

Supporting Information

Porous carbon/Fe₃O₄ nanocomposite as a new magnetically catalyst for the preparation of polyhydroquinolines

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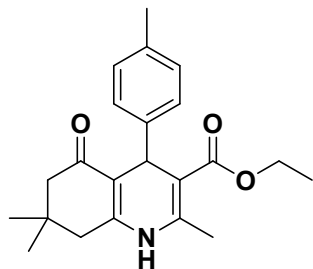
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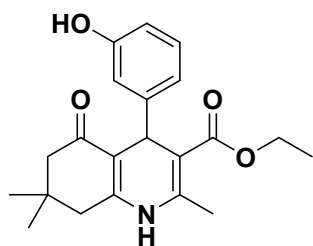
Spectral data of compounds:

Ethyl 2,7,7-trimethyl-5-oxo-4-(p-tolyl)-1,4,5,6,7,8-hexahydroquinoline-3-carboxylate (2)



White Solid; M.p; 259-261 °C; IR (KBr, cm^{-1}): 3276, 3208, 3083, 2935, 1701, 1647, 1605, 1495, 1380, 1215, 1194, 1072 cm^{-1} ; ^1H NMR (250 MHz, $\text{DMSO}-d_6$): δ (ppm) 0.83(s, 3H), 0.98 (s, 3H), 1.11 (t, $J = 6.75$ Hz, 3H), 1.94 (d, $J = 16.00$ Hz, 2H), 2.17 (s, 3H), 2.22 (s, 3H), 2.36-2.48 (m, 2H), 3.90-3.96 (m, 2H), 4.79 (s, 1H), 6.93-7.02 (m, 4H), 9.01 (s, 1H); ^{13}C NMR(62.5 MHz, $\text{DMSO}-d_6$): δ (ppm) 14.5, 18.6, 20.9, 26.8, 29.5, 32.5, 35.7, 50.6, 59.3, 104.1, 110.4, 127.7, 128.6, 134.9, 145.1, 149.7, 167.2, 194.6.

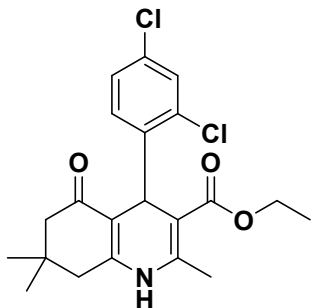
Ethyl 4-(3-hydroxyphenyl)-2,7,7-trimethyl-5-oxo-1,4,5,6,7,8-hexahydroquinoline-3-carboxylate (5)



White Solid; M.p; 229-231 °C; IR (KBr, cm^{-1}): 3279,3085, 2963,1688, 1618, 1488,1215, 1172, 869, 779; ^1H NMR (250 MHz, $\text{DMSO}-d_6$): δ (ppm) 0.85 (s, 3H), 0.99 (s, 3H), 1.12 (t, $J = 6.75$ Hz, 3H), 2.05 (dd, $J = 29, 16$ Hz, 2H), 2.25 (s, 3H), 2.35-2.48 (m, 2H), 3.40 (d, $J = 7.00$ Hz, 2H), 4.77 (s, 1H), 6.44 (d, $J = 7.50$ Hz, 1H), 6.57 (s, 2H), 6.62 (t, $J = 7.25$ Hz, 1H), 9.01 (s, 1H), 9.07

(s, 1H); ^{13}C NMR (62.5 MHz, $\text{DMSO-}d_6$): δ (ppm) 14.5, 18.6, 26.9, 29.5, 32.4, 35.9, 50.6, 59.4, 104.04, 110.3, 113.01, 114.9, 118.5, 128.8, 145.08, 149.3, 149.8, 157.2, 167.3, 194.6.

Ethyl 4-(2,4-dichlorophenyl)-2,7,7-trimethyl-5-oxo-1,4,5,6,7,8-hexahydroquinoline-3-carboxylate (7)



White Solid; M.p; 242-244 °C; IR (KBr, cm^{-1}): 3283, 3078, 2957, 1706, 1647, 1609, 1107, 1073 cm^{-1} ; ^1H NMR (250 MHz, $\text{DMSO-}d_6$): δ (ppm) 0.81 (s, 3H), 0.97 (s, 3H), 1.05 (t, $J=6.50$ Hz, 3H), 2.00 (dd, $J=42, 16$ Hz, 2H), 2.23 (s, 3H), 2.36-2.48 (m, 2H), 3.91 (d, $J=6.50$ Hz, 2H), 5.12 (s, 1H), 7.25 (s, 2H), 7.32 (s, 1H), 9.13 (s, 1H); ^{13}C NMR(62.5 MHz, $\text{DMSO-}d_6$): δ (ppm) 14.4, 18.6, 26.7, 29.4, 32.3, 35.1, 50.5, 59.4, 103.1, 109.6, 127.2, 128.5, 131.1, 133.2, 144.6, 145.8, 150.2, 166.9, 194.3.

