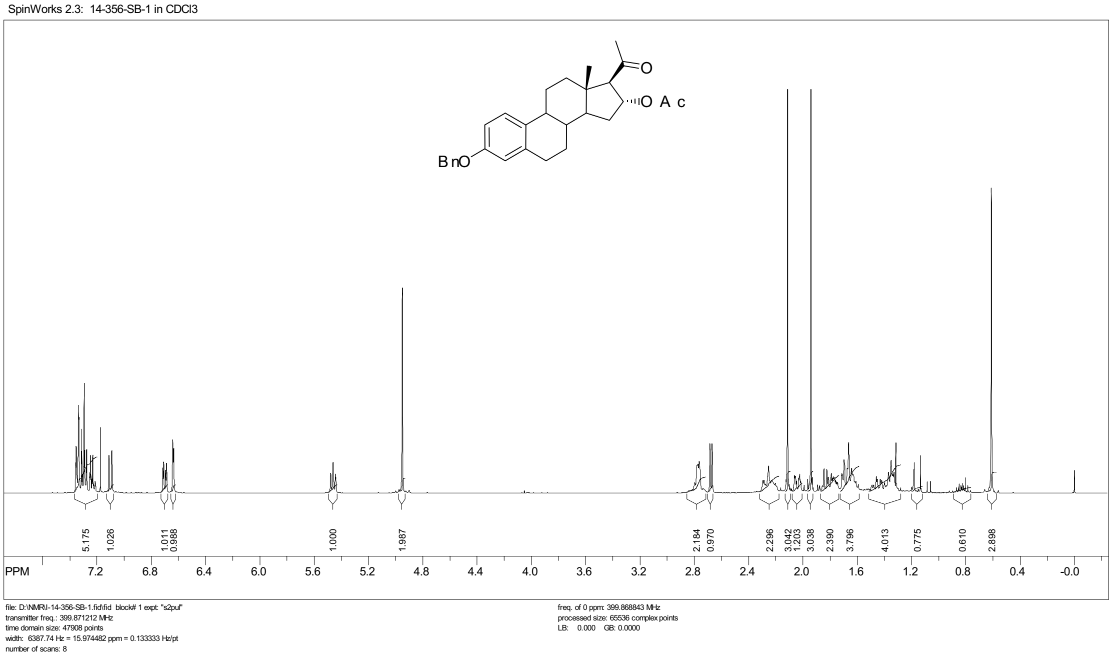
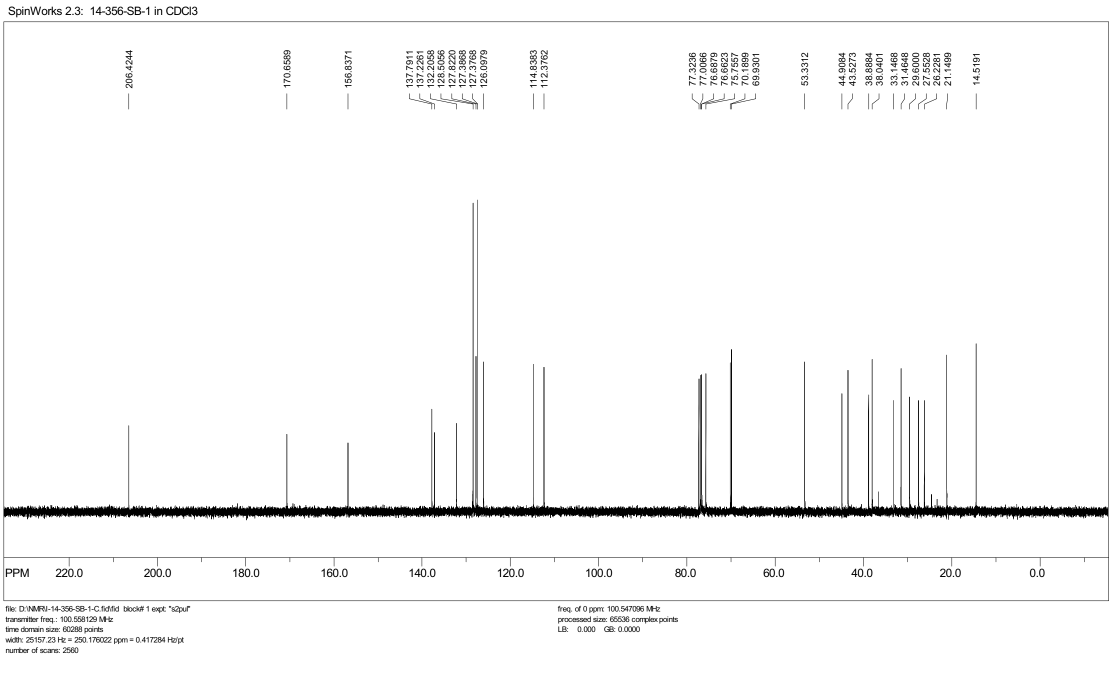
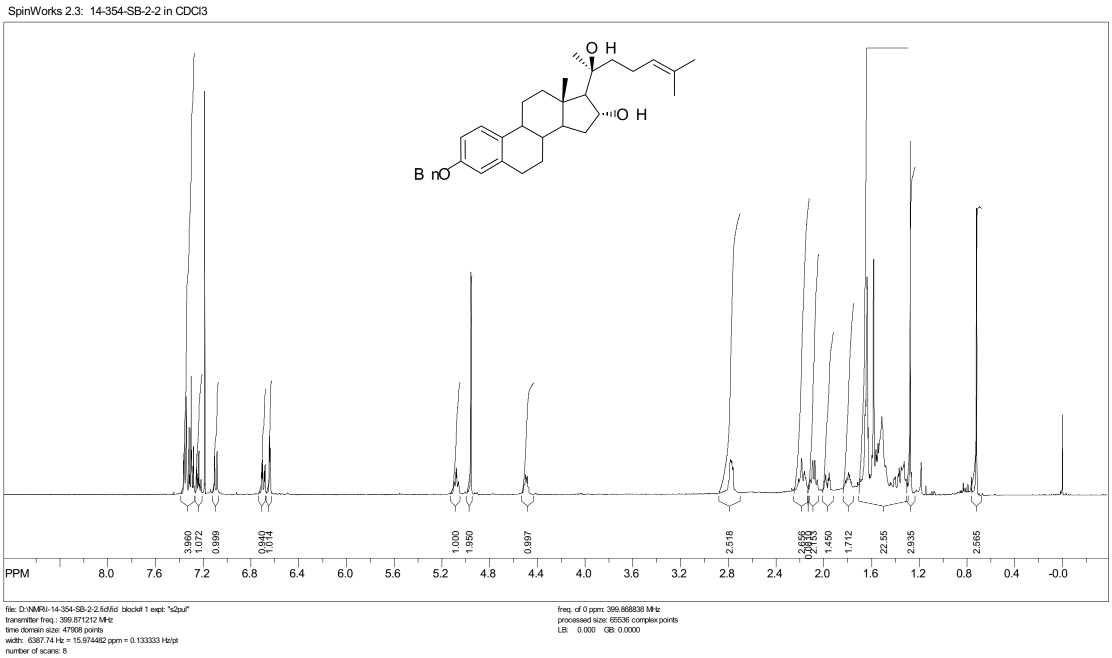


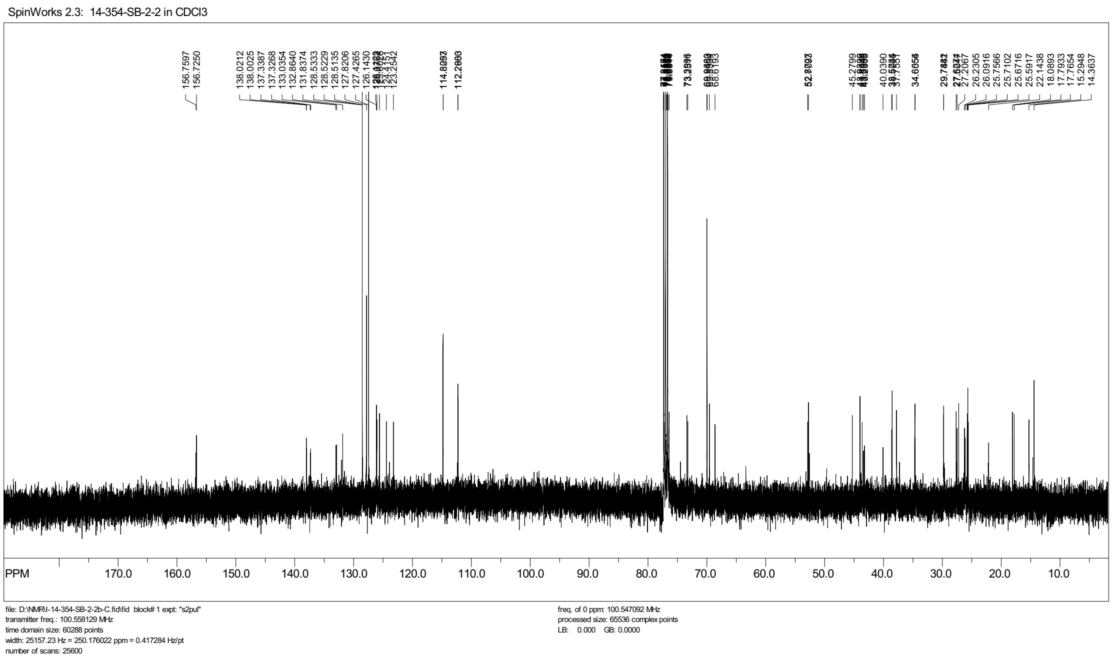
Apendix Figure 46 400 MHz ^{1}H NMR spectrum: 3-benzyloxy- 16α-acetoxy -17-acetyl-$\Delta^{1,3,5(10)}$-estratriene (155)



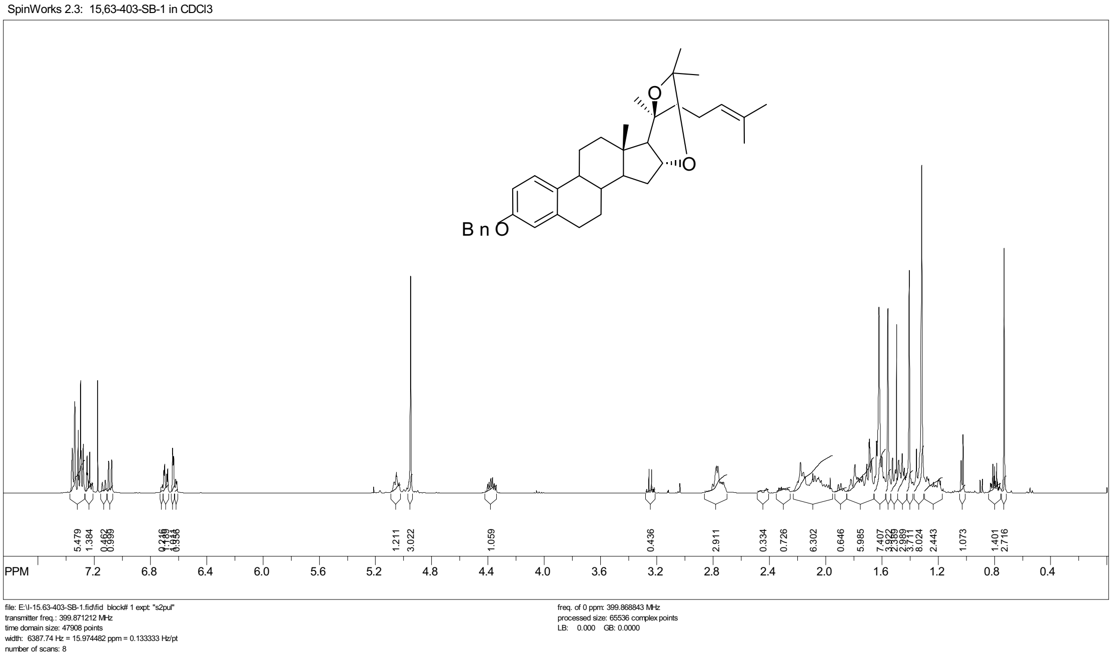
Apendix Figure 47 100 MHz ^{13}C NMR spectrum: 3-benzyloxy- 16α-acetoxy -17-acetyl-$\Delta^{1,3,5(10)}$-estratriene (155



