

Supporting Information
SYNTHESIS OF 1-AZASPIRO[4.5]DECAN-2-ONE FROM L-
ASPARAGINE AND L-ASPARTIC ACID

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(3S,5S)-1-Allyl-3-(dibenzylamino) 1-azaspiro[4.5]decan-2-one (32)

R_f (4:1 hexane/EtOAc) 0.53; ¹H NMR (300 MHz, CDCl₃) δ 7.43 (d, *J* = 7.1 Hz, 4H), 7.40-7.15 (m, 6H), 5.82 (dddd, *J* = 17.1, 10.2, 7.2, 6.8 Hz, 1H), 5.77 (d, *J* = 10.1 Hz, 1H), 5.60 (dt, *J* = 10.1, 2.0 Hz, 1H), 5.17 (d, *J* = 17.1 Hz, 1H), 5.10 (d, *J* = 10.2 Hz, 1H), 4.10-3.93 (m, 3H), 3.980-3.59 (m, 4H), 2.30-2.10 (m, 3H), 1.91-1.79 (m, 1H), 1.78-1.58 (m, 3H), 1.50 (d, *J* = 5.5 Hz, 1H); ¹³C NMR (75 MHz, CDCl₃) δ 173.8, 139.9 (2C), 134.8, 129.4, 128.5 (4C), 128.3 (4C), 126.9 (2C), 124.8, 116.4, 59.0, 58.1, 54.5, 50.8, 41.9, 33.9, 33.6, 33.3, 23.2; [α]₂₅^D -6.4 (*c* 1.0, CHCl₃); ν_{max} (film) 3084, 3029, 2939, 2847, 1689, 1362, 1195, 1130, 698 cm⁻¹; ESI-HRMS calculated for C₂₆H₃₁N₂O [M+H]⁺ 387.2431, found 387.2436.

(3S,5S) -3-(Dibenzylamino) 1-propargyl -1-azaspiro[4.5]decan-2-one (33)

R_f (4:1 hexane/EtOAc) 0.44; ¹H NMR (300 MHz, CDCl₃) δ 7.50-7.10 (m, 10H), 5.75-5.64 (m, 1H), 5.60-5.49 (m, 1H), 4.05-3.91 (m, 3H), 3.85-3.63 (m, 4H), 2.44 (d, *J* = 18.5 Hz, 1H), 2.30-2.18 (m, 4H), 2.15 (t, *J* = 2.4 Hz, 1H), 1.80-1.60 (m, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 173.4, 139.8 (2C), 128.8 (4C), 128.4 (4C), 126.9 (2C), 126.4, 124.7, 80.0, 70.7, 59.1, 58.0, 54.6, 53.4, 33.8, 33.5, 32.8, 27.8, 23.1; [α]₂₅^D -31.7 (*c* 1.0, CHCl₃); ν_{max} (film) 3270, 3042, 3020, 2938, 2847, 1688, 1360, 1195, 1131, 698 cm⁻¹; ESI-HRMS calculated for C₂₆H₂₉N₂O [M+H]⁺ 385.2274, found 385.2275.

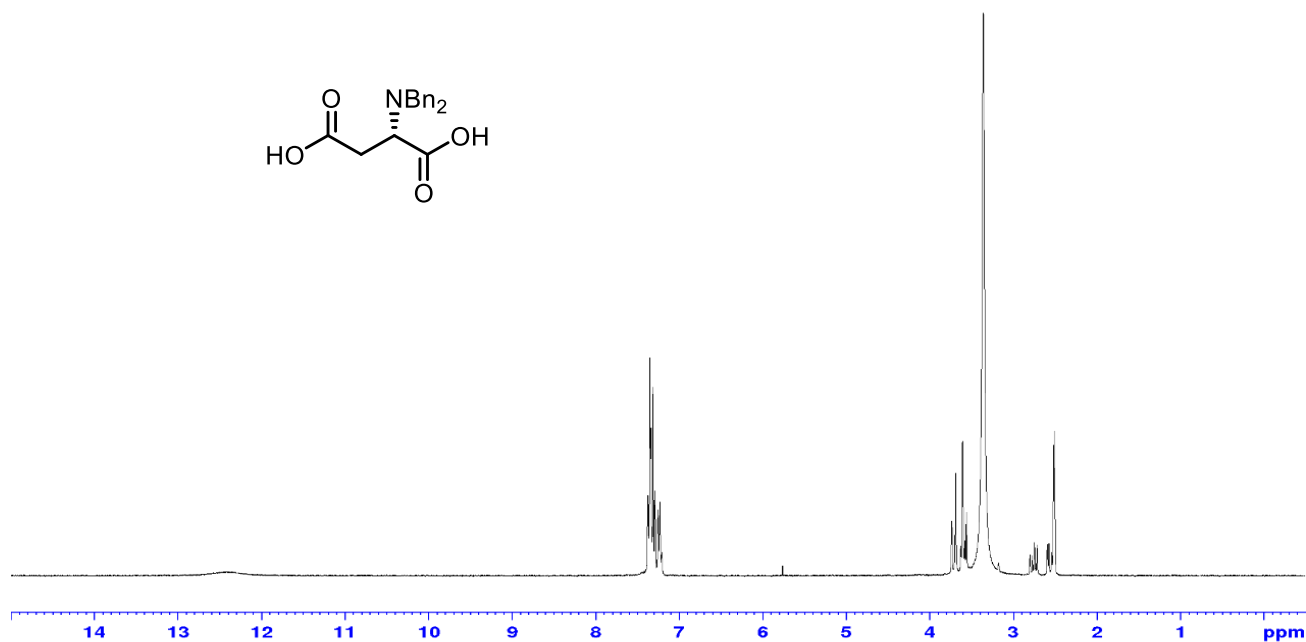
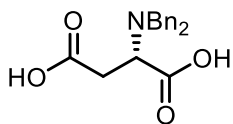
(3S,5S) -1-(5-Bromo-3,4-dimethoxyphenylethyl)-3-(dibenzylamino)- 1-azaspiro[4.5]decan-2-one (34)

R_f (4:1 hexane/EtOAc) 0.63; ¹H NMR (300 MHz, CDCl₃) δ 7.44 (d, *J* = 7.2 Hz, 4H), 7.40-7.08 (m, 6H), 6.97 (s, 1H), 6.84 (s, 1H), 5.74-5.63 (m, 1H), 5.47-5.58 (m, 1H), 3.99 (d, *J* = 14.0 Hz, 2H), 3.84 (s, 3H), 3.80 (s, 3H), 3.79-3.68 (m, 3H), 3.52-3.40 (m, 1H), 3.22-3.11 (m, 1H), 3.08-2.94 (m, 2H), 2.26-2.10 (m, 4H), 1.98 (q, *J* = 8.0 Hz, 1H), 1.75-1.58 (m, 2H), 1.35 (d, *J* = 9.3 Hz, 1H); ¹³C NMR (75 MHz, CDCl₃) δ 174.5, 148.5, 148.3, 139.7 (2C), 138.2, 129.2, 128.8 (4C), 128.4 (4C), 126.9 (2C), 126.5, 124.8, 115.5, 114.0, 57.5, 56.1, 56.0, 55.9, 54.5, 38.7, 31.9, 30.3, 30.0, 29.3, 27.3, 20.9; [α]₂₅^D +6.6 (*c* 1.1, CHCl₃); ν_{max} (film) 3084, 3029, 2939, 2847, 1688, 1360, 1195, 1075, 697 cm⁻¹; ESI-HRMS calculated for C₃₃H₃₈BrN₂O₃ [M+H]⁺ 589.2060, found 589.2064.

(3S,5S)-1-(5-Bromobenzo[*d*][1,3]-dioxol-6-yl)-3-(dibenzylamino)-1-azaspiro[4.5]-7-decan-2-one (35)

R_f (4:1 hexane/EtOAc) 0.55; ¹H NMR (300 MHz, CDCl₃) δ 7.45 (d, *J* = 7.1 Hz, 4H), 7.40-7.20 (m, 6H), 6.96 (s, 1H), 6.84 (s, 1H), 5.96 (s, 1H), 5.84 (s, 1H), 5.75-5.60 (m, 1H), 5.58-5.44 (m, 1H), 4.01 (d, *J* = 13.9, 2H), 3.82-3.61 (m, 3H), 3.43 (dd, *J* = 7.0, 4.7 Hz, 1H), 3.20-3.05 (m, 1H), 3.04-2.92 (m, 2H), 2.30-2.10 (m, 4H), 2.08-1.90 (m, 1H), 1.75-1.58 (m, 2H), 1.35 (d, *J* = 9.3 Hz, 1H); ¹³C NMR (75 MHz, CDCl₃) δ 172.8, 145.8, 145.5, 138.3 (2C), 130.0, 126.6 (4C), 125.5 (4C), 125.2 (2C), 124.8, 123.1, 112.8, 110.9, 109.2, 100.0, 57.2, 56.4, 52.9 (2C), 38.2, 34.0, 32.2, 31.7, 31.3, 21.6; [α]₂₅^D +15.0 (*c* 1.1, CHCl₃); ν_{max} (film) 3060, 3027, 2925, 2844, 1680, 1476, 1229, 1128, 1036, 734, 698 cm⁻¹; ESI-HRMS calculated for C₃₂H₃₄⁷⁹BrN₂O₃ [M+H]⁺ 573.1747, found 573.1752.