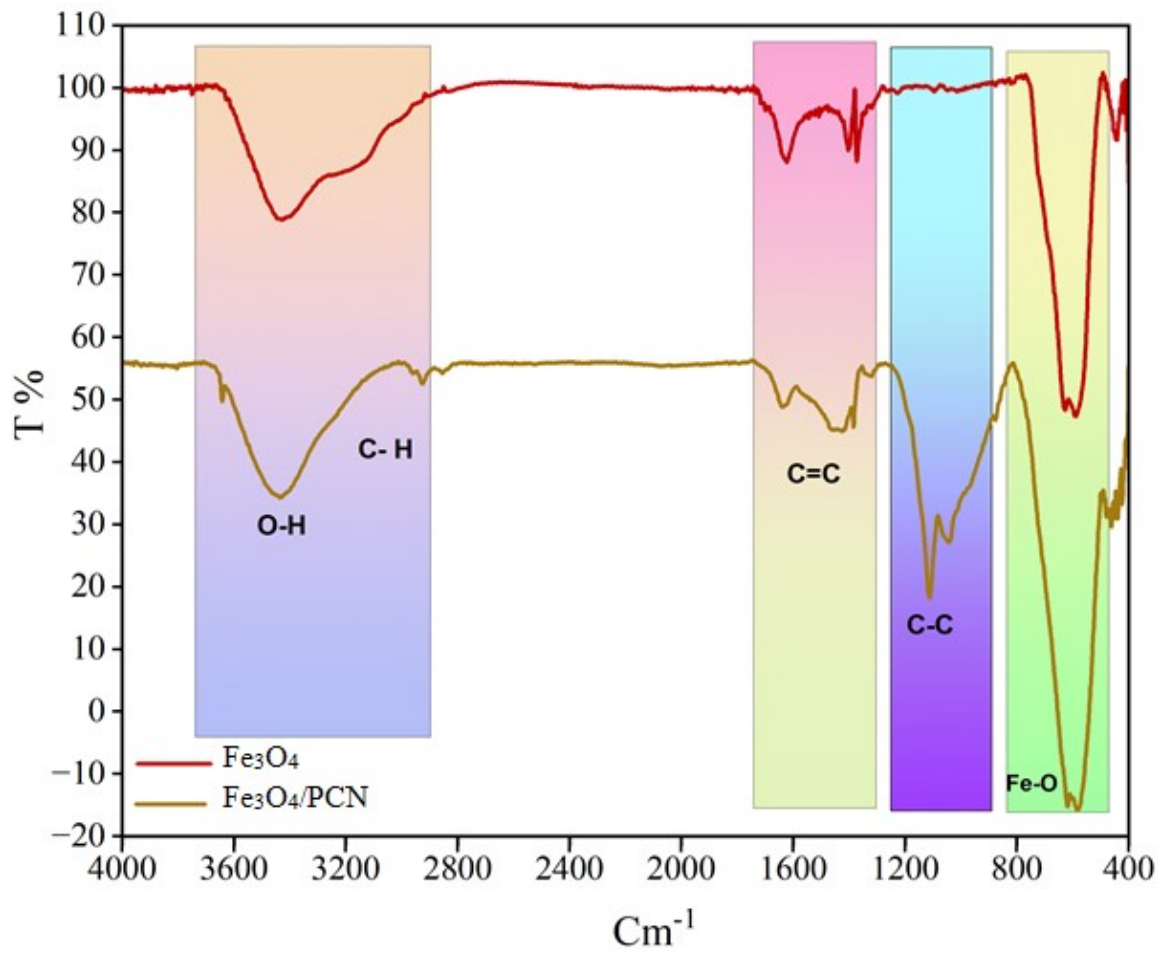


Figure S1. FT-IR spectrum of Fe₃O₄/PCN in comparison with Fe₃O₄

ethyl 2,7,7-trimethyl-5-oxo-4-(p-tolyl)-1,4,5,6,7,8-hexahydroquinoline-3-carboxylate

