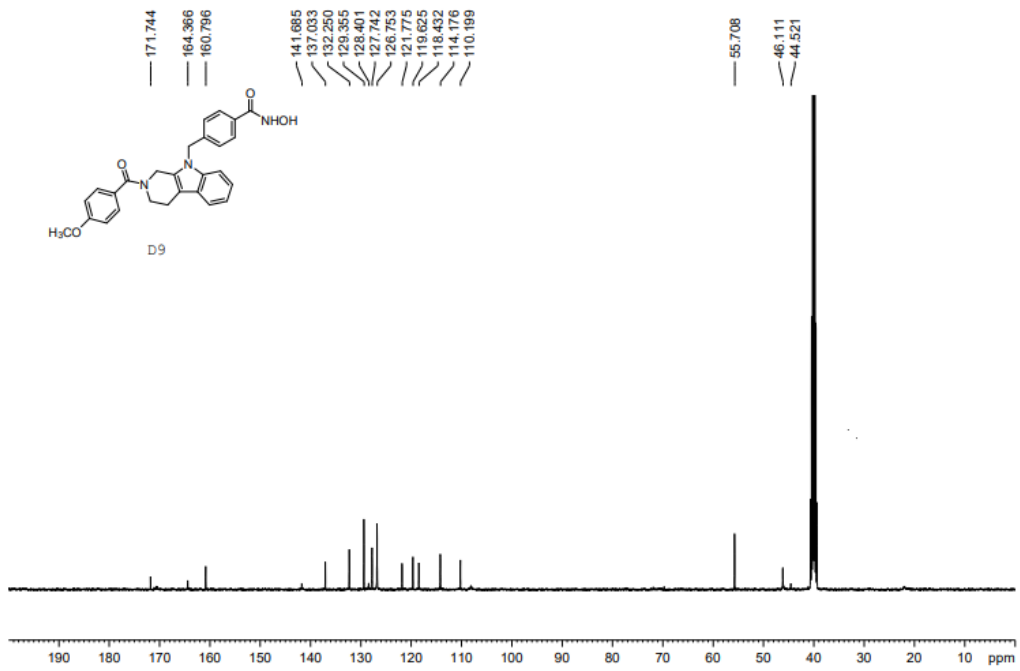




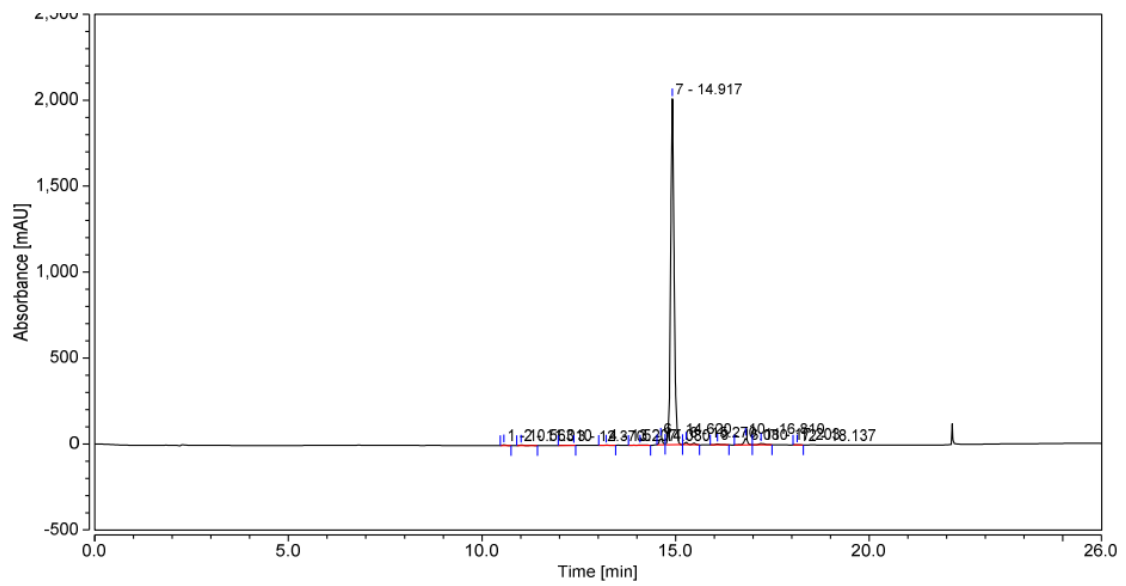
HRMS spectrum of **D9**



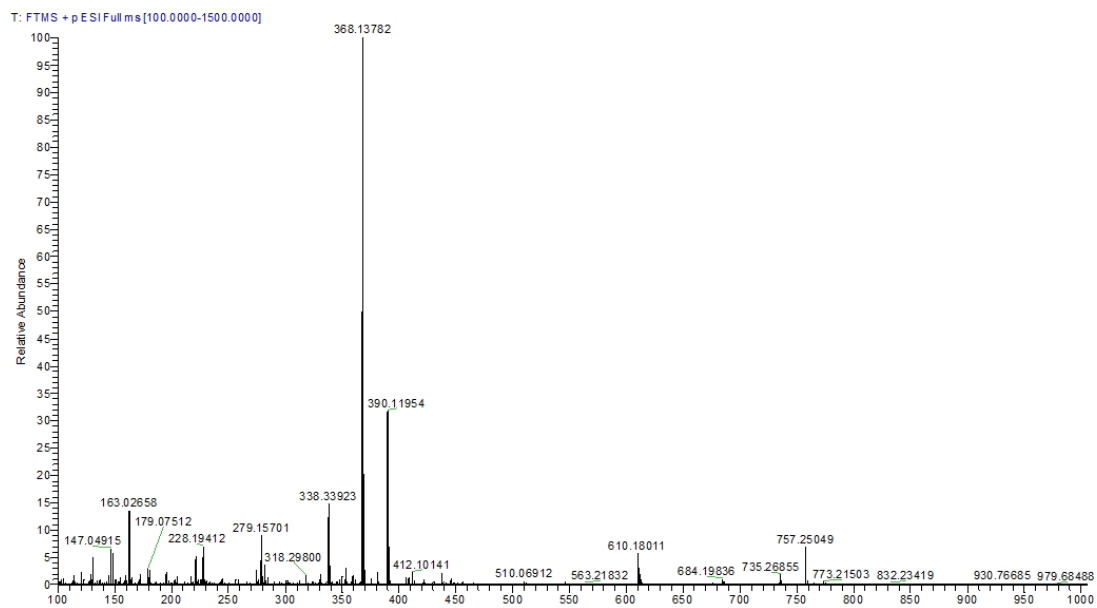
$^1\text{H}$  NMR spectrum of **D9**



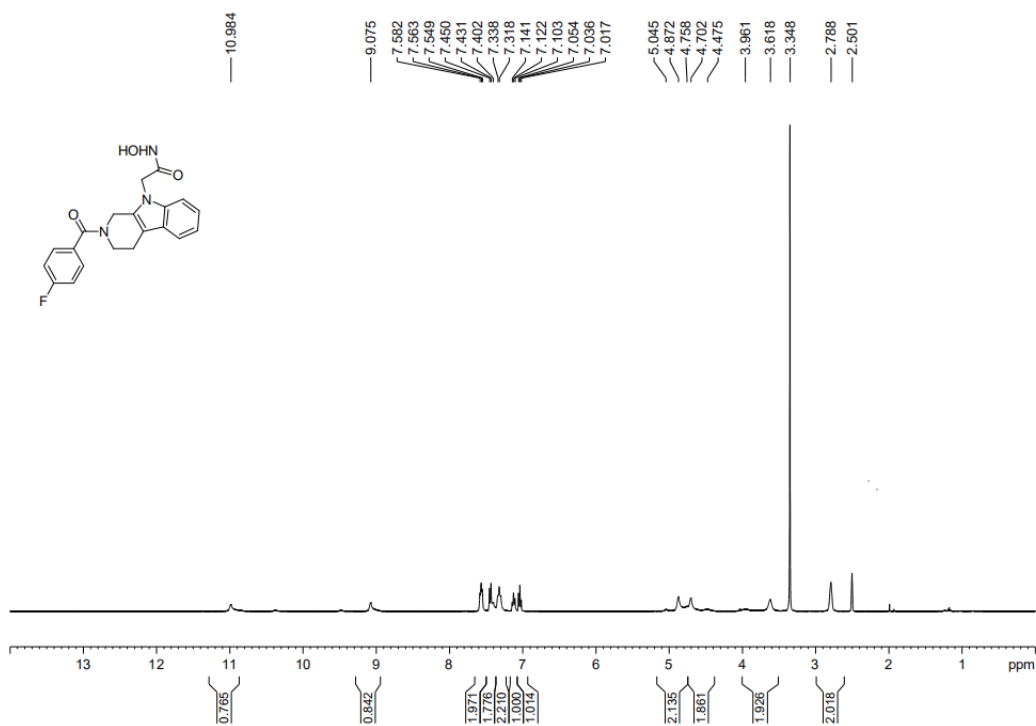
<sup>13</sup>C NMR spectrum of **D9**



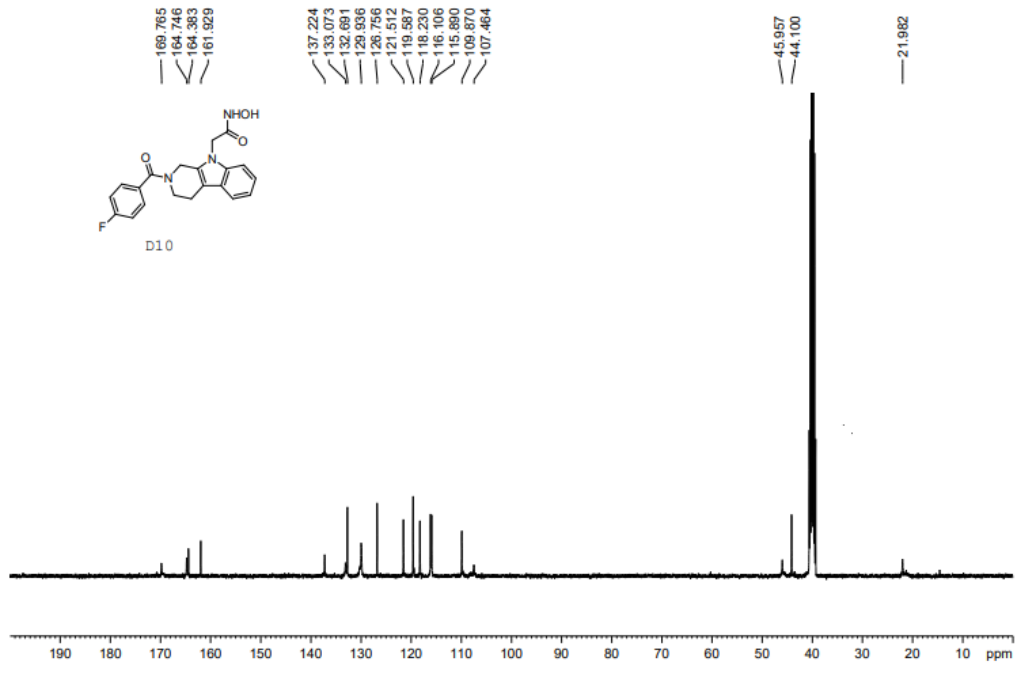
HPLC spectrum of **D9**



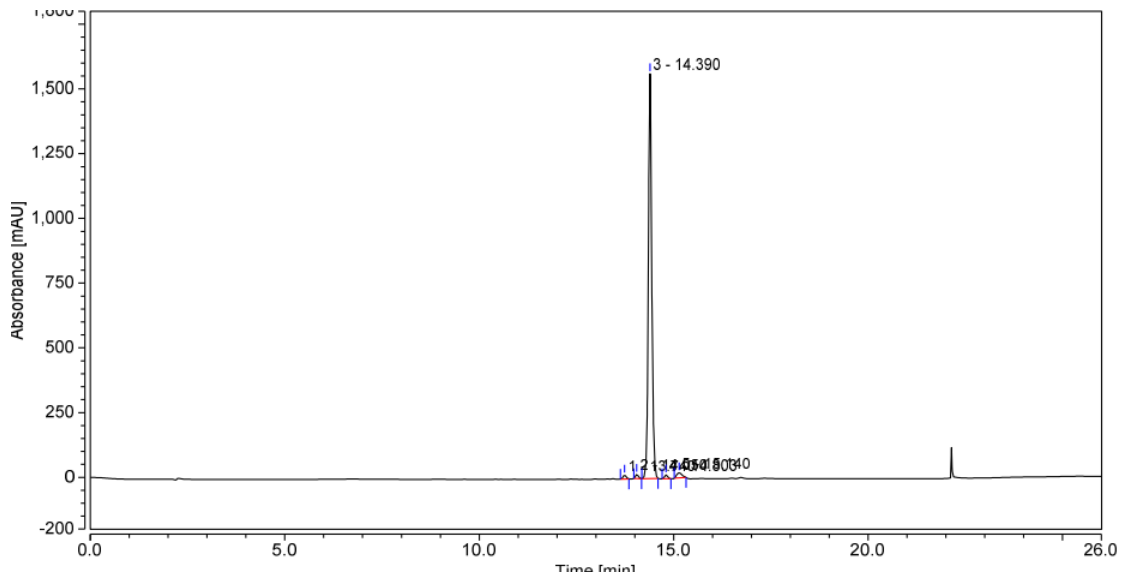
HRMS spectrum of **D10**



<sup>1</sup>H NMR spectrum of **D10**

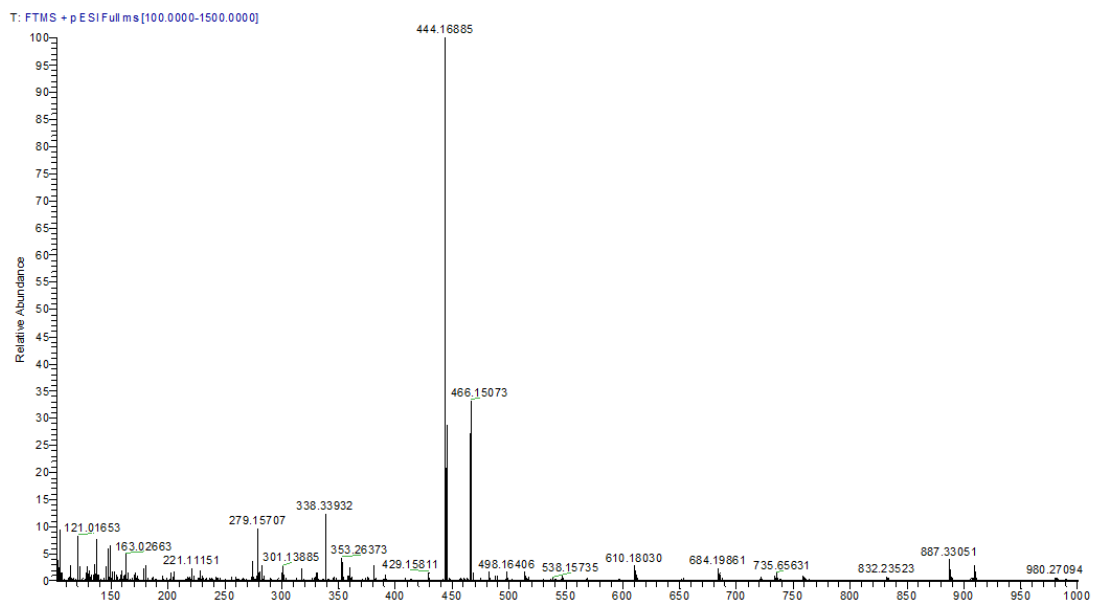


<sup>13</sup>C NMR spectrum of **D10**

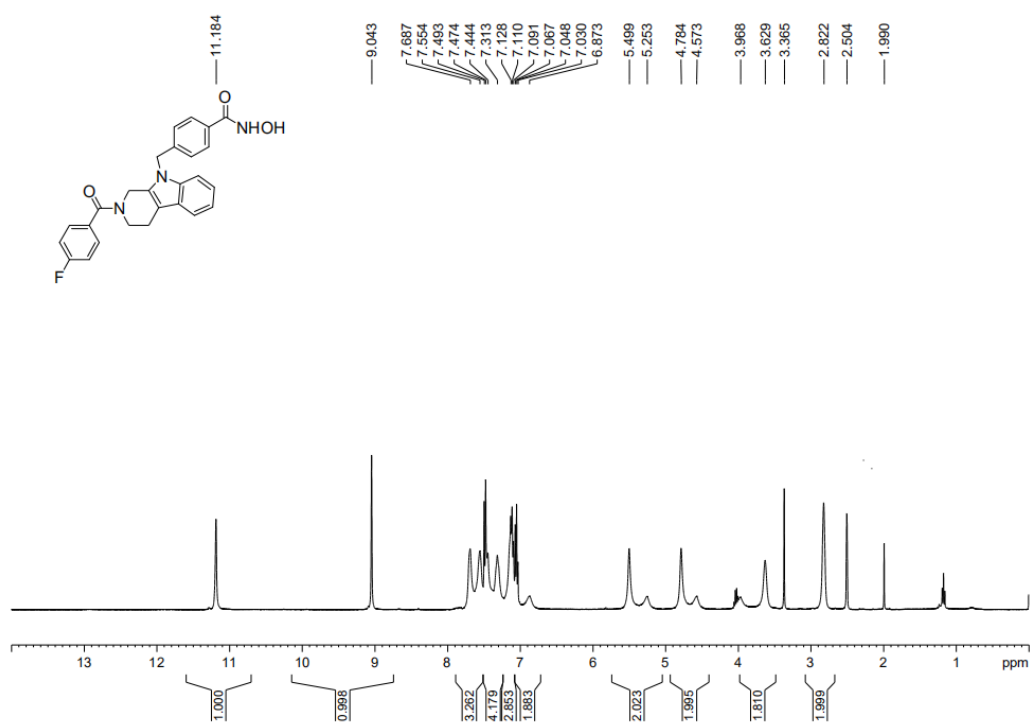


HPLC spectrum of **D10**

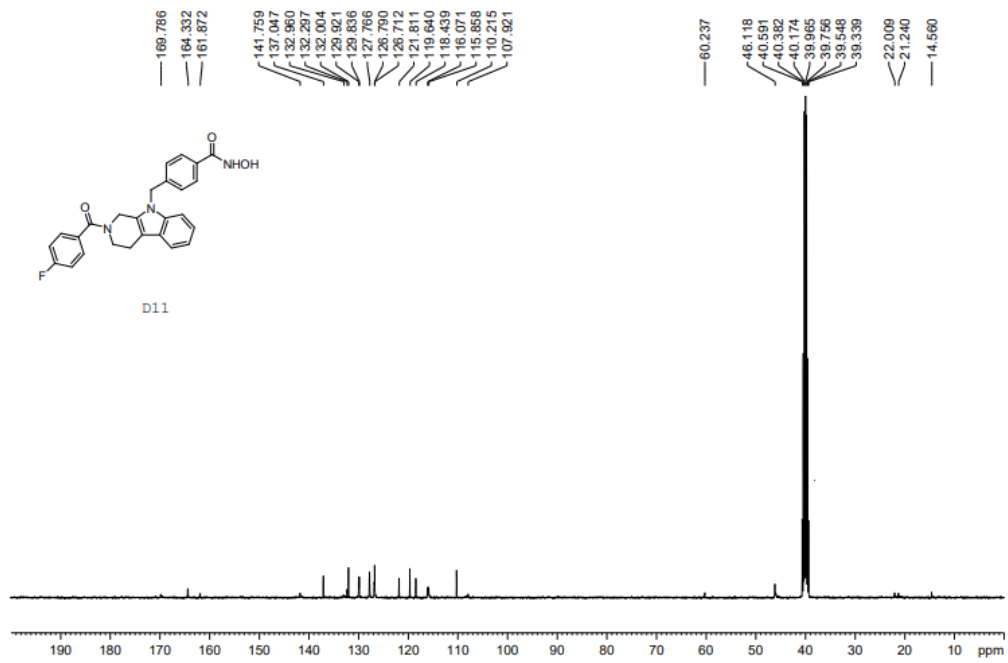




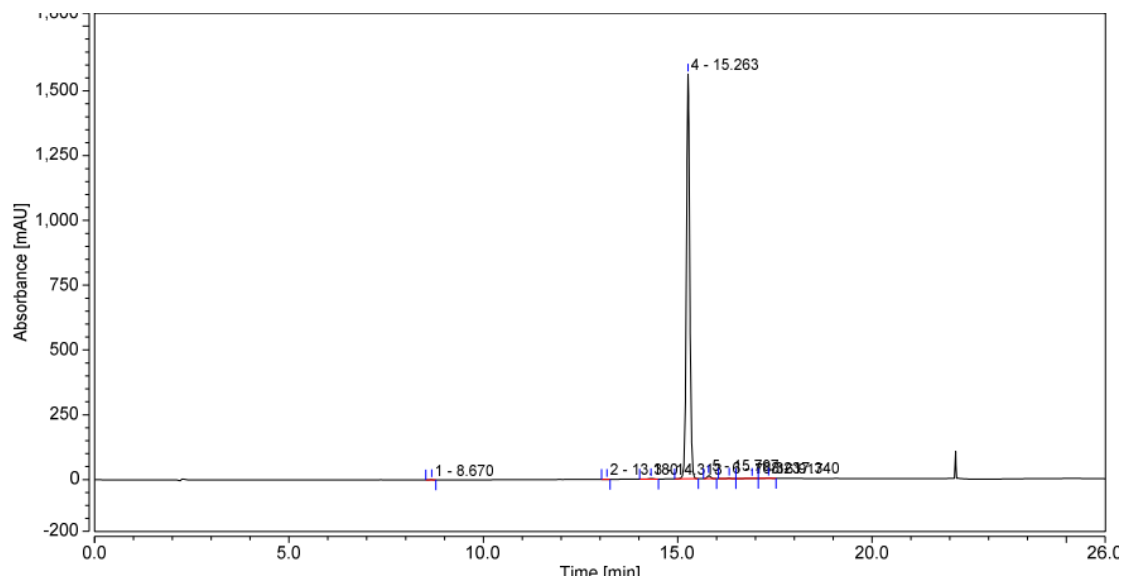
HRMS spectrum of D11



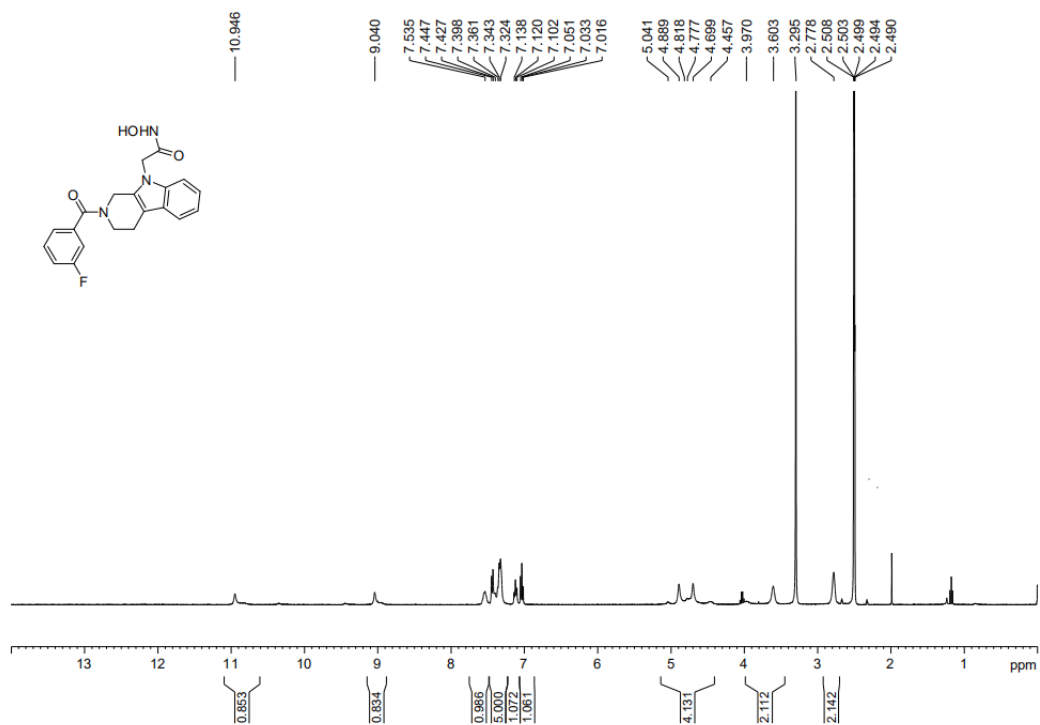
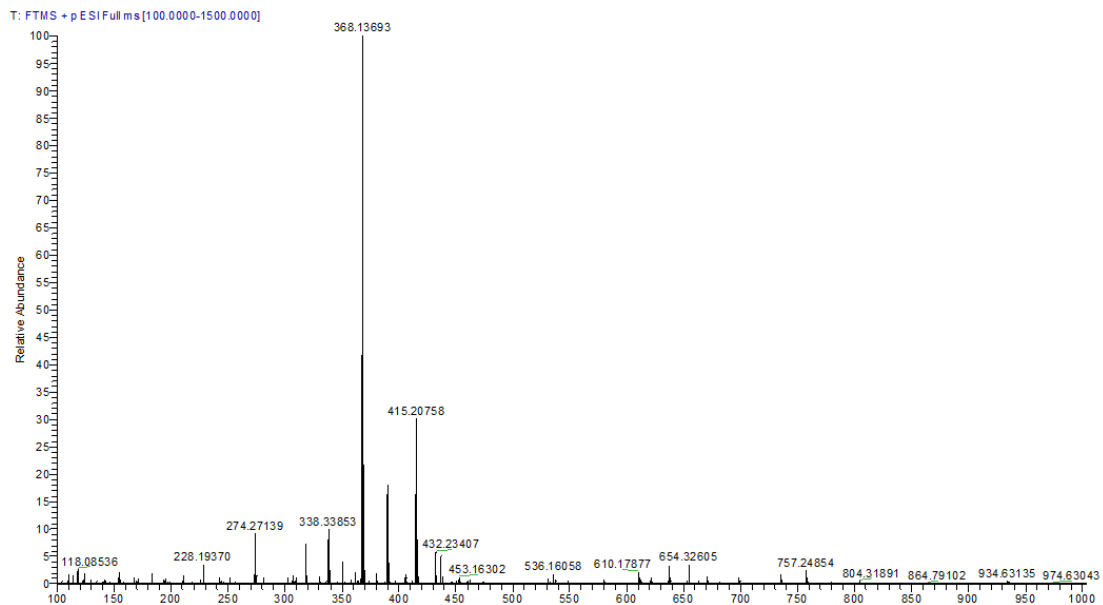
<sup>1</sup>H NMR spectrum of D11