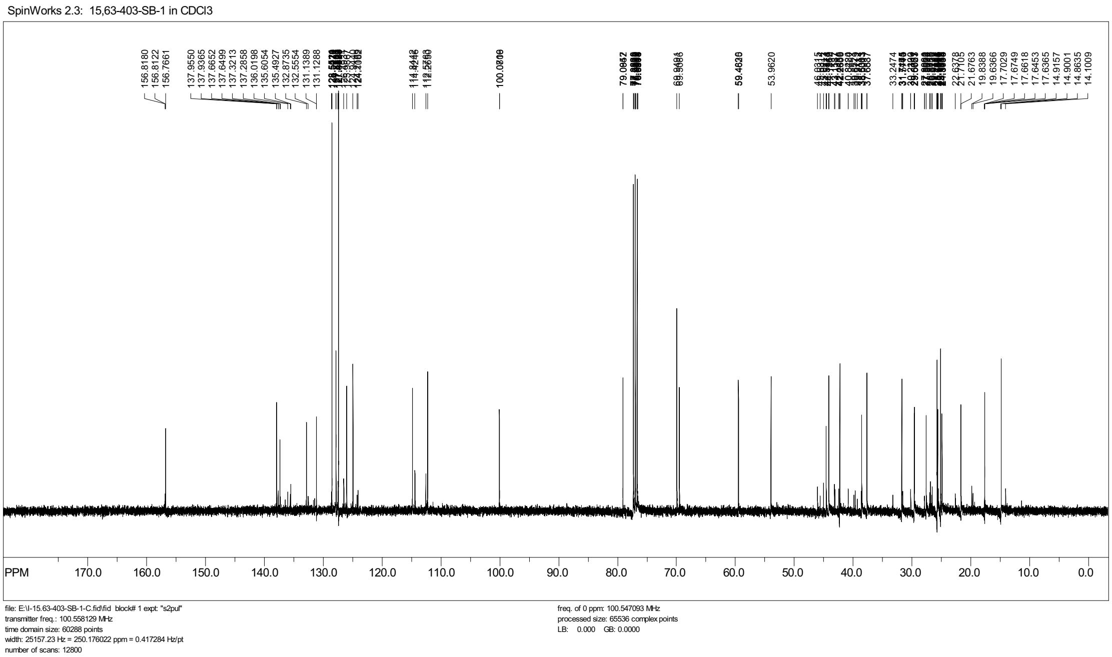
Apendix Figure 48 400 MHz ^{1}H NMR spectrum: 3-benzyloxy, 16*R*, 20*S*-trihydroxy-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (156)



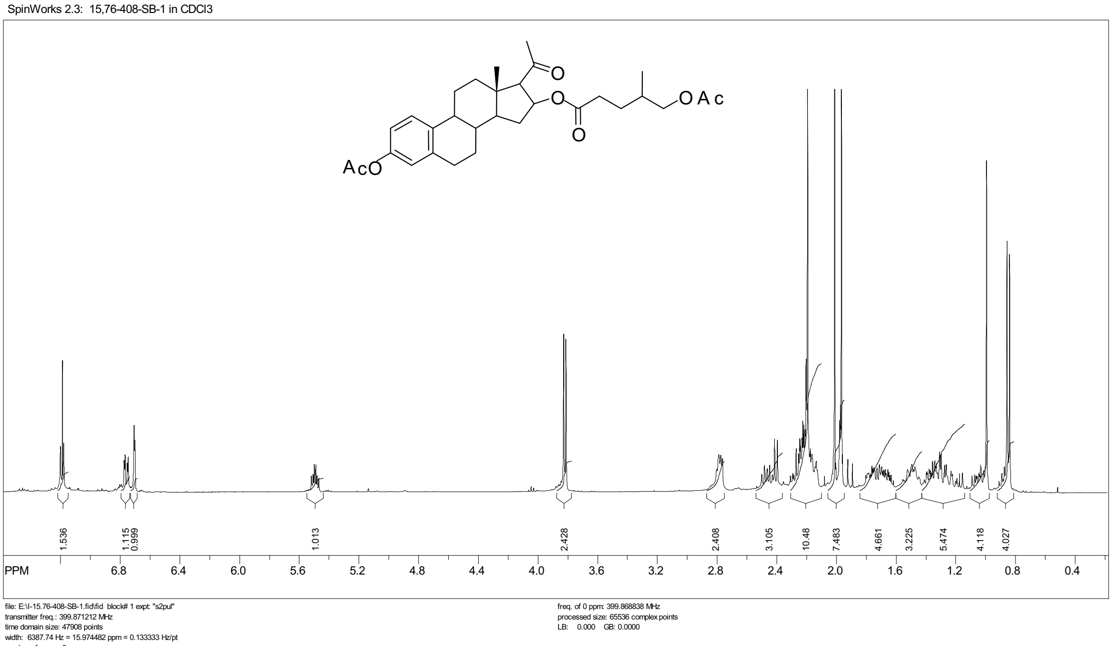
Apendix Figure 49 100 MHz ^{13}C NMR spectrum: 3-benzyloxy, 16*R*, 20*S*-trihydroxy-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (156)



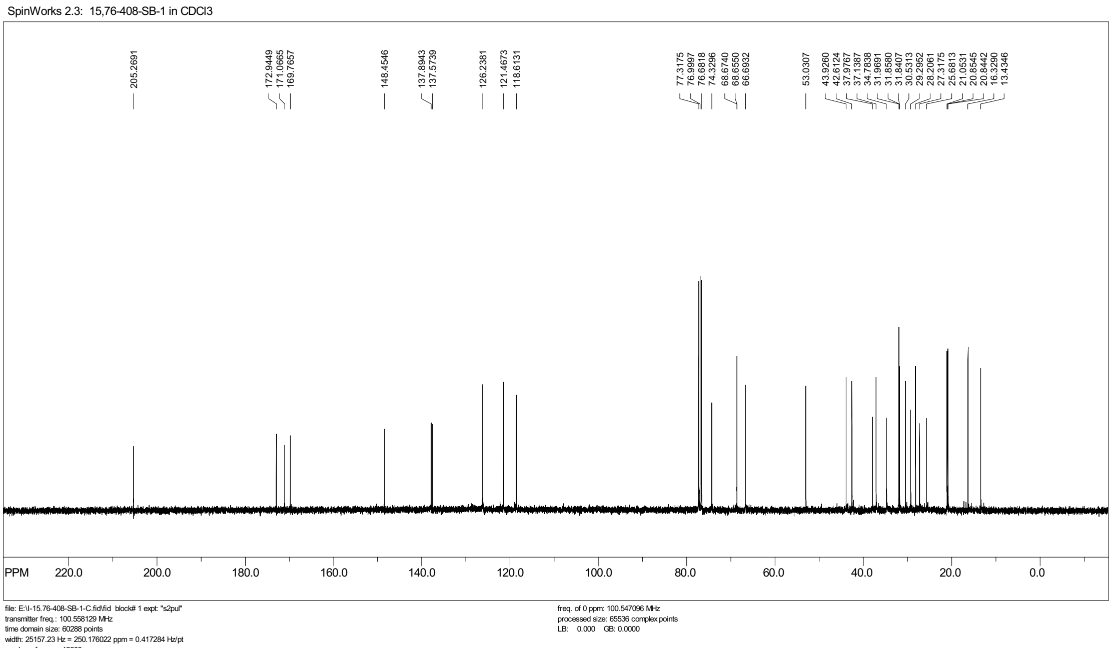
Apendix Figure 50 400 MHz ^{1}H NMR spectrum: 3-benzyloxy-(16*R*, 20*S*)-16, 20-acetonide-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (157)



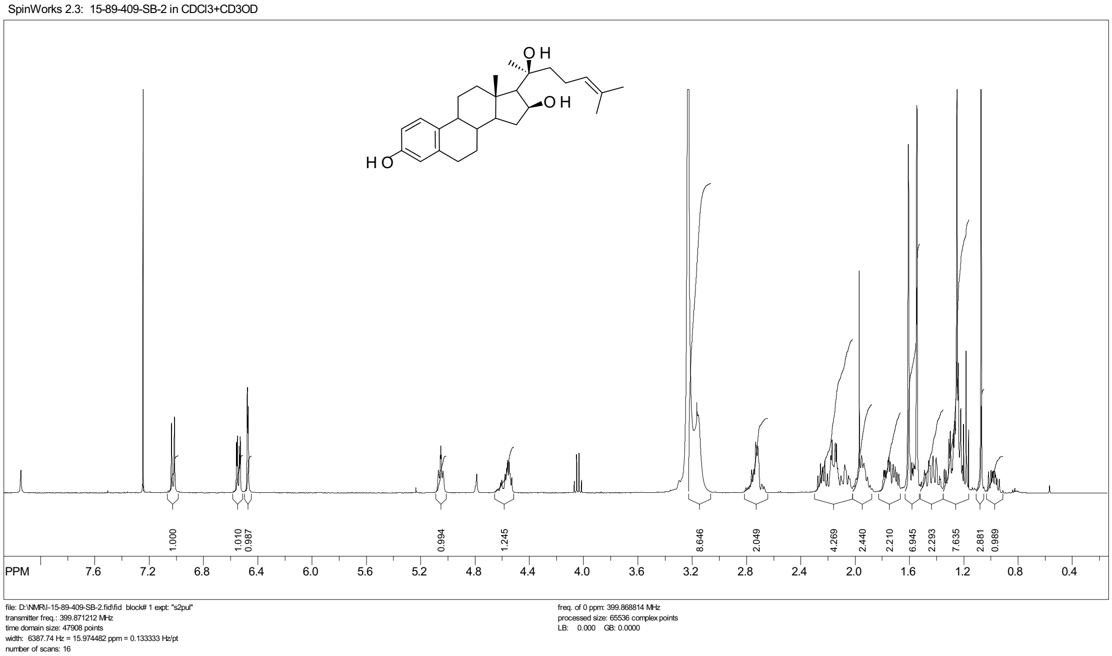
Apendix Figure 51 100 MHz ^{13}C NMR spectrum: 3-benzyloxy-(16*R*, 20*S*)-16, 20-acetonide-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (157)



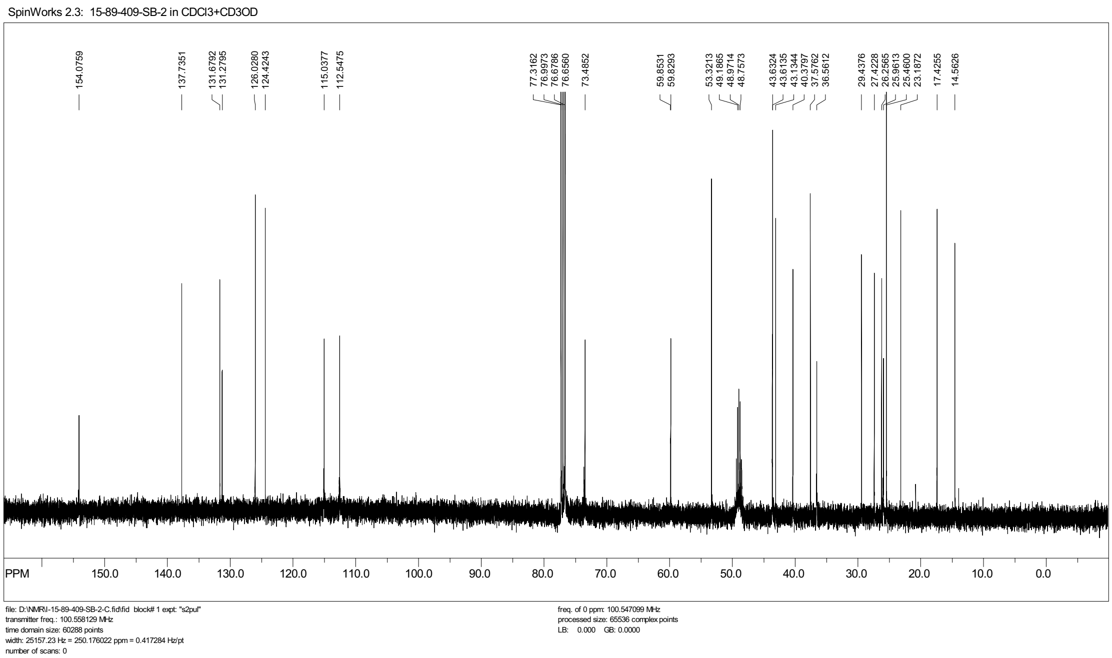
Apendix Figure 52 400 MHz ^{1}H NMR spectrum: 3-acetoxy-16β-acetoxymethylvaleroyloxy-17-acetyl-$\Delta^{1,3,5(10)}$- estratriene (151)



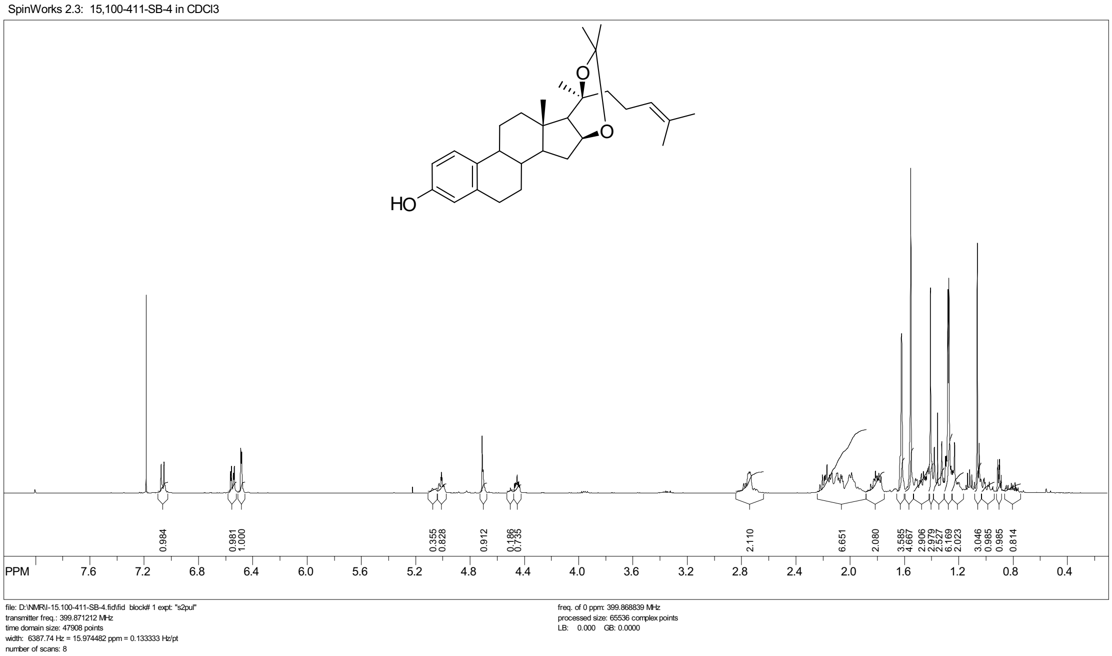
Apendix Figure 53 100 MHz ^{13}C NMR spectrum : 3-acetoxy-16β-acetoxymethylvaleroyloxy-17-acetyl-$\Delta^{1,3,5(10)}$- estratriene (151)