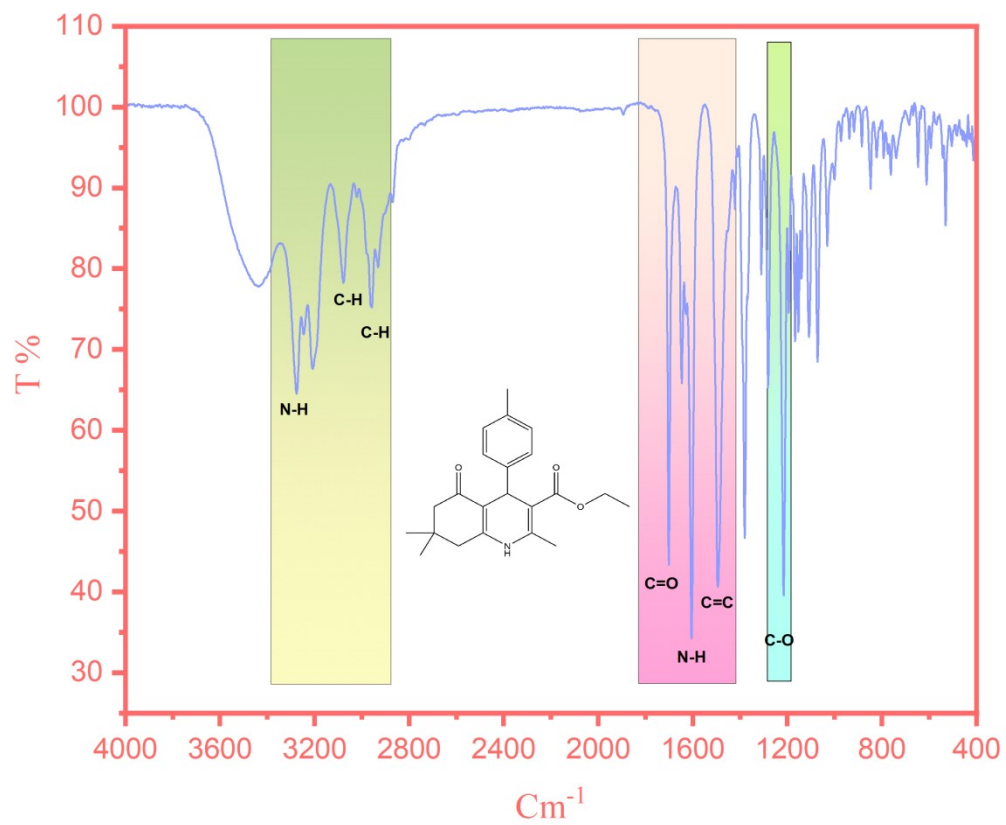


Figure S2. FT-IR spectrum of compound 2.