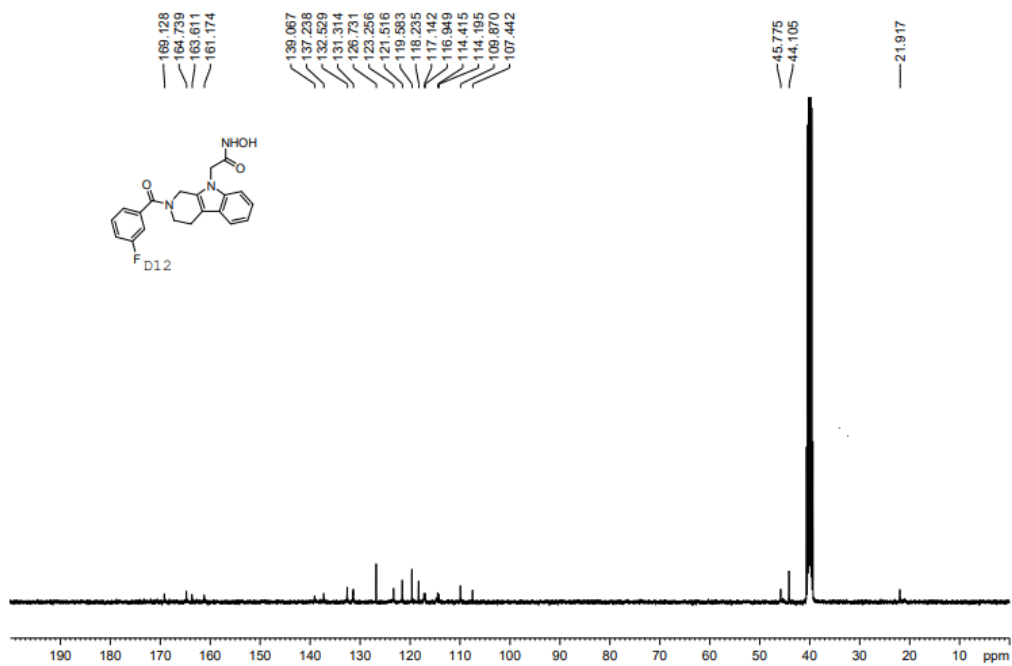


<sup>13</sup>C NMR spectrum of D11

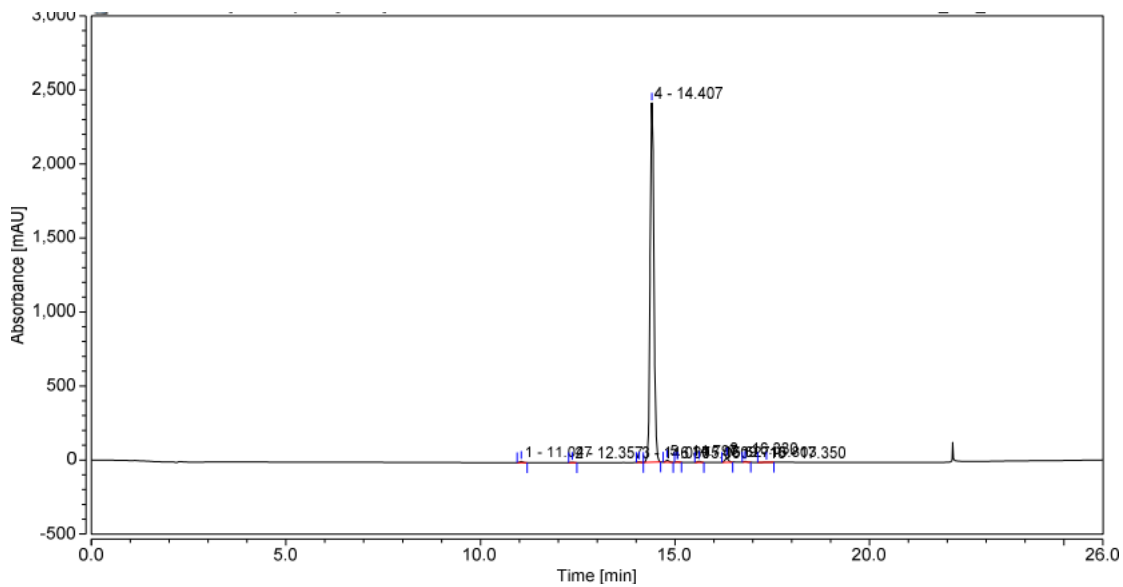


HPLC spectrum of D11

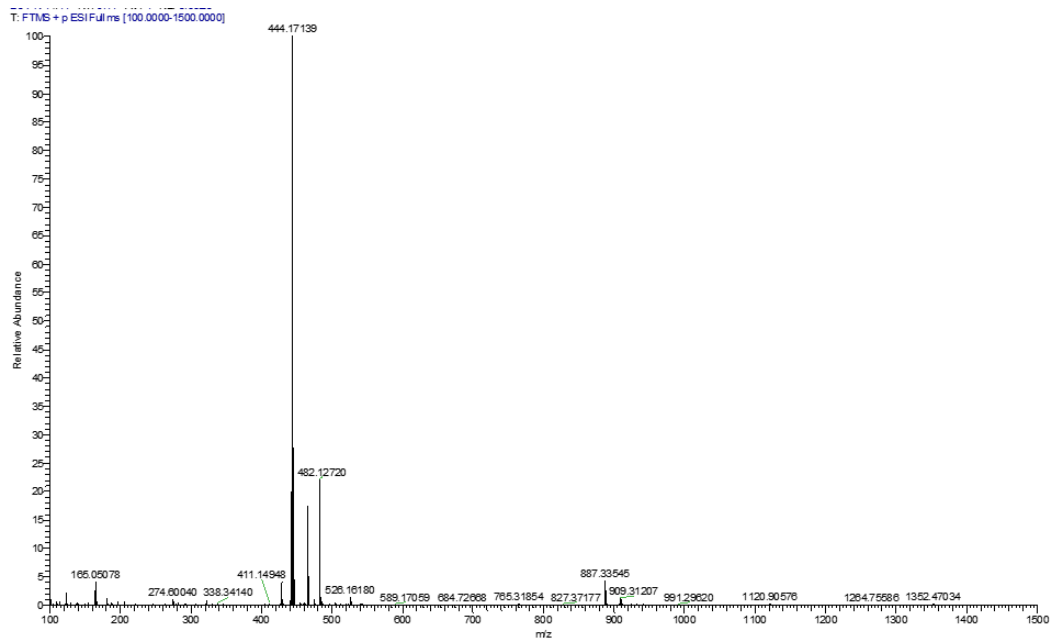




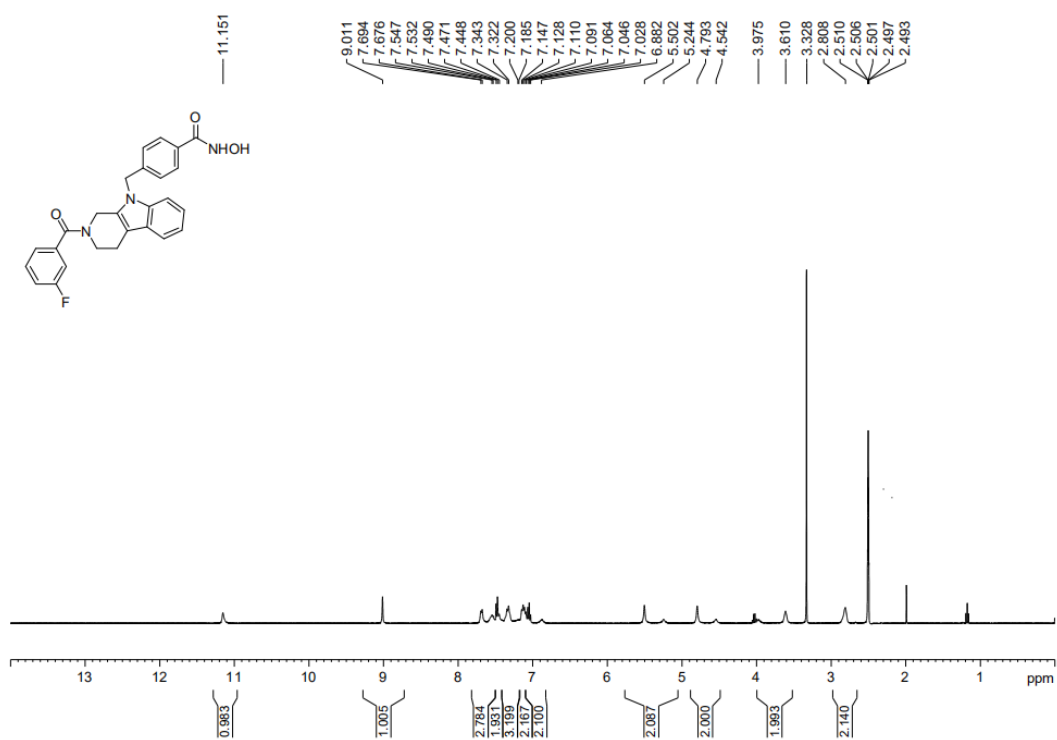
<sup>13</sup>C NMR spectrum of **D12**



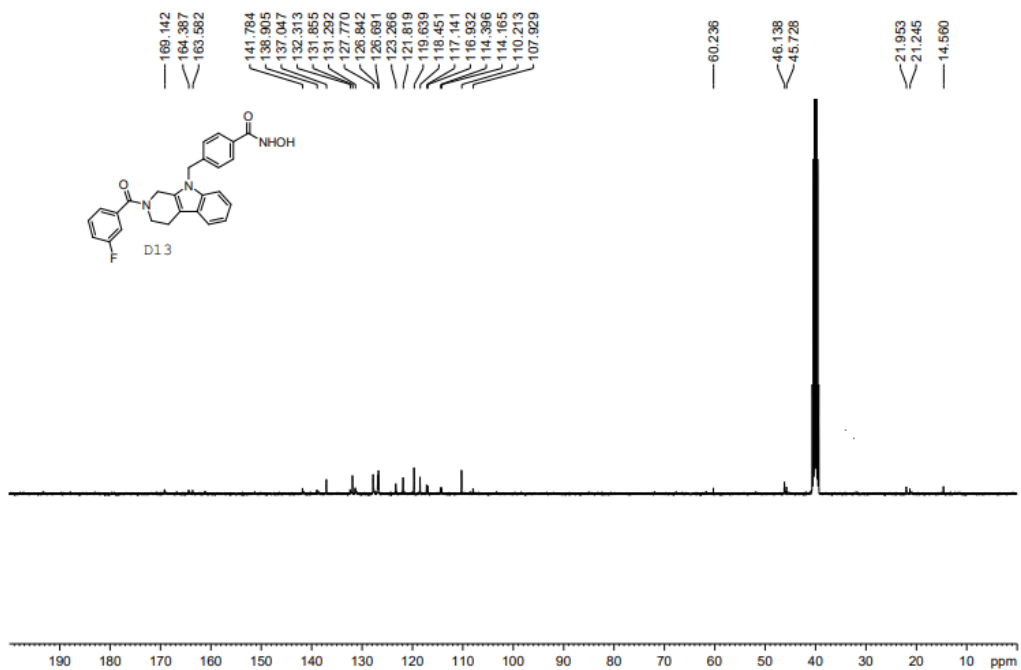
HPLC spectrum of **D12**



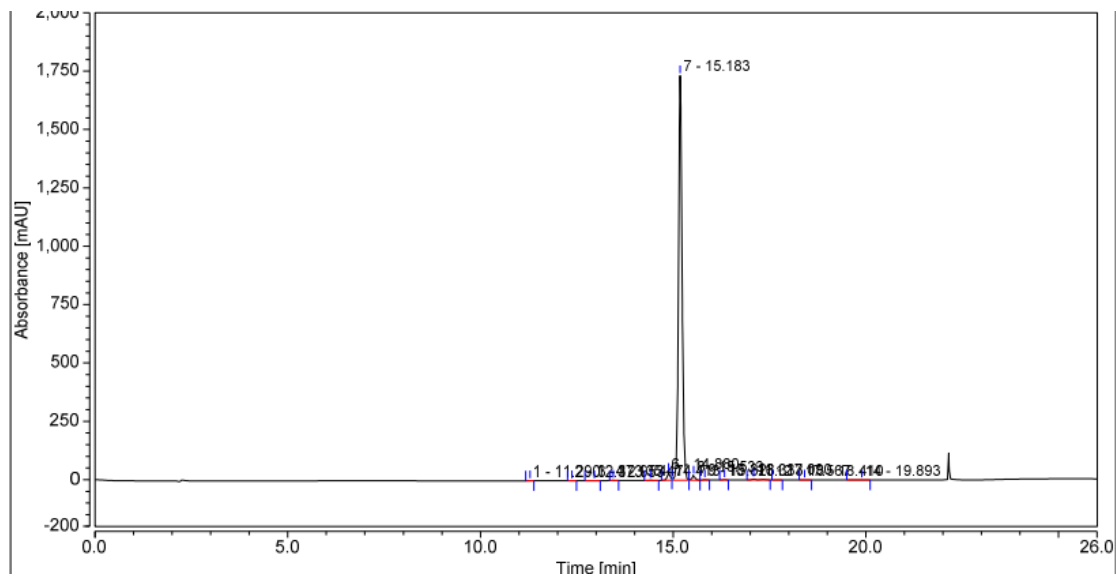
HRMS spectrum of **D13**



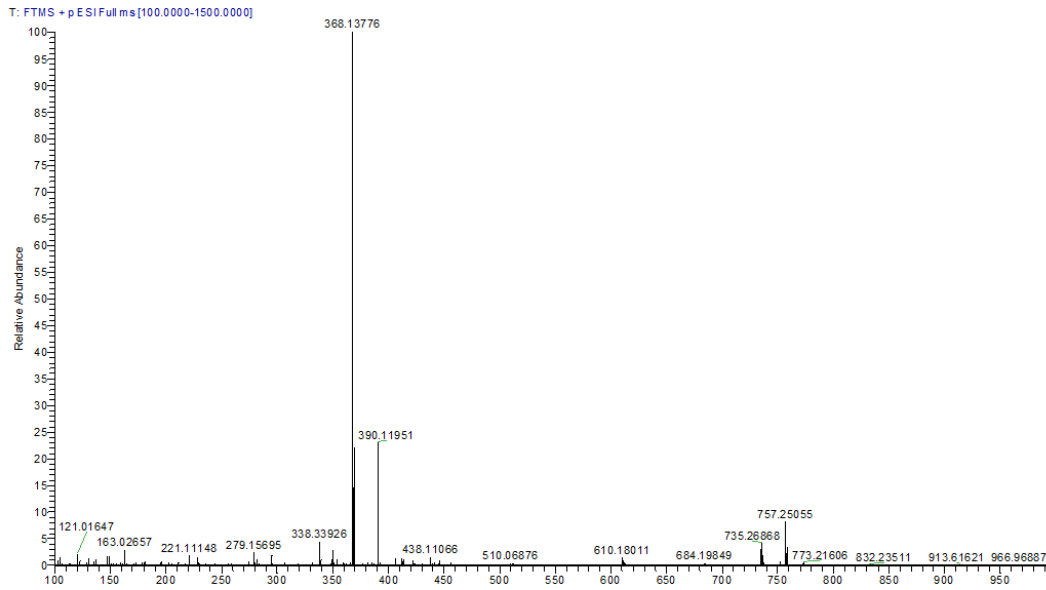
$^1\text{H}$  NMR spectrum of **D13**



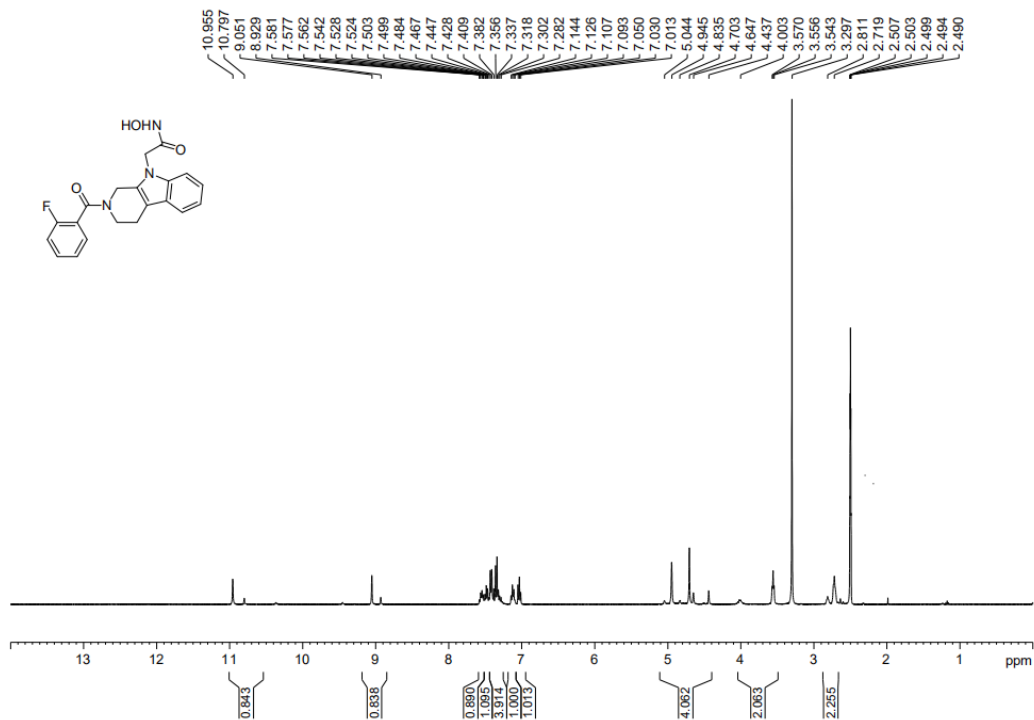
<sup>13</sup>C NMR spectrum of D13



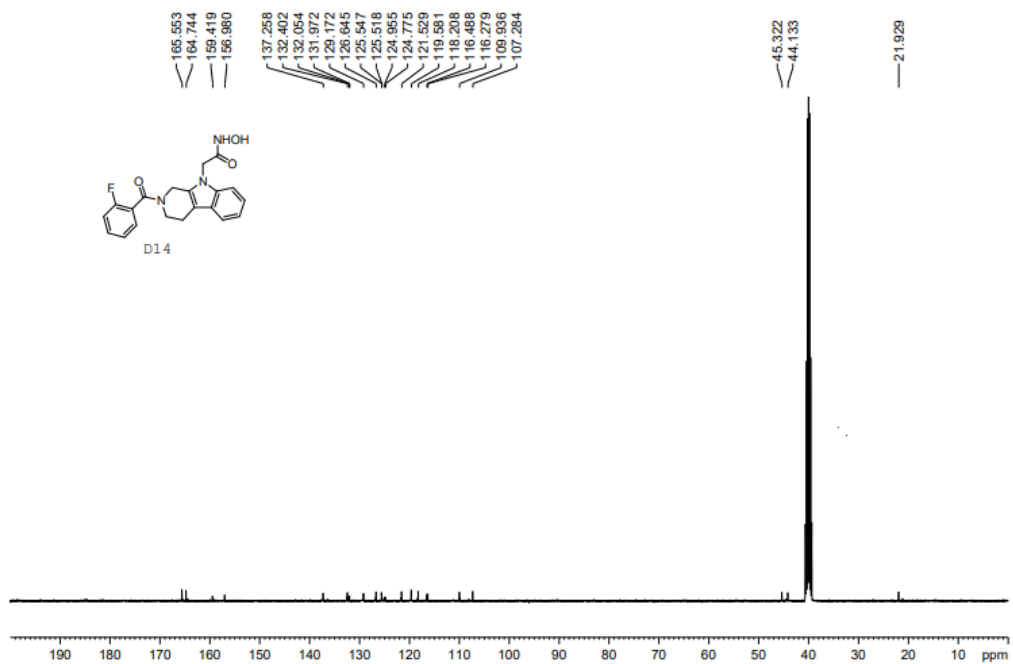
HPLC spectrum of D13



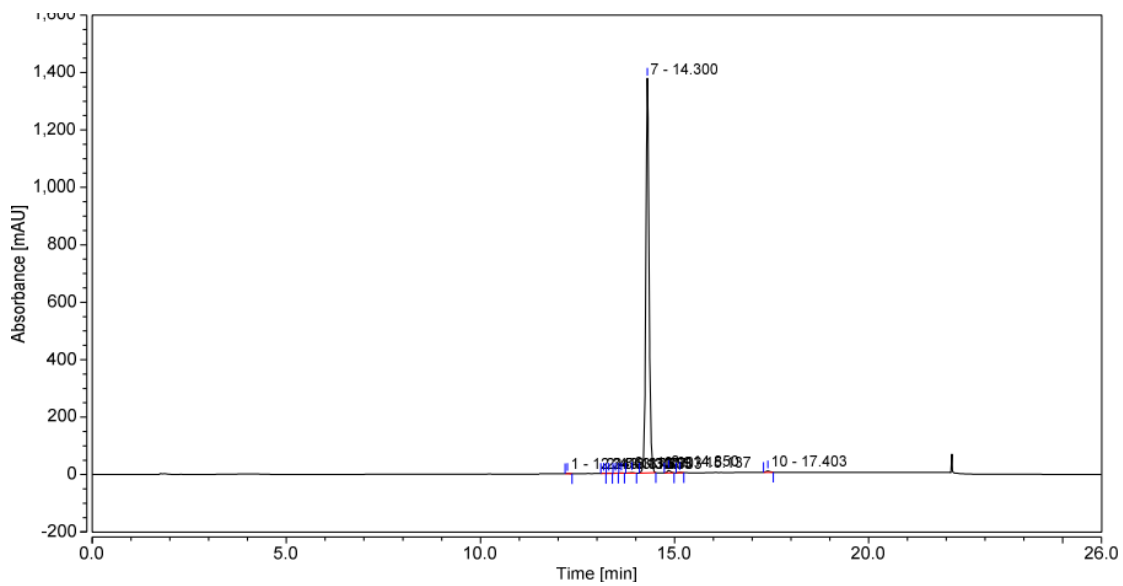
HRMS spectrum of D14