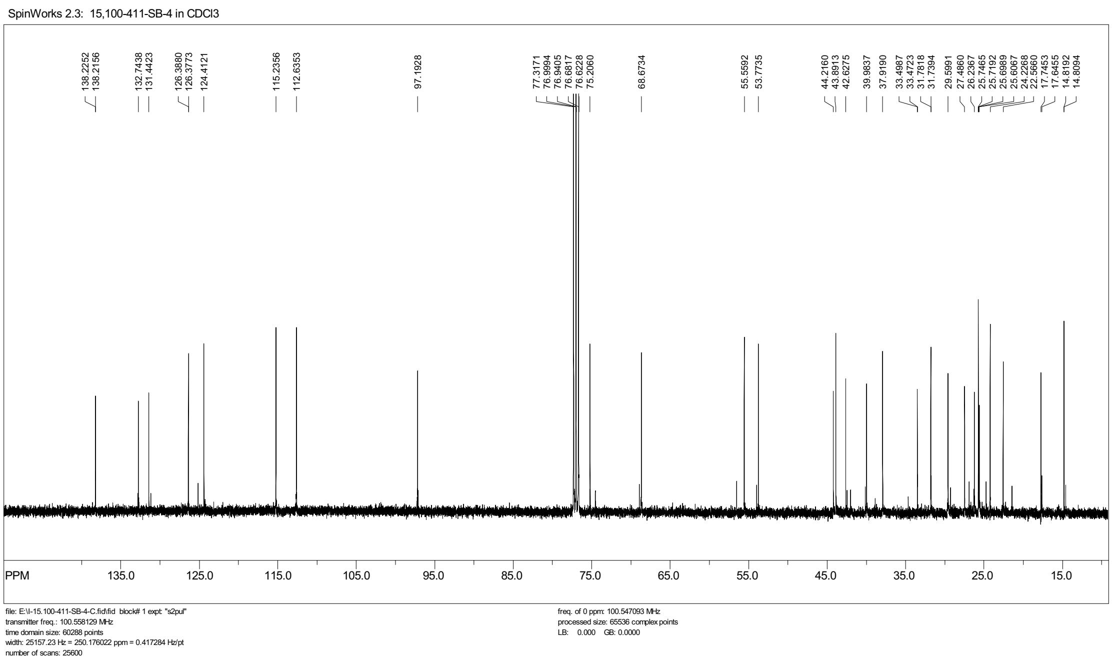
Apendix Figure 54 400 MHz ^{1}H NMR spectrum: 3, 6*S*, 20*S*-16, 20-trihydroxy-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (159)



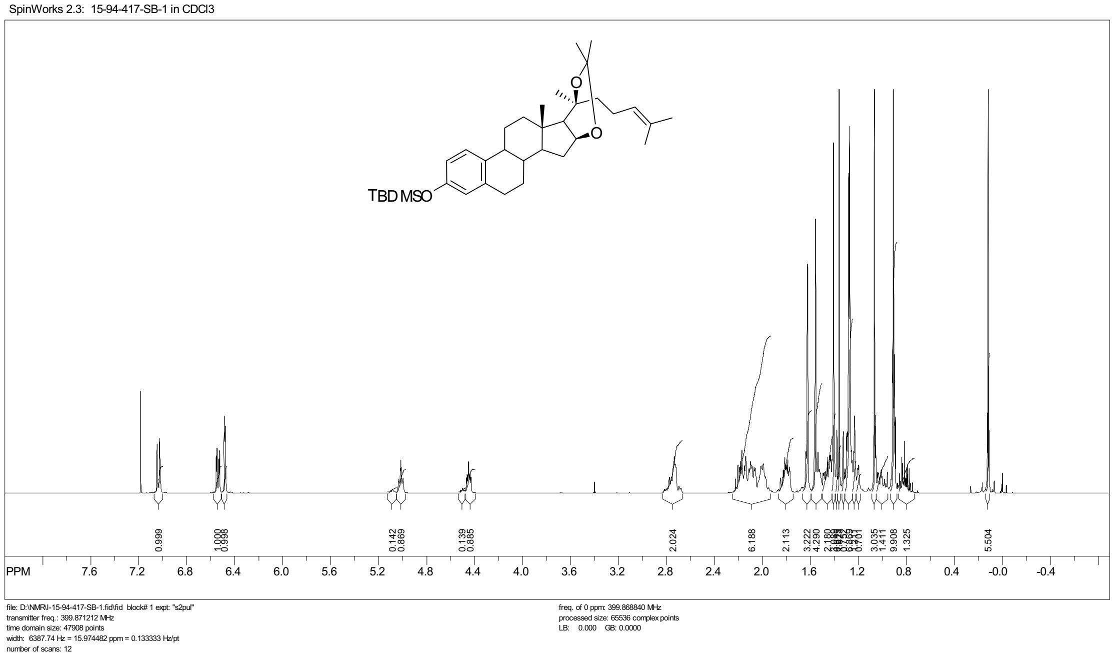
Apendix Figure 55 100 MHz ^{13}C NMR spectrum : 3, 6*S*, 20*S*-16, 20-trihydroxy-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (159)



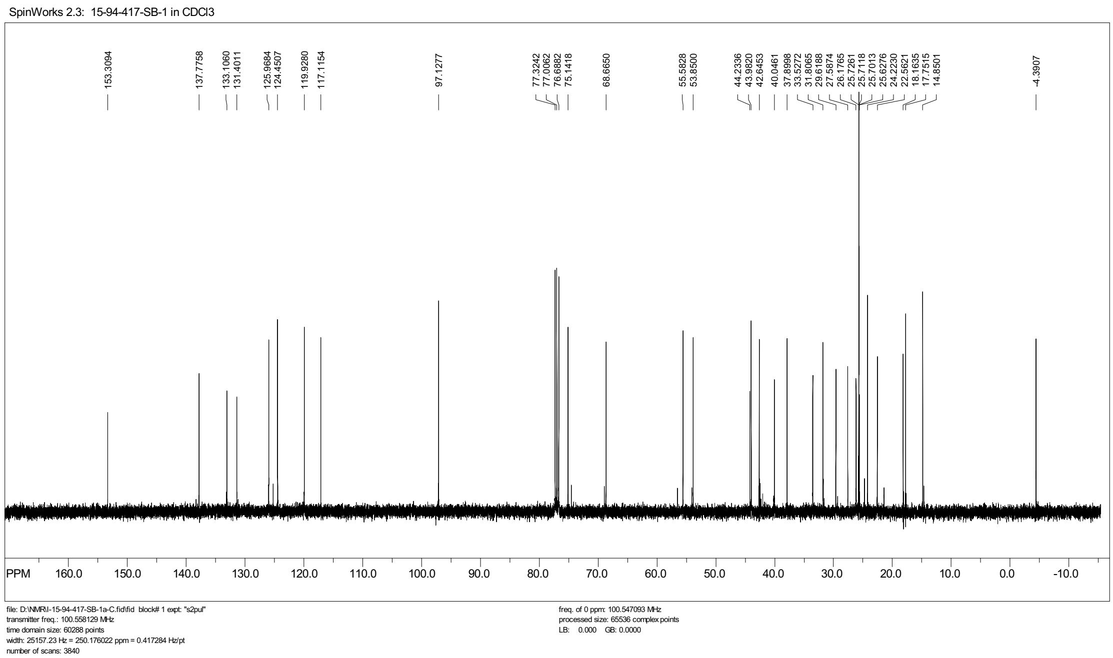
Apendix Figure 56 400 MHz ^{1}H NMR spectrum: 3-hydroxy-(16*S*, 20*S*)-16, 20-acetonide-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (160)



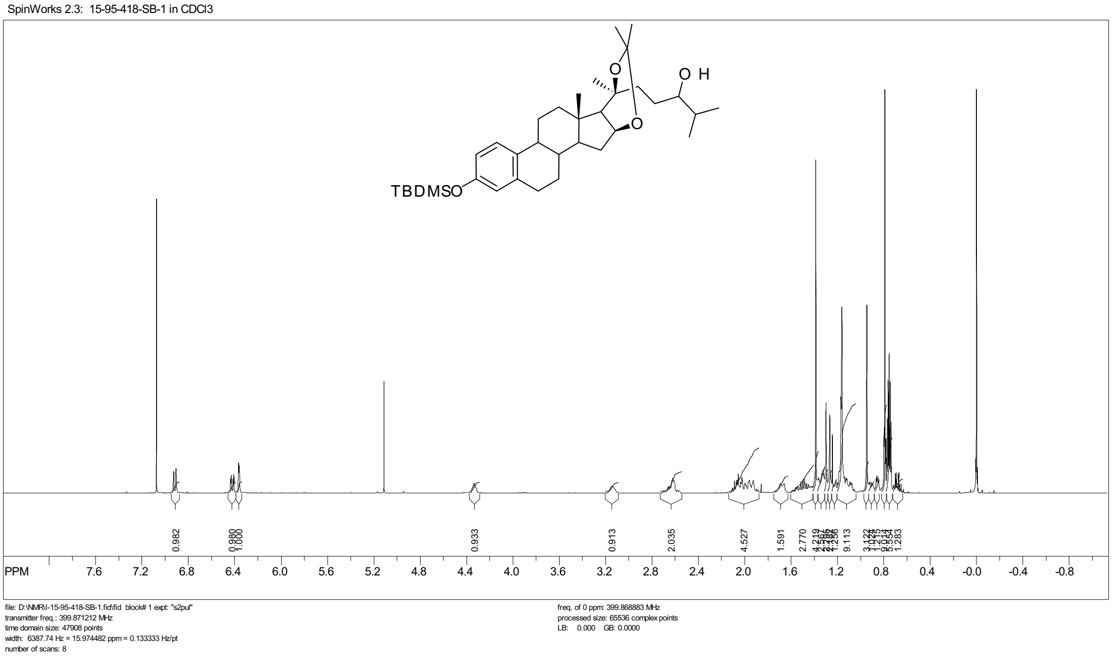
Apendix Figure 57 100 MHz ^{13}C NMR spectrum: 3-hydroxy-(16*S*, 20*S*)-16, 20-acetonide-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (160)



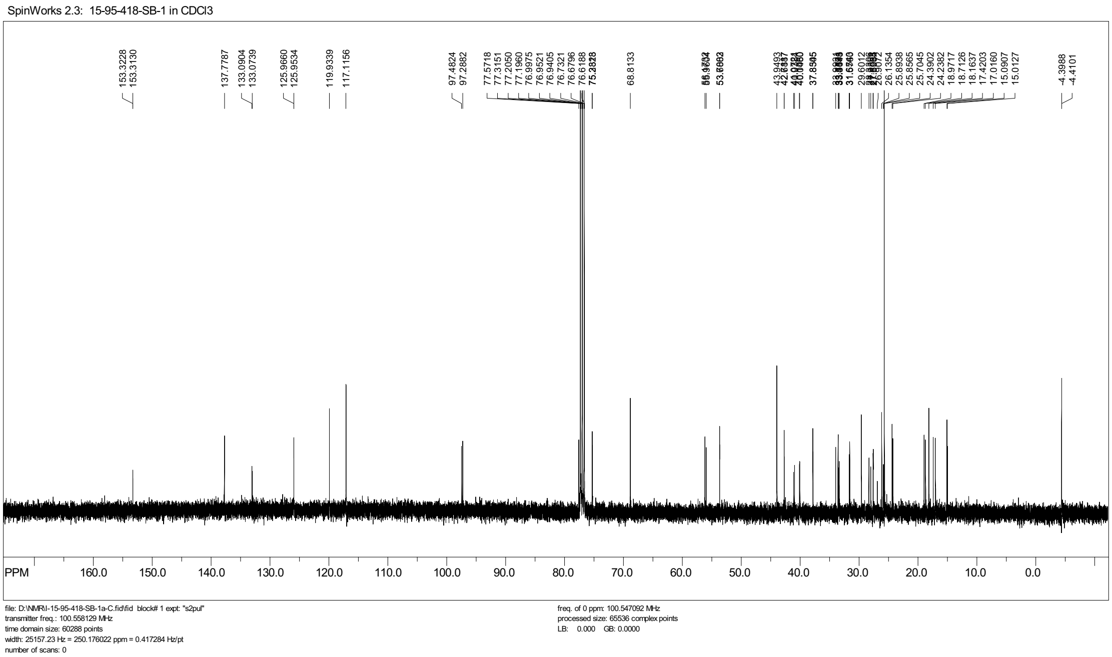
Apendix Figure 58 400 MHz ^{1}H NMR spectrum: 3-*tert*-butyl-dimethylsiloxy-(16*S*, 20*S*)-16, 20-acetonide-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (161)