***N,N*-Dibenzyl-L-aspartic acid (17)**



173.16
172.94

138.73

128.89
128.66
127.42

58.15
54.58

40.81

40.53

40.25

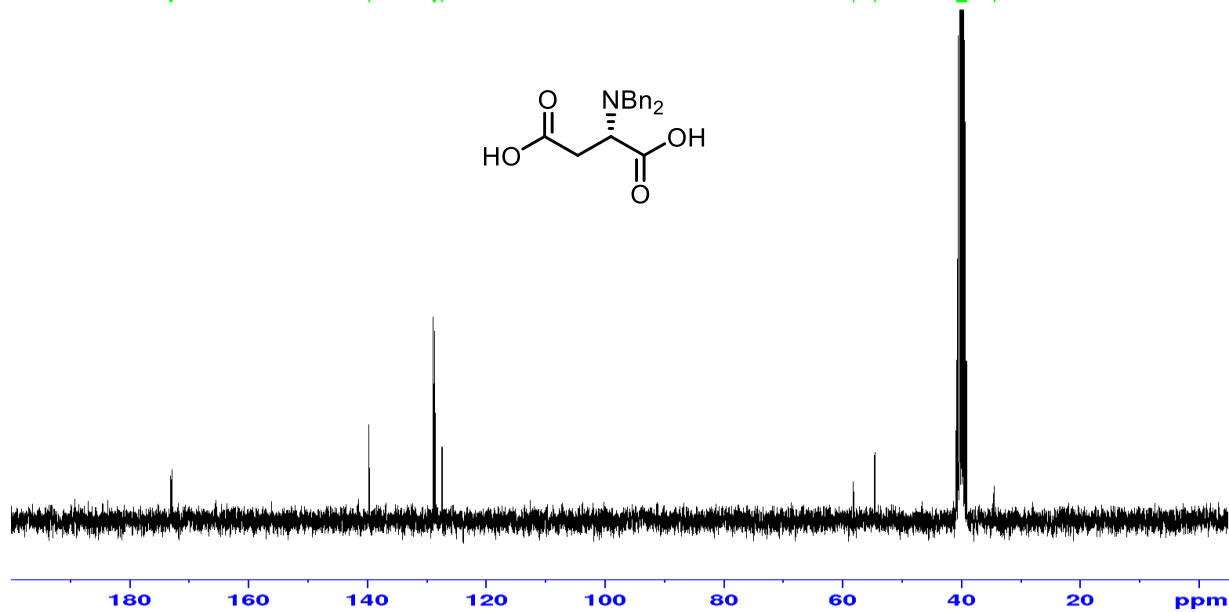
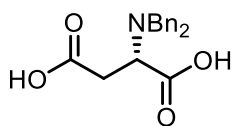
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39.70

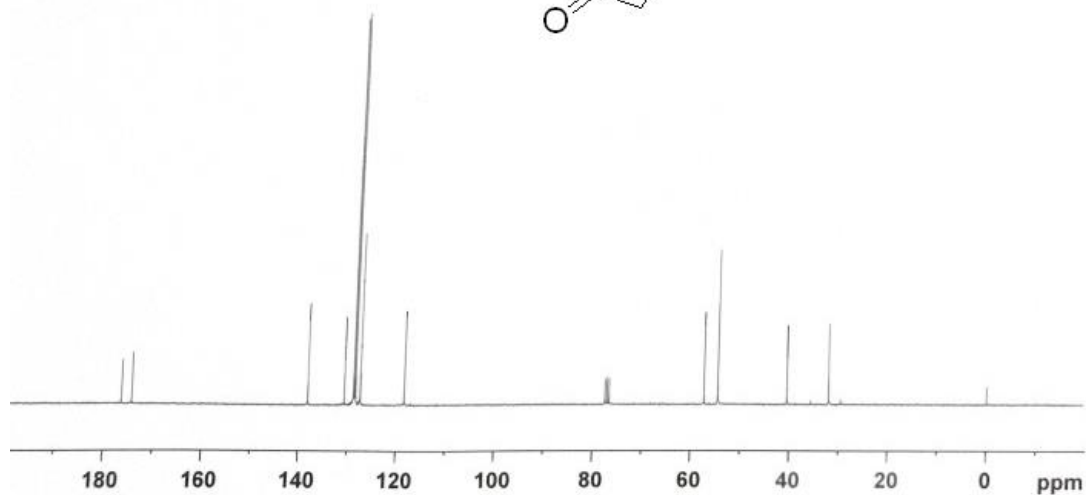
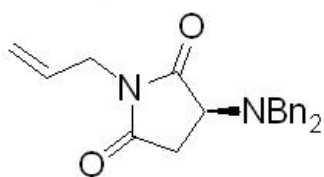
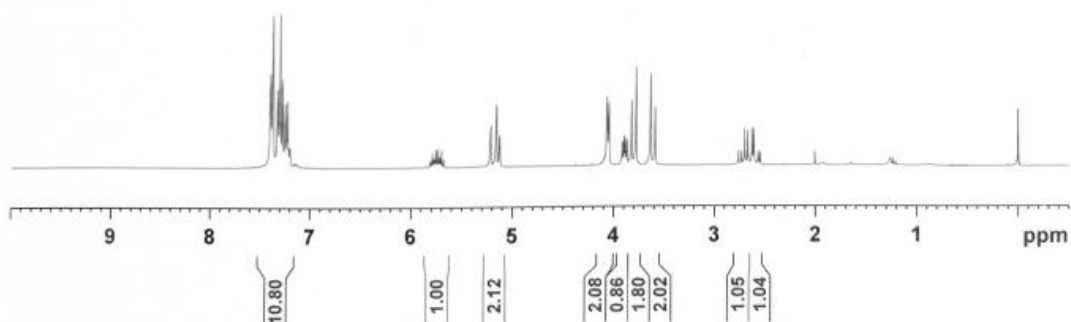
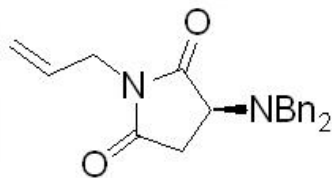
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39.14

