

Supplementary Material

An eco-friendly approach for the synthesis of 1,2,5-trisubstituted and 4-amino-1,2,5-tetrasubstituted imidazoles *via* a multi-component condensation

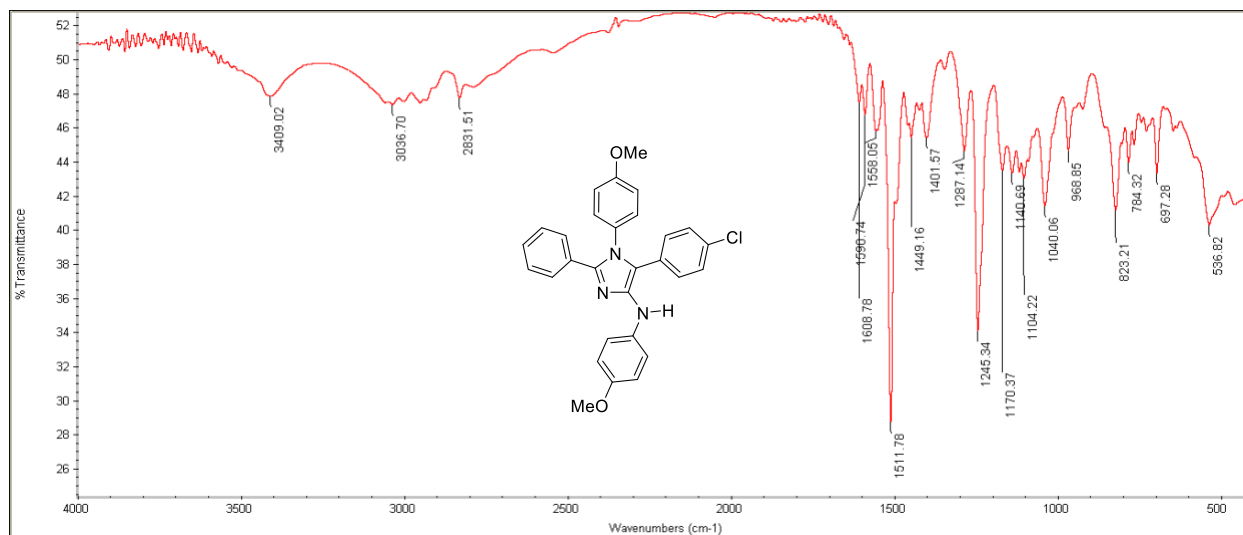
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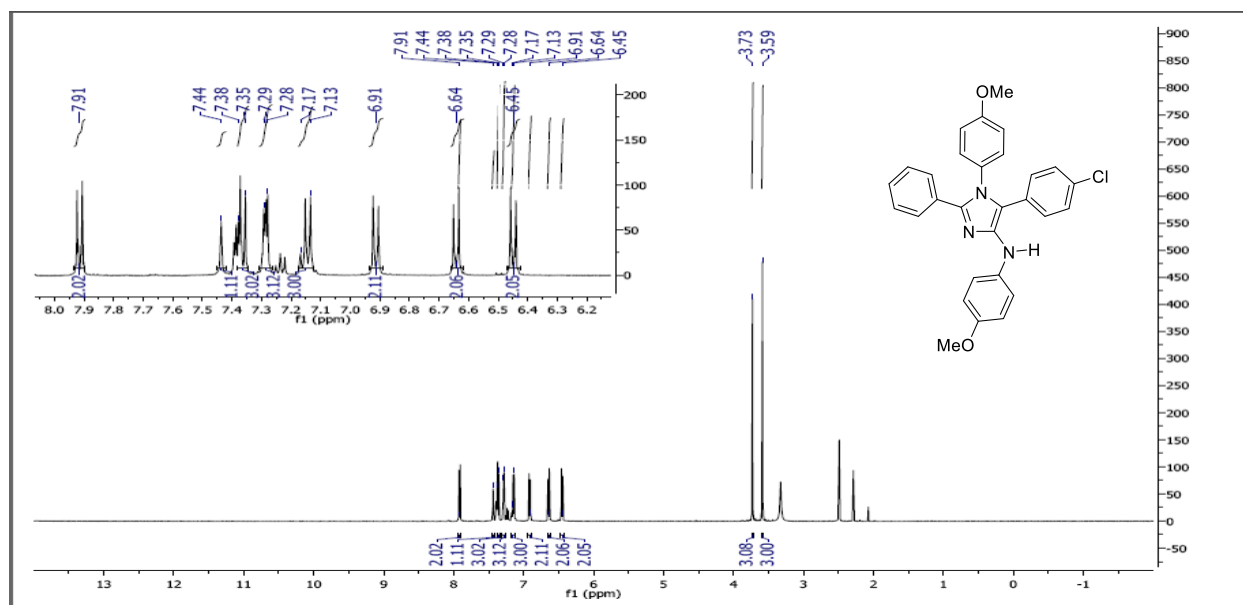
E-mail: mehraby_h@yahoo.com