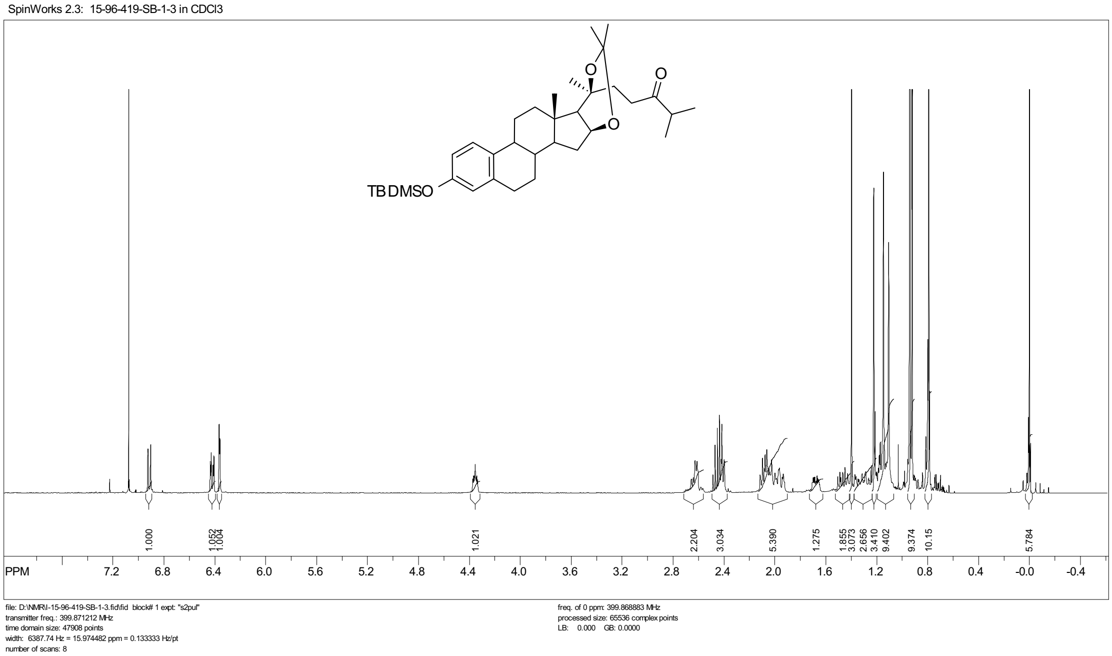
Apendix Figure 59 100 MHz ^{13}C NMR spectrum: 3-*tert*-butyl-dimethylsiloxy-(16*S*, 20*S*)-16, 20-acetonide-24-cholestene-$\Delta^{1,3,5(10)}$- estratriene (161)



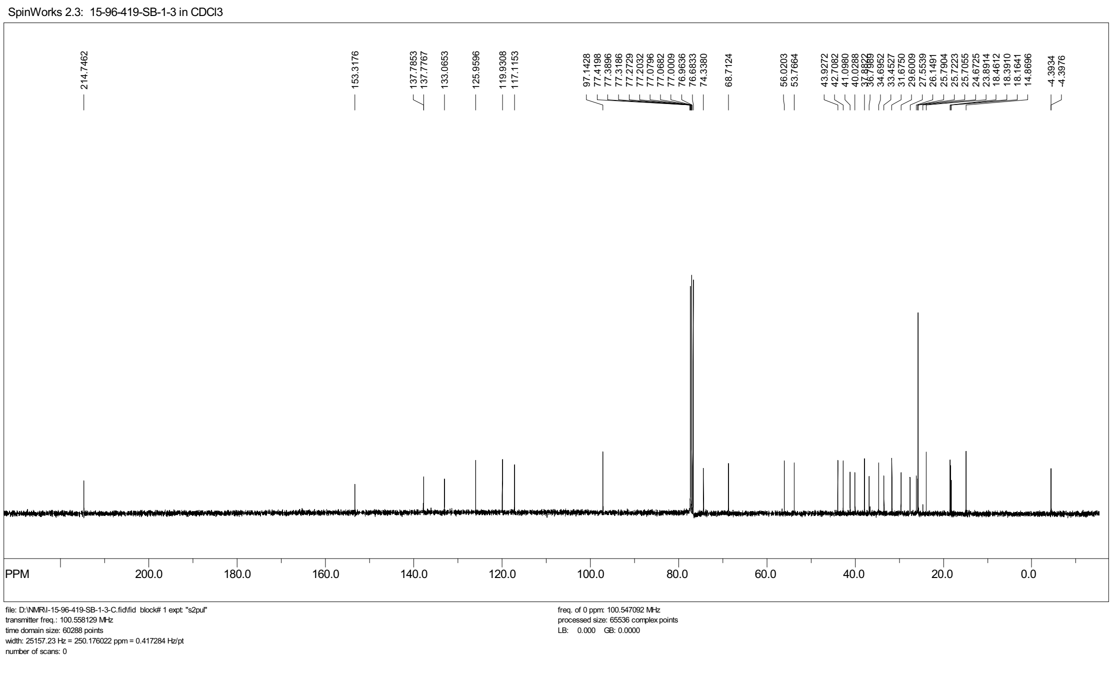
Apendix Figure 60 400 MHz ^{1}H NMR spectrum: 3-*tert*-butyl-dimethylsiloxy-(16*S*, 20*S*)-16, 20-acetonide-24-ol-chlorestane-$\Delta^{1,3,5(10)}$- estratriene (162)



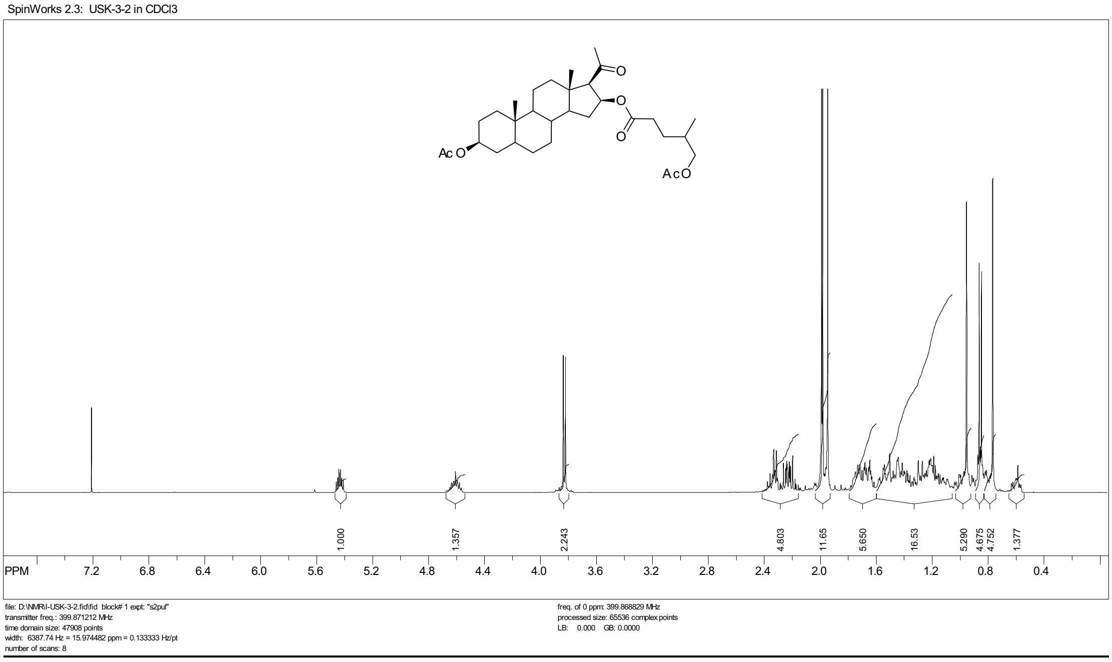
Apendix Figure 61 100 MHz ^{13}C NMR spectrum: 3-*tert*-butyl-dimethylsiloxy-(16*S*, 20*S*)-16, 20-acetonide-24-ol-chlorestane-$\Delta^{1,3,5(10)}$- estratriene (162)



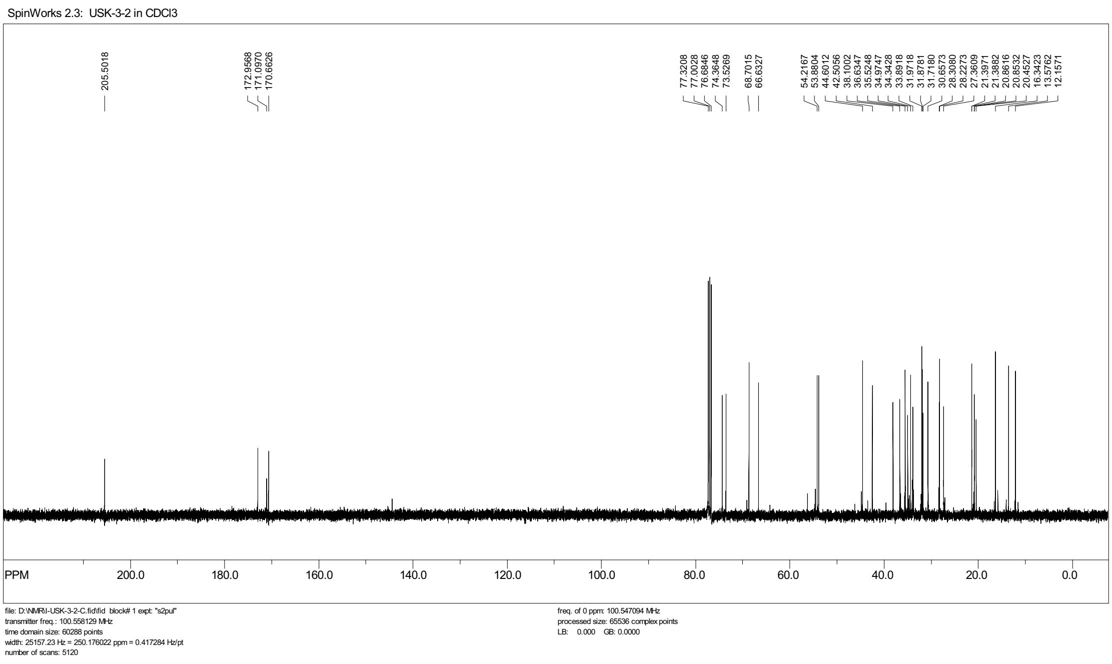
Apendix Figure 62 400 MHz ^{1}H NMR spectrum: 3-*tert*-butyl-dimethylsiloxy-(16*S*, 20*S*)-16, 20-acetonide-24-one-chlorestane-$\Delta^{1,3,5(10)}$- estratriene (163)



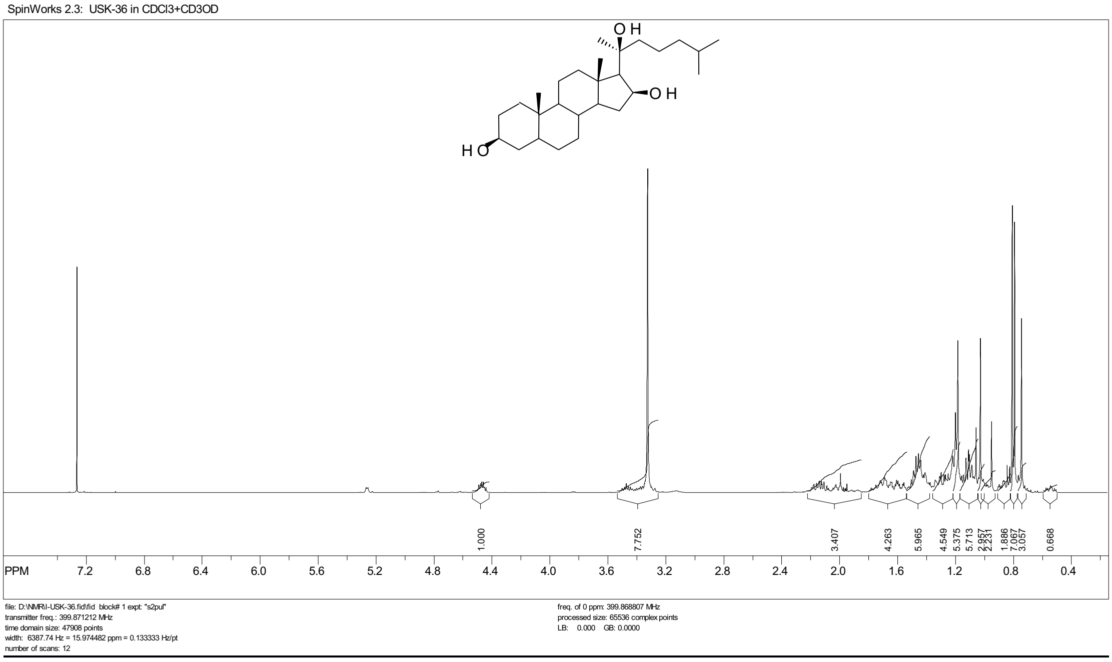
Apendix Figure 63 100 MHz ^{13}C NMR spectrum: 3-*tert*-butyl-dimethylsiloxy-(16*S*, 20*S*)-16, 20-acetonide-24-one-chlorestane-$\Delta^{1,3,5(10)}$- estratriene (163)