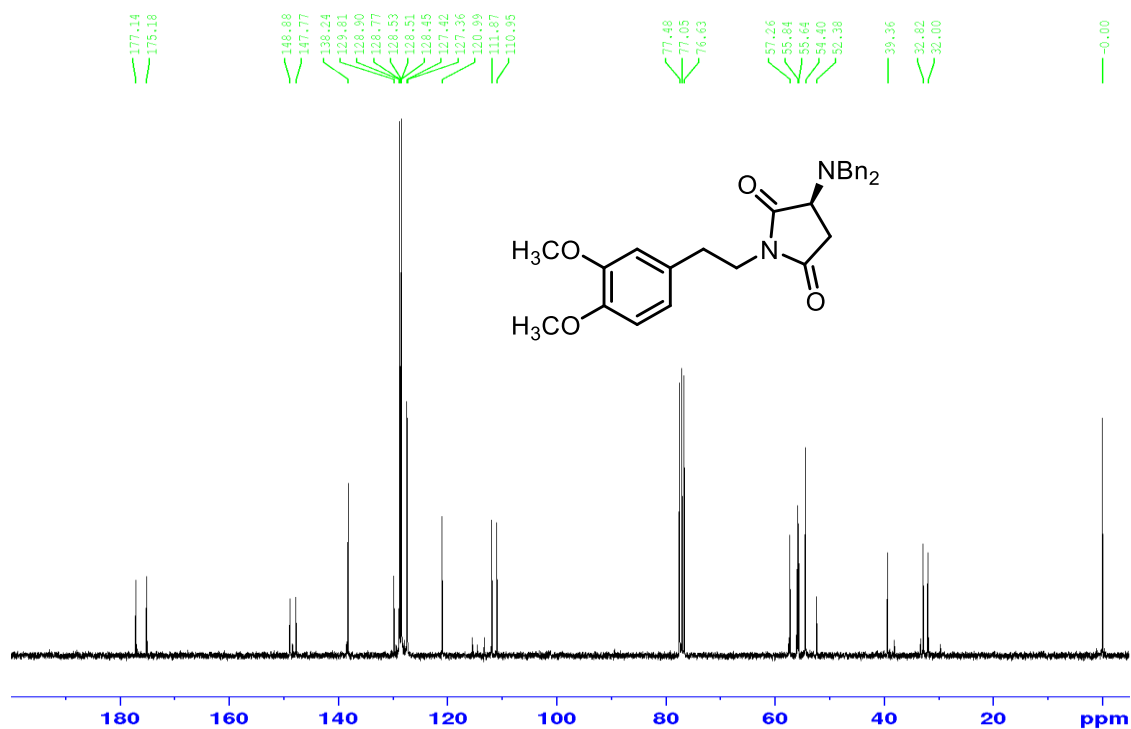
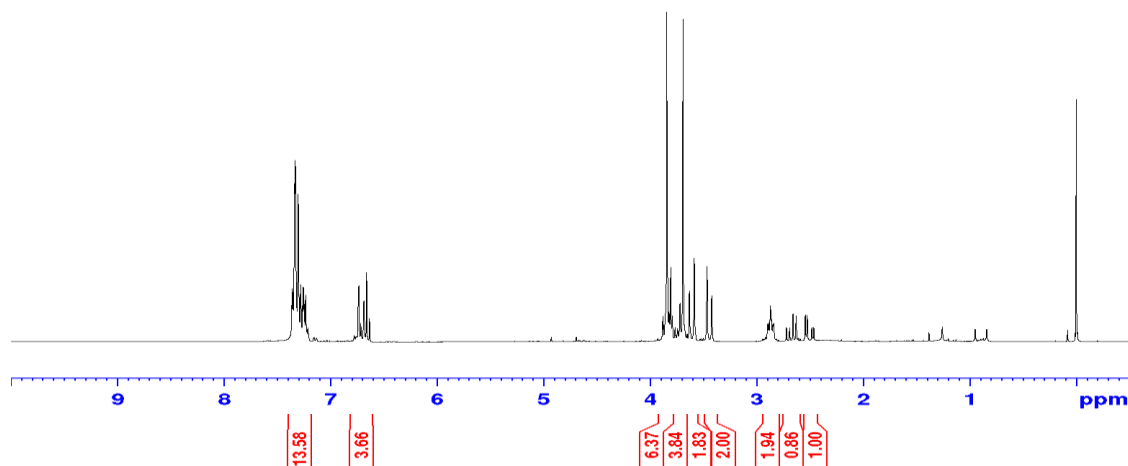
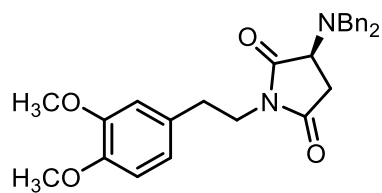
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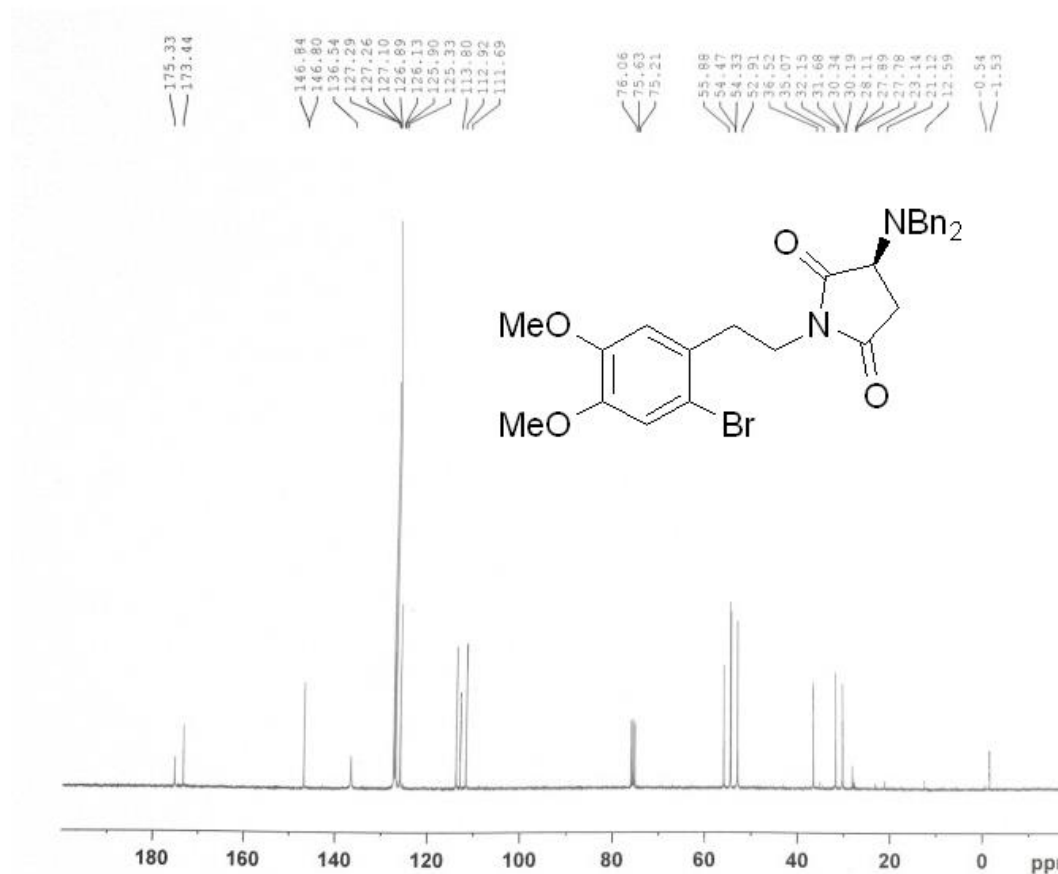
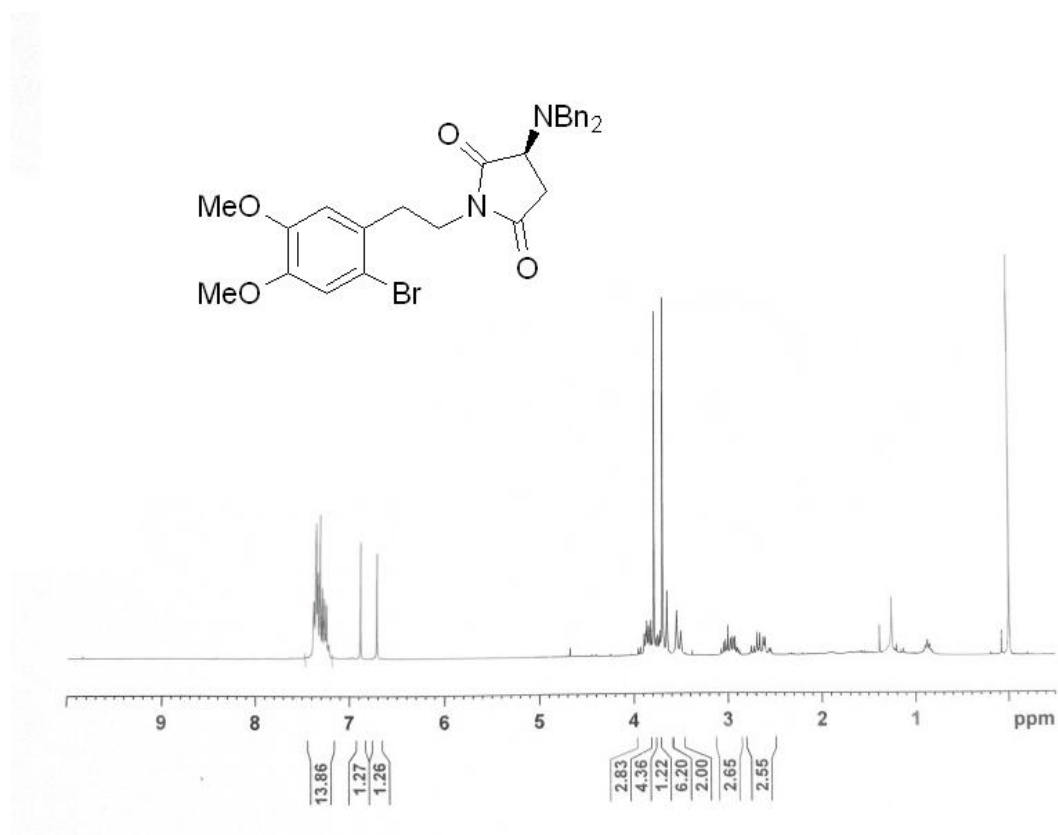
(S)-1-Allyl-3-(dibenzylamino)pyrrolidine-2,5-dione (18)



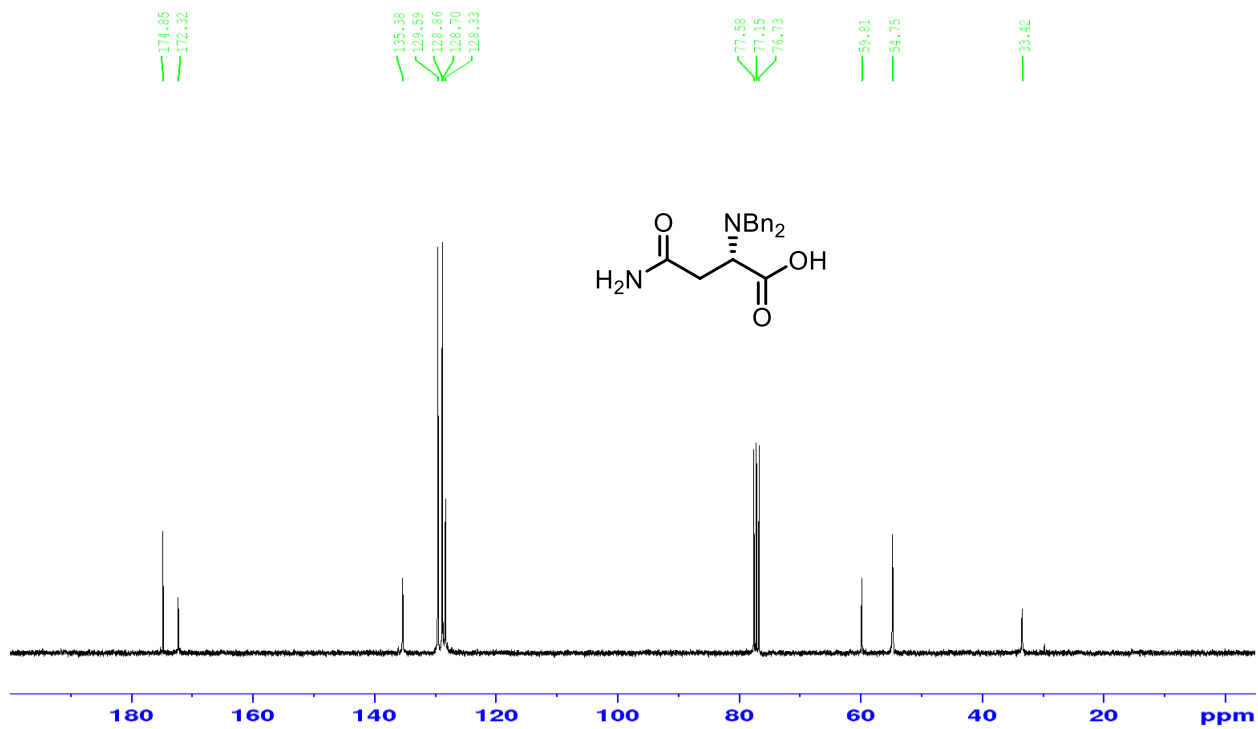
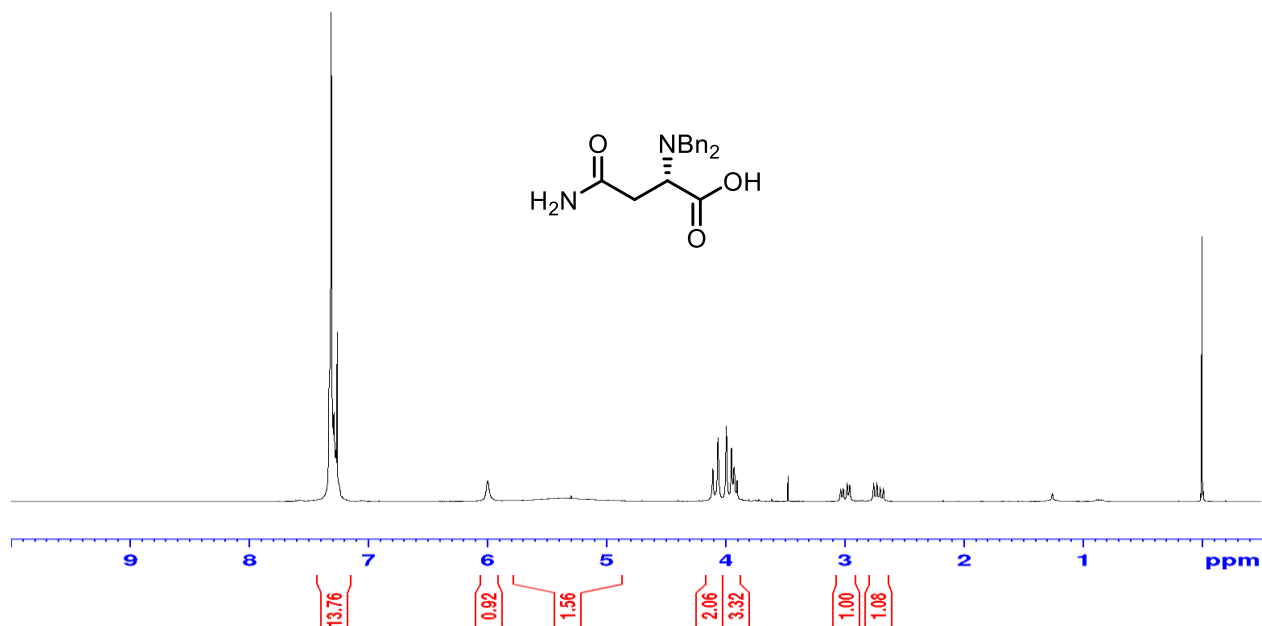
(S)-1-(3,4-Dimethoxyphenylethyl)-3-(dibenzylamino)pyrrolidine-2,5-dione (19)