Zafari-4-methyl-1402-10-10

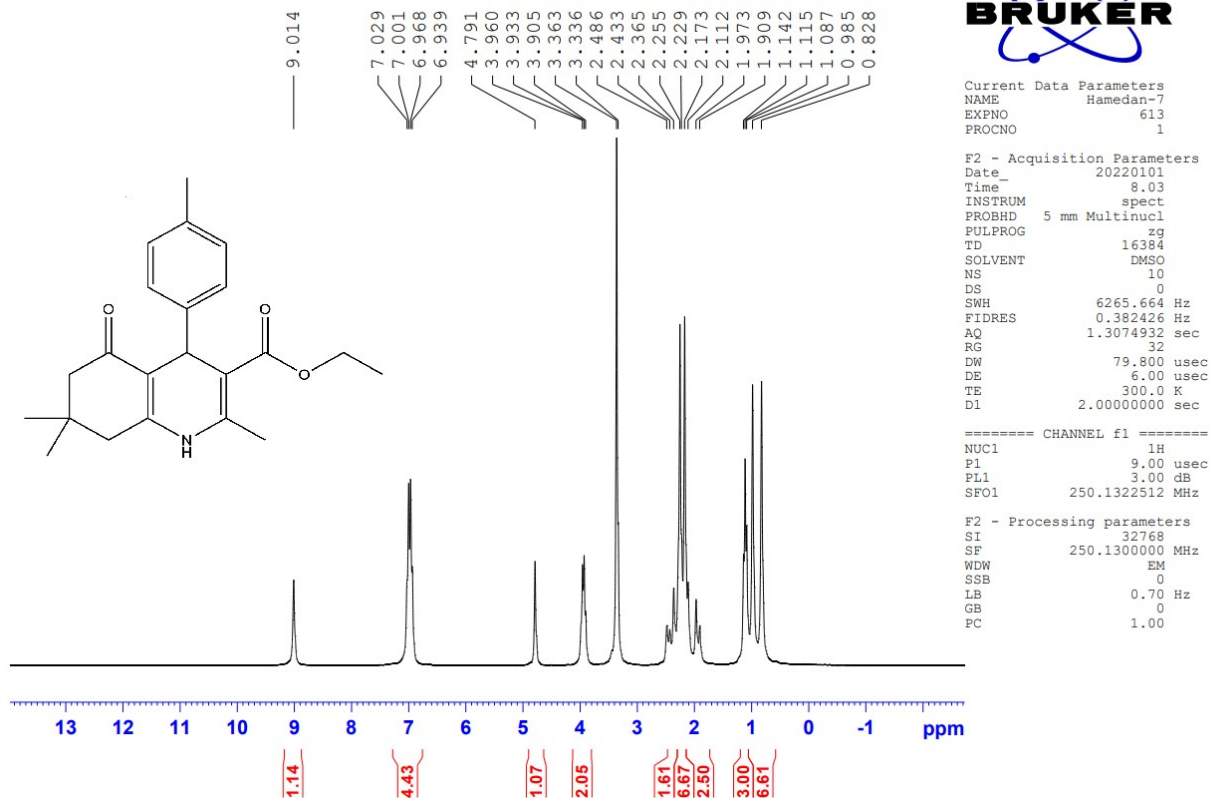


Figure S3. ¹H NMR spectrum of compound 2.

Zafari-4methyl-benzaldehyde

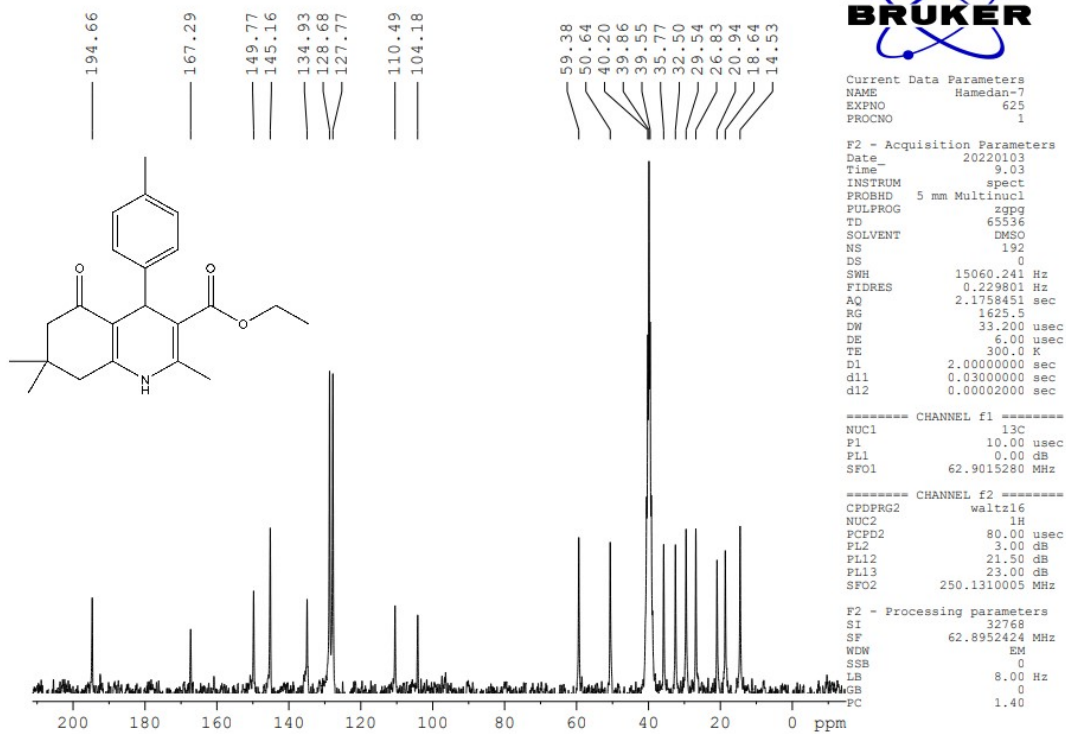


Figure S4. ¹³C NMR spectrum of compound 2.