<sup>1</sup>H NMR spectrum of D14

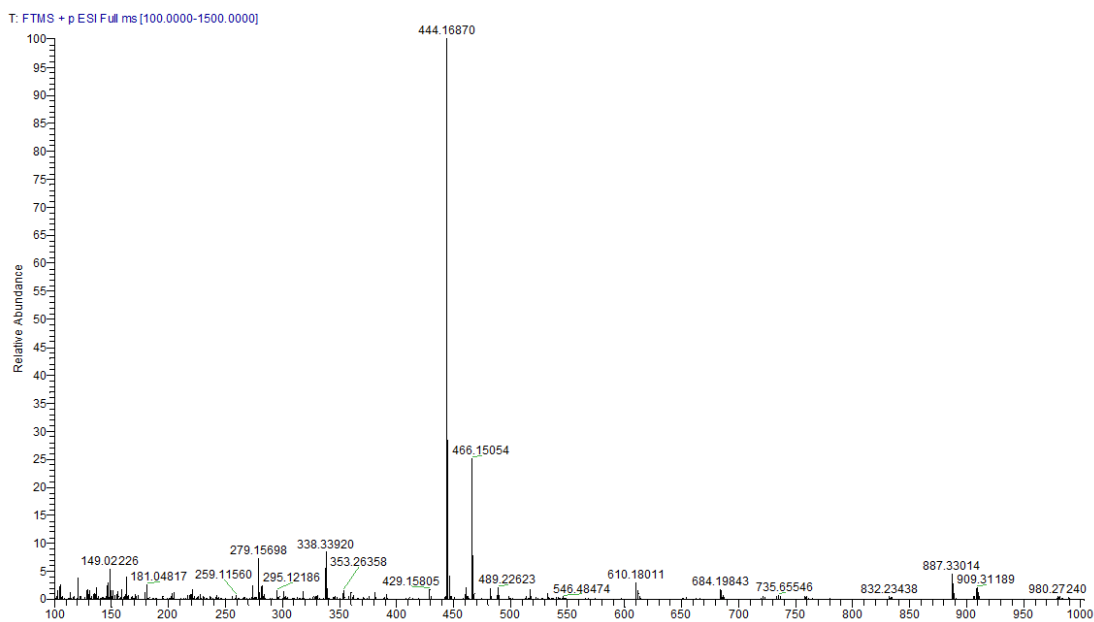


<sup>13</sup>C NMR spectrum of **D14**

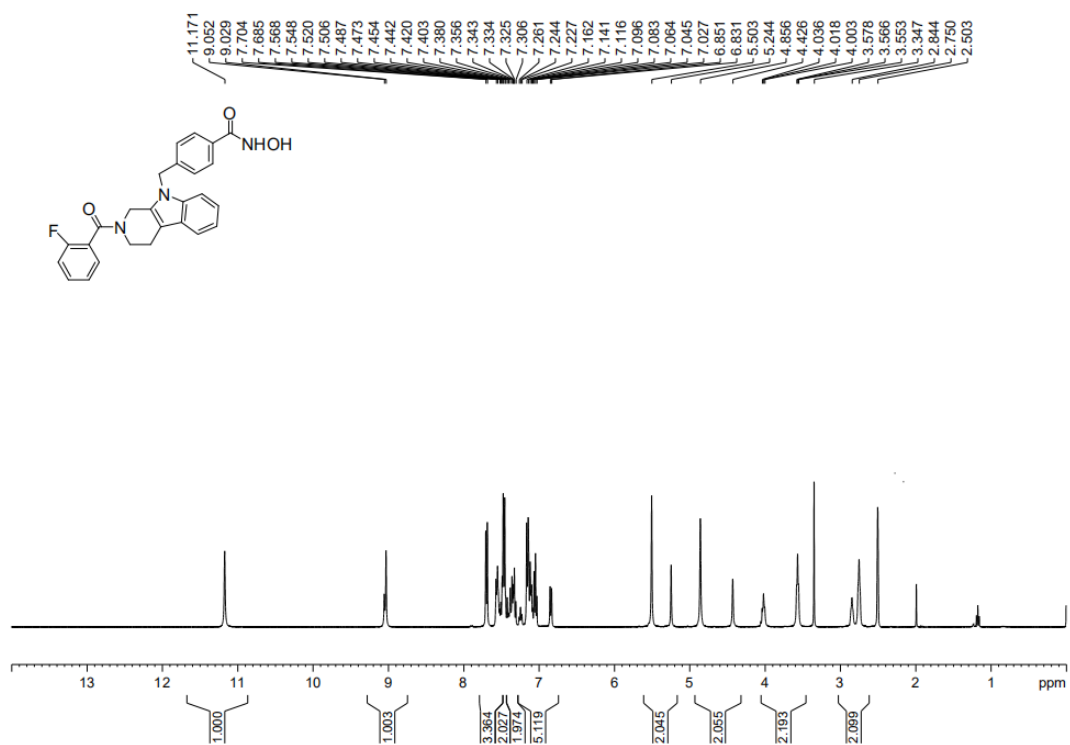


HPLC spectrum of **D14**

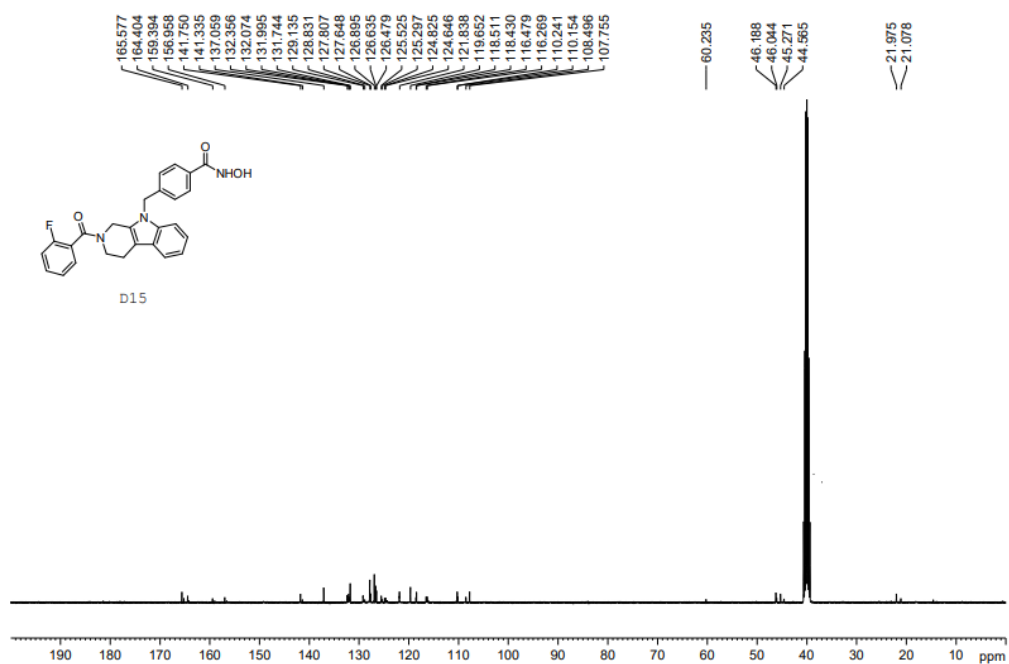




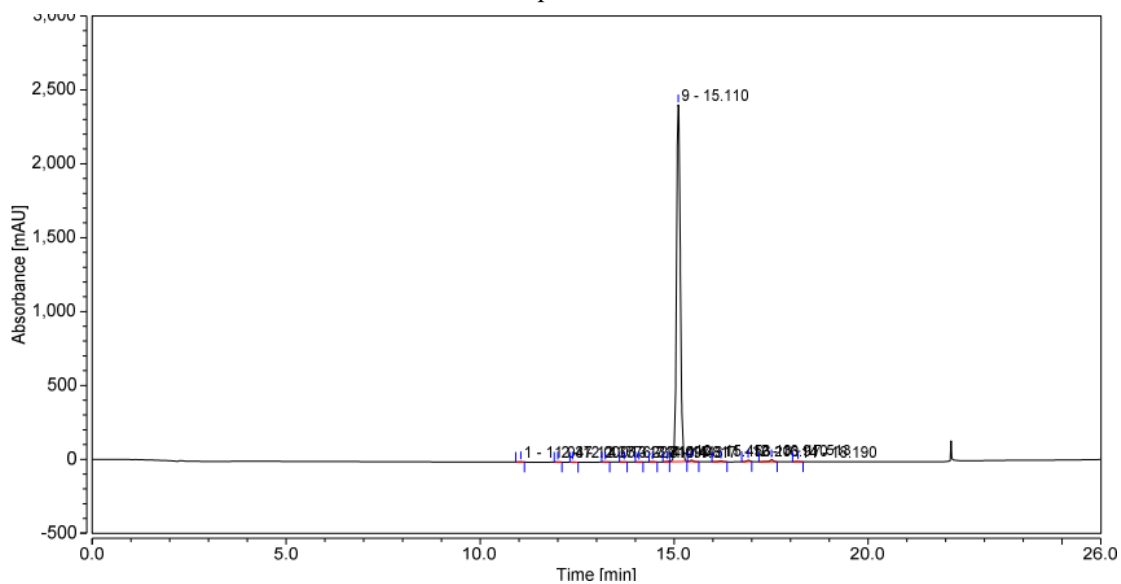
HRMS spectrum of D15



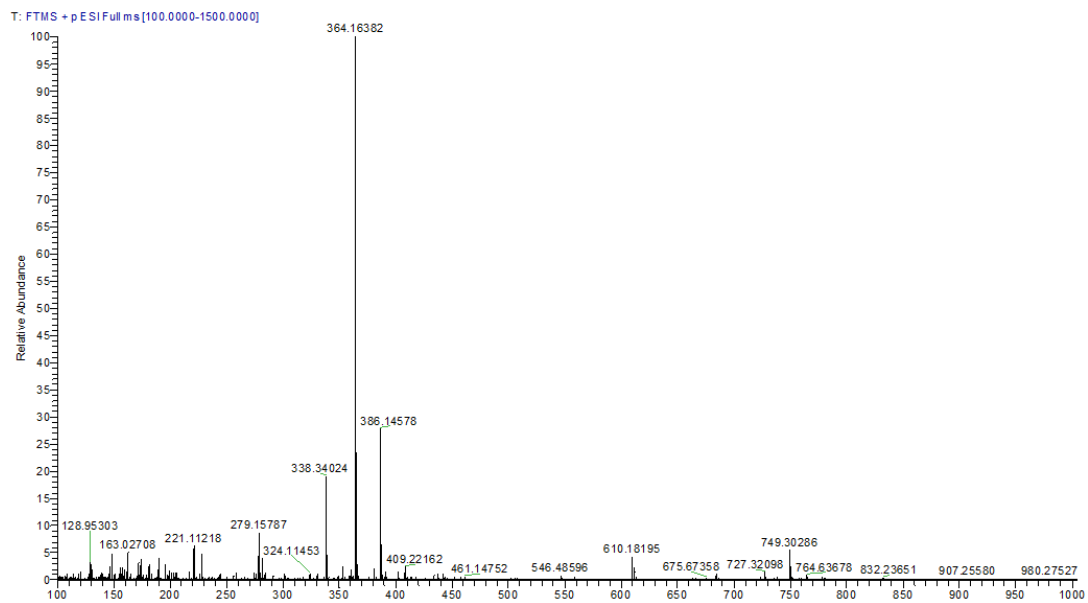
<sup>1</sup>H NMR spectrum of D15



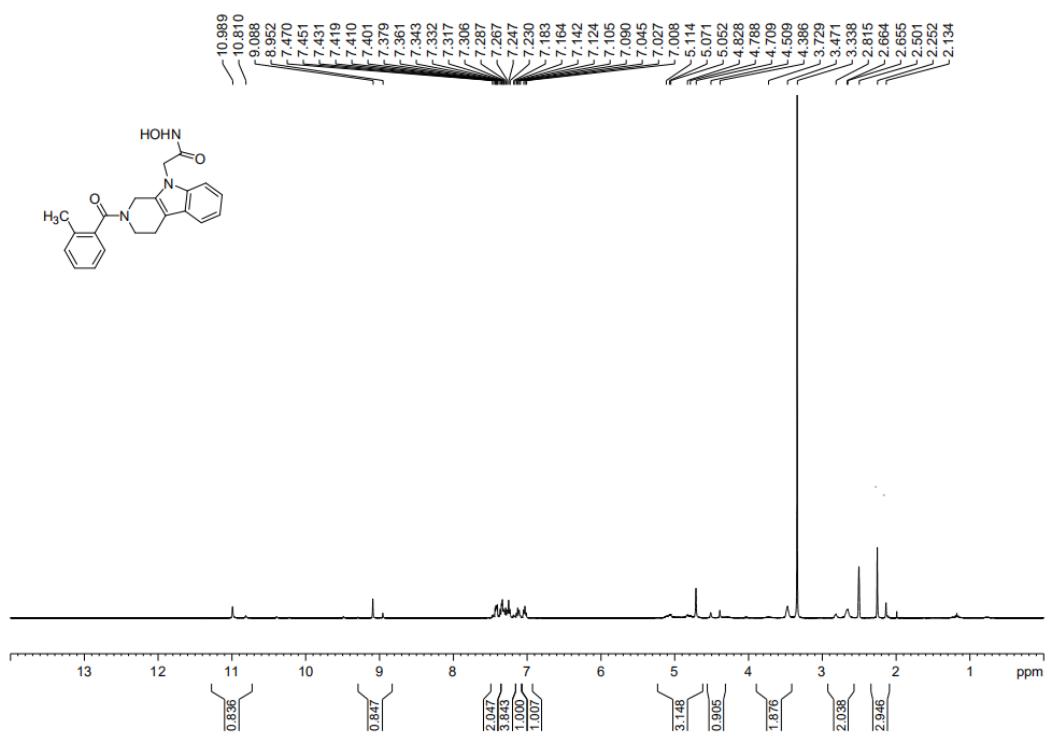
<sup>13</sup>C NMR spectrum of D15



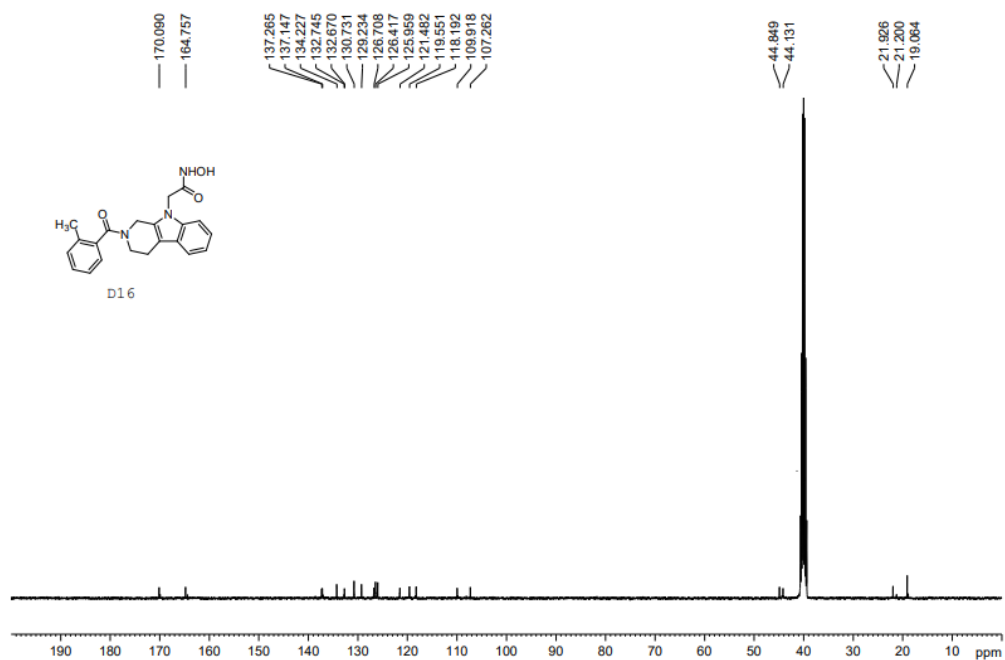
HPLC spectrum of D15



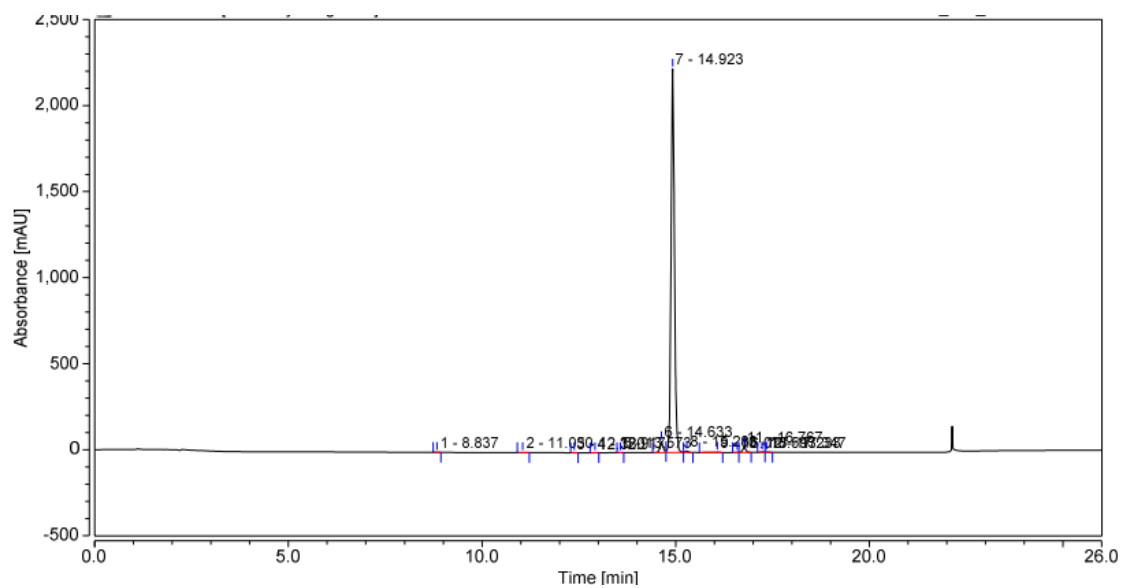
HRMS spectrum of D16



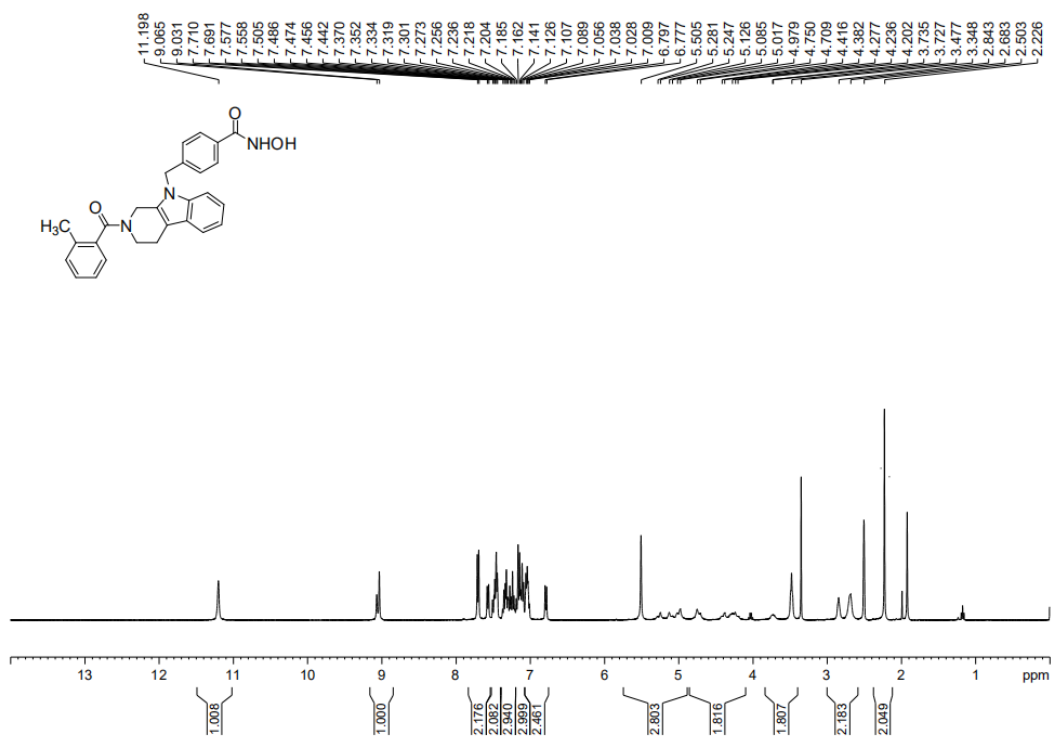
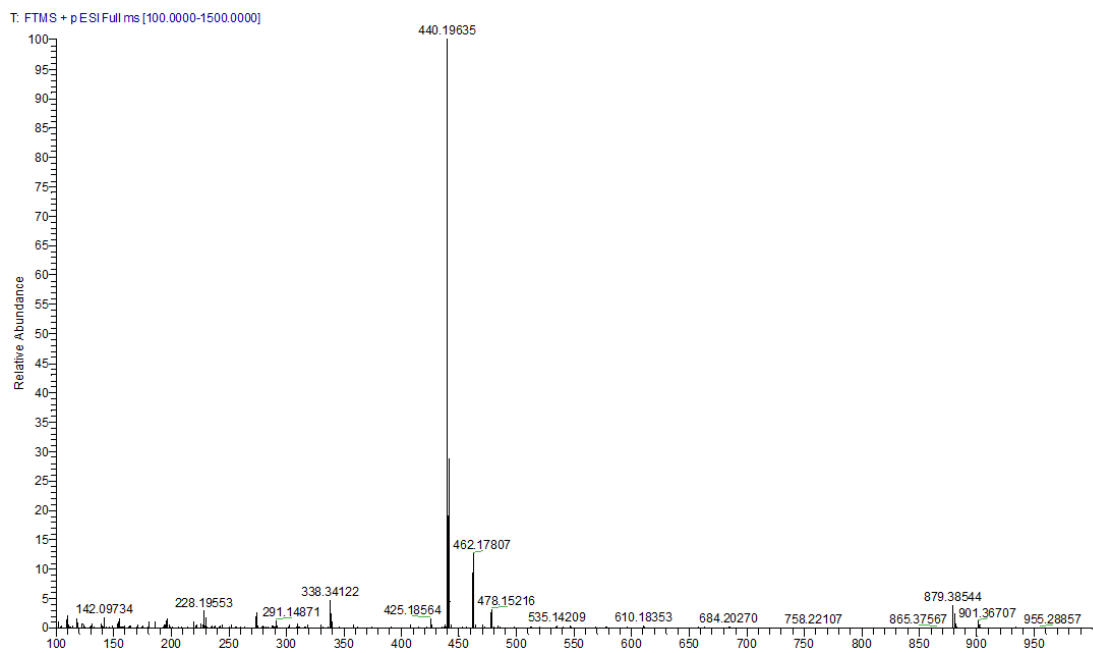
<sup>1</sup>H NMR spectrum of D16