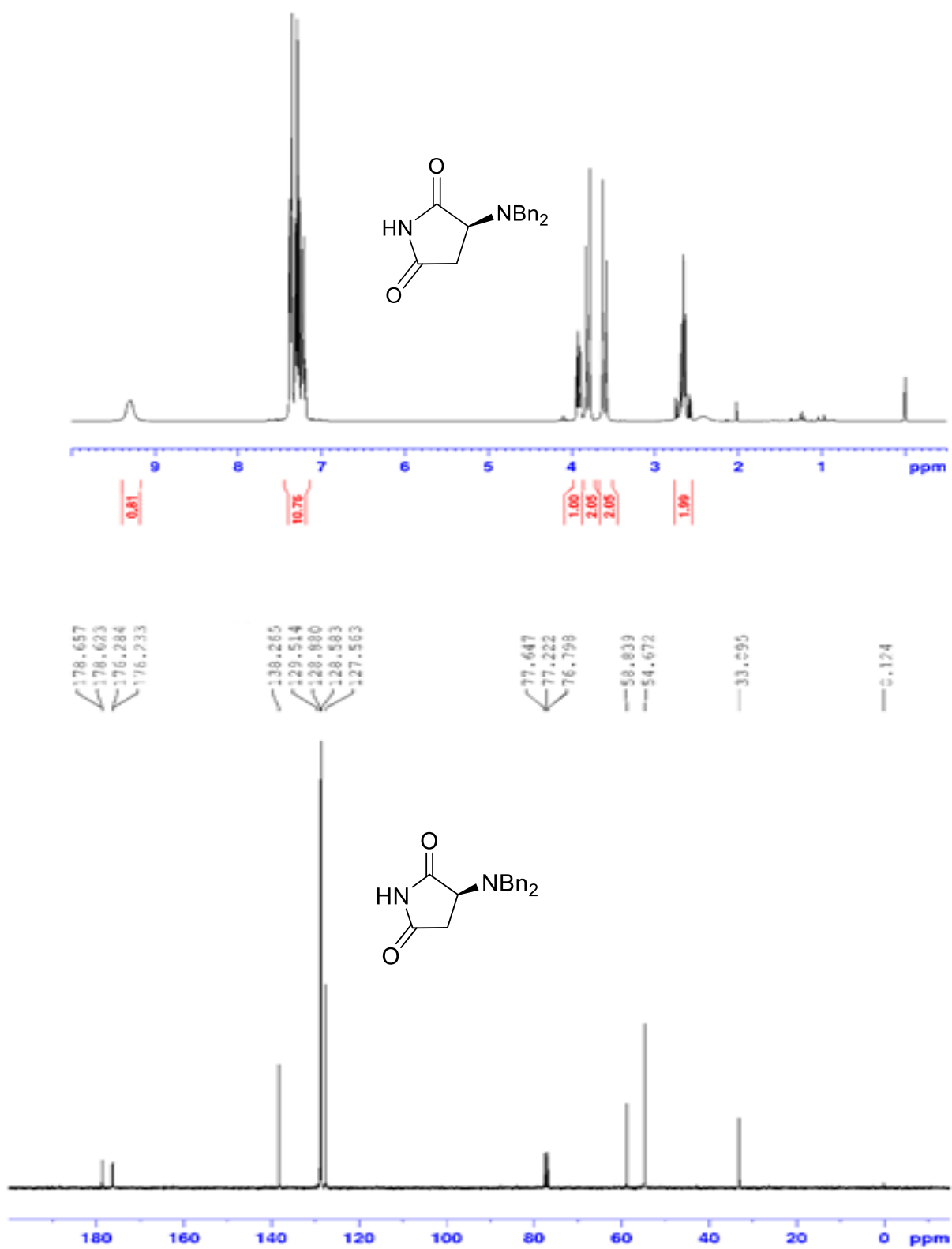
(S)-1-(2-Bromo-4,5-dimethoxyphenylethyl)-3-(dibenzylamino)pyrrolidine-2,5-dione (20)



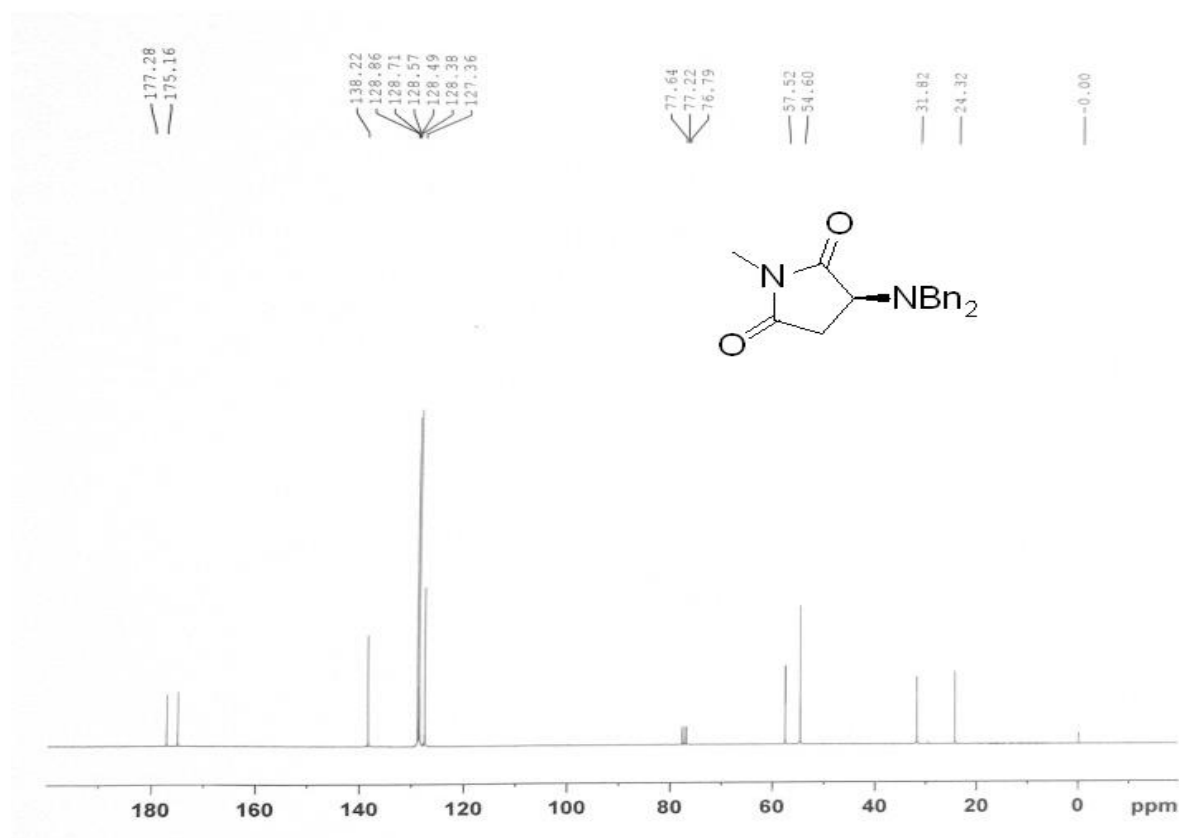
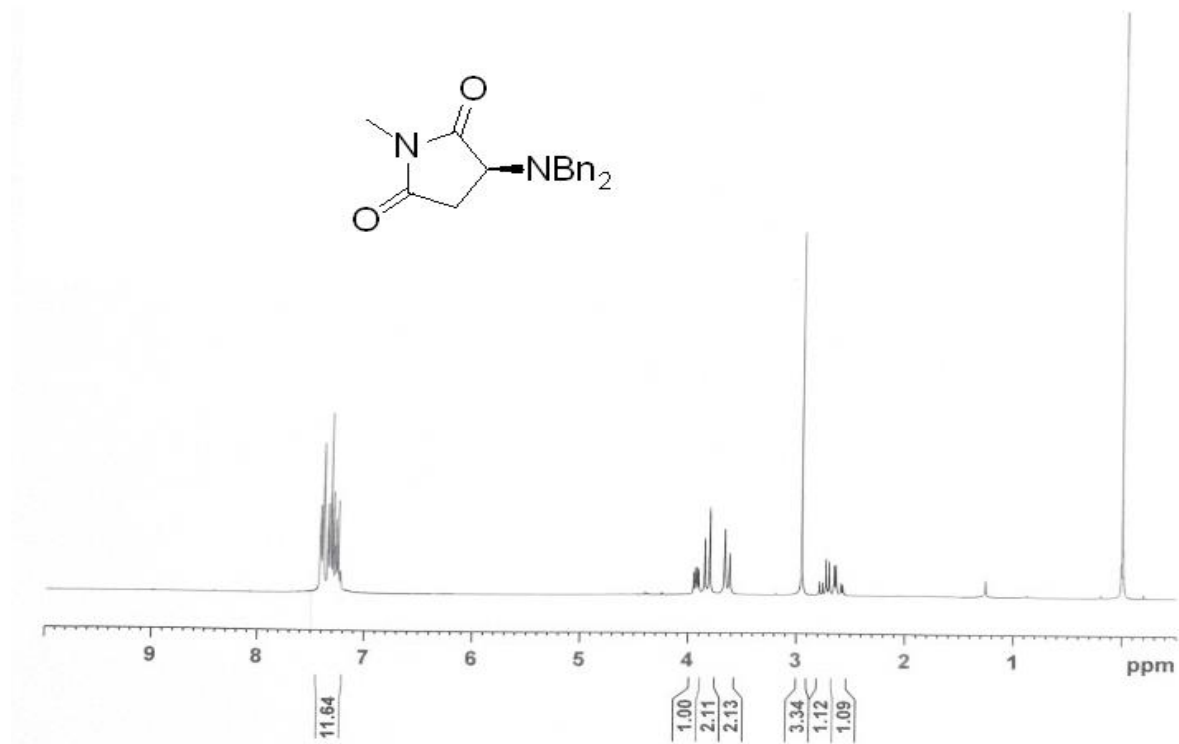
N,N-Dibenzyl-L-asparagine (21)