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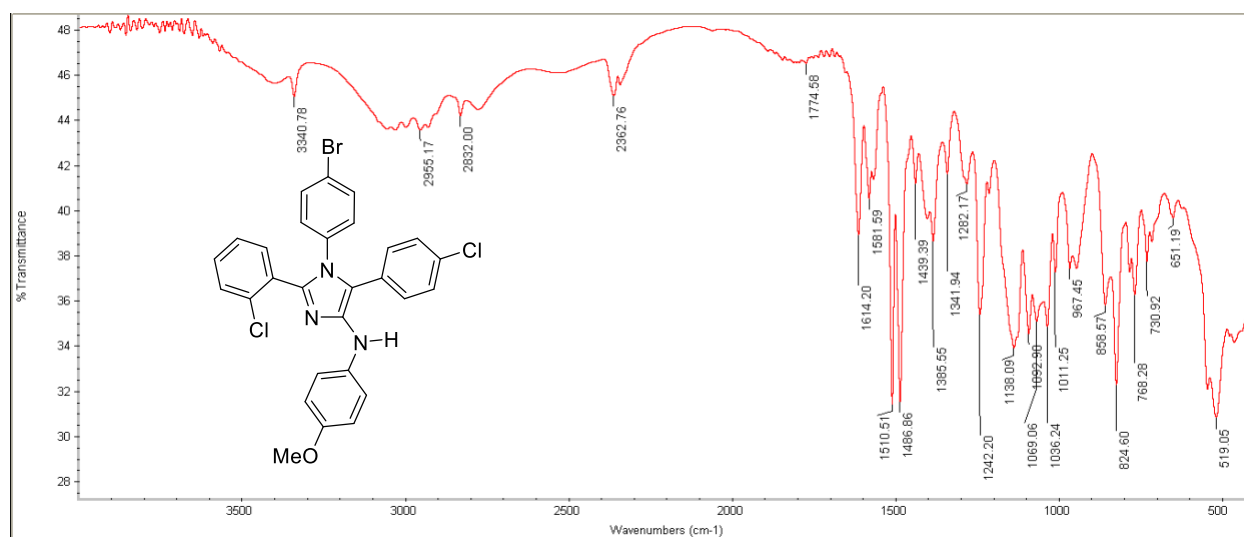
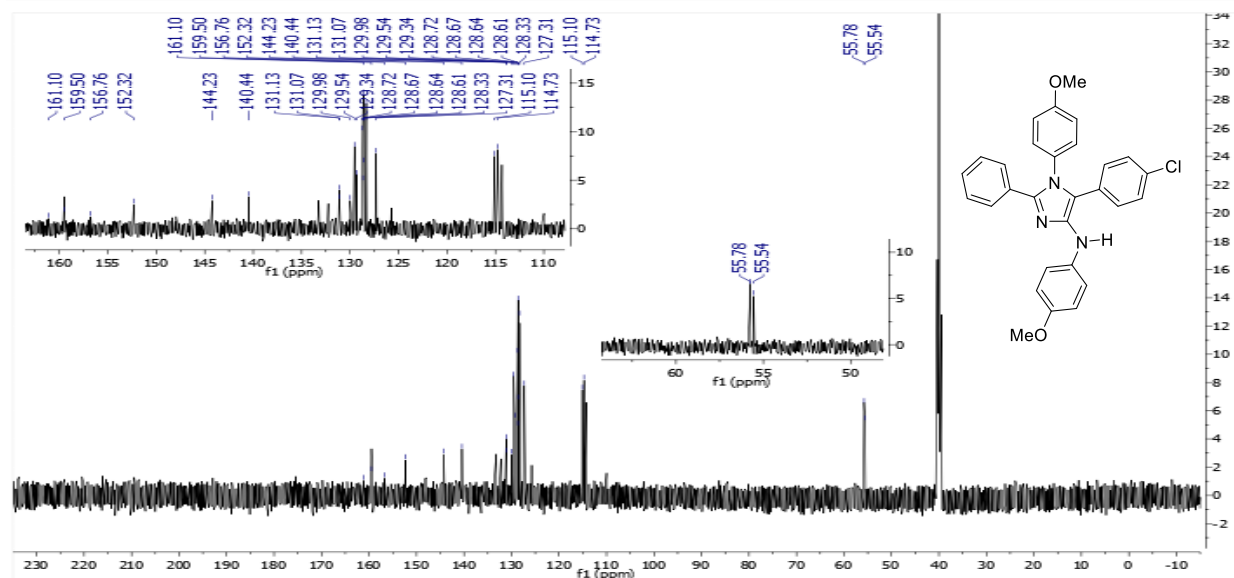