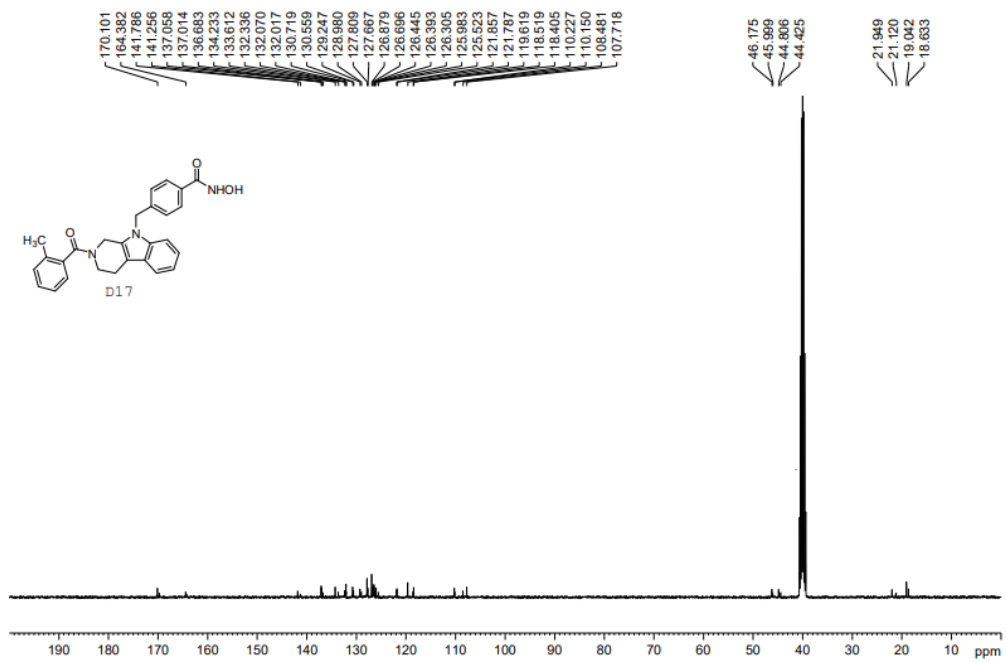


<sup>13</sup>C NMR spectrum of D16

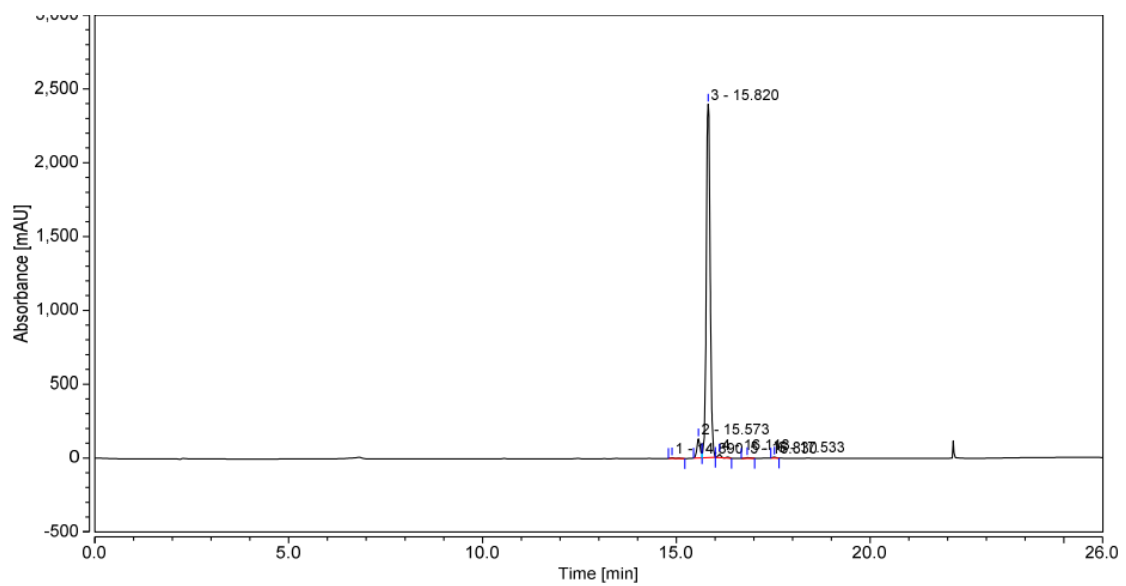


HPLC spectrum of D16

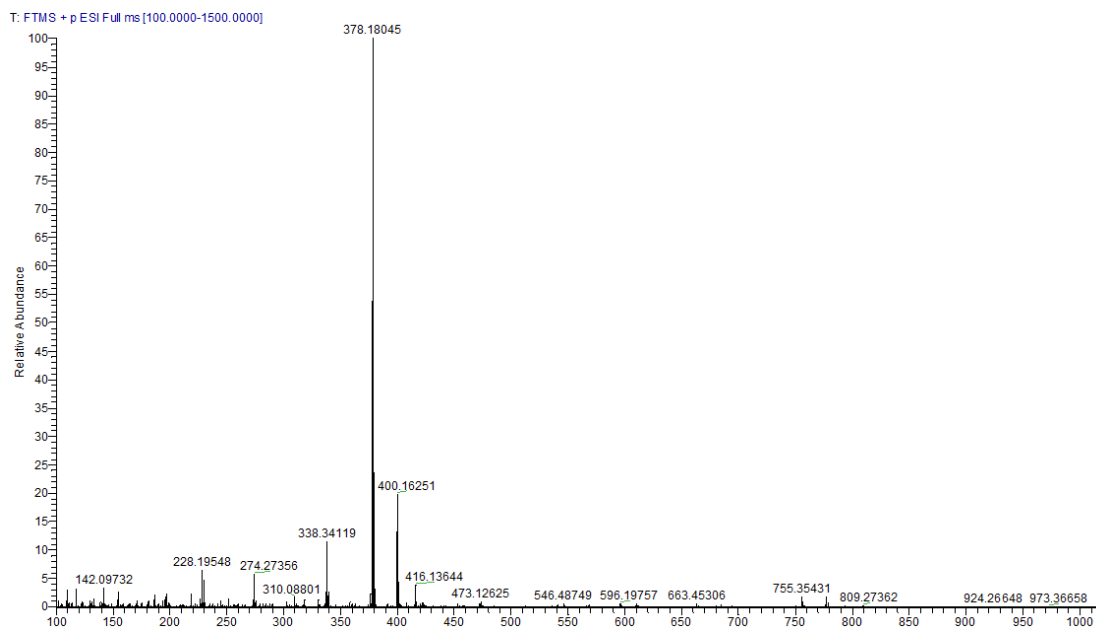




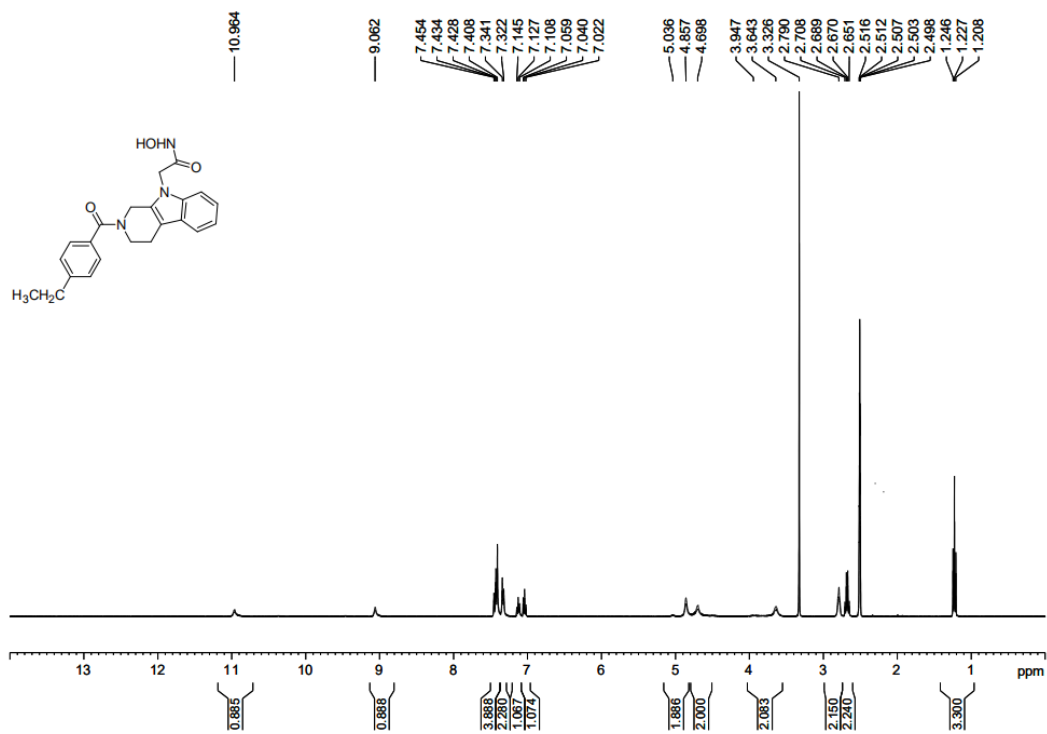
<sup>13</sup>C NMR spectrum of **D17**



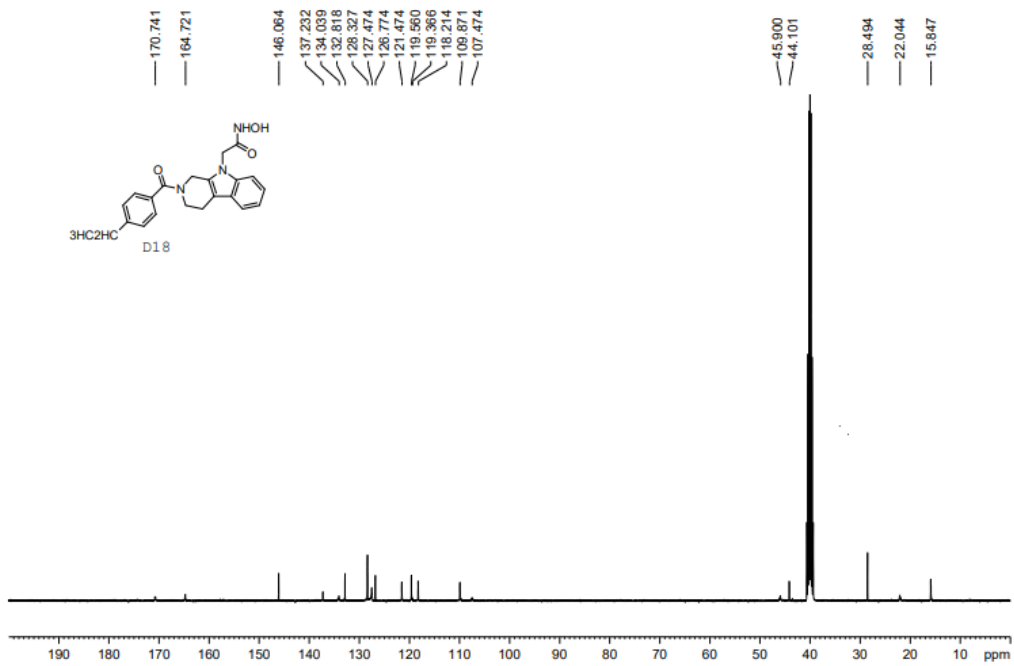
HPLC spectrum of **D17**



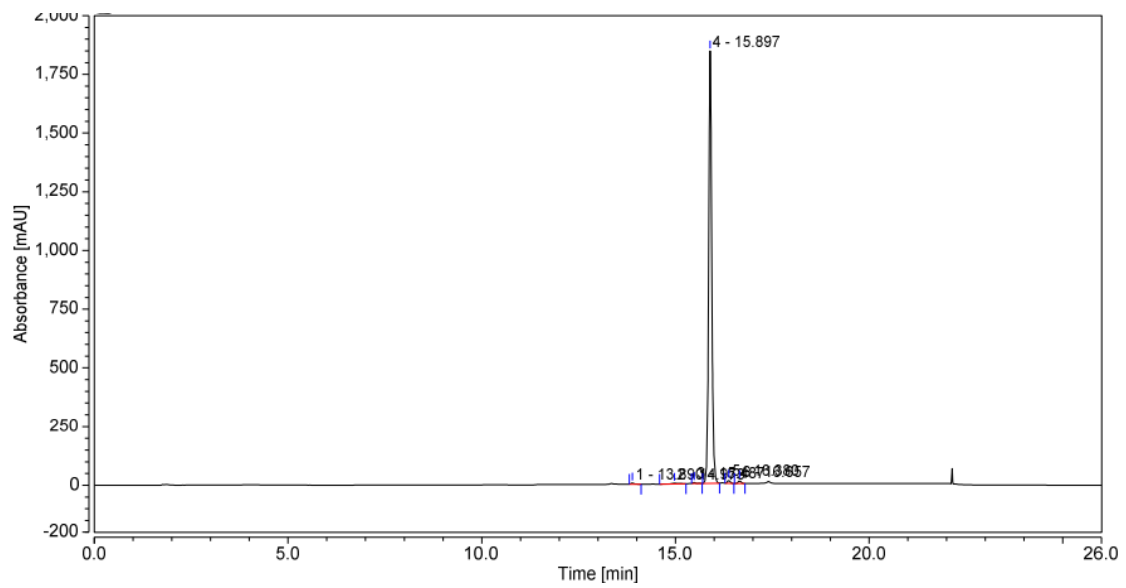
HRMS spectrum of **D18**



$^1\text{H}$  NMR spectrum of **D18**



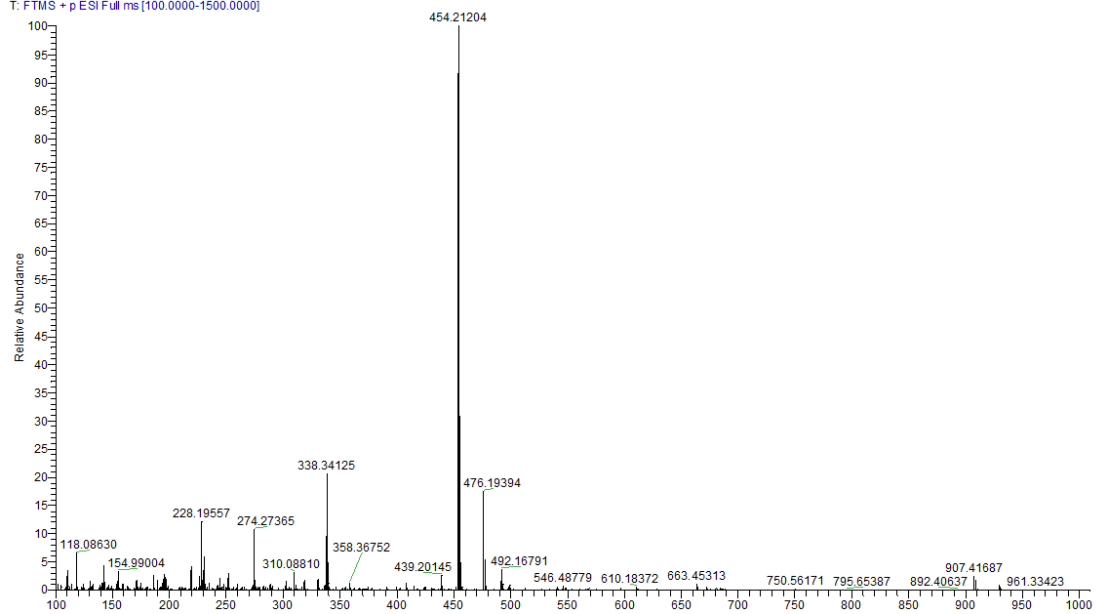
$^{13}\text{C}$  NMR spectrum of **D18**



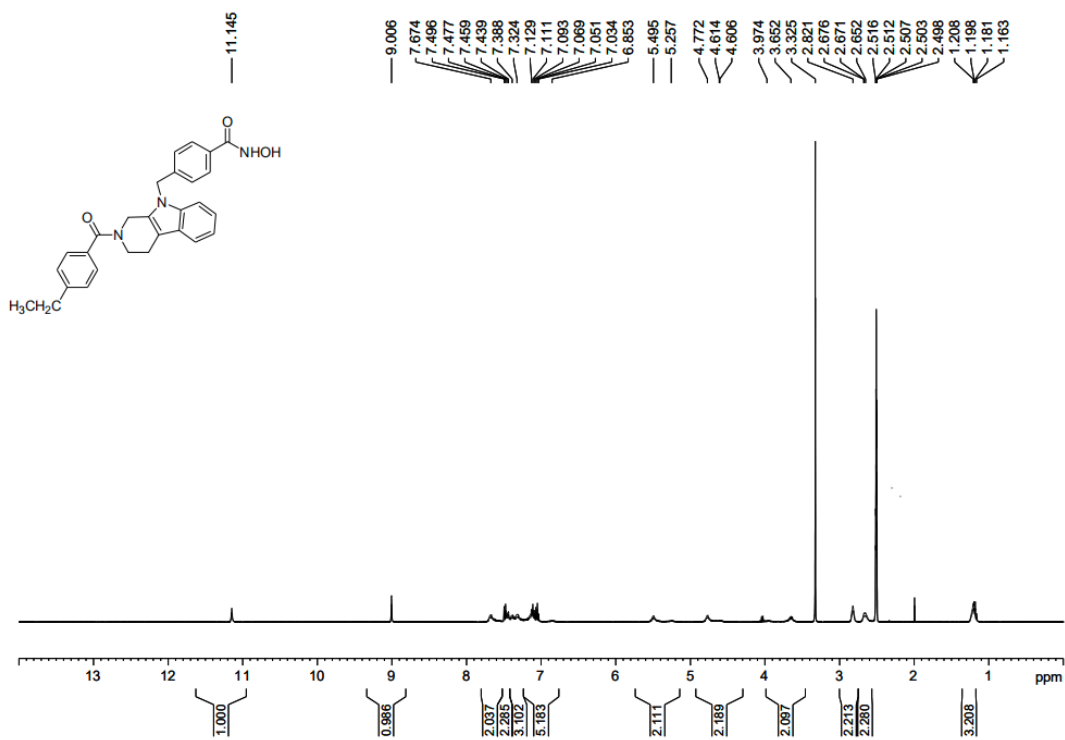
HPLC spectrum of **D18**



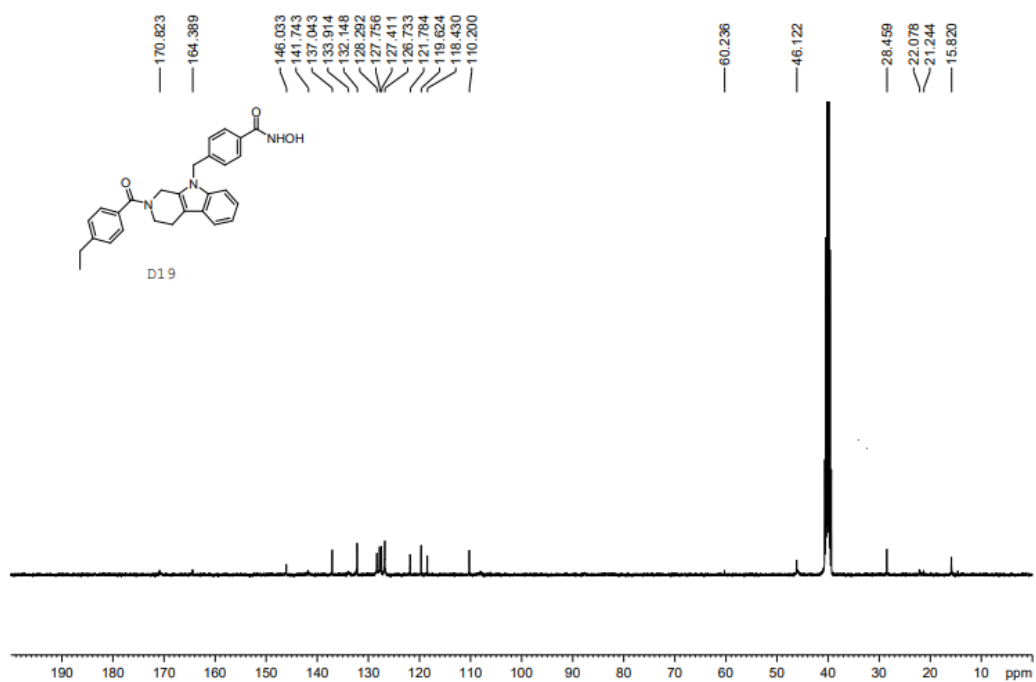
T: FTMS + p ESI Full ms [100.0000-1500.0000]