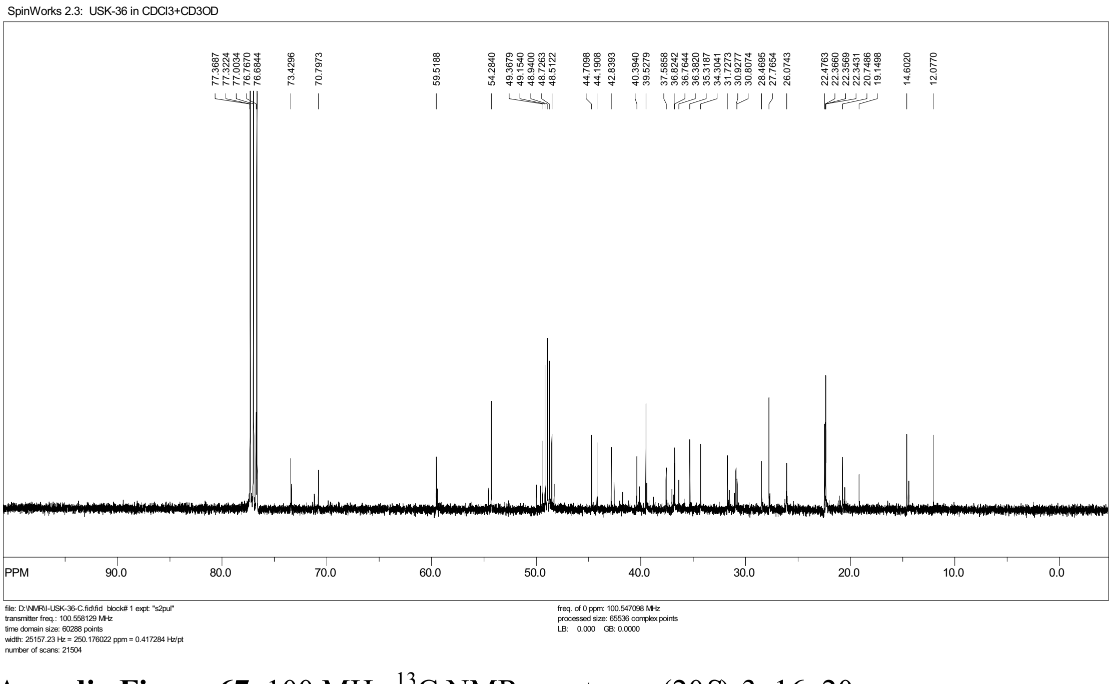
Apendix Figure 64 400 MHz ^{1}H NMR spectrum: 3β-Acetoxy-16β-γ-acetoxymethylvaleroyloxy-5α-pregnan-20-one (164)



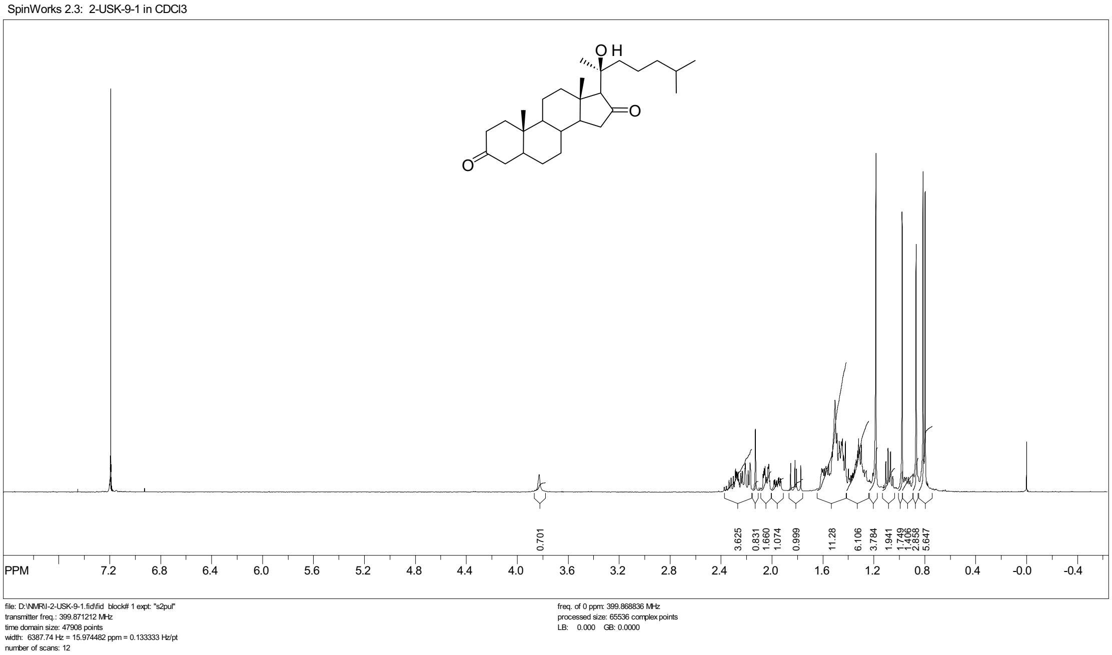
Apendix Figure 65 100 MHz ^{13}C NMR spectrum: 3β-Acetoxy-16β-γ-acetoxymethylvaleroyloxy-5α-pregnan-20-one (164)



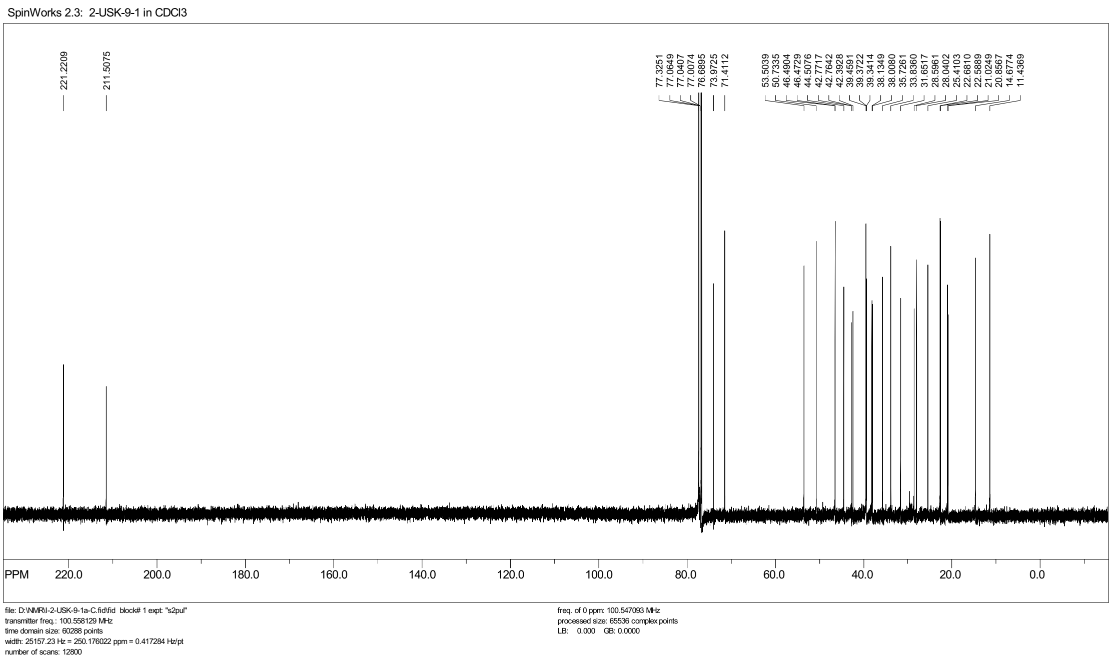
Apendix Figure 66 400 MHz ^{1}H NMR spectrum: (20S)-3, 16, 20-trihydroxycholestane (165)



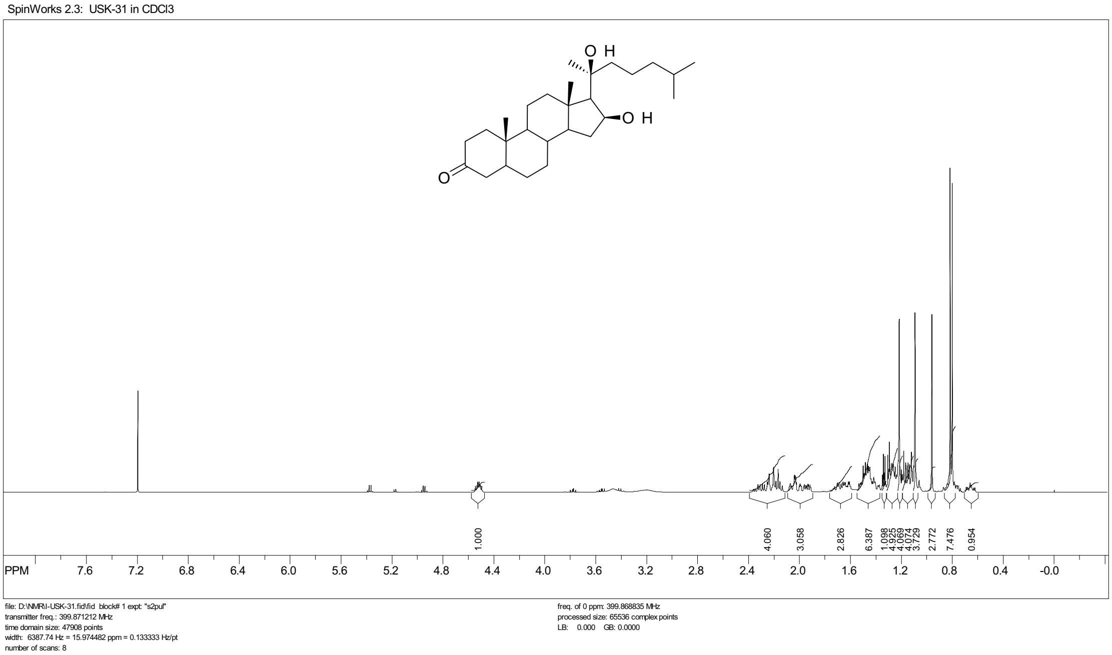
Apendix Figure 67 100 MHz ^{13}C NMR spectrum: (20*S*)-3, 16, 20-trihydroxycholestane (165)



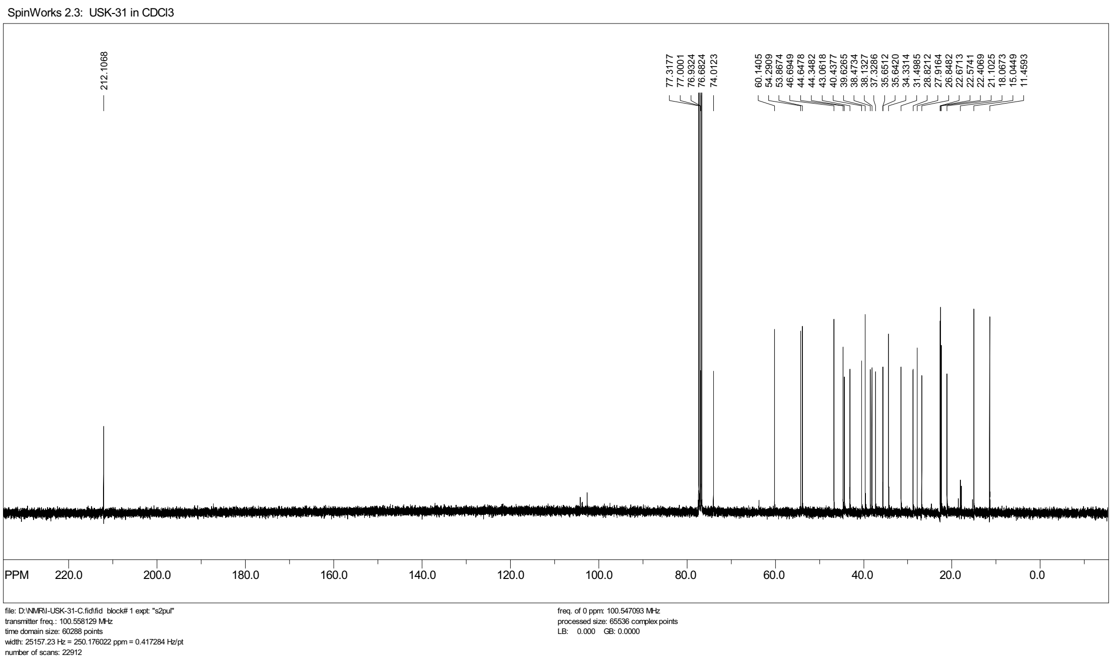
Apendix Figure 68 400 MHz ^{1}H NMR spectrum: (20S)-20-hydroxycholestane-3,16-dione (166)



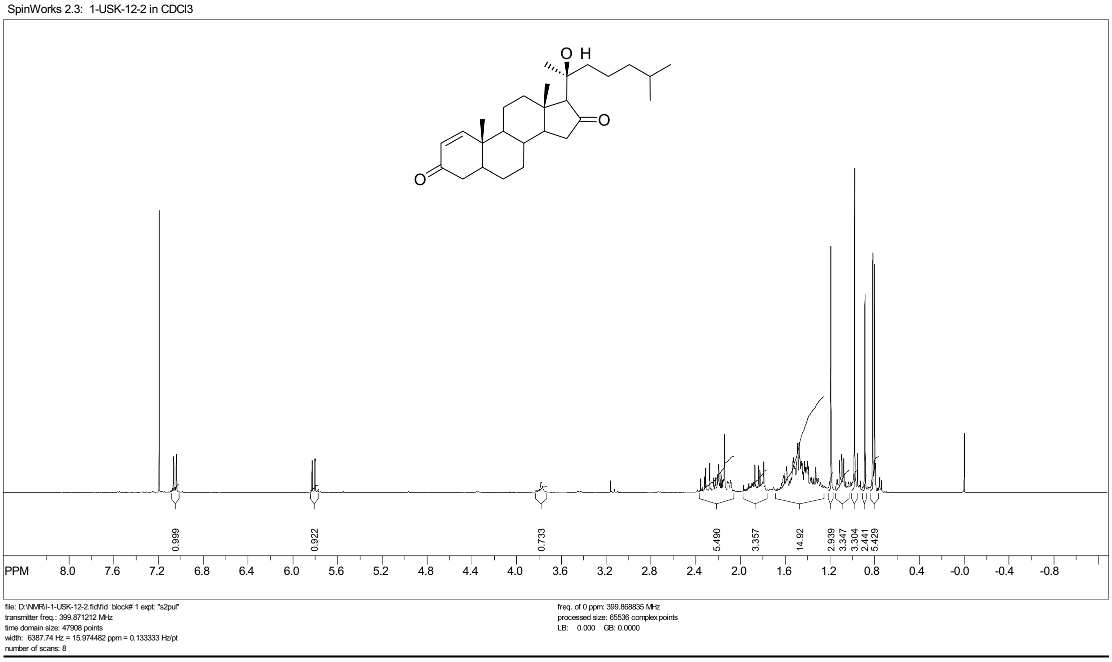
Apendix Figure 69 100 MHz ^{13}C NMR spectrum: (20S)-20-hydroxycholestane-3,16-dione (166)