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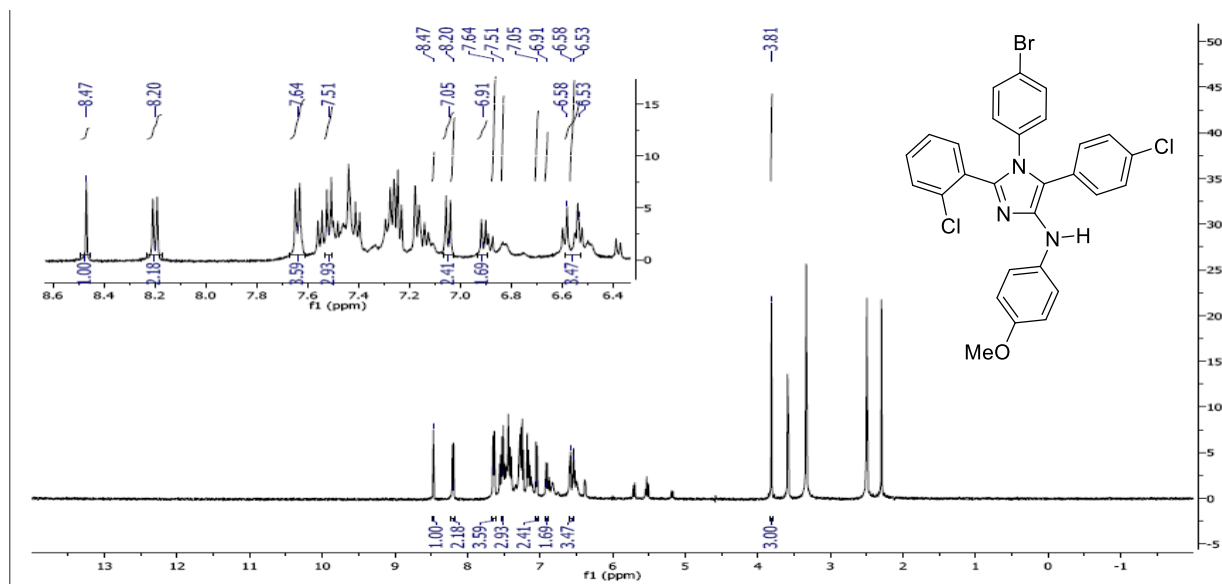