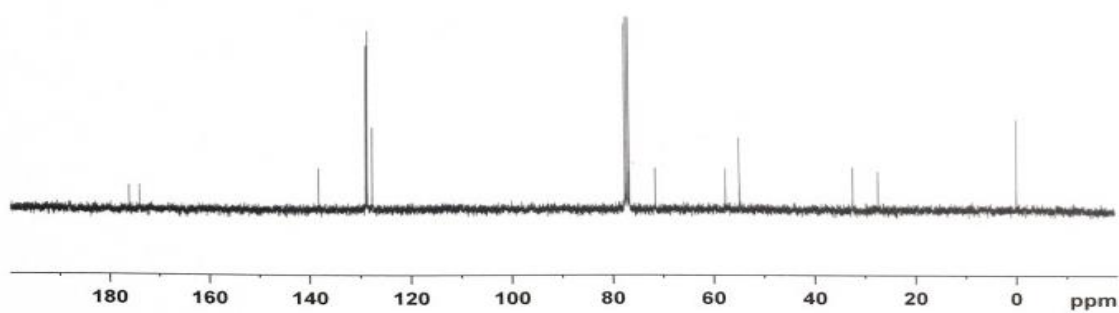
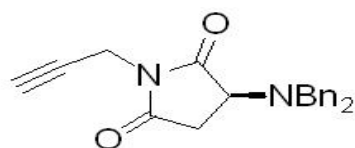
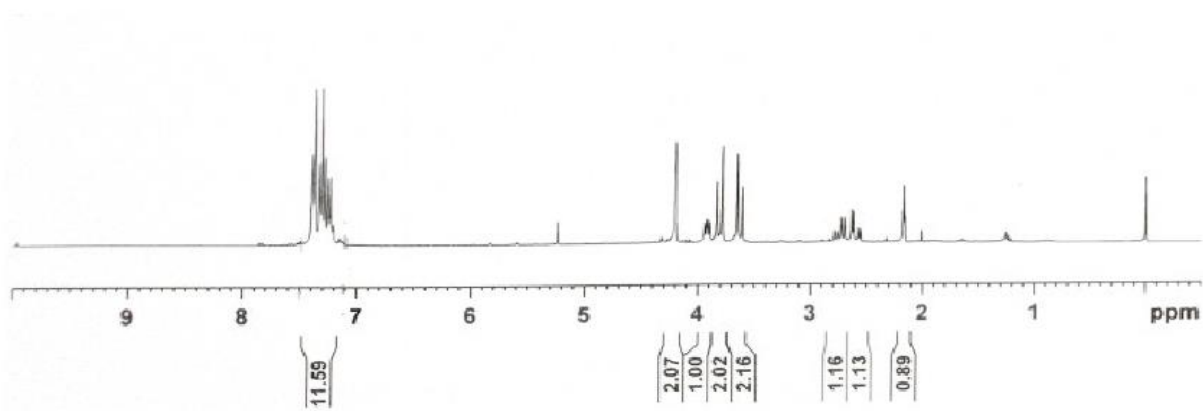
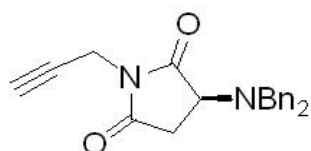
(S)-3-(Dibenzylamino)pyrrolidine-2,5-dione (22)



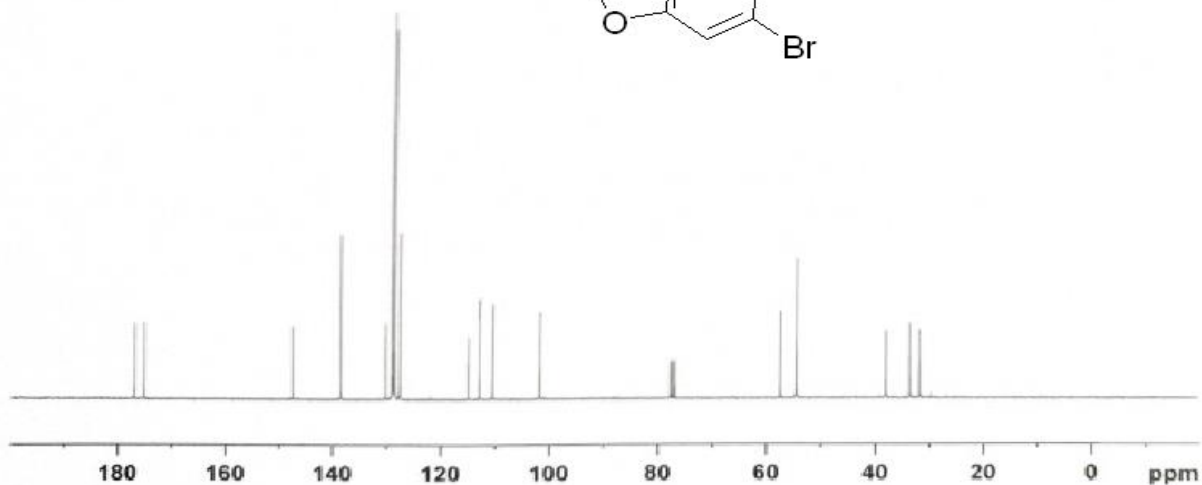
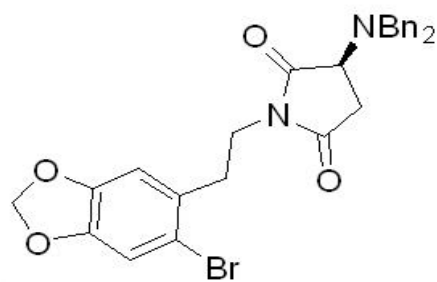
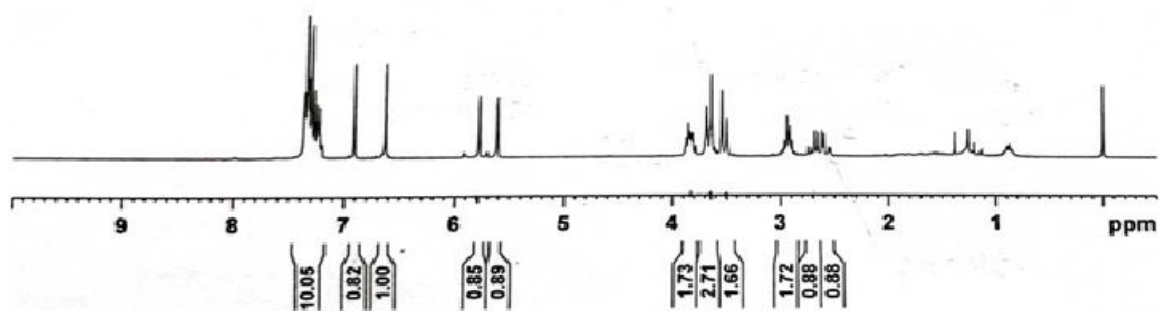
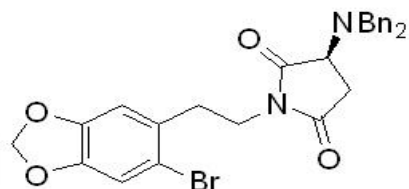
(S)-3-(Dibenzylamino)-1-methylpyrrolidine-2,5-dione (23)