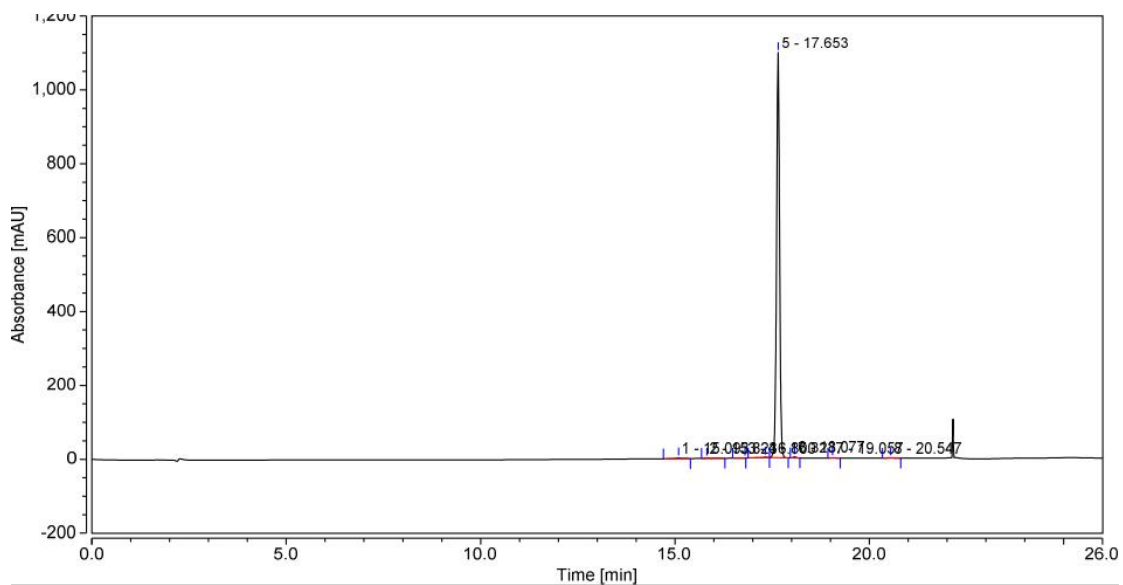
HRMS spectrum of D19



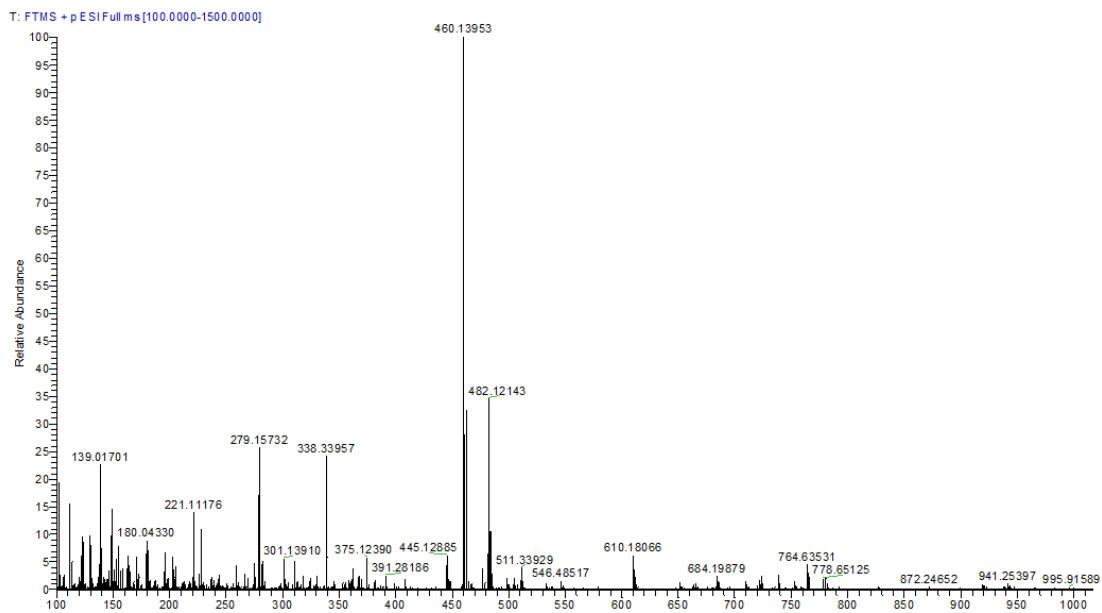
<sup>1</sup>H NMR spectrum of D19



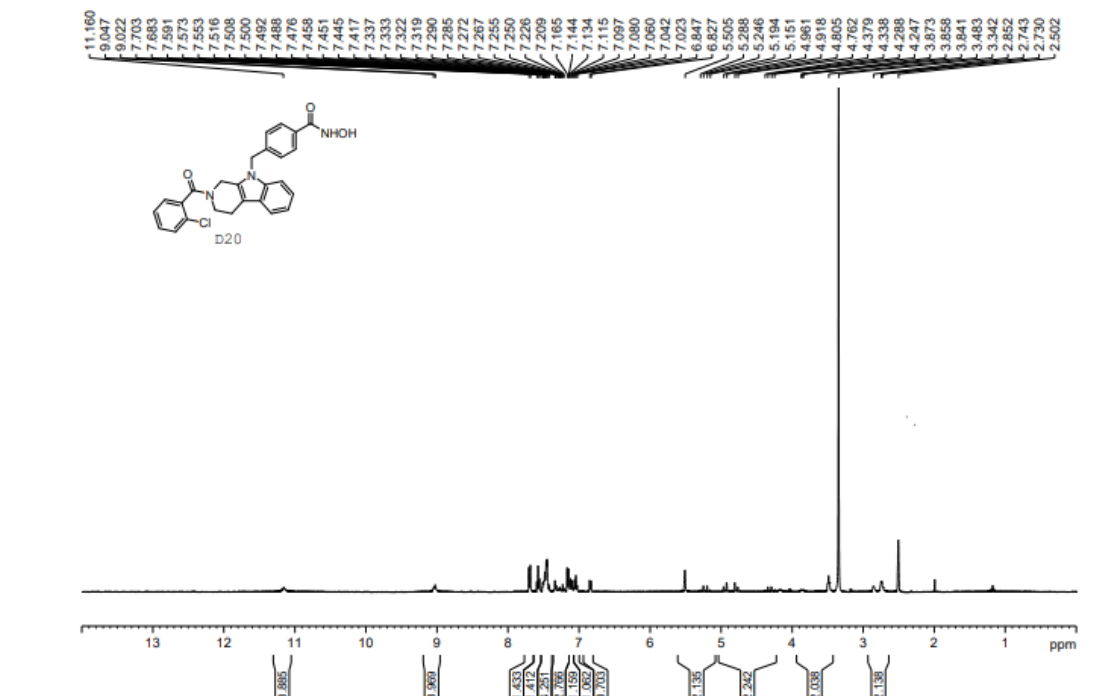
<sup>13</sup>C NMR spectrum of **D19**



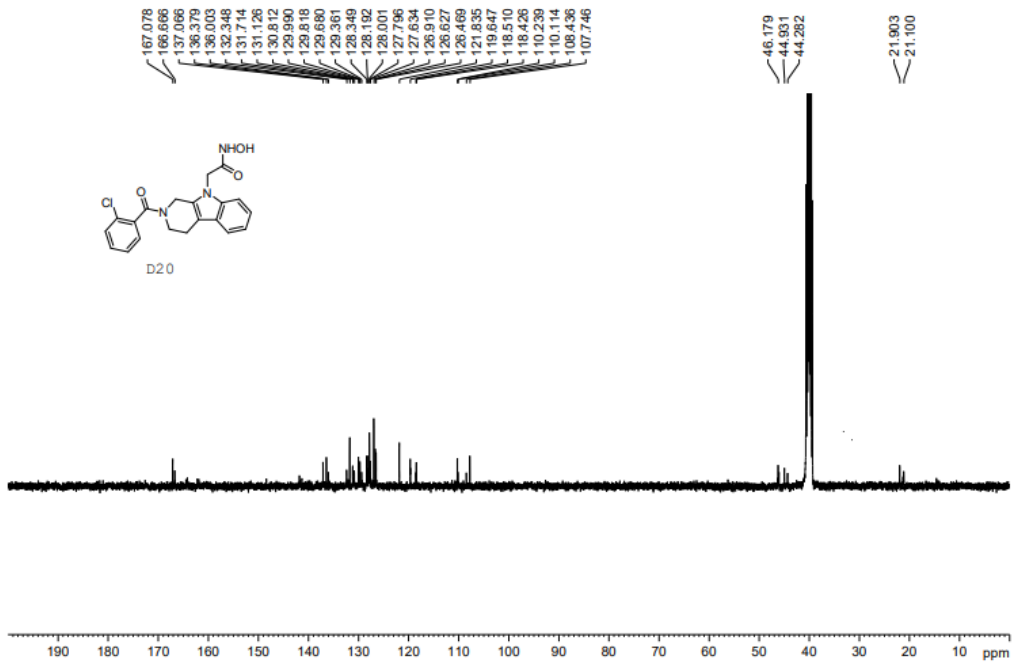
HPLC spectrum of **D19**



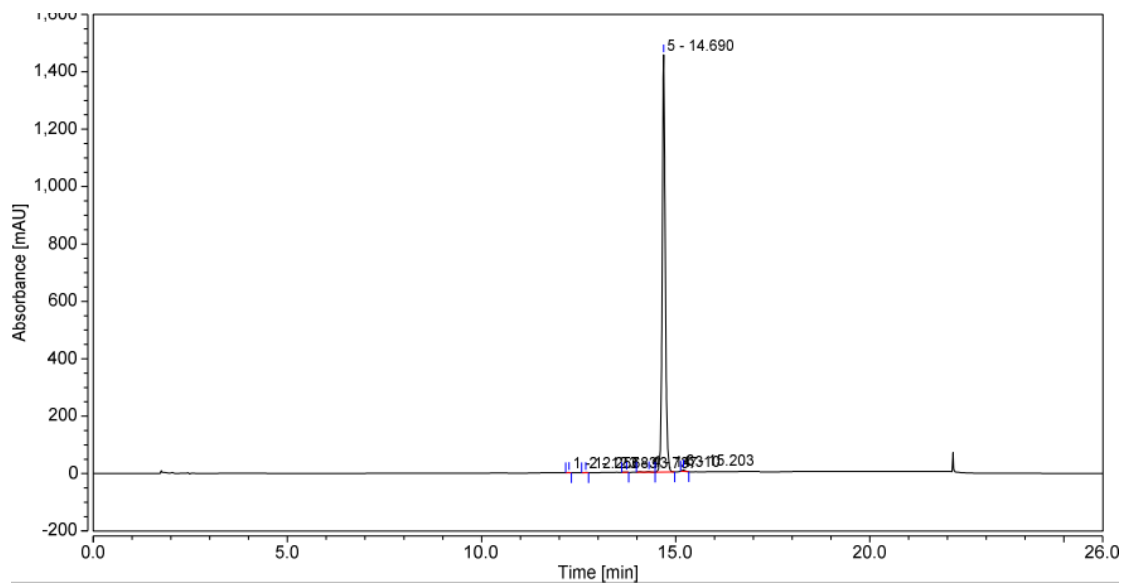
HRMS spectrum of D20



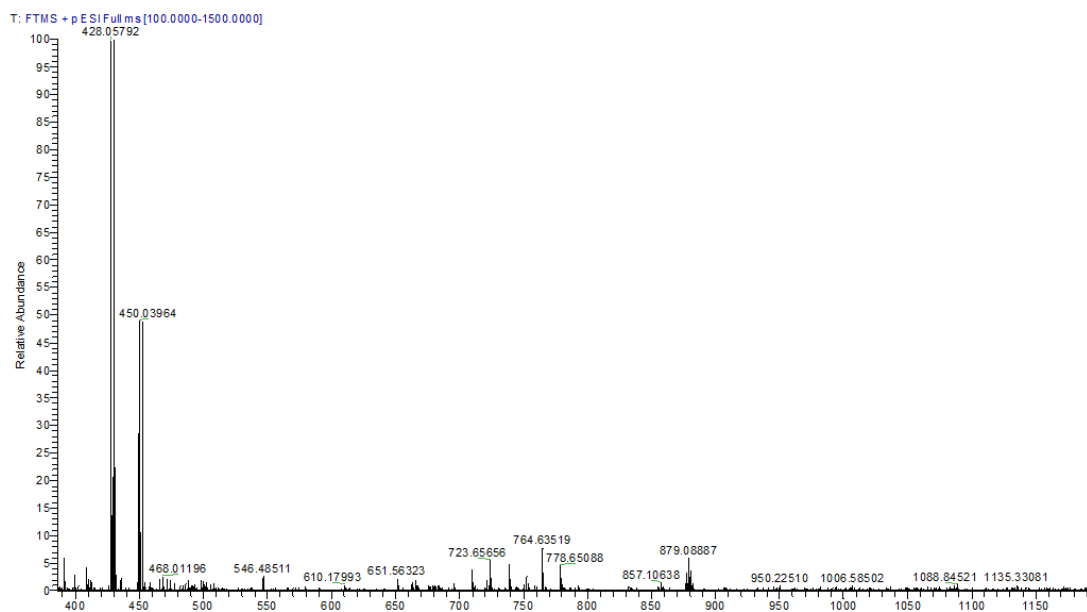
<sup>1</sup>H NMR spectrum of D20



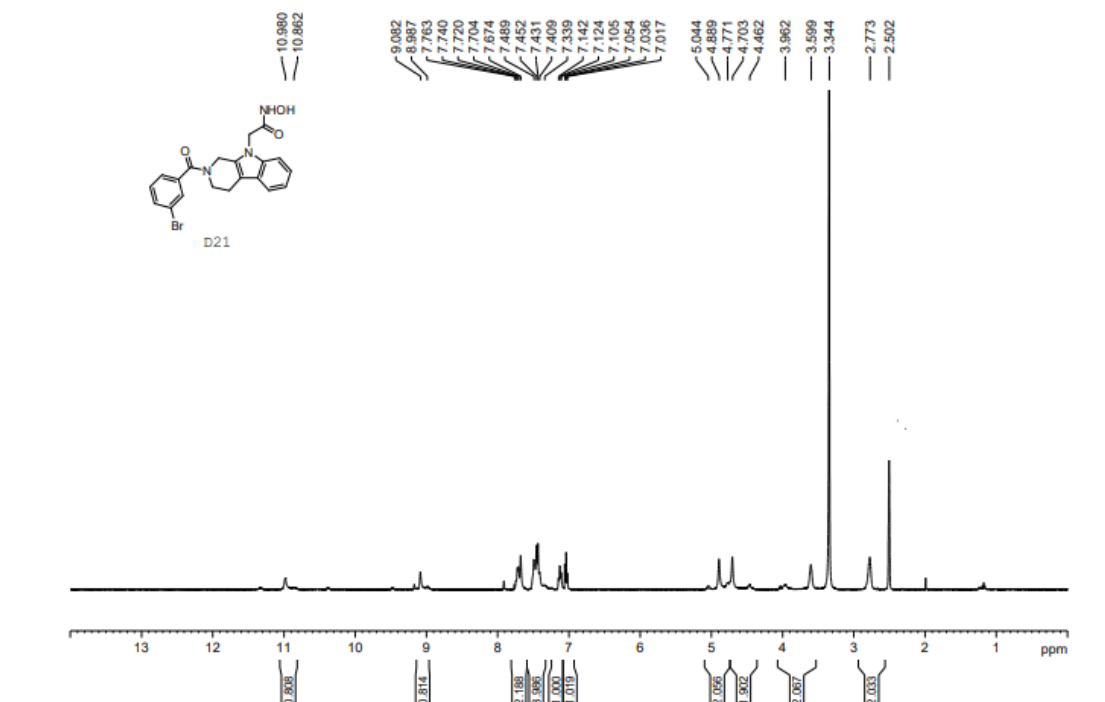
<sup>13</sup>C NMR spectrum of **D20**



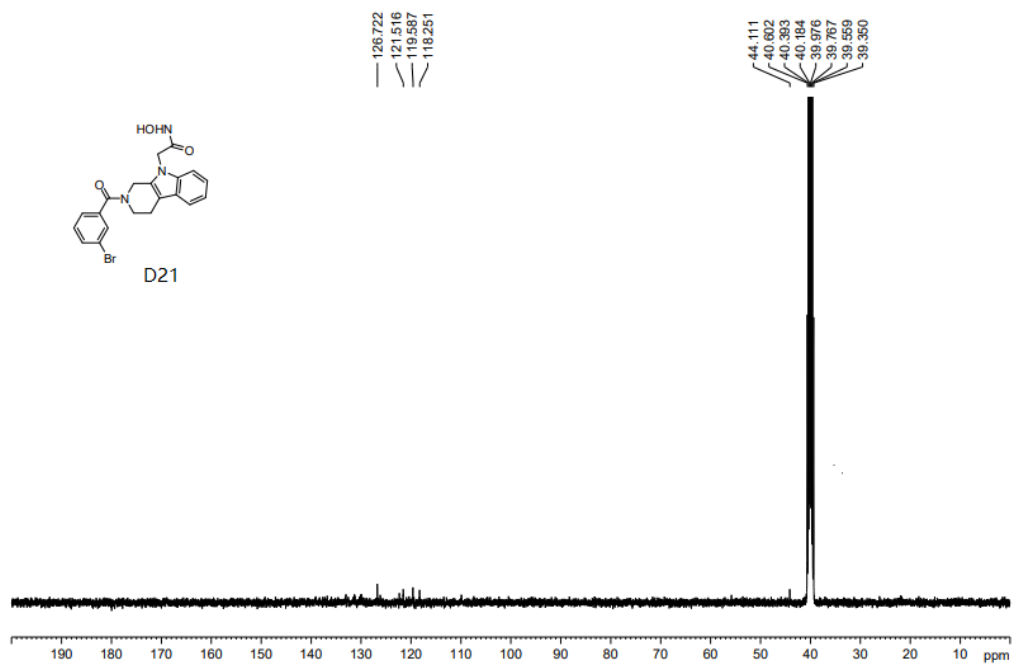
HPLC spectrum of **D20**



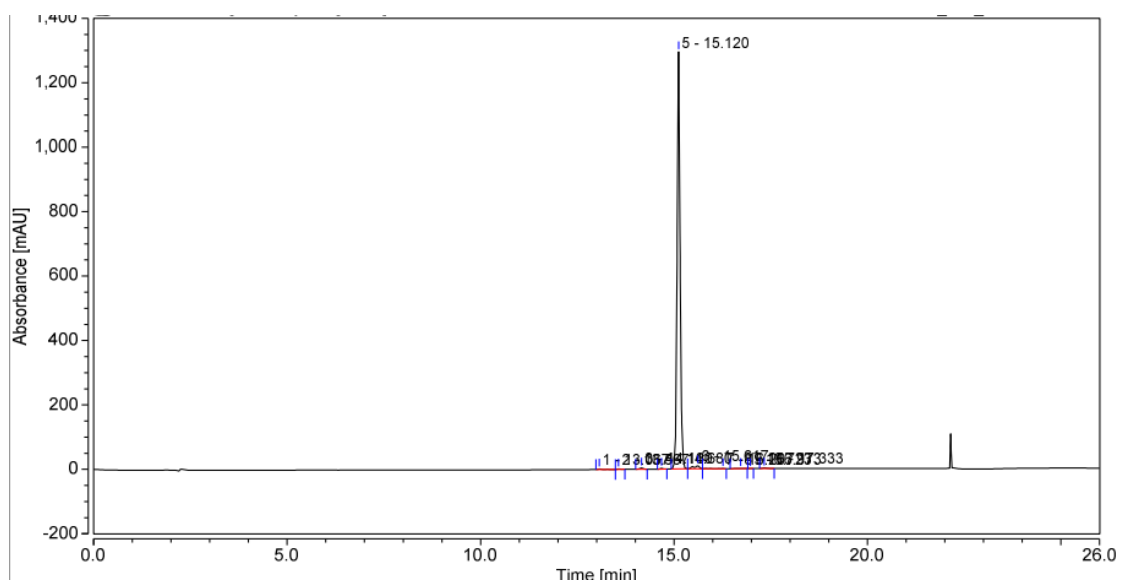
HRMS spectrum of D21



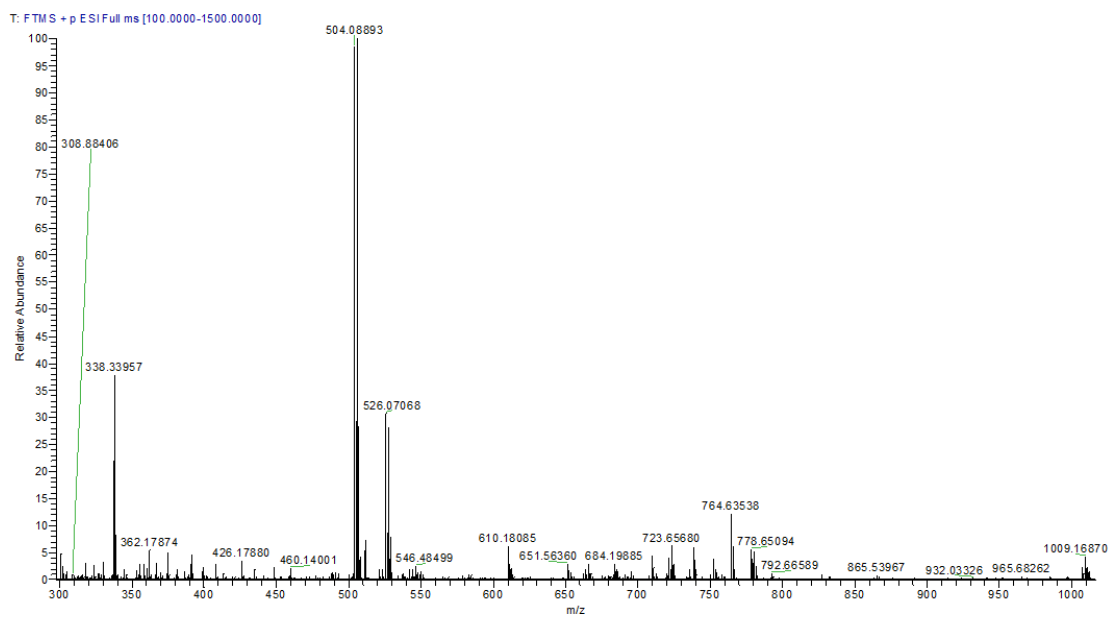
$^1\text{H}$  NMR spectrum of D21



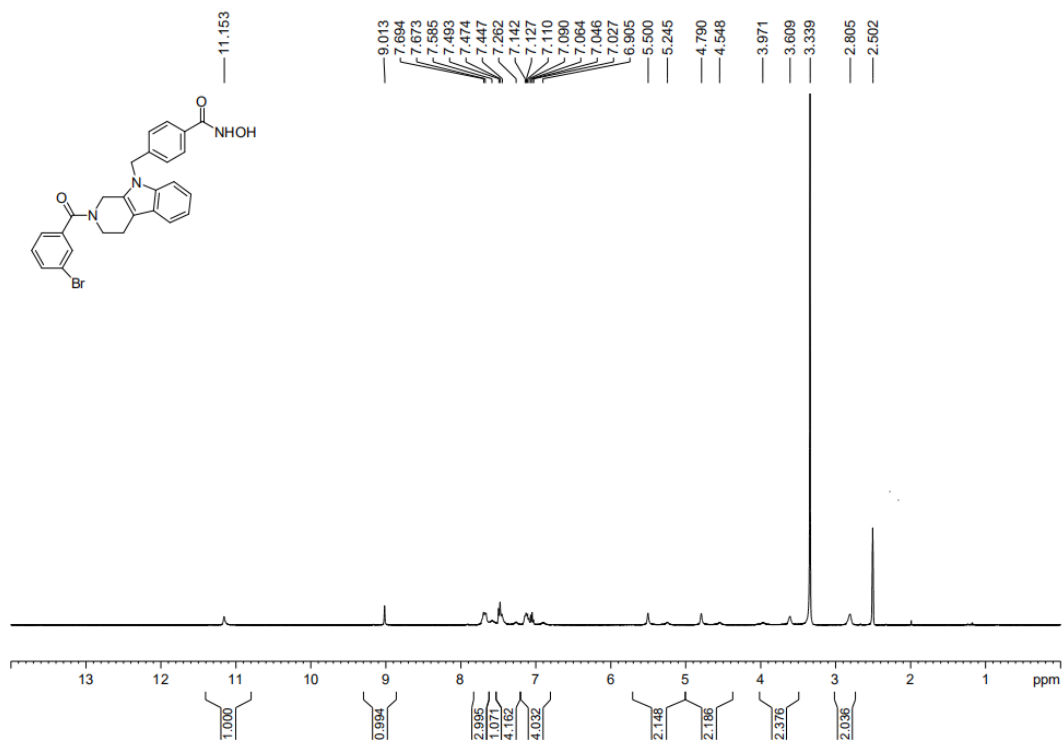
$^{13}\text{C}$  NMR spectrum of **D21**