IR ν/cm^{-1} (KBr) for compound **(6a)**: 3409 (NH), 1608 (C=N) cm^{-1} .

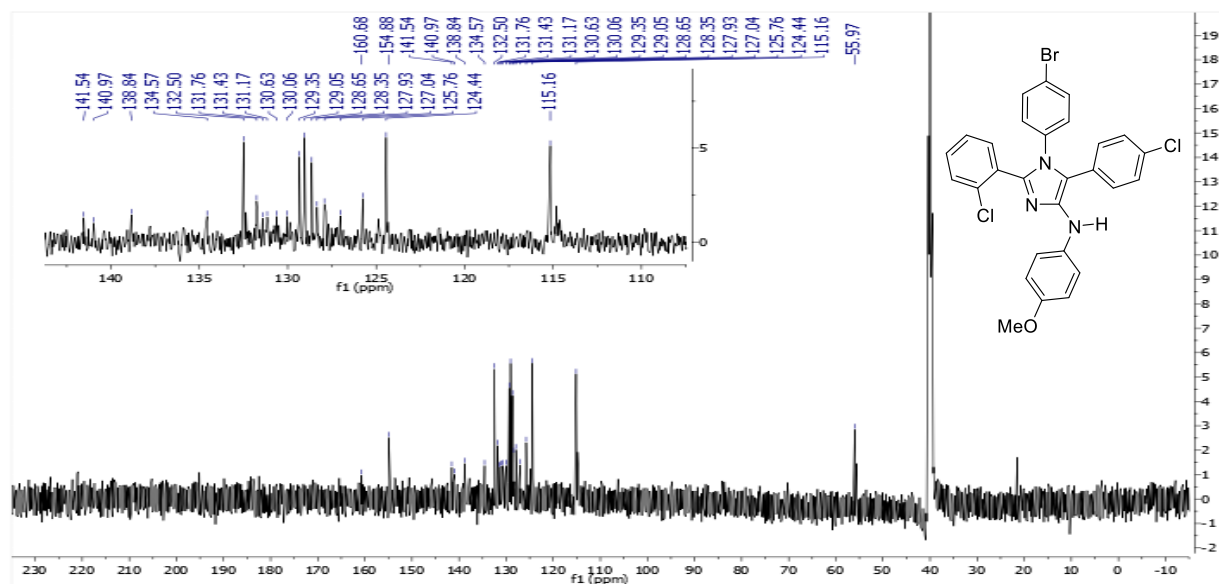


¹H NMR (500 MHz, DMSO-*d*₆) for compound **(6a)**: δ_{H} 3.59 (s, 3H, OCH₃), 3.73 (s, 3H, OCH₃), 6.45 (d, *J* 9.0, 2H, ArH), 6.64 (d, *J* 9.0, 2H, ArH), 6.91 (d, *J* 9.0, 2H, ArH), 7.13-7.38 (m, 9H, ArH), 7.44 (bs, 1H, NH), 7.91 (d, *J* 9.0, 2H, ArH).