ethyl 4-(3-hydroxyphenyl)-2,7,7-trimethyl-5-oxo-1,4,5,6,7,8-hexahydroquinoline-3-carboxylate

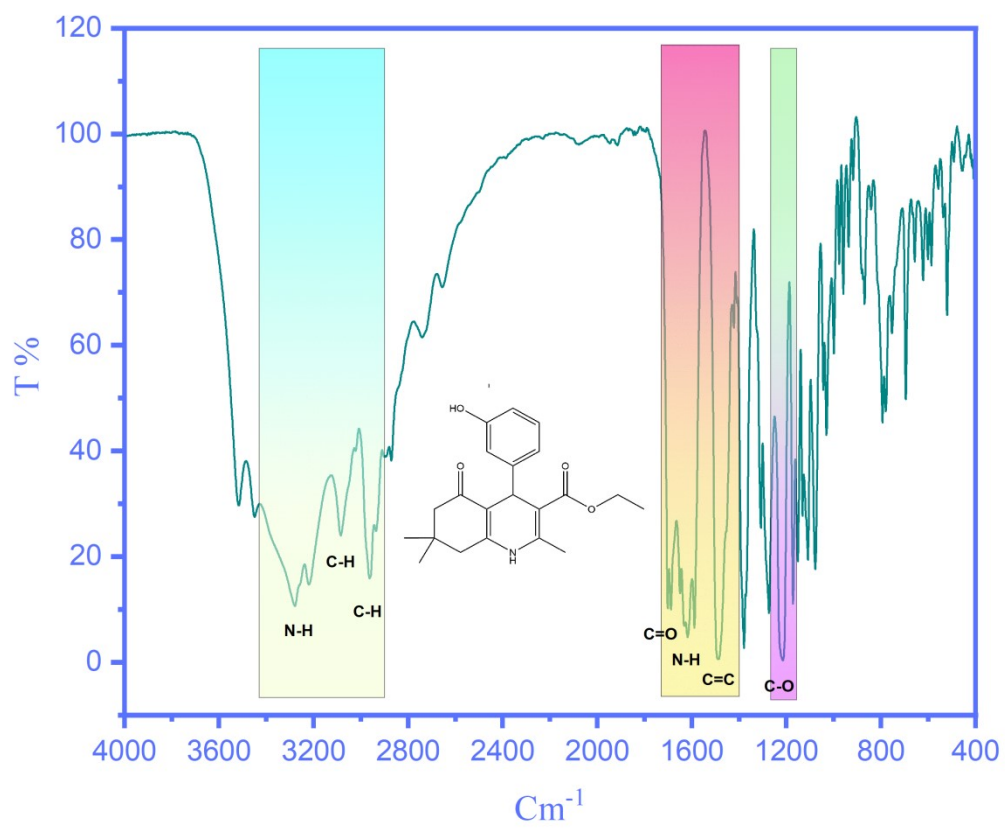


Figure S5. FT-IR spectrum of compound 5.