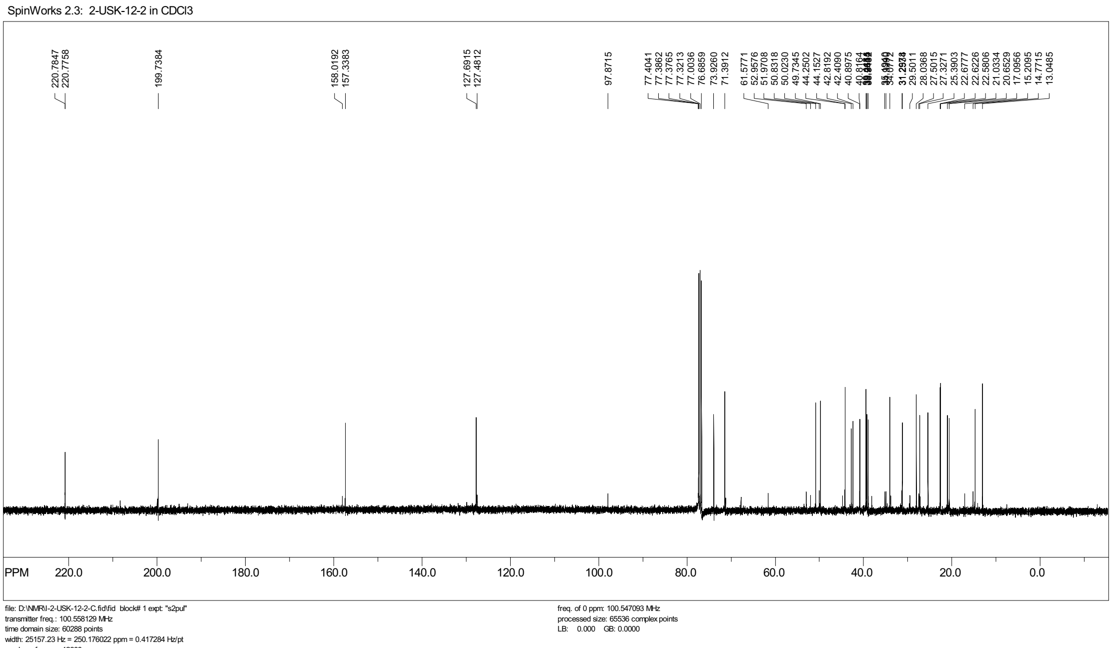
Apendix Figure 70 400 MHz ^{1}H NMR spectrum: (16S, 20S)-16, 20-dihydroxy-cholestan-3-one (167)



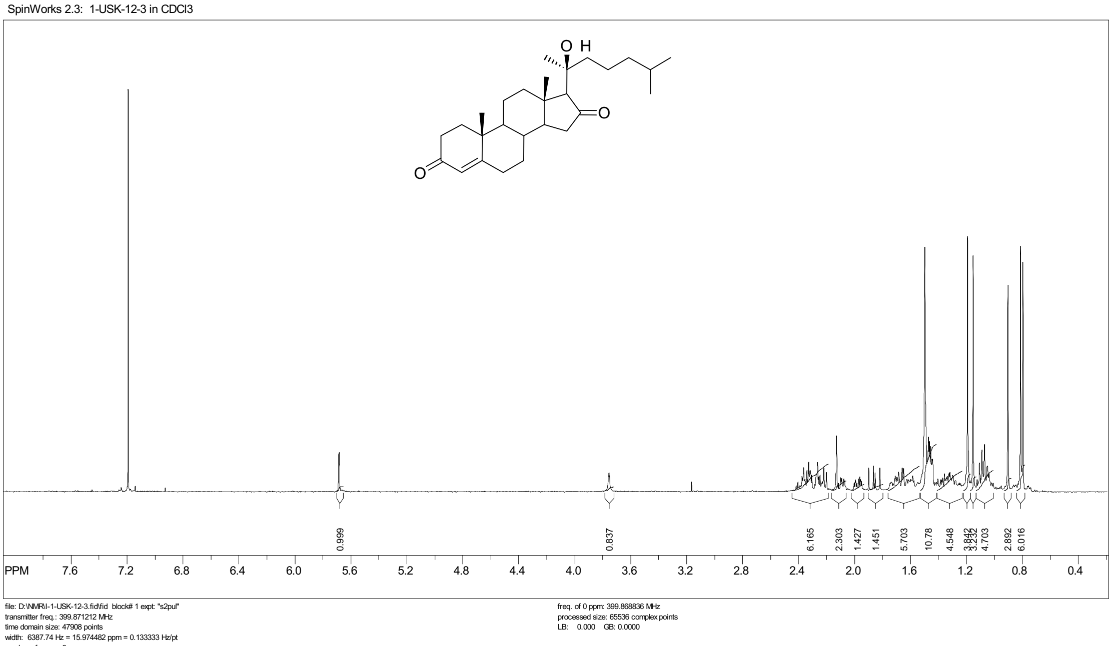
Apendix Figure 71 100 MHz ^{13}C NMR spectrum: (16S, 20S)-16, 20-dihydroxy-cholestan-3-one (167)



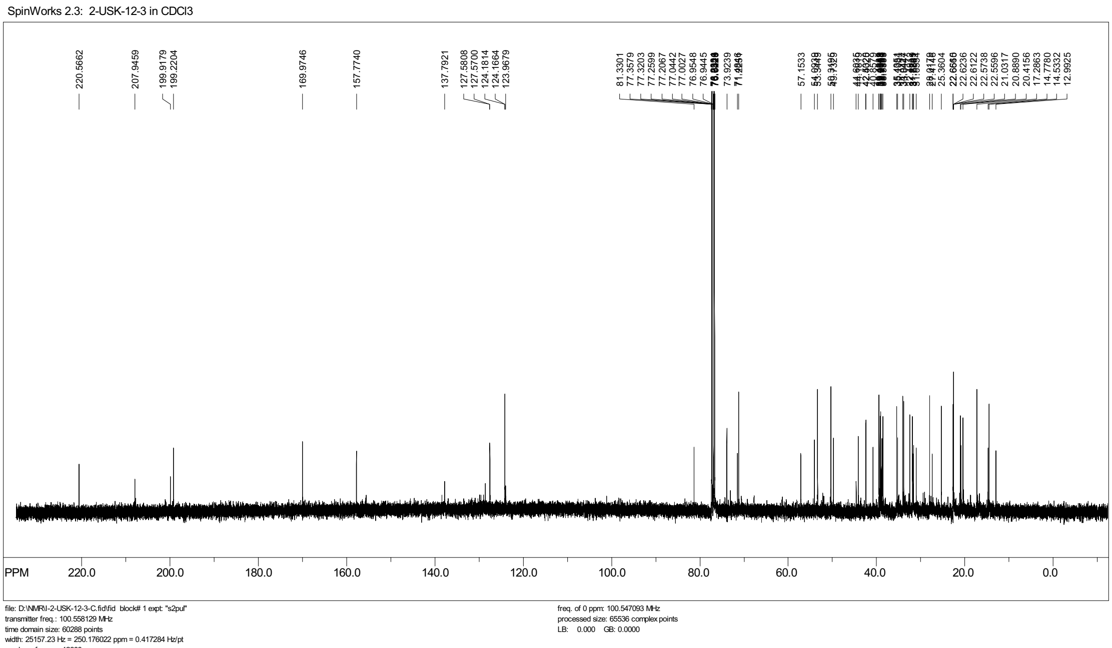
Apendix Figure 72 400 MHz ^{1}H NMR spectrum: (20S)-20-Hydroxycholest-1-ene-3,16-dione (168)



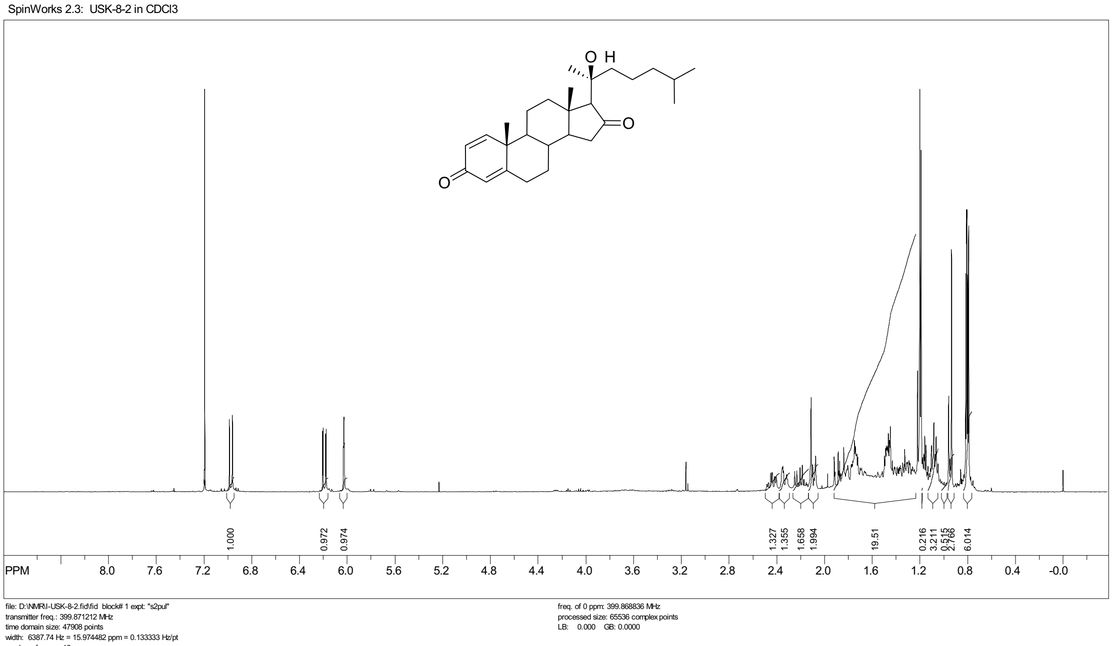
Apendix Figure 73 100 MHz ^{13}C NMR spectrum: (20S)-20-Hydroxycholest-1-ene-3,16-dione (168)



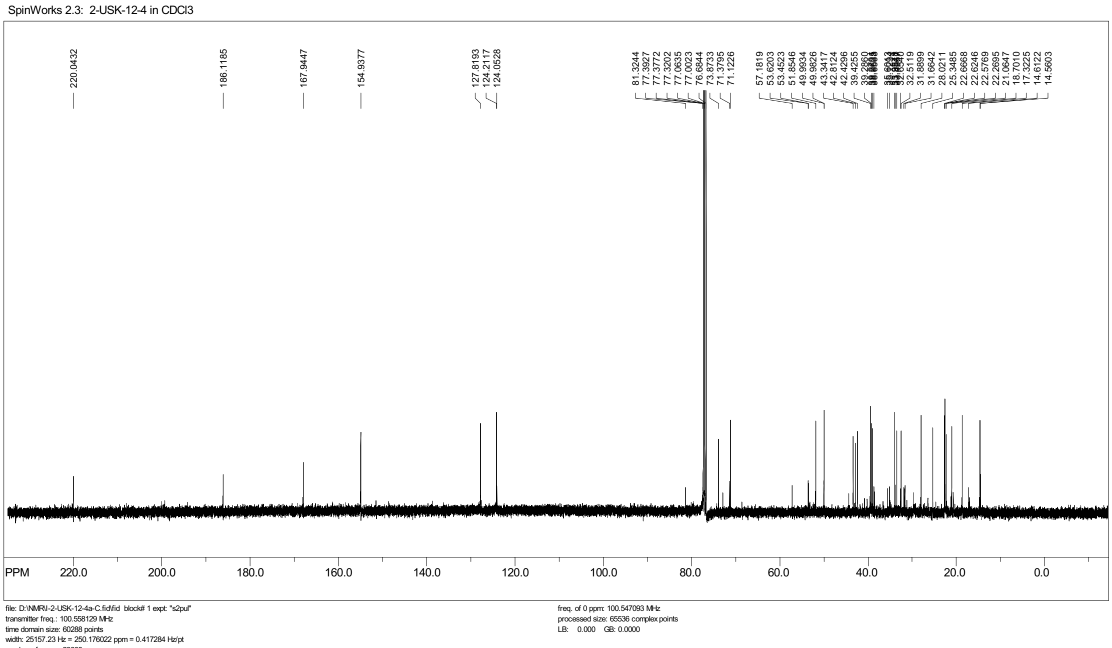
Apendix Figure 74 400 MHz ^{1}H NMR spectrum: (20S)-20-hydroxy cholest-4-ene-3,16-dione (169)