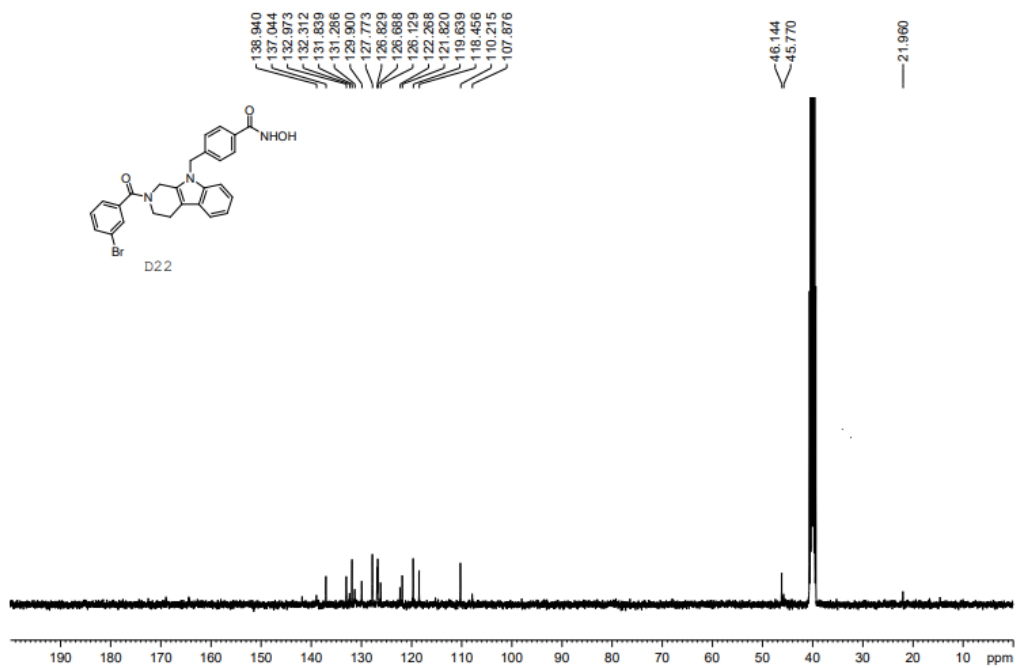
HPLC spectrum of **D21**



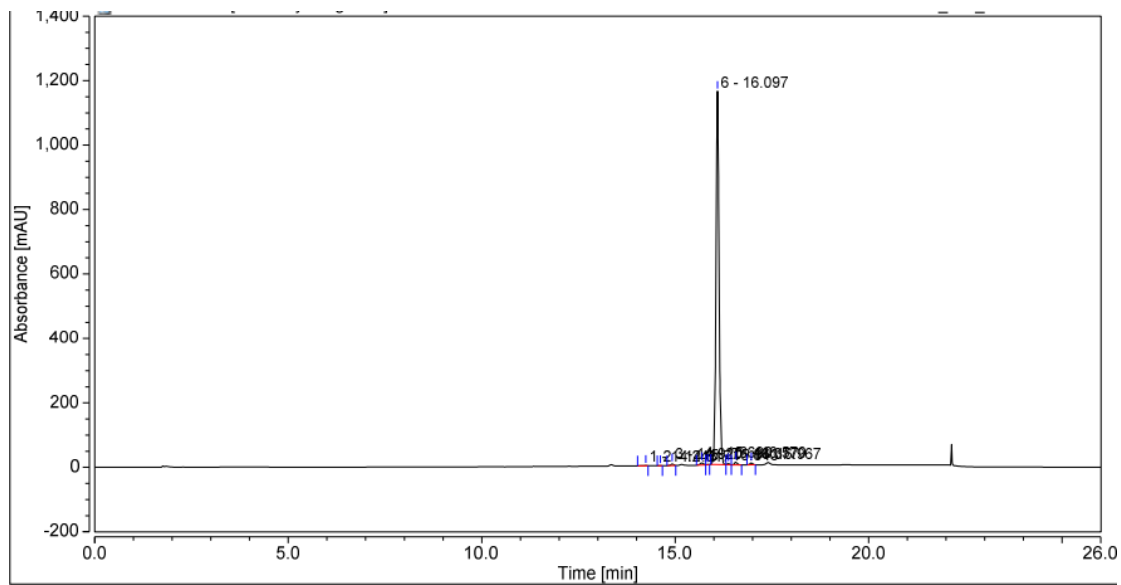
HRMS spectrum of D22



<sup>1</sup>H NMR spectrum of D22

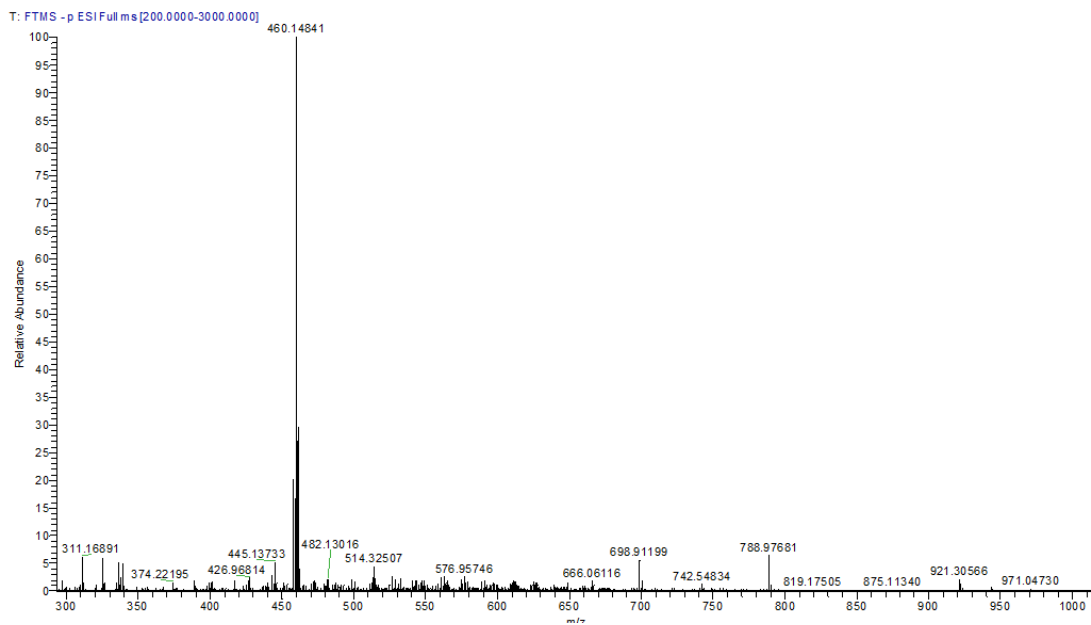


<sup>13</sup>C NMR spectrum of **D22**

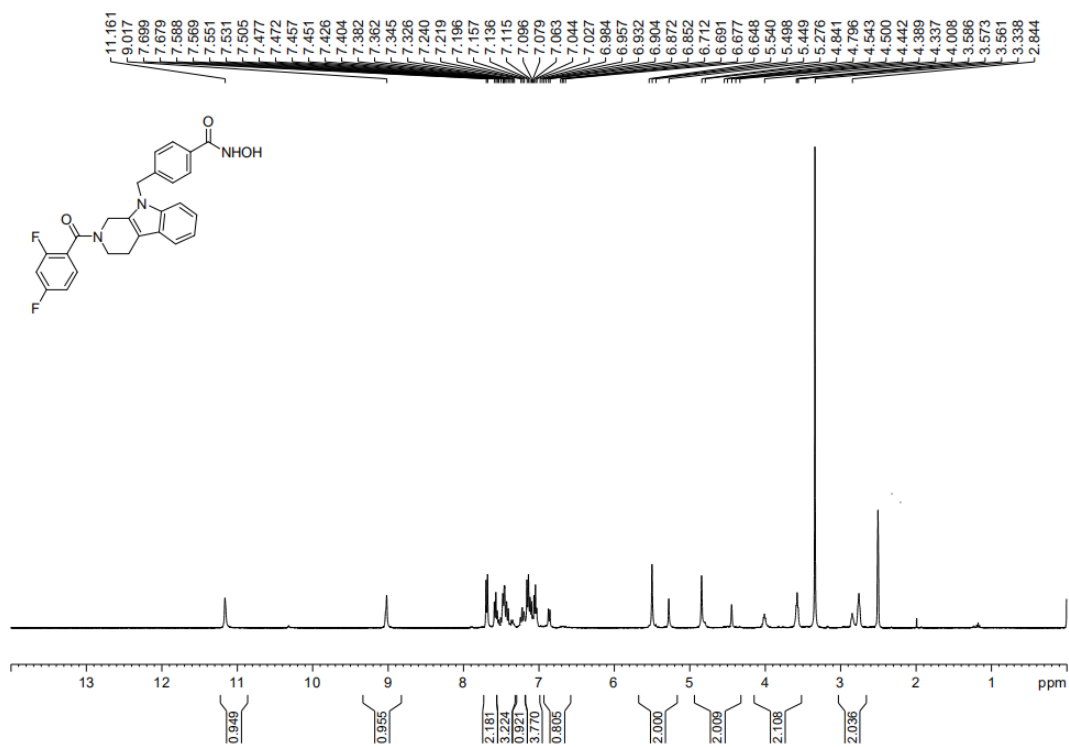


HPLC spectrum of **D22**

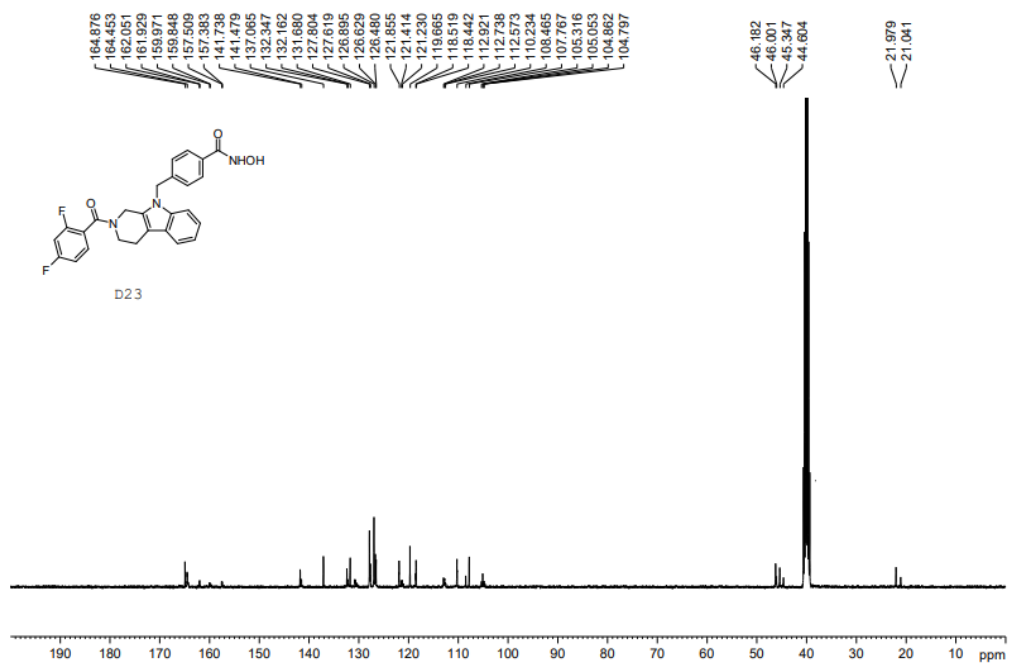




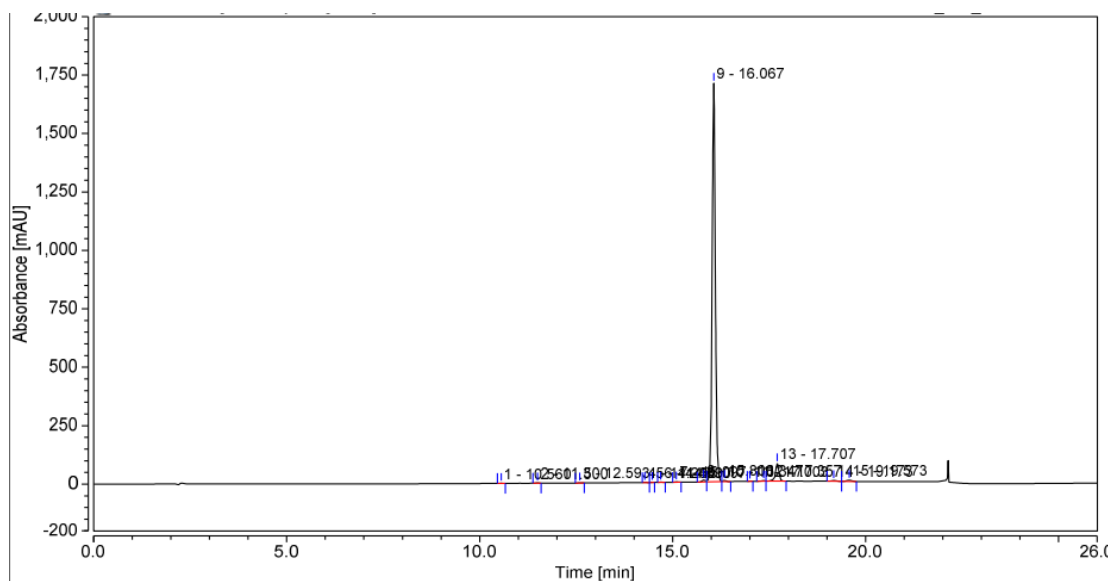
HRMS spectrum of **D23**



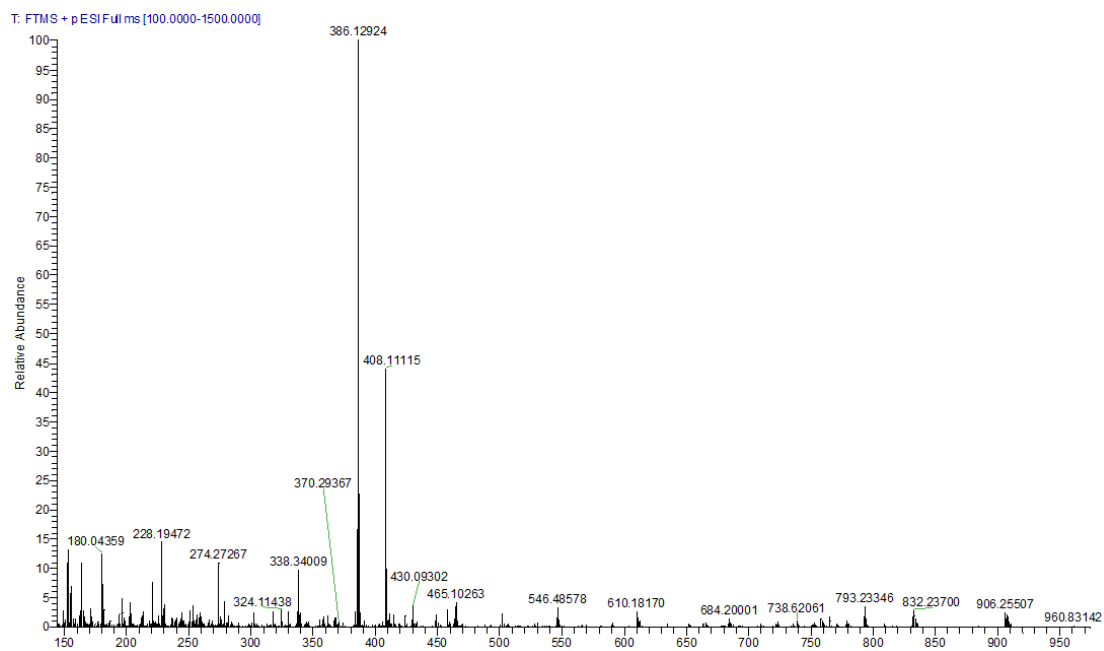
$^1\text{H}$  NMR spectrum of **D23**



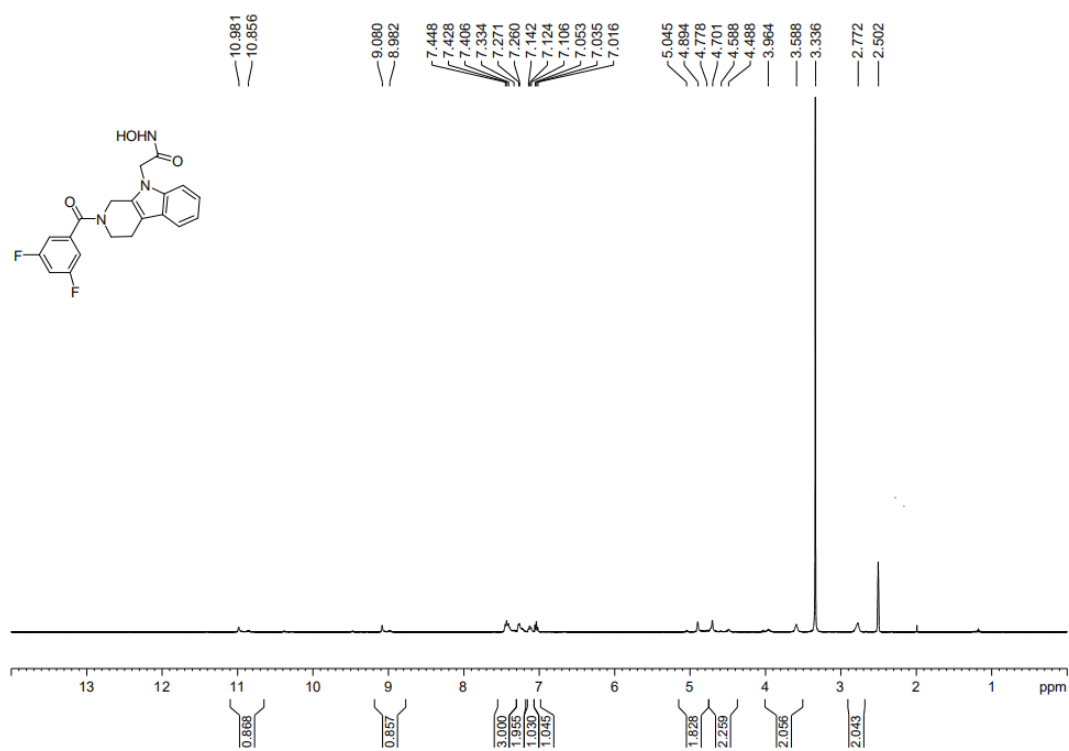
<sup>13</sup>C NMR spectrum of D23



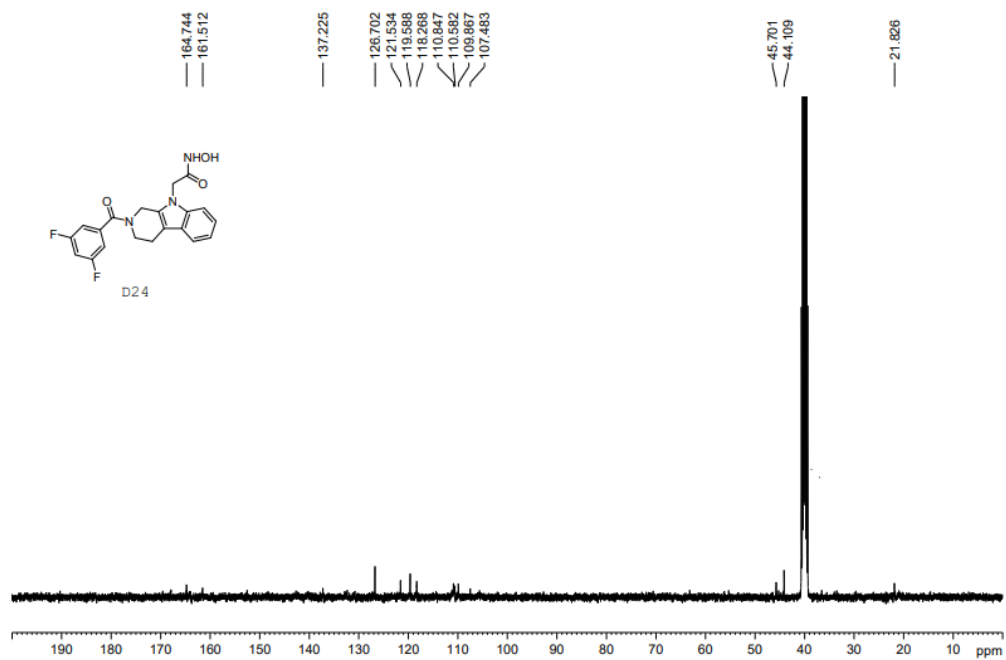
HPLC spectrum of D23



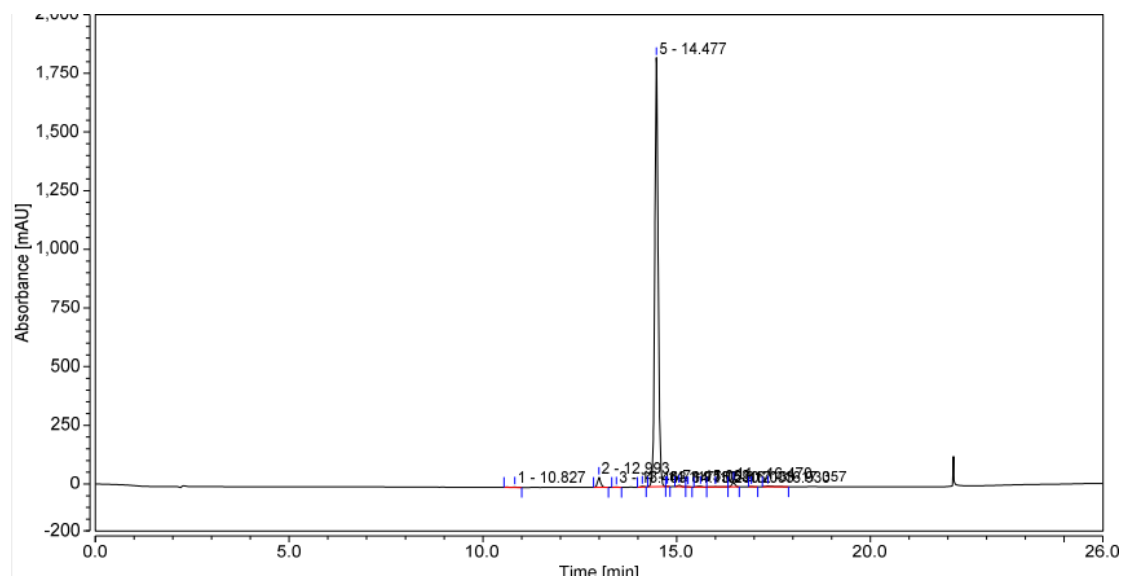
HRMS spectrum of D24



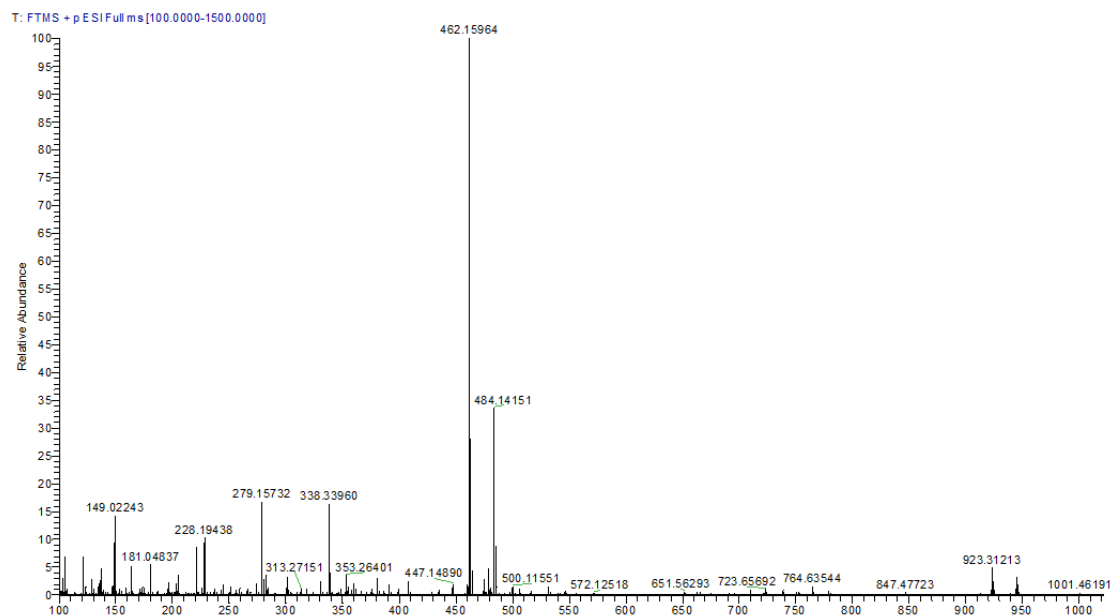