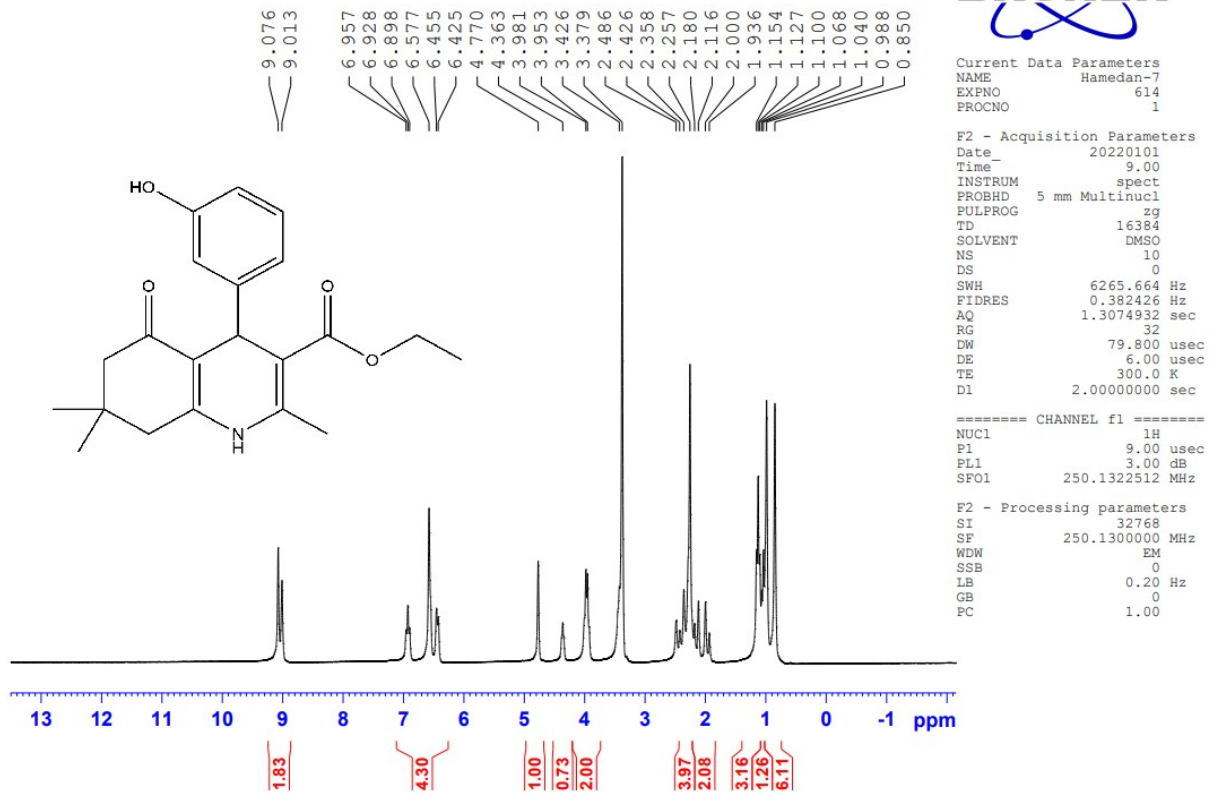
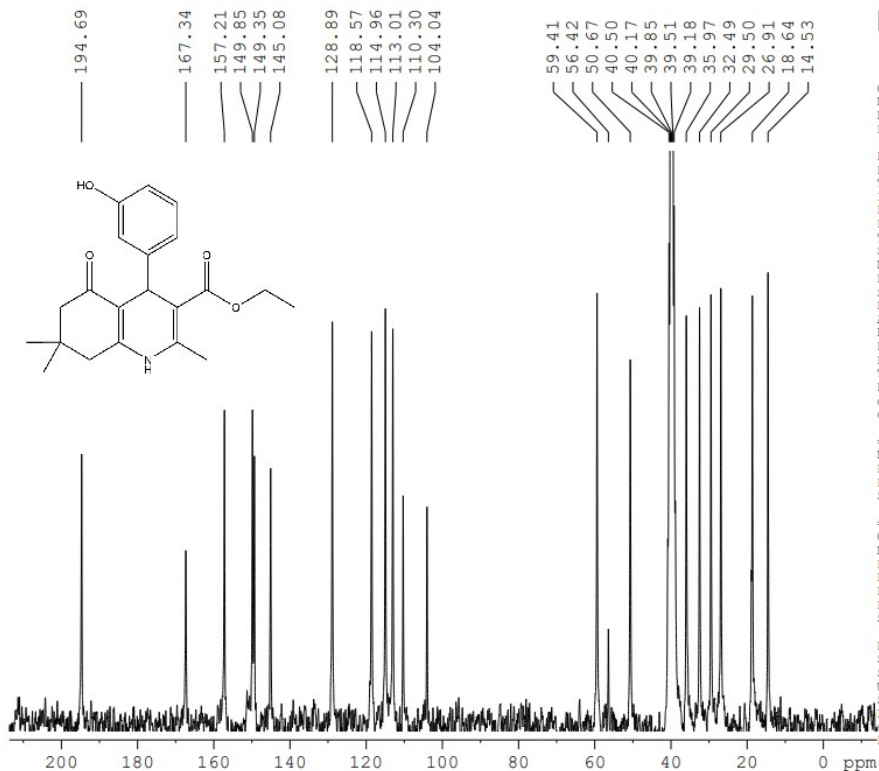


Figure S6. ¹H NMR spectrum of compound 5.

Zafari-3-hydroxy-benzaldehyde



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===== CHANNEL f2 =====
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F2 - Processing parameters
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Figure S7. ¹³CNMR spectrum of compound 5.