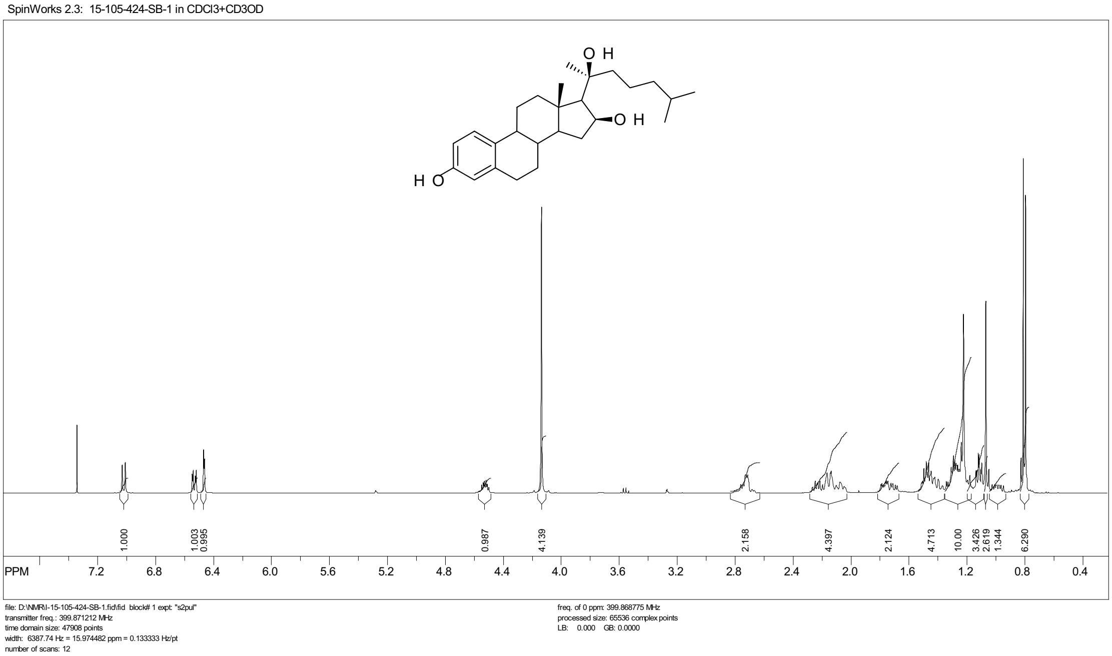
Apendix Figure 75 100 MHz ^{13}C NMR spectrum: (20S)-20-hydroxy cholest-4-ene-3,16-dione (169)



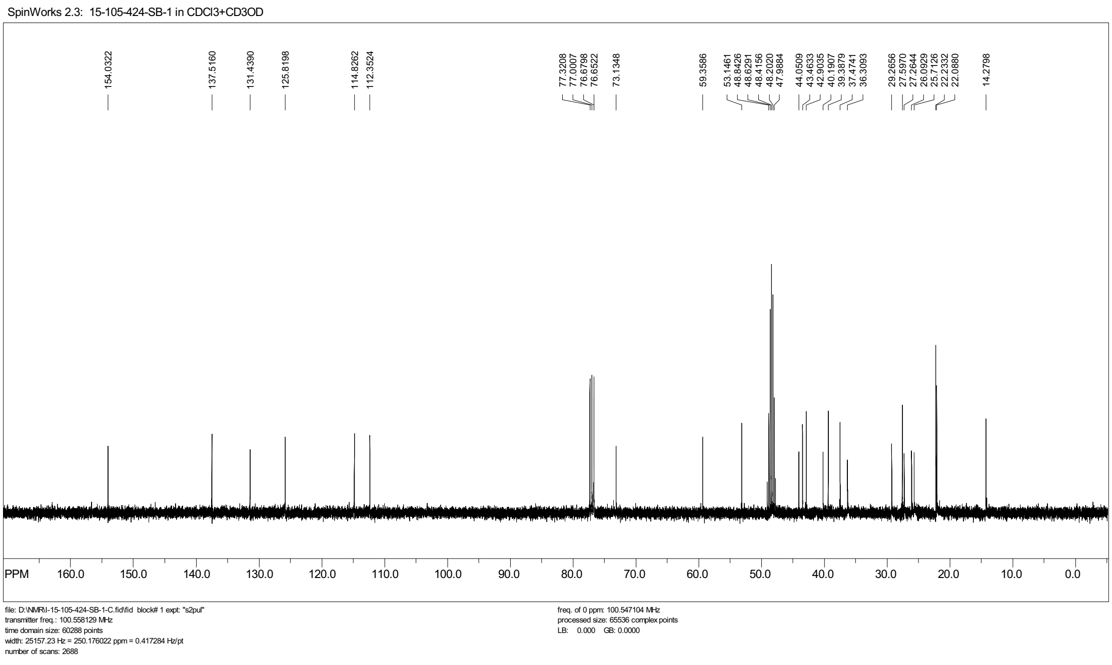
Apendix Figure 76 400 MHz ^{1}H NMR spectrum: (20S)-20-hydroxycholest-1,4-diene-3,16-dione (170)



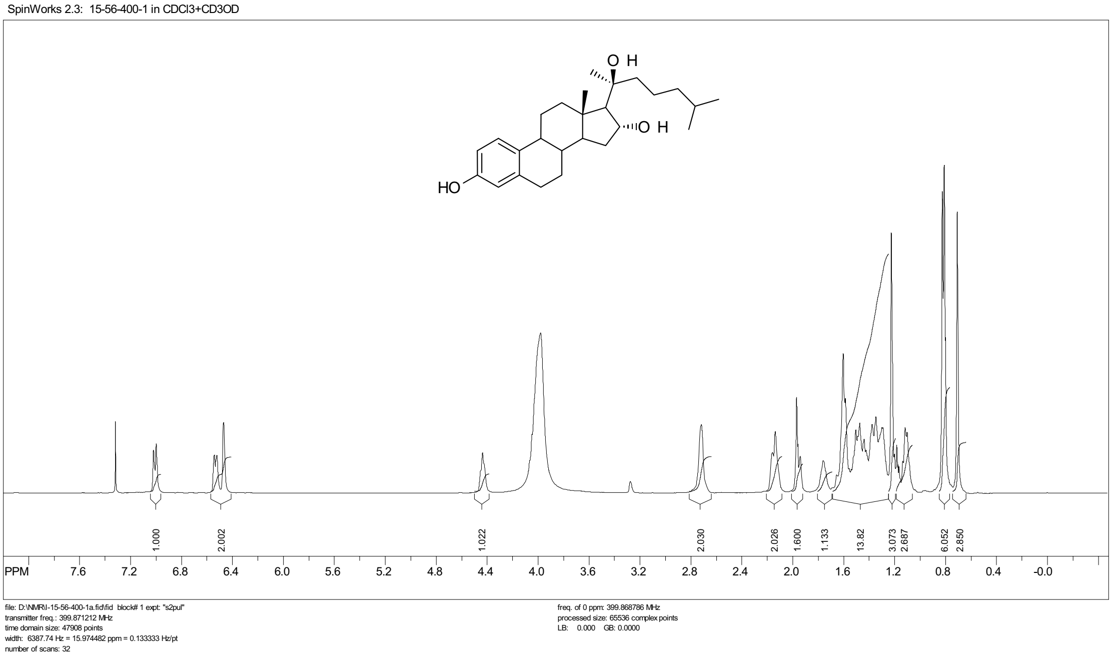
Apendix Figure 77 100 MHz ^{13}C NMR spectrum: (20S)-20-hydroxycholest-1,4-diene-3,16-dione (170)



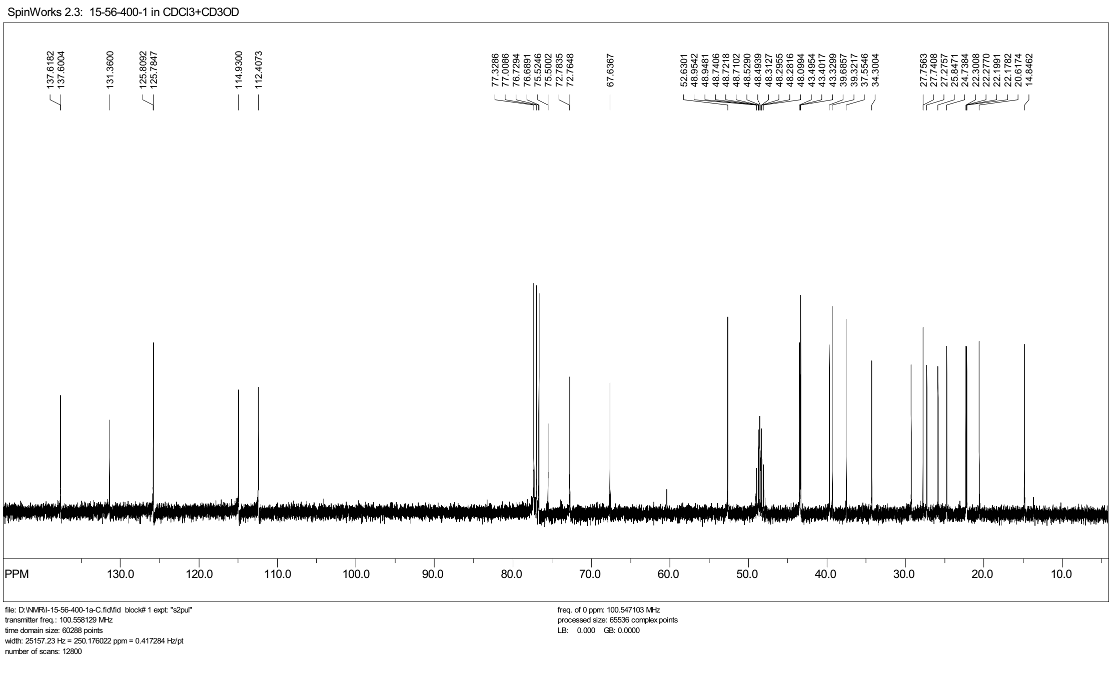
Apendix Figure 78 400 MHz ^{1}H NMR spectrum: 3, 16*s*, 20*s*-trihydroxy-cholestan-$\Delta^{1,3,5(10)}$- estratriene (171)



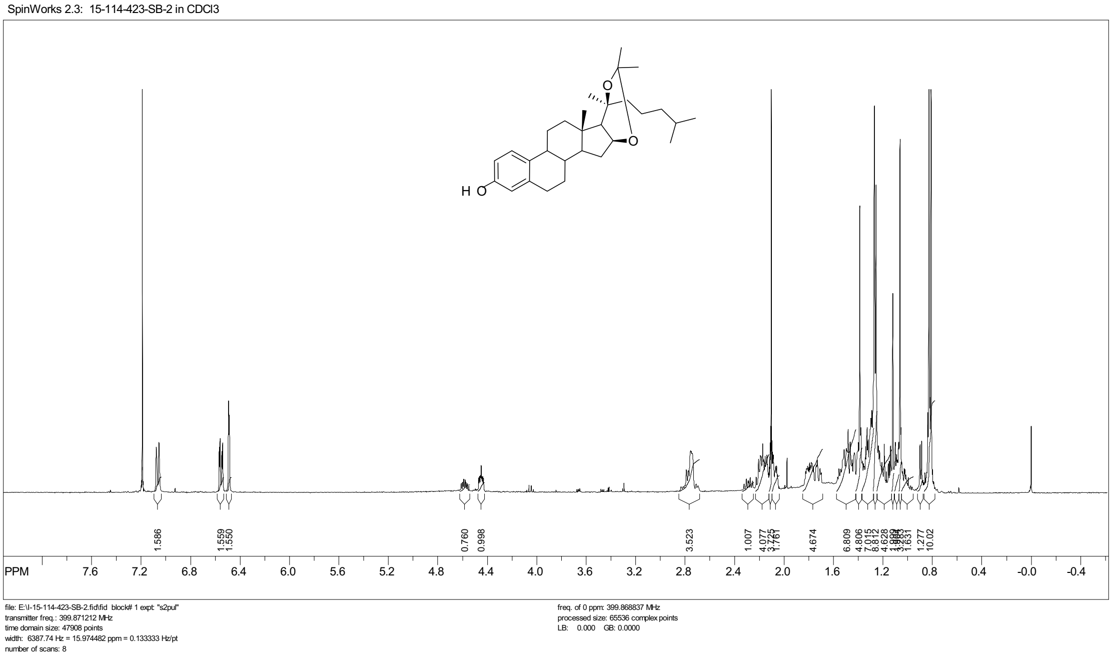
Apendix Figure 79 100 MHz ^{13}C NMR spectrum: 3, 16*S*, 20*S*-trihydroxy-cholestan-$\Delta^{1,3,5(10)}$-estratriene (171)



Apendix Figure 80 400 MHz ^{1}H NMR spectrum: 3-benzyloxy, 16*R*, 20*S*-trihydroxy-cholestane-$\Delta^{1,3,5(10)}$- estratriene (172)