<sup>1</sup>H NMR spectrum of D24



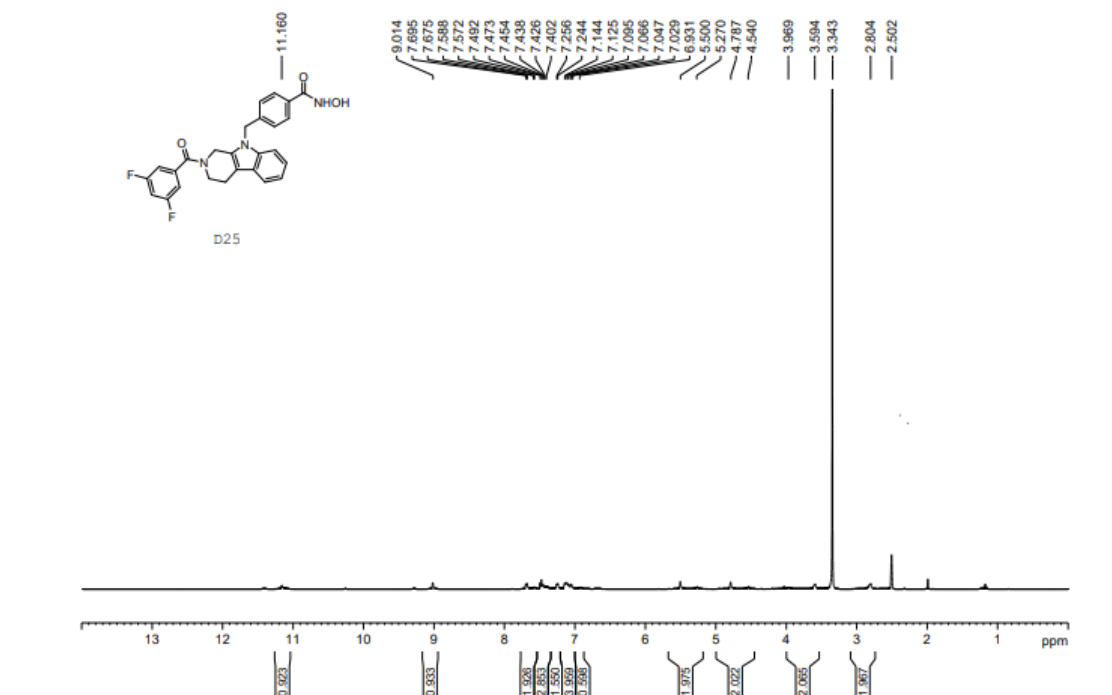
<sup>13</sup>C NMR spectrum of **D24**



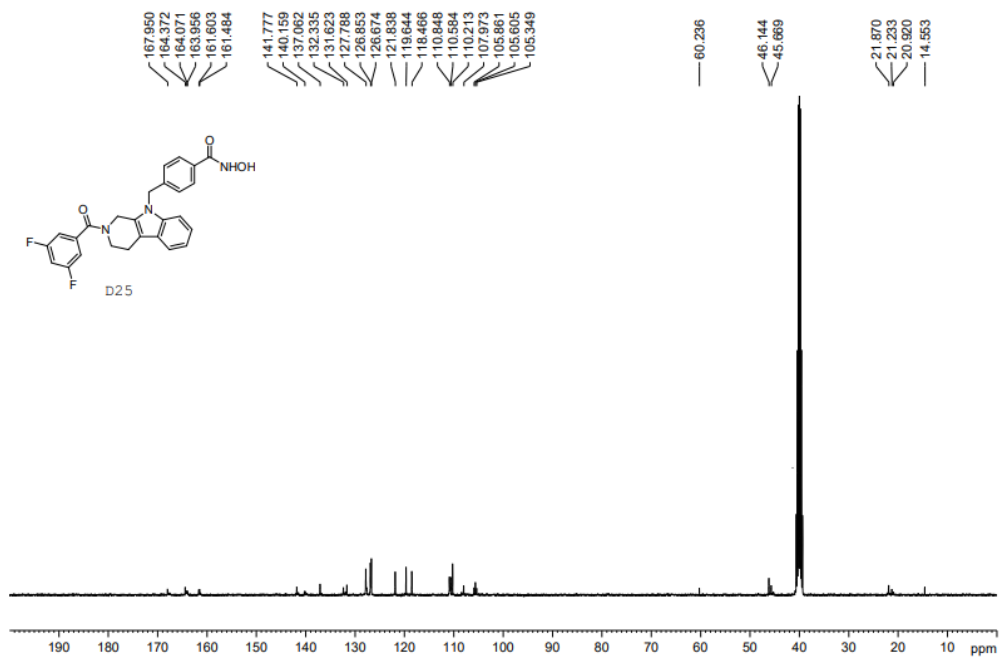
HPLC spectrum of **D24**



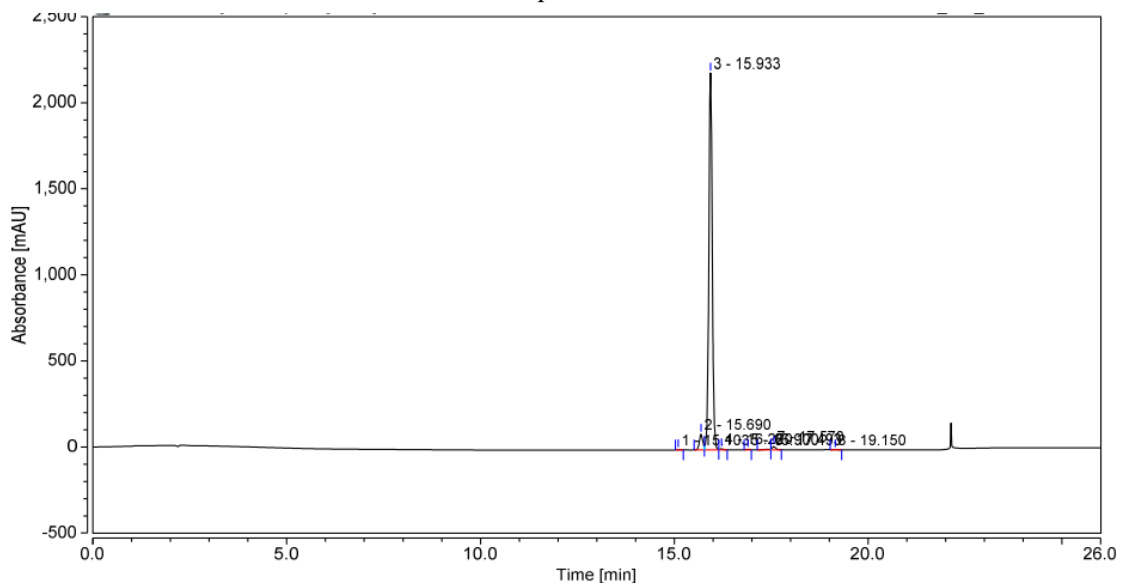
HRMS spectrum of D25



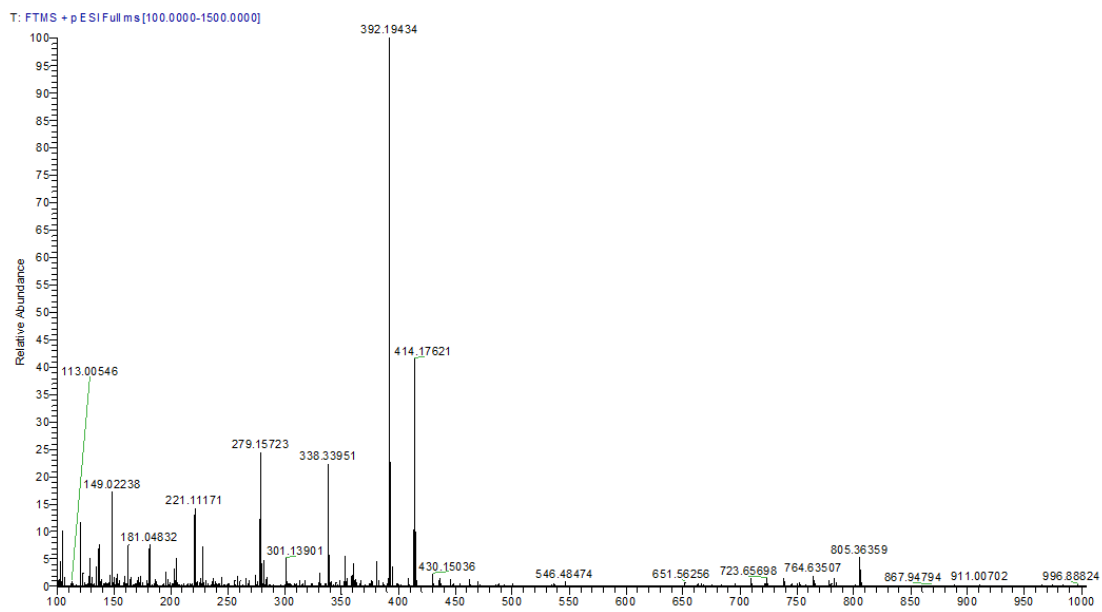
<sup>1</sup>H NMR spectrum of D25



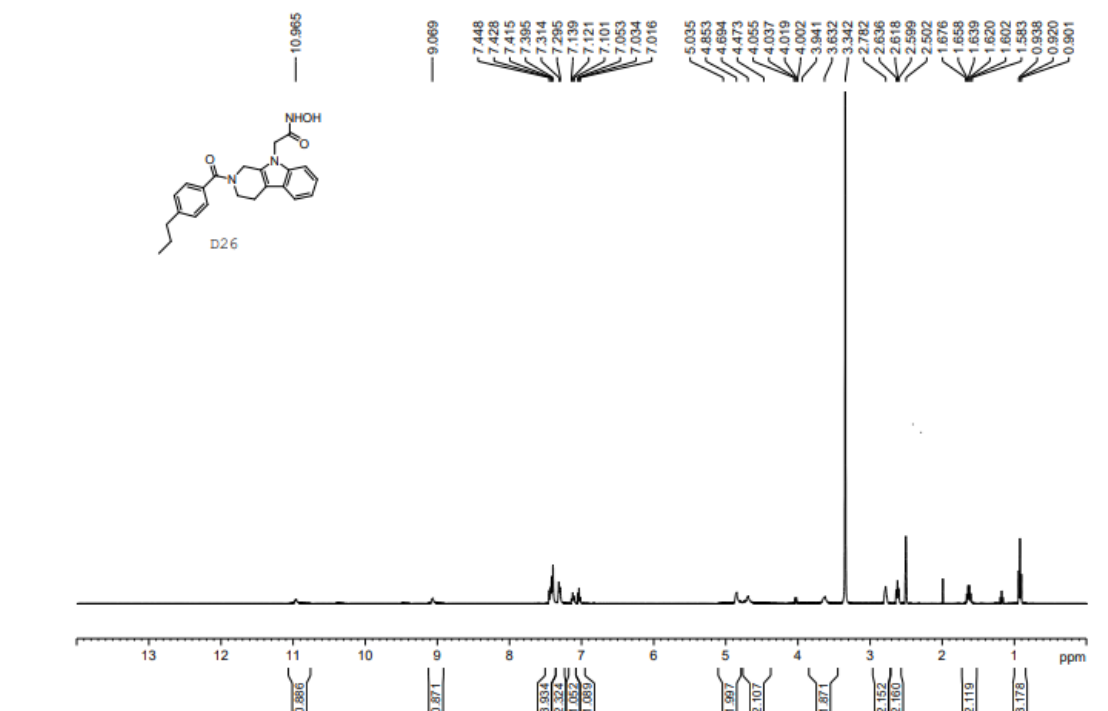
<sup>13</sup>C NMR spectrum of D25



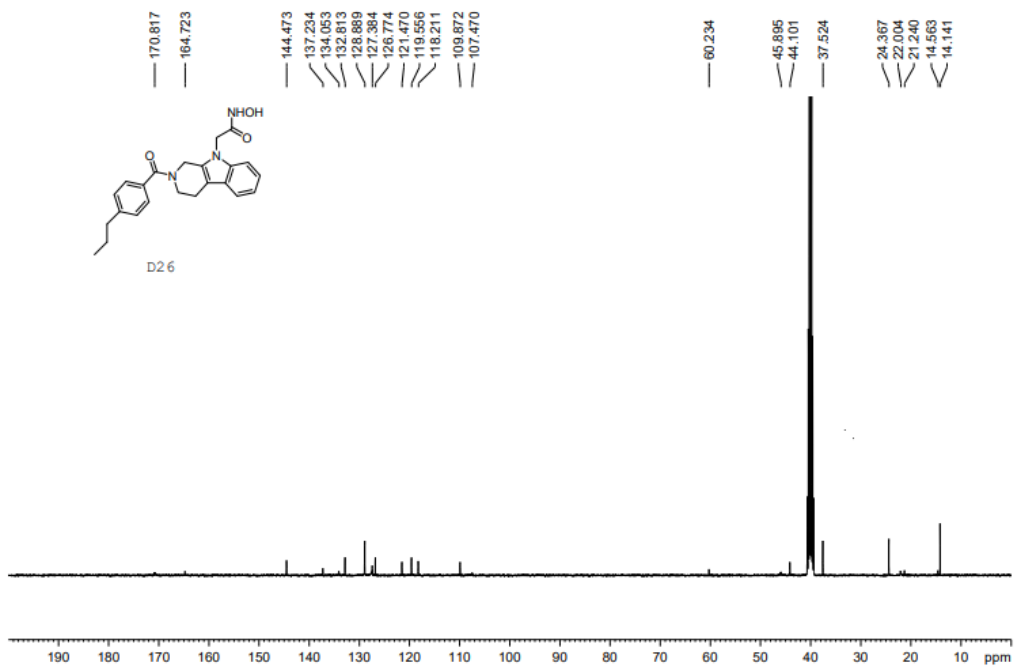
HPLC spectrum of D25



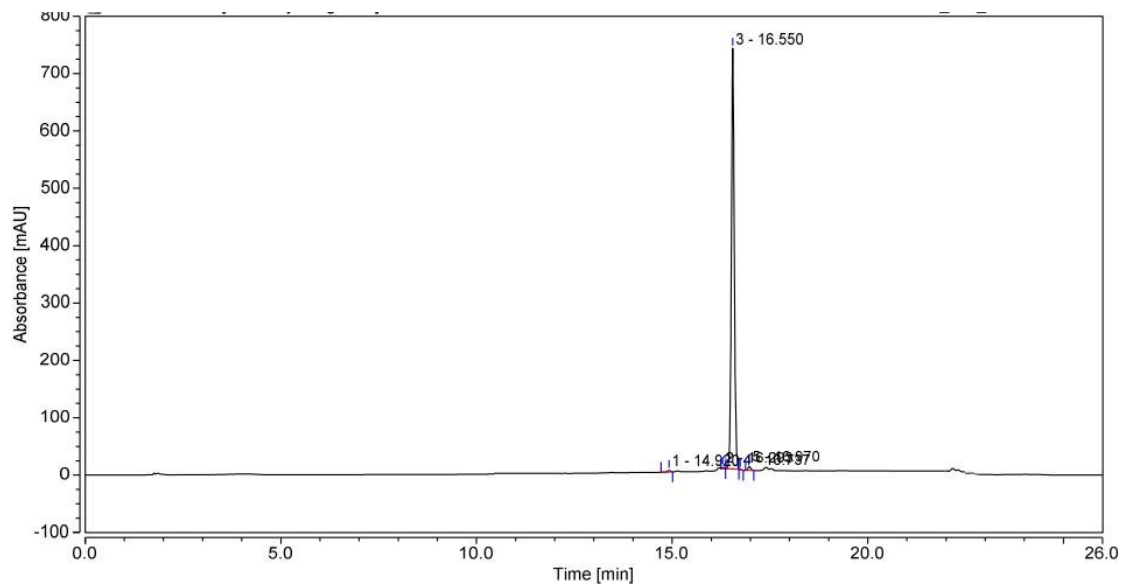
HRMS spectrum of D26



<sup>1</sup>H NMR spectrum of D26

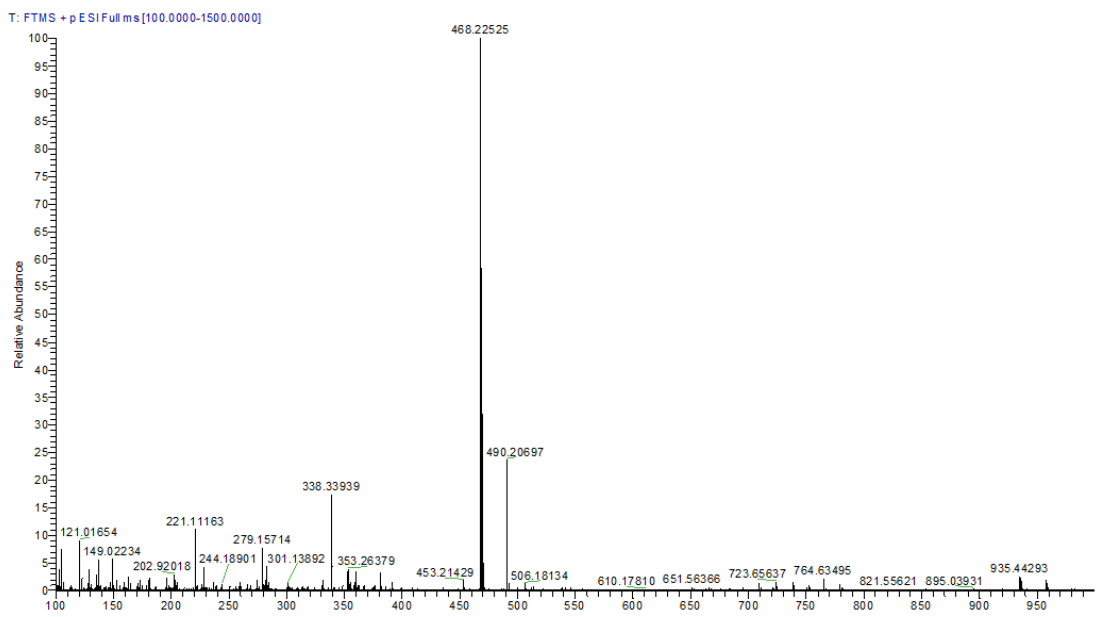


<sup>13</sup>C NMR spectrum of **D26**

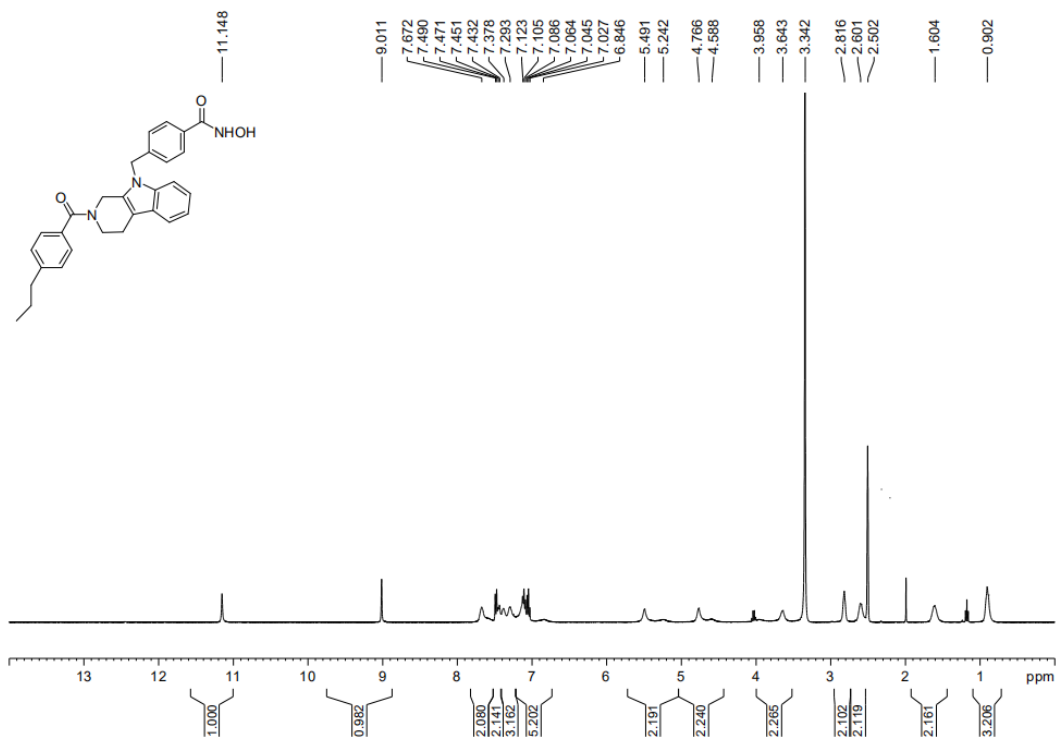


HPLC spectrum of **D26**

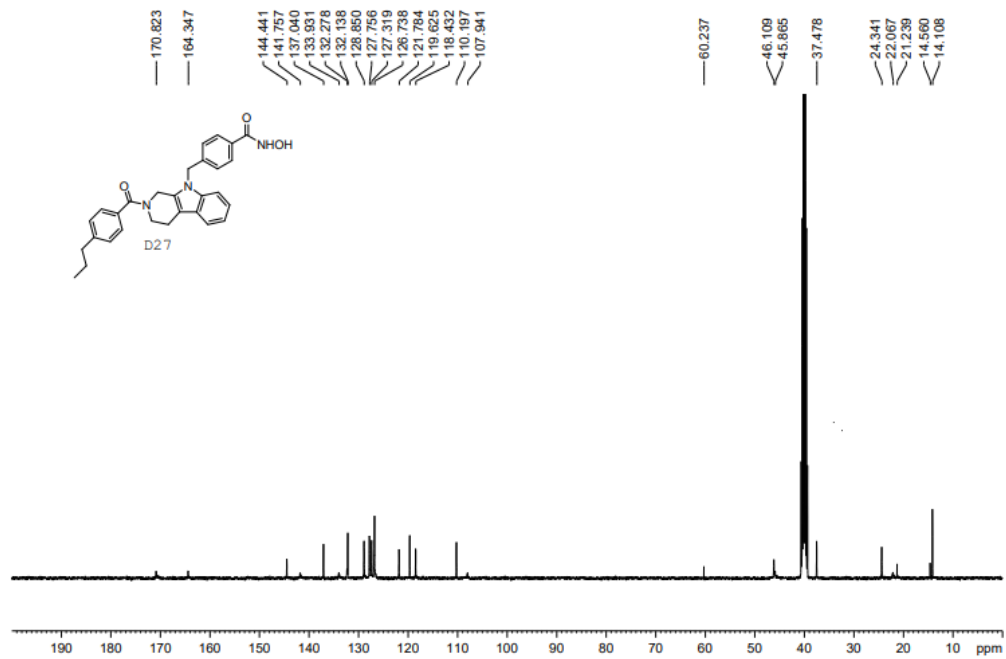