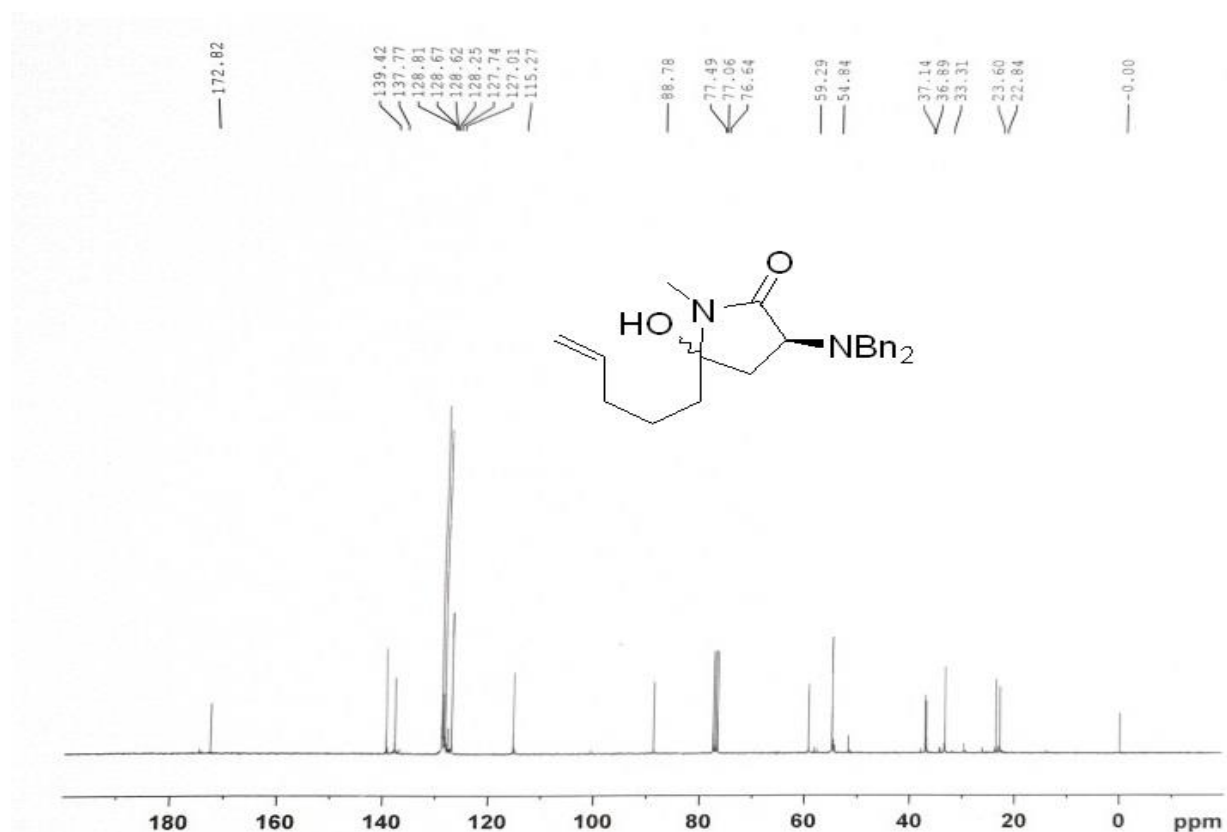
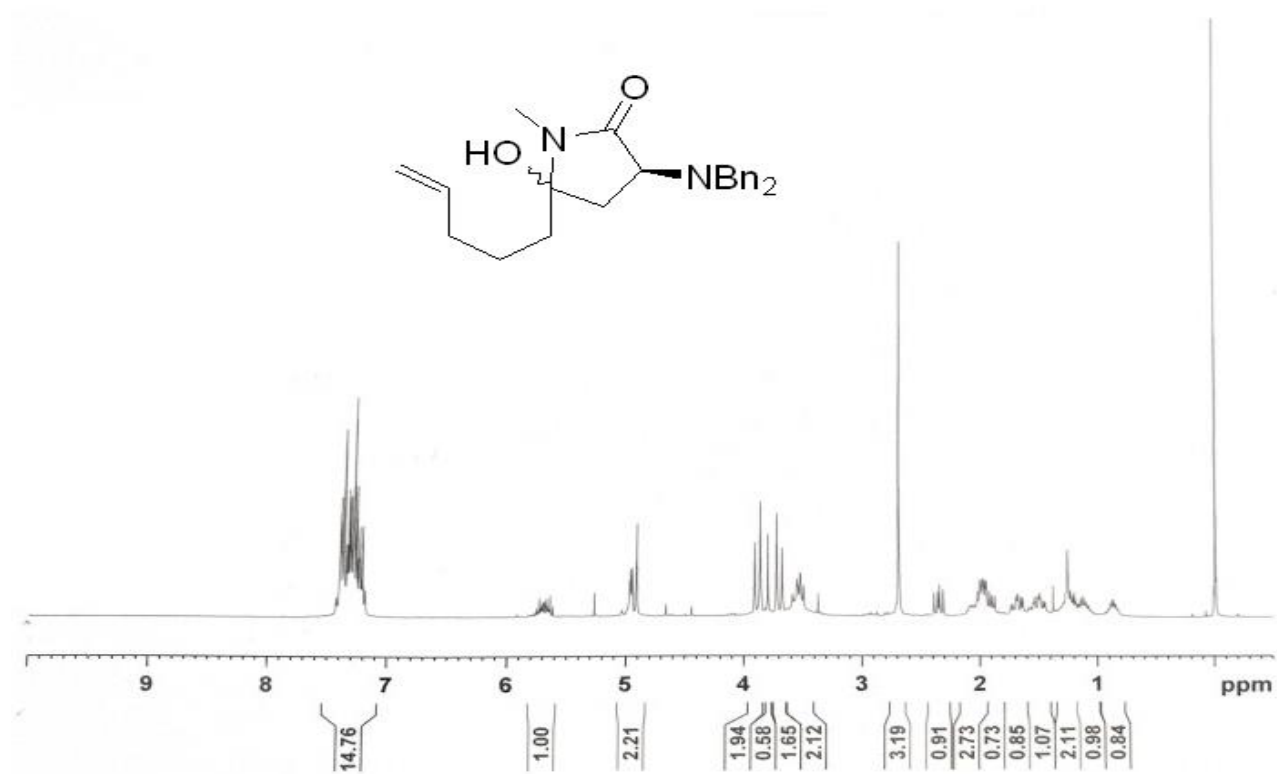
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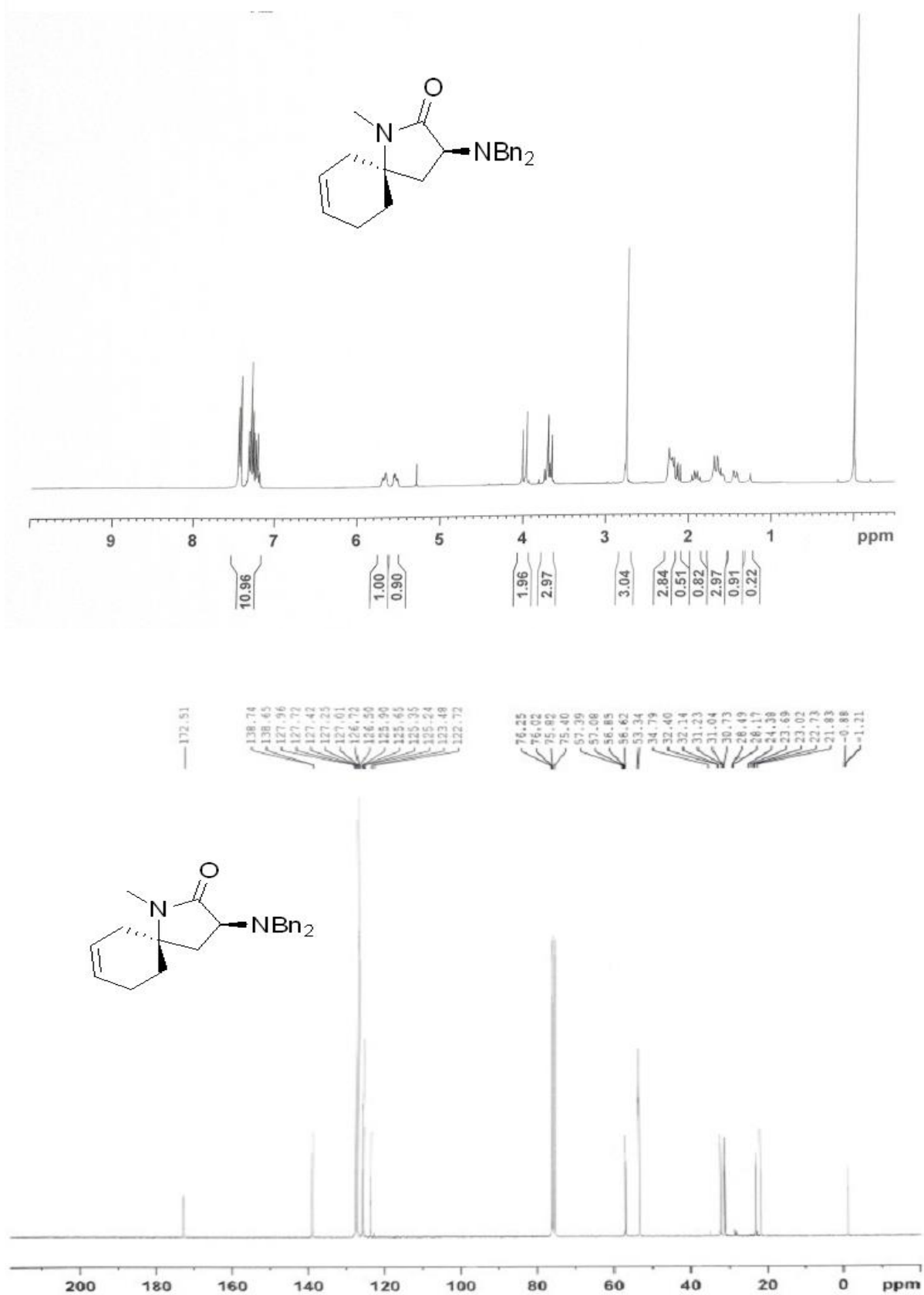
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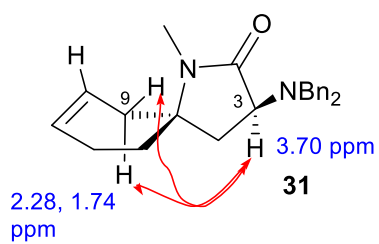
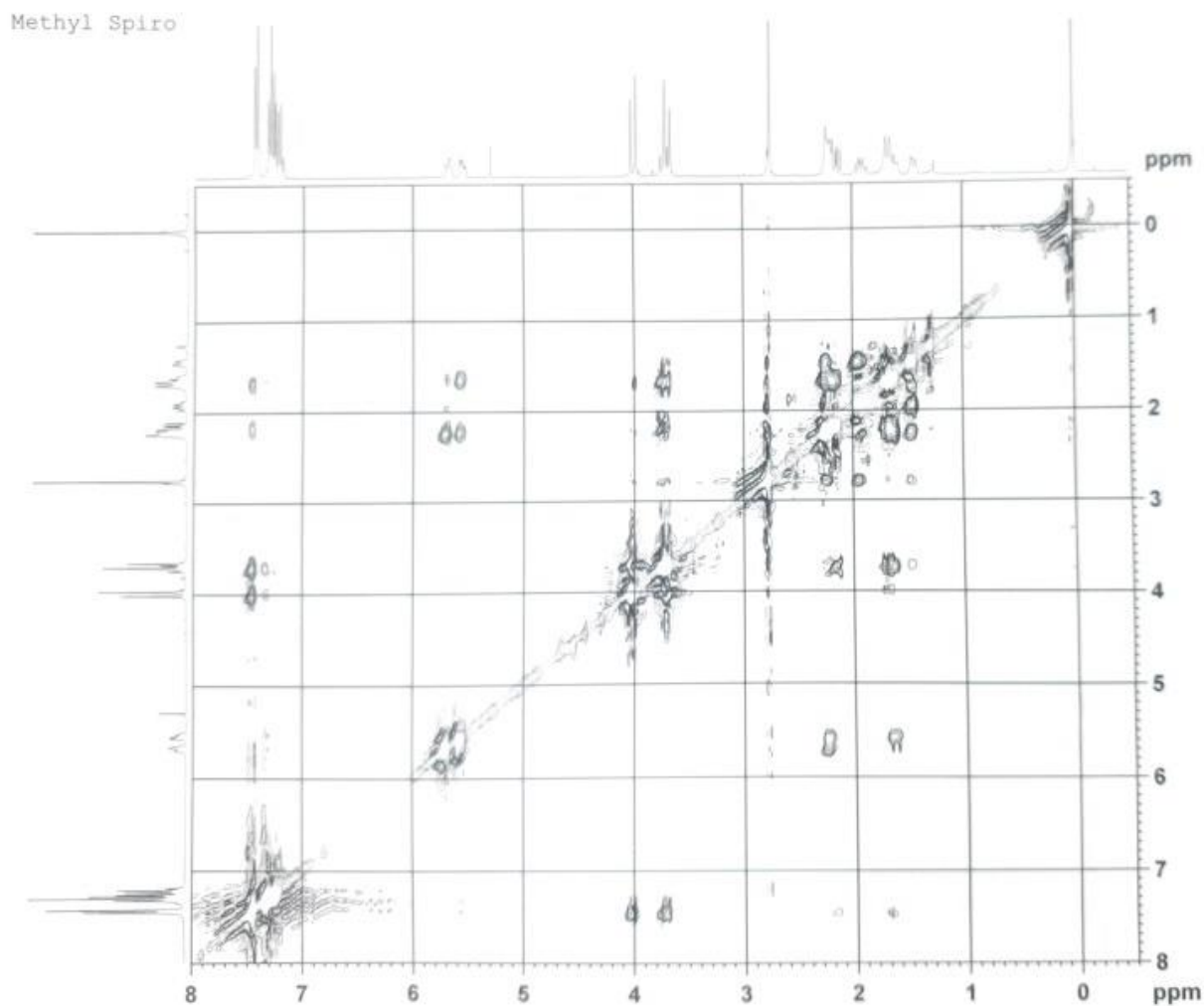
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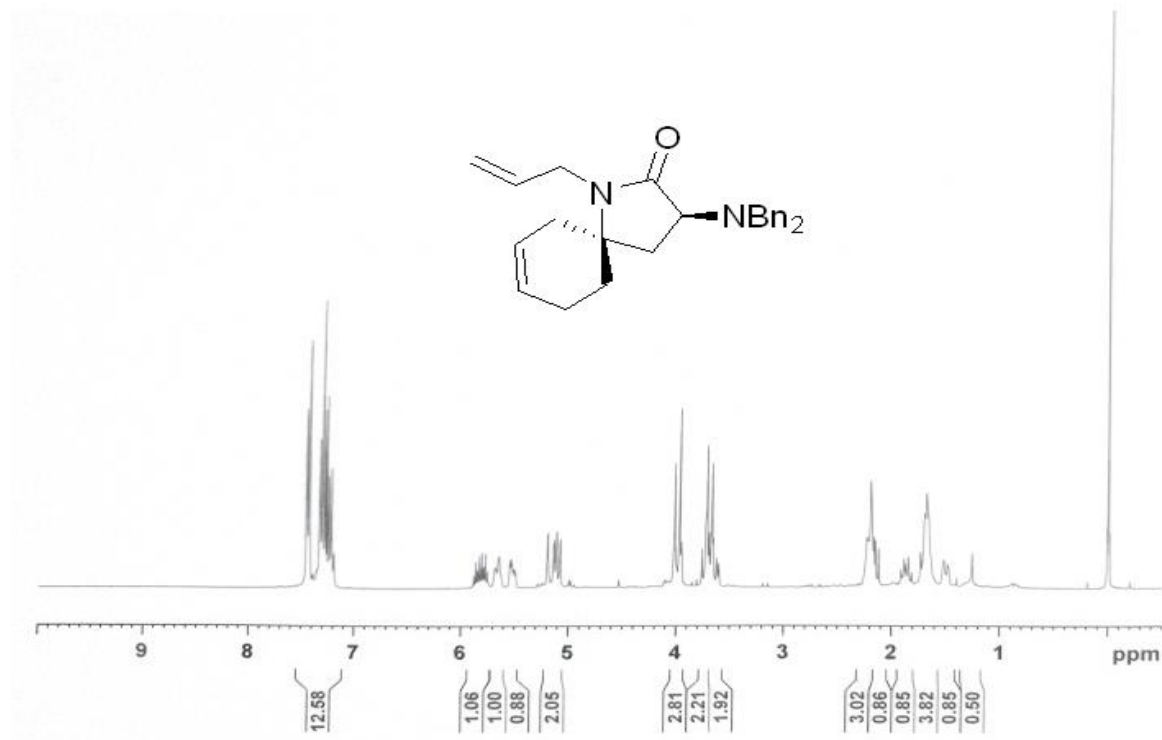
(3*S*,5*S*)-3-(Dibenzylamino)-1-methyl-1-azaspiro[4.5]-7-decen-2-one (31)