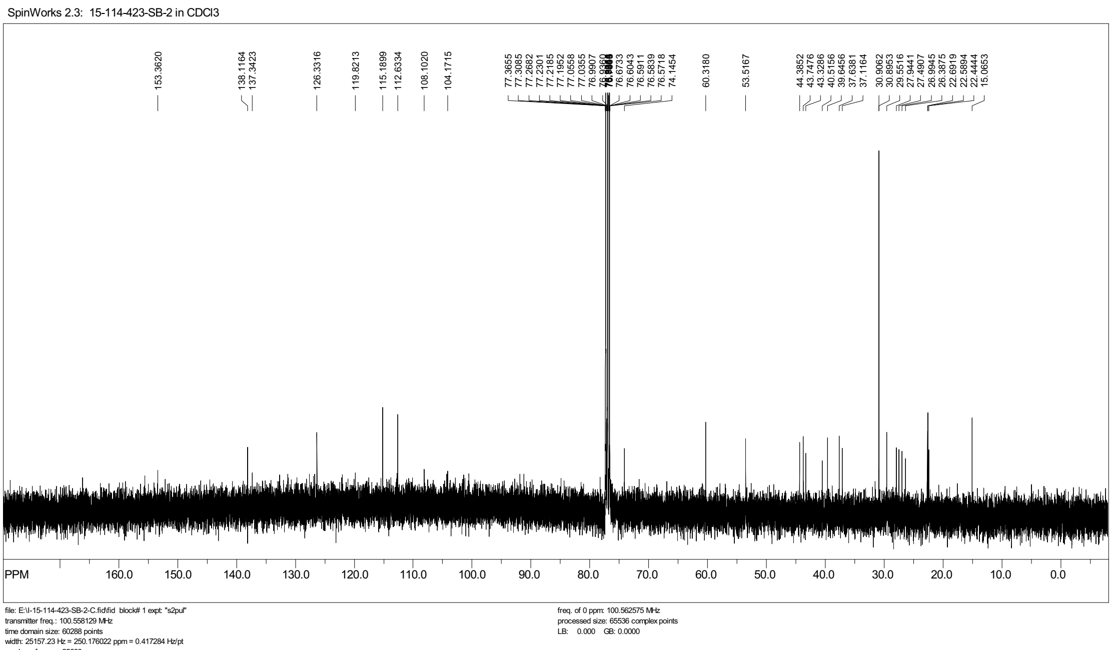


Apendix Figure 81 100 MHz ^{13}C NMR spectrum: 3-benzyloxy, 16*R*, 20*S*-trihydroxy-cholestane-$\Delta^{1,3,5(10)}$- estratriene (172)



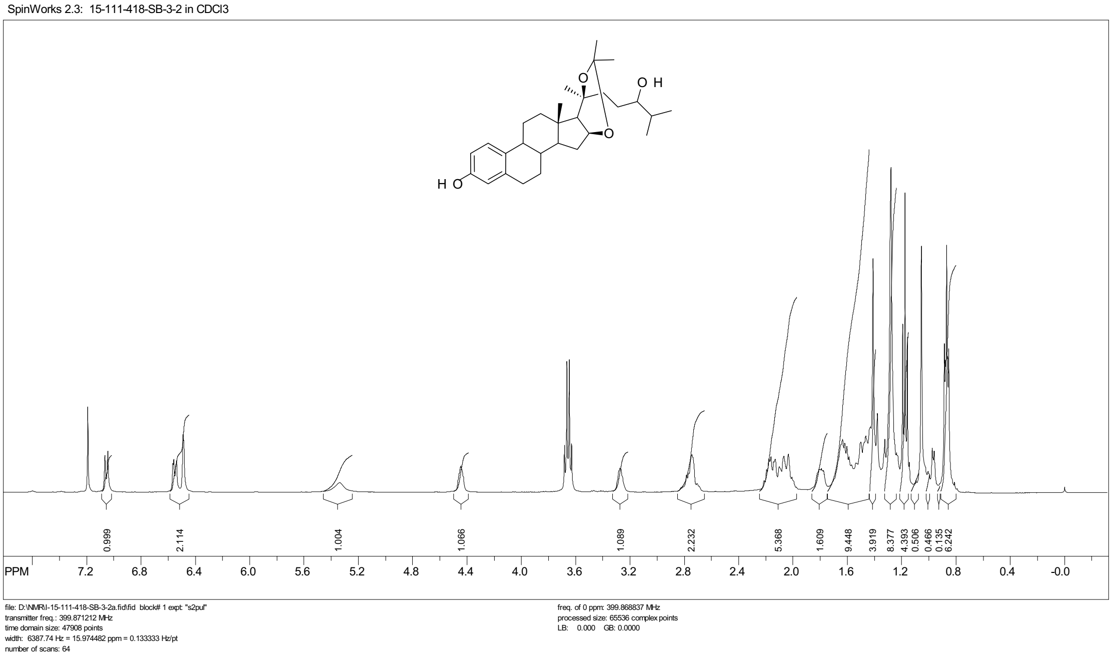
Apendix Figure 82 400 MHz ^{1}H NMR spectrum: 3-hydroxy-(16*S*, 20*S*)-16, 20-acetonide-cholestan-$\Delta^{1,3,5(10)}$- estratriene (175)

Remark: ^{1}H NMR contained **175** and the compound that acetonide was removed in $CDCl_3$.

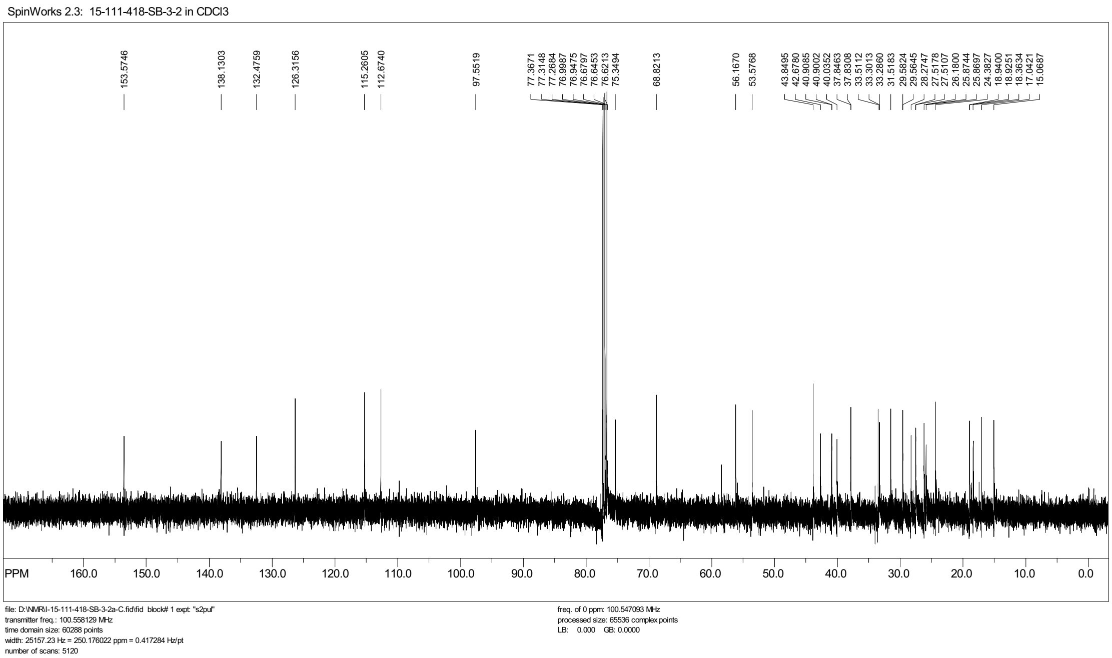


Apendix Figure 83 100 MHz ^{13}C NMR spectrum: 3-hydroxy-(16*S*, 20*S*)-16, 20-acetonide-cholestan-$\Delta^{1,3,5(10)}$- estratriene (175)

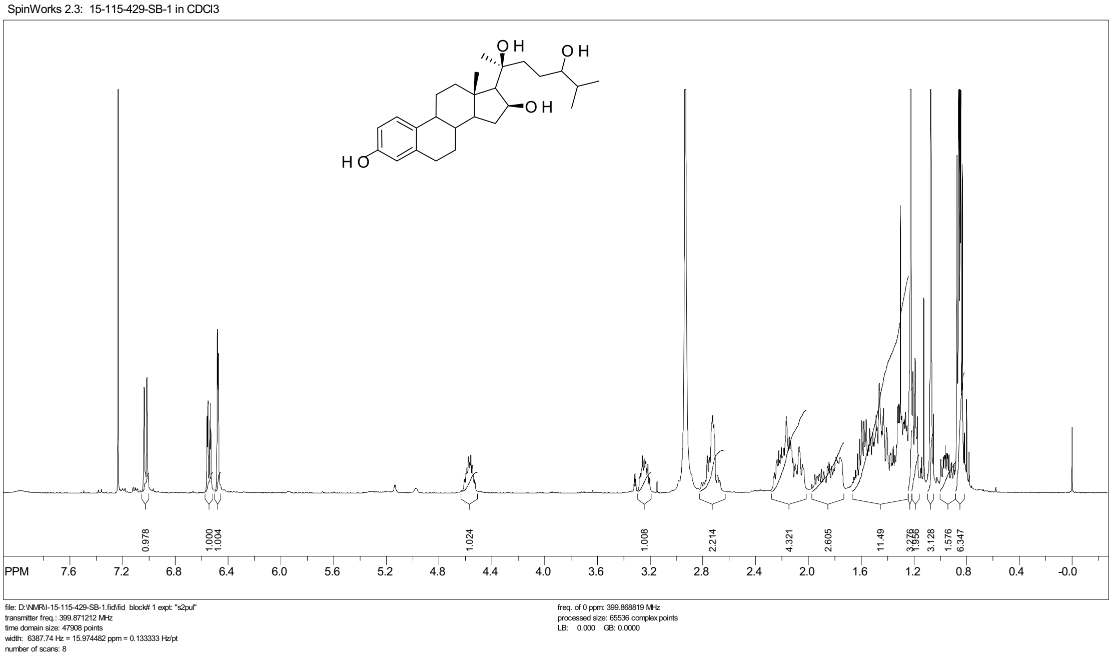
Remark: **175** was completely converted to **171** during the period of ^{13}C experiment.



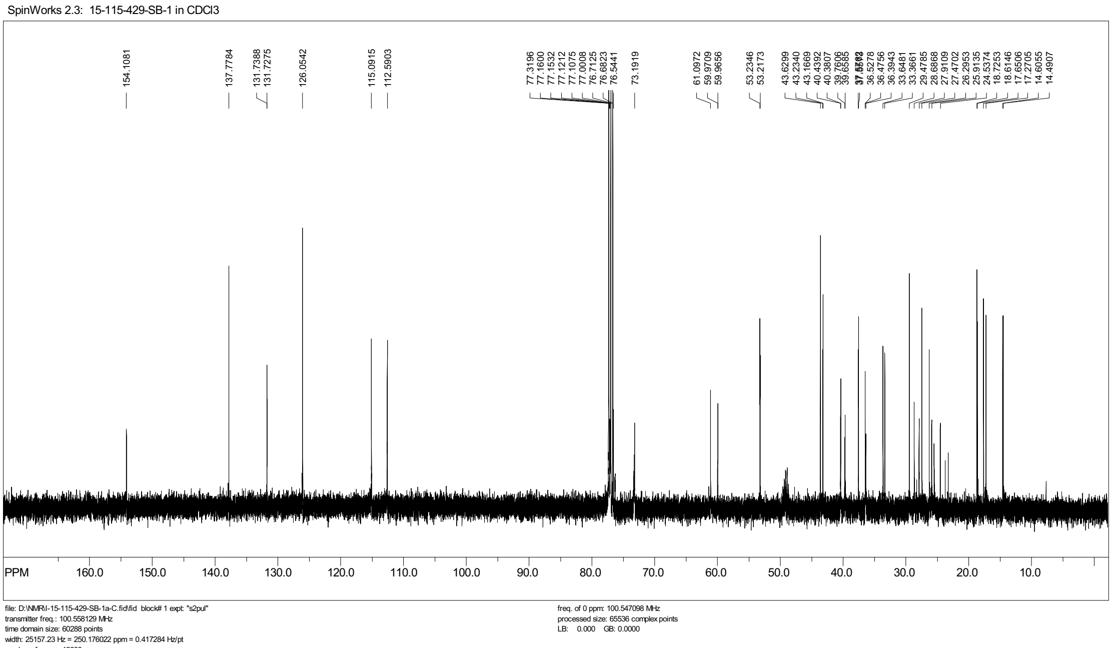
Apendix Figure 84 400 MHz ^{1}H NMR spectrum: 3,24-dihydroxy-(16*S*, 20*S*)-16, 20-acetonide-cholestan-$\Delta^{1,3,5(10)}$- estratriene (173)



Apendix Figure 85 100 MHz ^{13}C NMR spectrum: 3,24-dihydroxy-(16*S*, 20*S*)-16, 20-acetonide-cholestan-$\Delta^{1,3,5(10)}$- estratriene (173)



Apendix Figure 86 400 MHz ^{1}H NMR spectrum: 3, 16*S*, 20*S*, 24-tetrahydroxy-24-cholestan-$\Delta^{1,3,5(10)}$- estratriene (174)



Apendix Figure 87 100 MHz ^{13}C NMR spectrum: 3, 16*S*, 20*S*, 24-tetrahydroxy-24-cholestan-$\Delta^{1,3,5(10)}$- estratriene (174)

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OUTPUT

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1. **First synthesis of 3,16,20-polyoxygenated cholestanes, new cytotoxic steroids from the gorgonian *Leptogorgia sarmentosa***

Suthinee Boonananwong, Boonsong Kongkathip, Ngampong Kongkathip,* ***Steroids***, 2008, *73, 1123-1127.*

2. **Synthesis and Biological Evaluation of 3,16,20-Polyoxygenated Steroids of Marine Origin and their Analogs**

Suthinee Boonananwong, Boonsong Kongkathip, Ngampong Kongkathip,* **Kasetsart J. (Nat. Sci.)** *42 : 531-542* (2008)