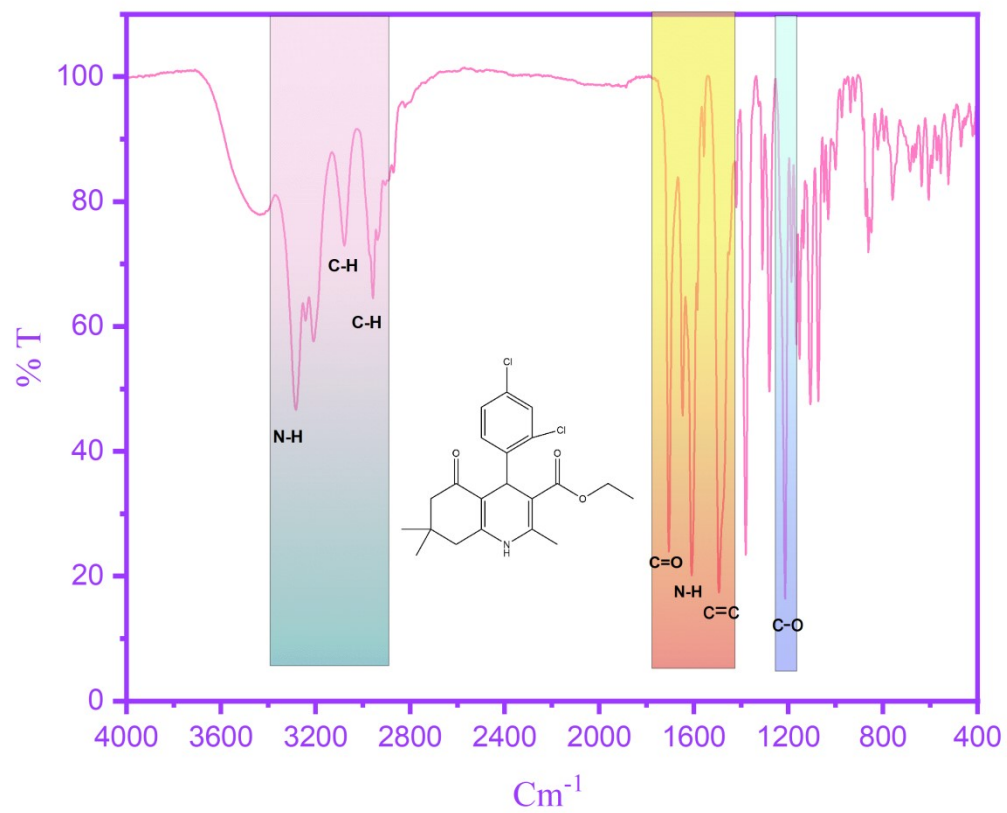


Figure S8. FT-IR spectrum of compound 7.