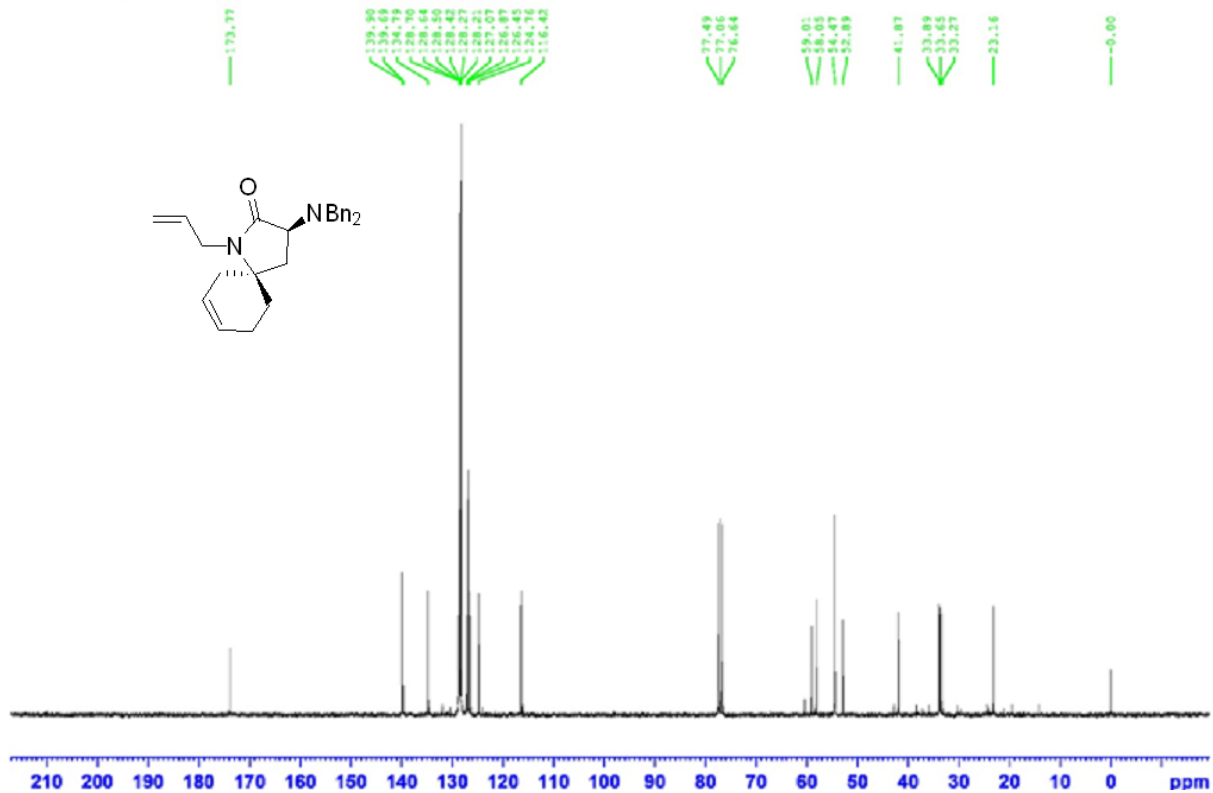
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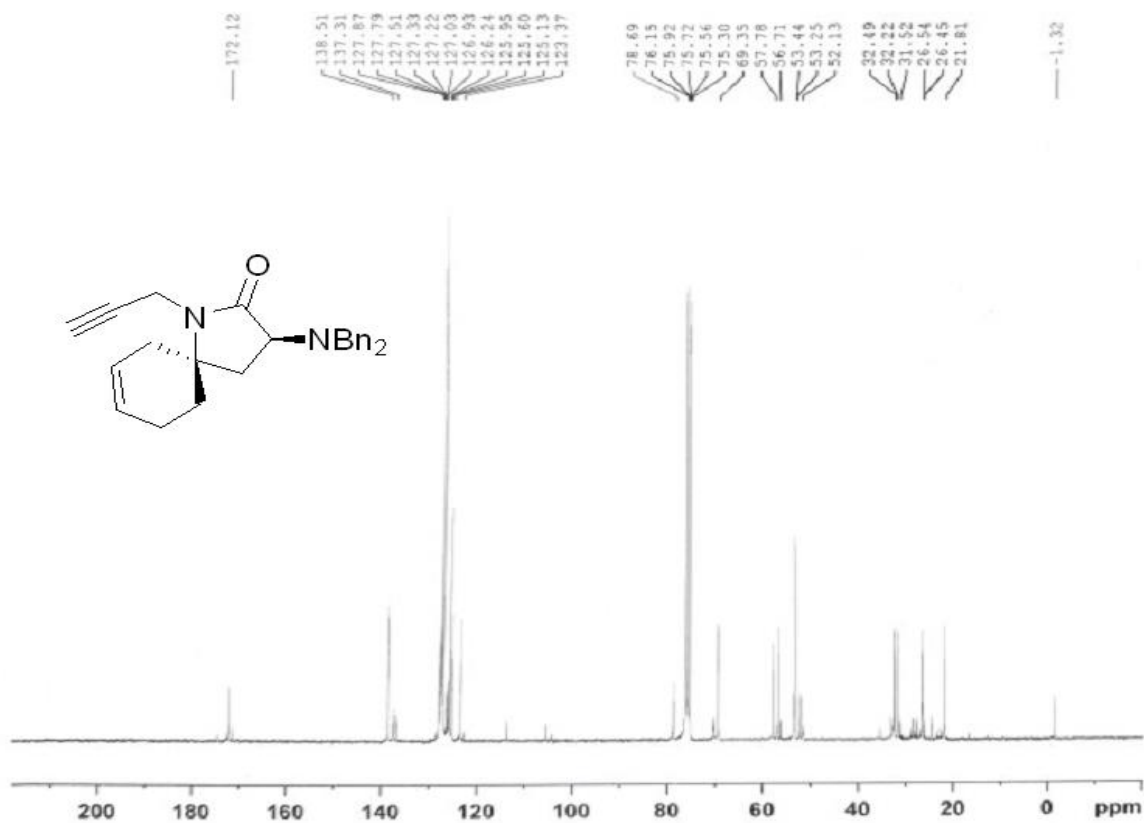
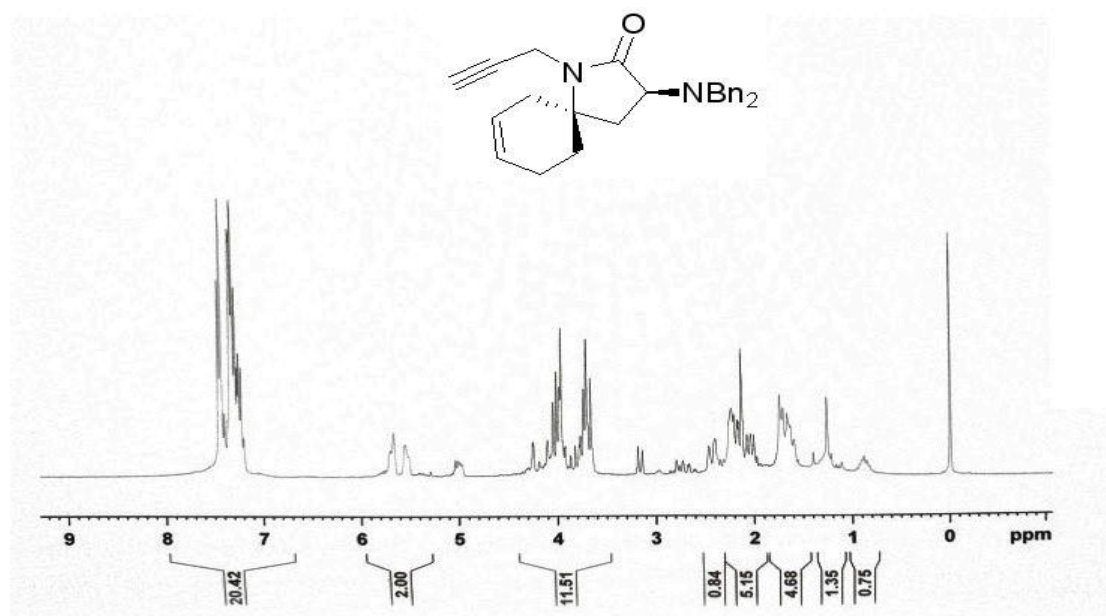
(3*S*,5*S*)-1-Allyl-3-(dibenzylamino) 1-azaspiro[4.5]decan-2-one (32)