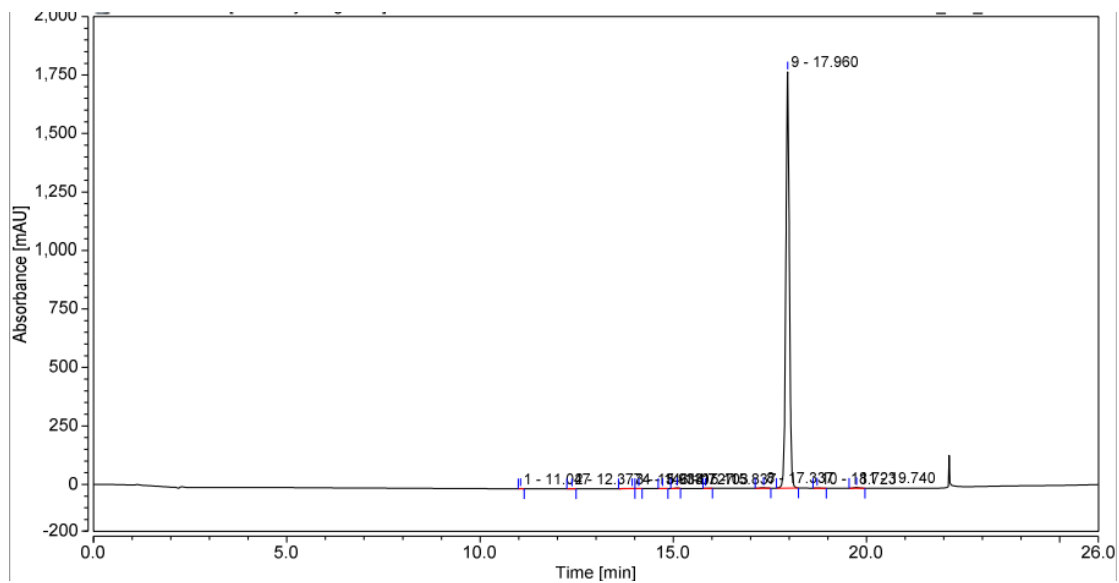
HRMS spectrum of D27



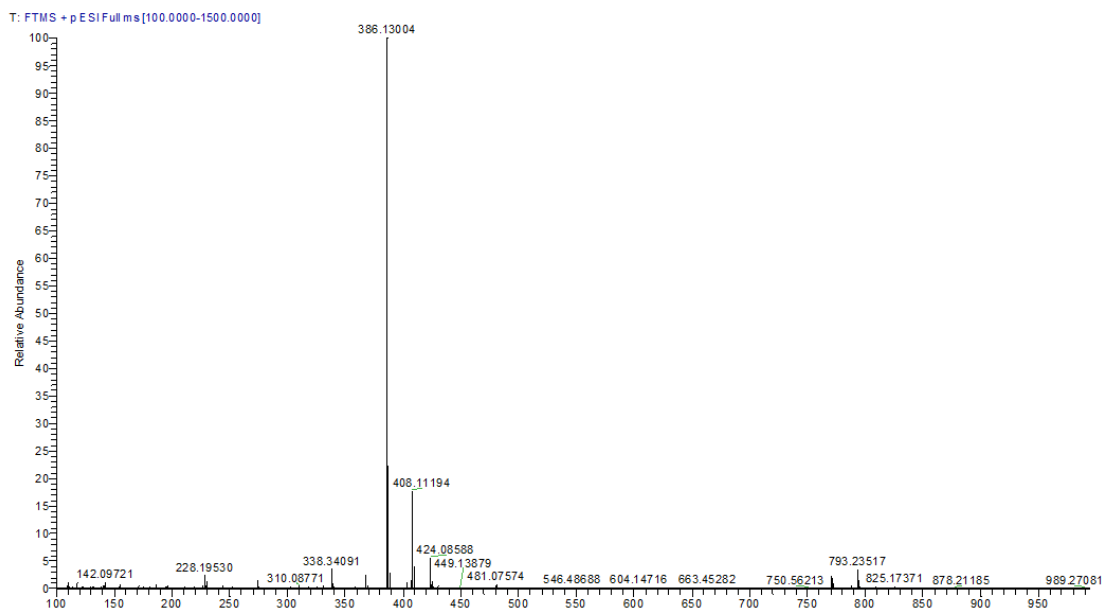
<sup>1</sup>H NMR spectrum of D27



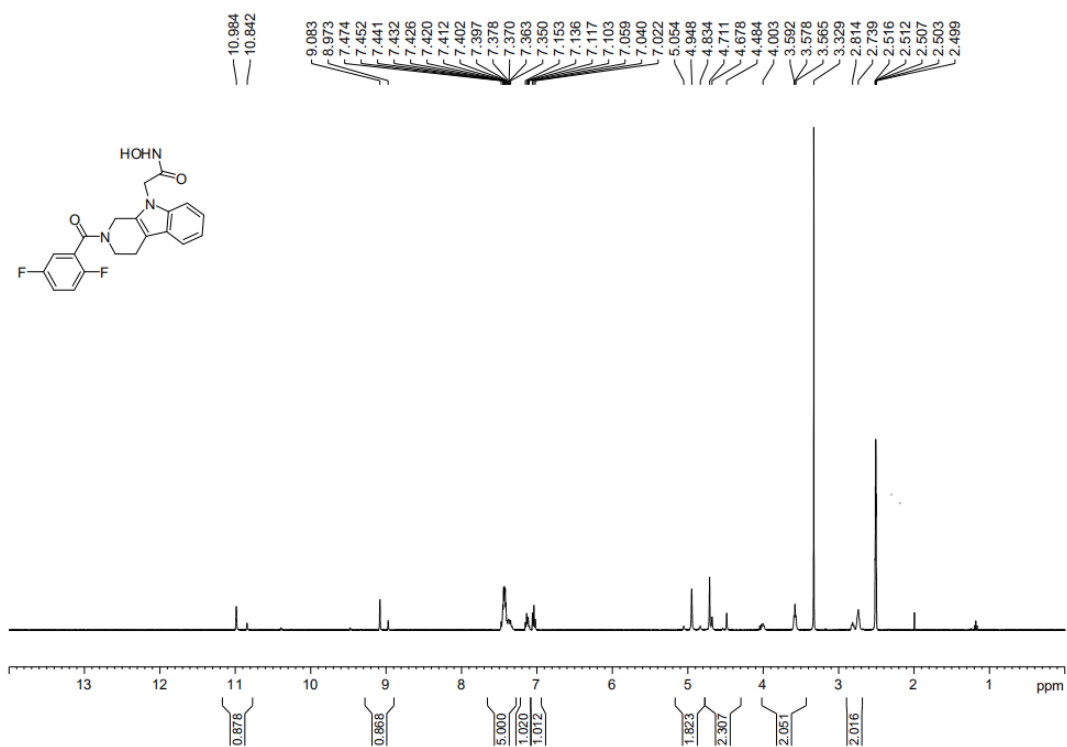
<sup>13</sup>C NMR spectrum of **D27**



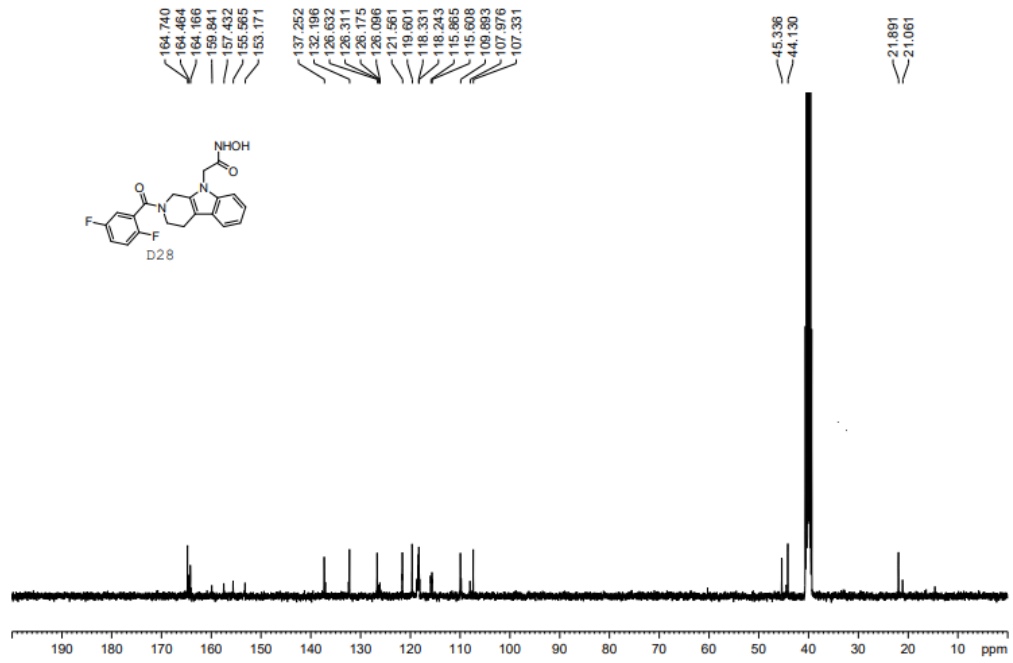
HPLC spectrum of **D27**



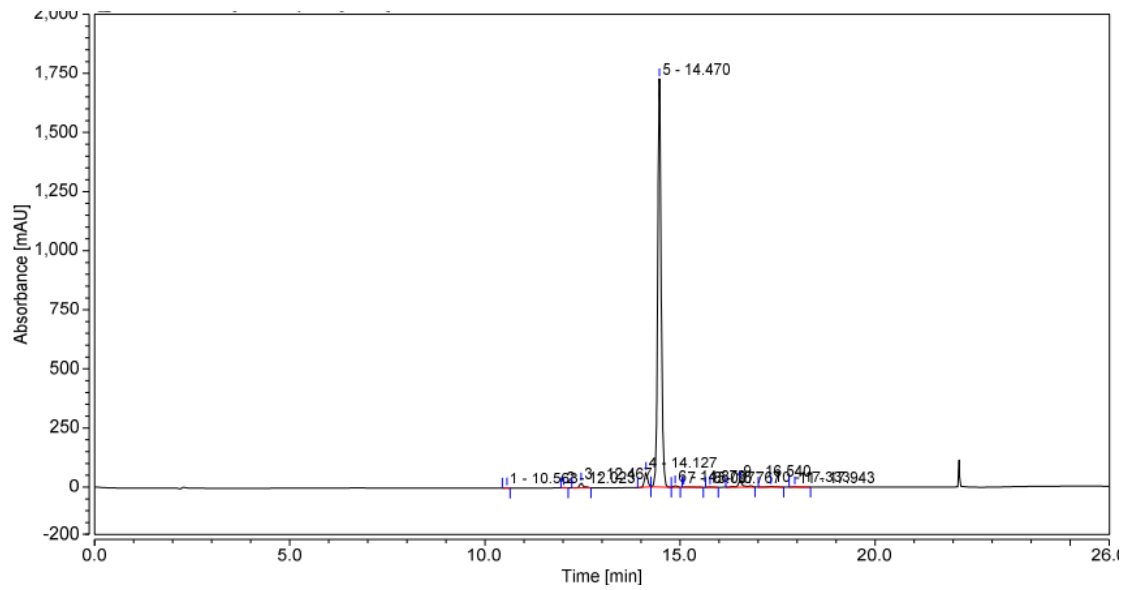
HRMS spectrum of D28



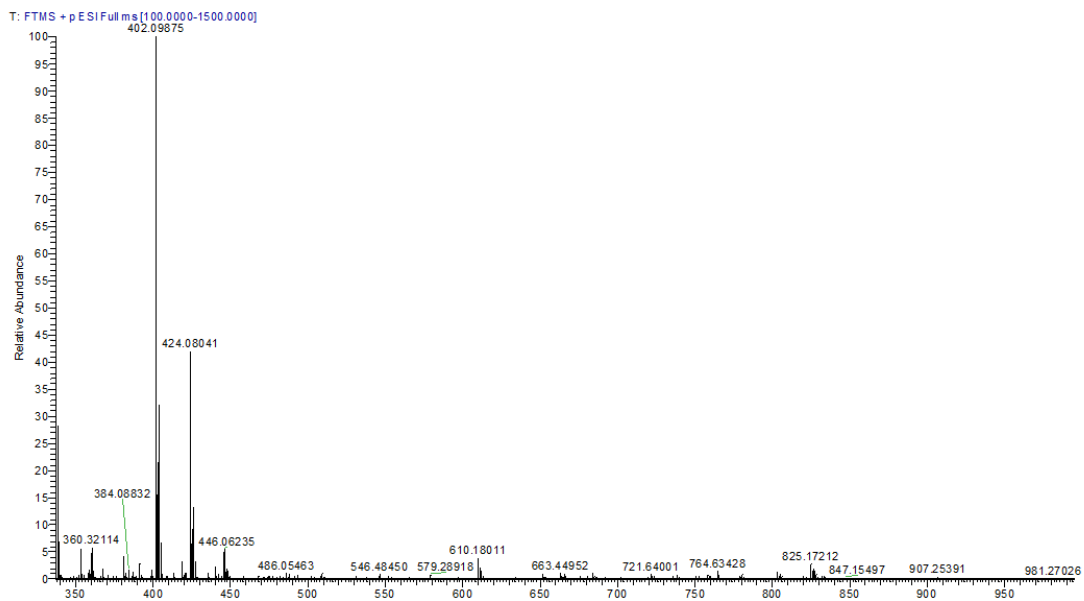
<sup>1</sup>H NMR spectrum of D28



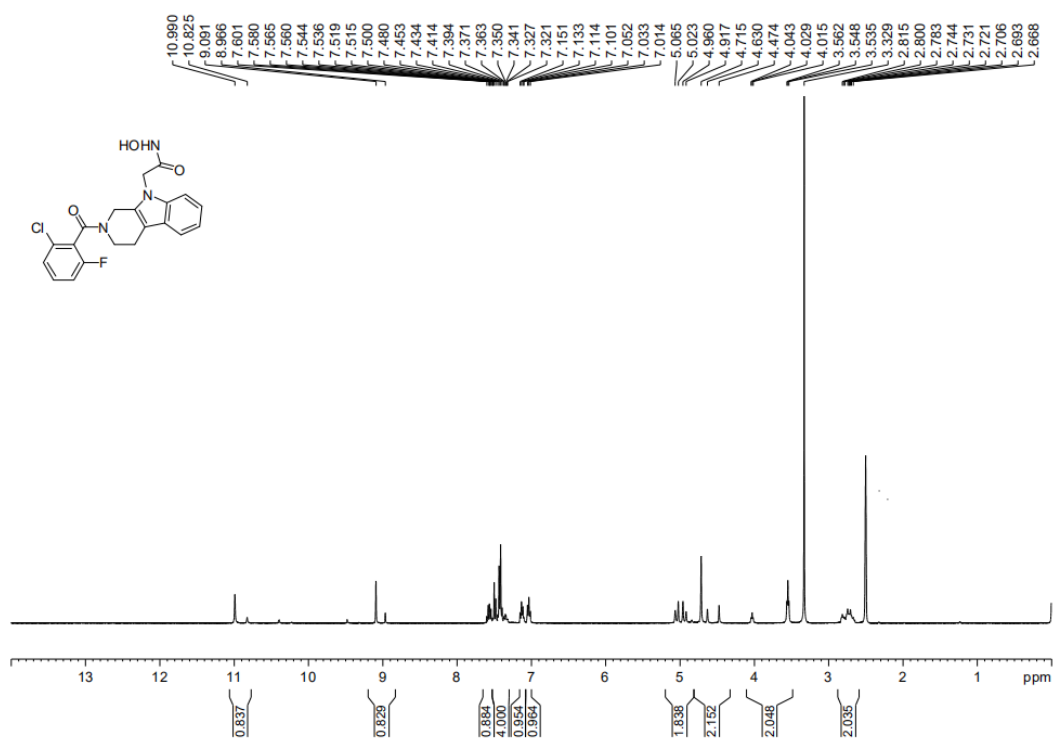
<sup>13</sup>C NMR spectrum of **D28**



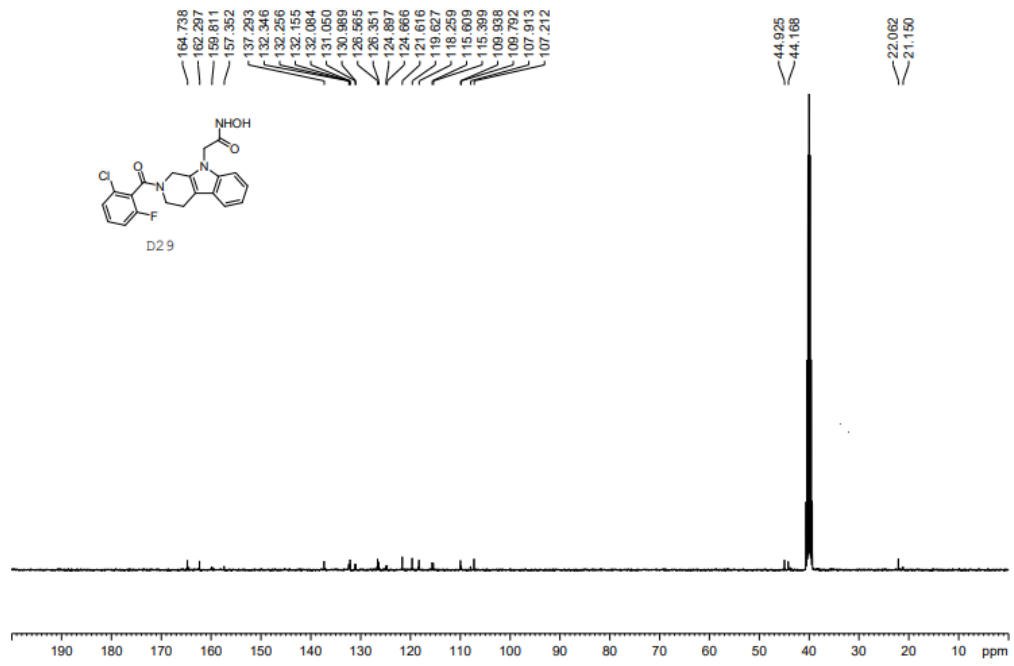
HPLC spectrum of **D28**



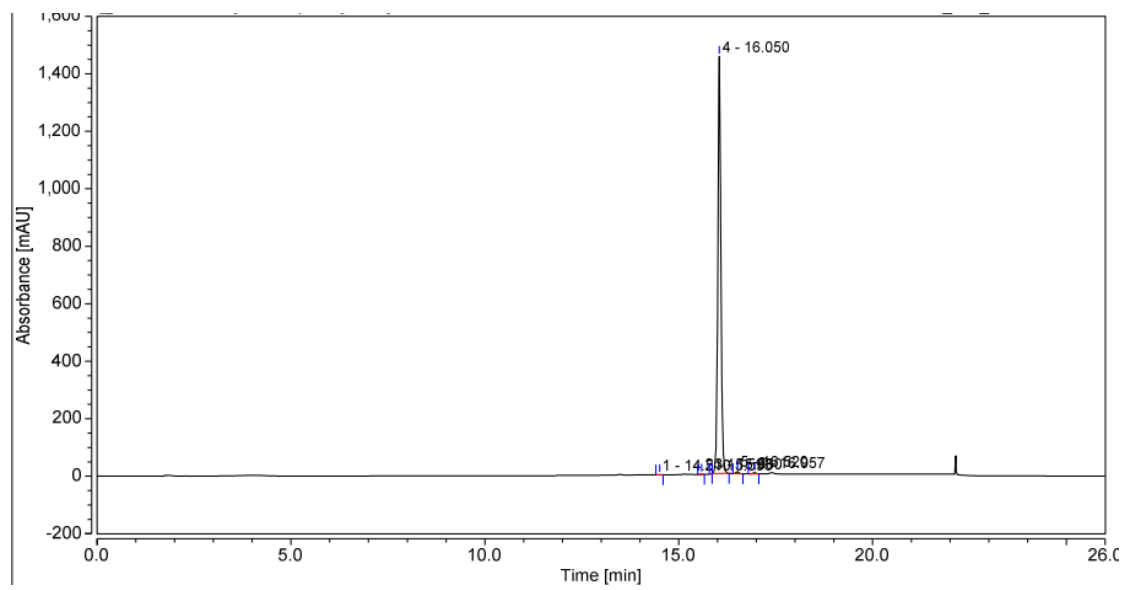
HRMS spectrum of **D29**



$^1\text{H}$  NMR spectrum of **D29**



<sup>13</sup>C NMR spectrum of D29



HPLC spectrum of D29