Zafari-2,4-di-chloro-benzaldehyde-1402-10-9

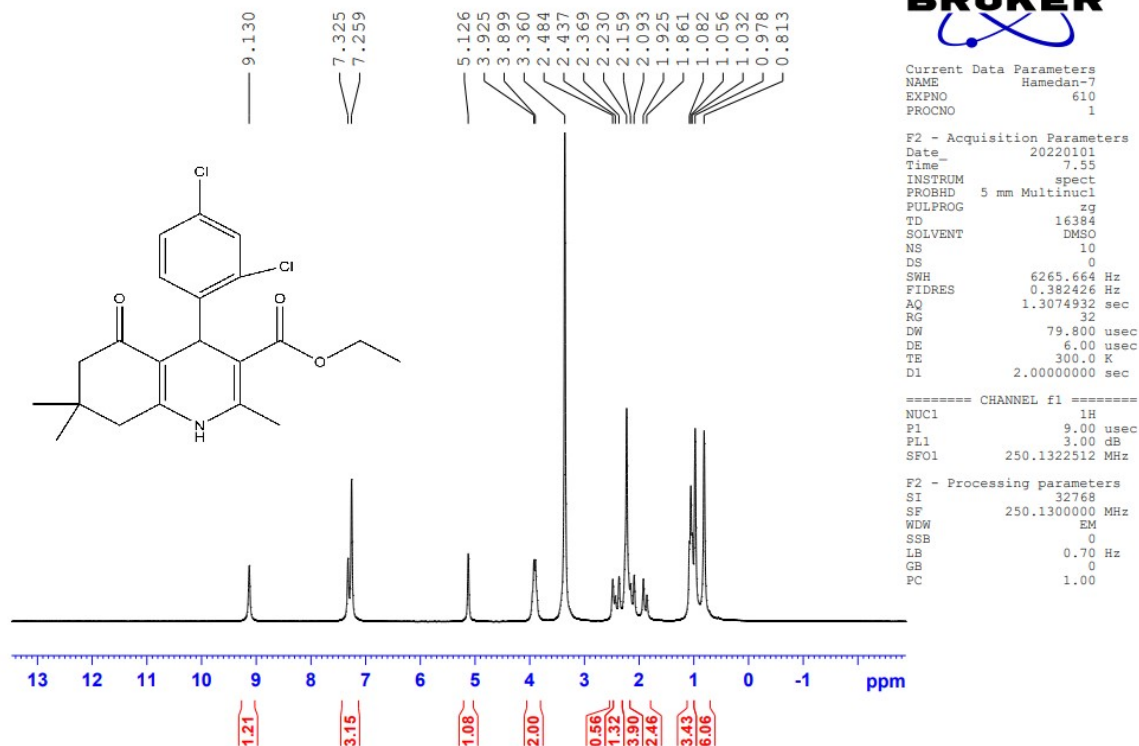


Figure S9. ¹H NMR spectrum of compound 7.

zafari-2,4-dichlorobenzaldehyde

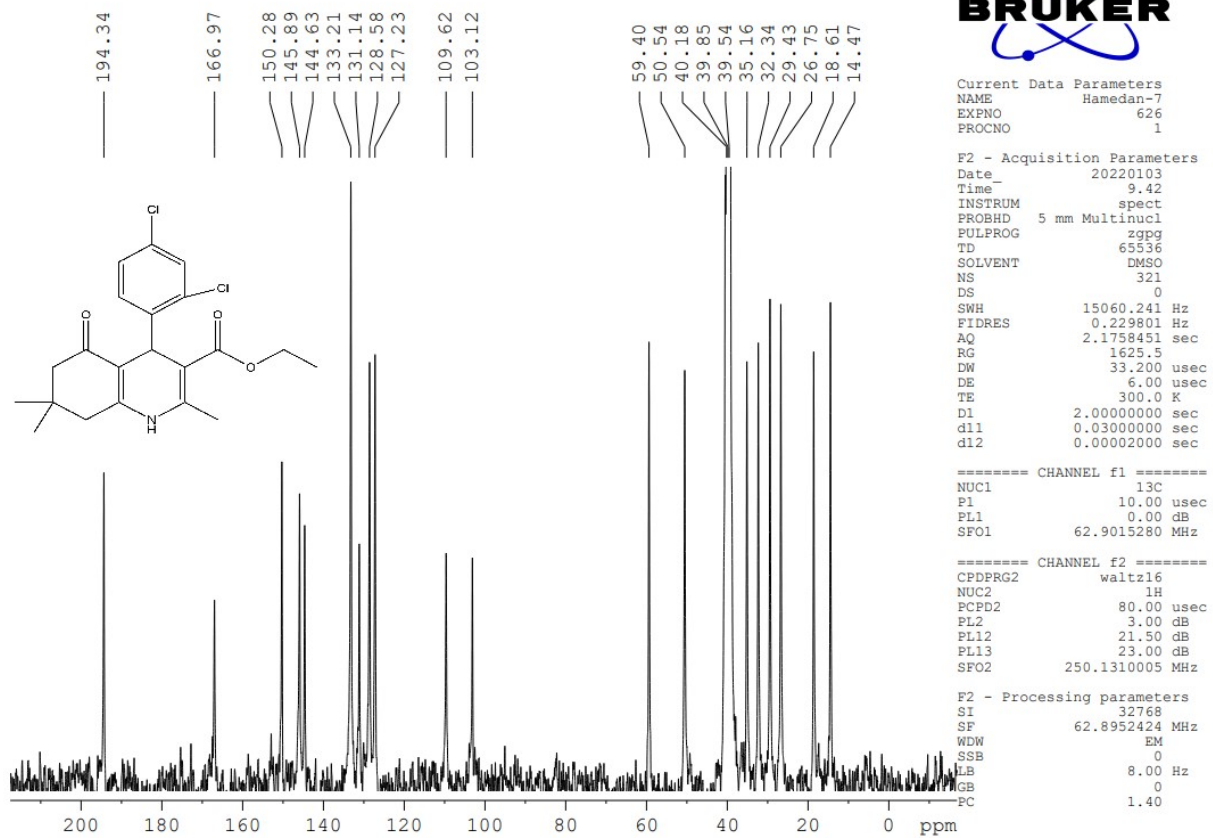


Figure S10. ¹³CNMR spectrum of compound 7.