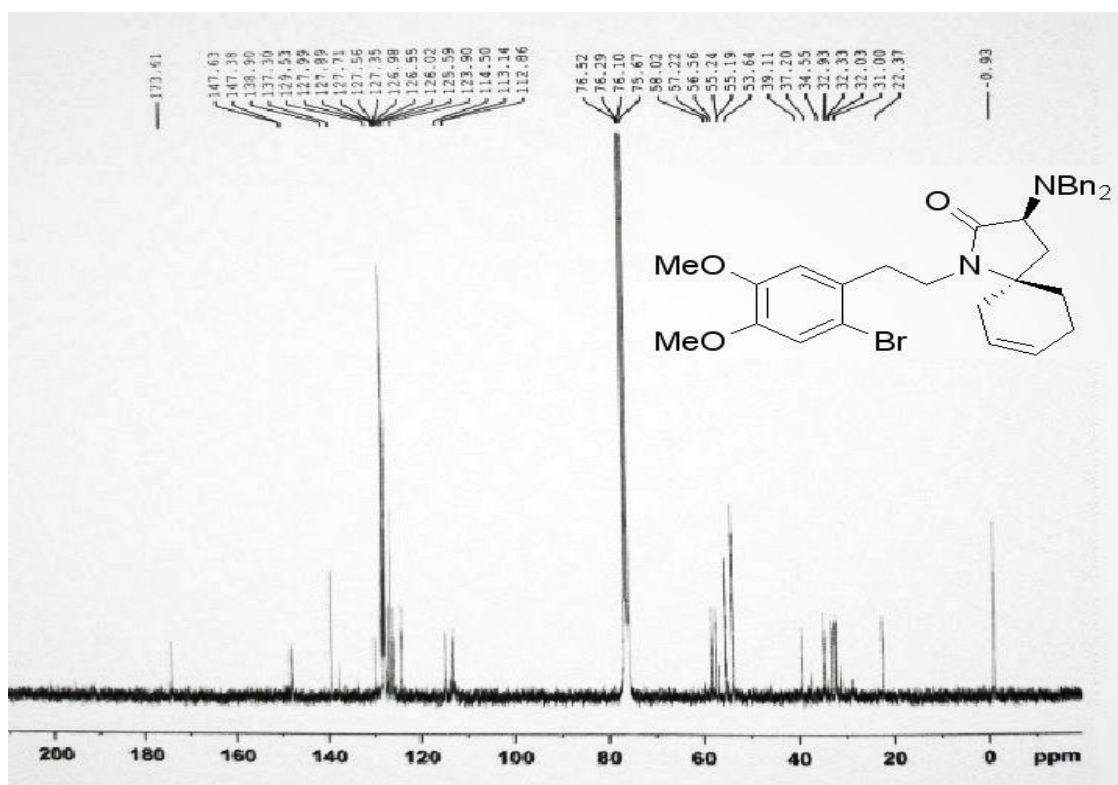
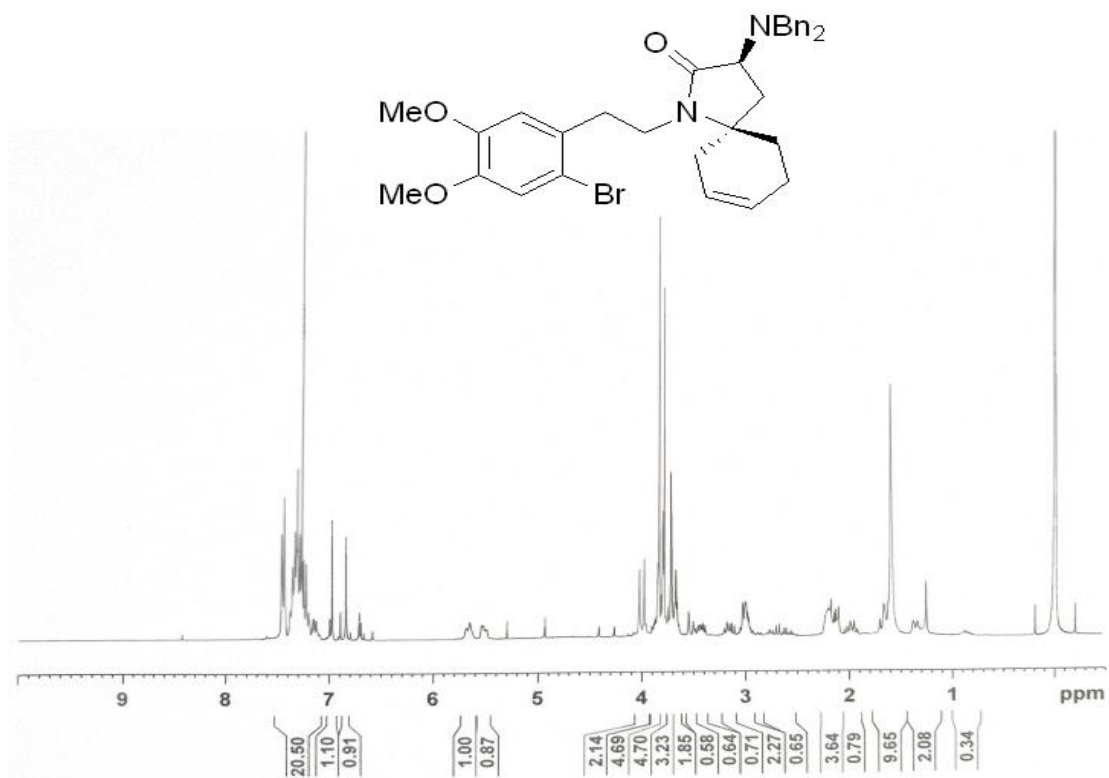
¹³C n-allyl-spirocyclohexene pyrrolidinoe



(3*S*,5*S*) -3-(Dibenzylamino) 1-propargyl -1-azaspiro[4.5]decan-2-one (33)



(3*S*,5*S*)-1-(5-Bromo-3,4-dimethoxyphenylethyl)-3-(dibenzylamino)-1-azaspiro[4.5]decan-2-one (34)



(3*S*,5*S*)-1-(5-Bromobenzo[*d*][1,3]-dioxol-6-yl)-3-(dibenzylamino)-1-azaspiro[4.5]-7-decan-2-one (35)