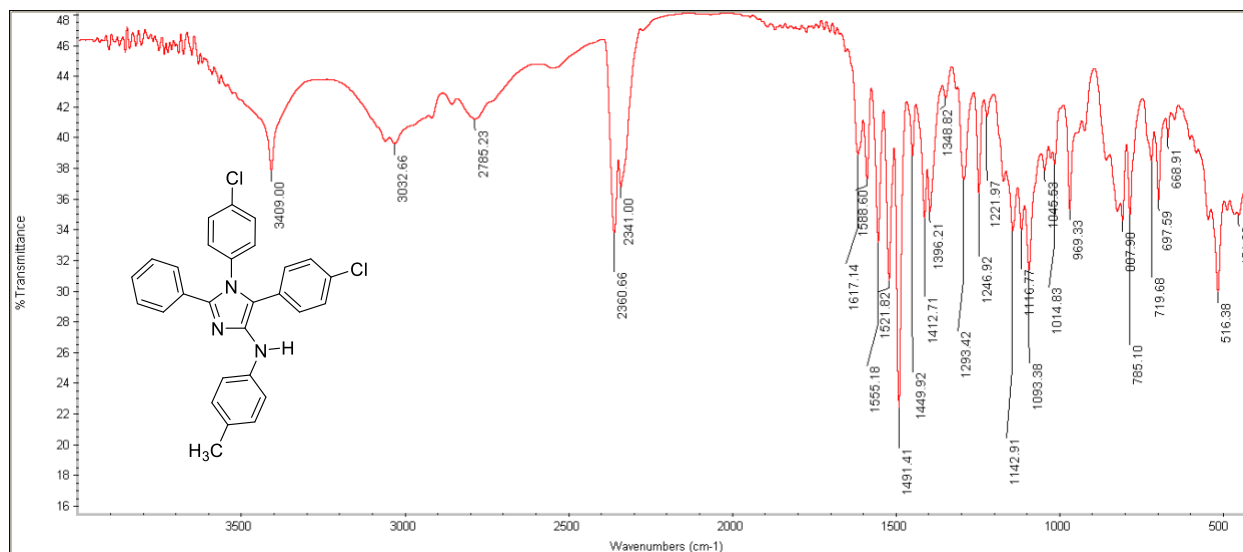




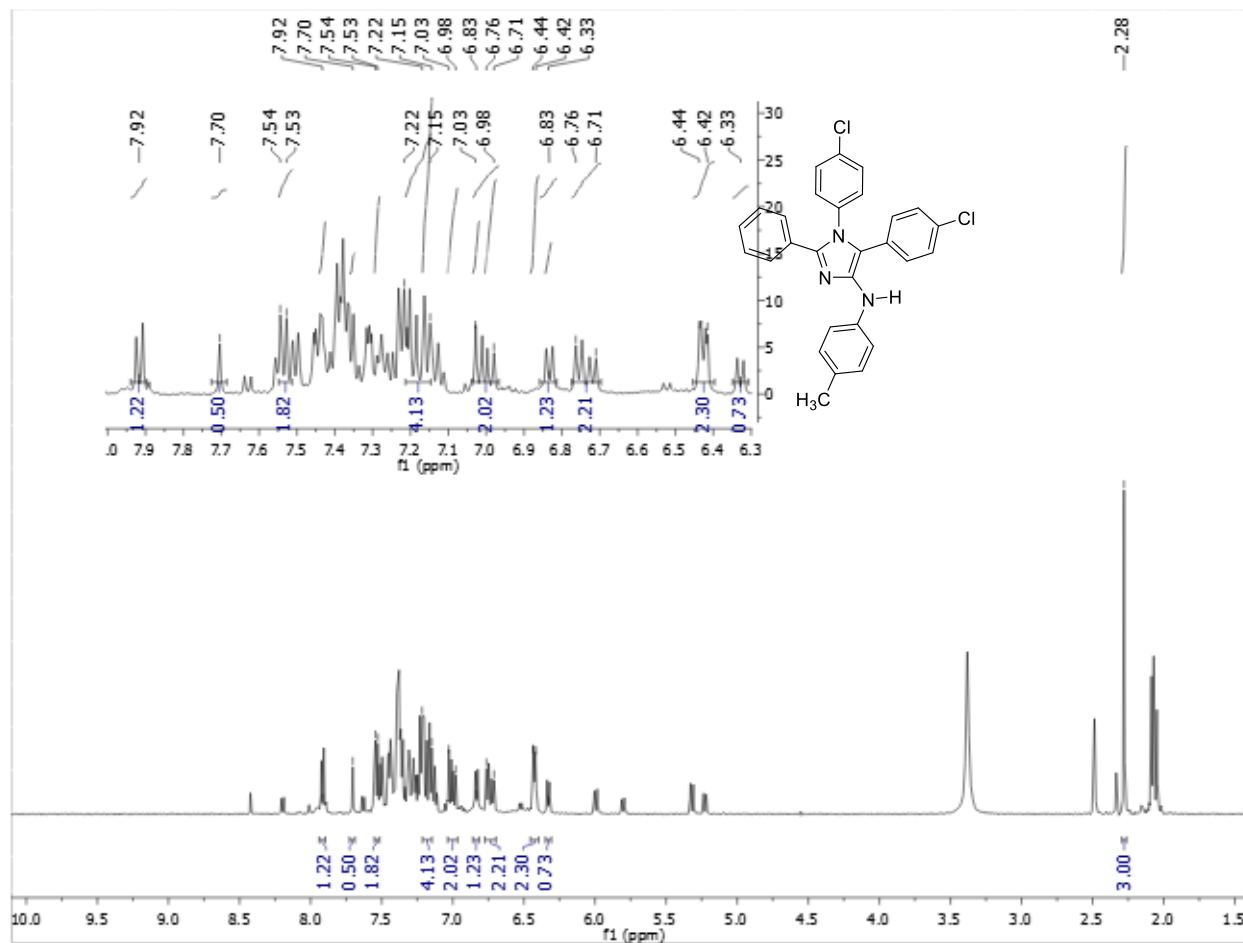
¹H NMR (500 MHz, DMSO-*d*₆) for compound **(6b)**: δ_{H} 3.81 (s, 3H, OCH₃), 6.53-6.58 (m, 3H, ArH), 6.91 (d, 8.5, 2H, ArH), 7.06 (d, *J* 8.5, 2H, ArH), 7.51-7.64 (m, 7H, ArH), 8.20 (d, *J* 8.5, 2H, ArH), 8.47 (bs, 1H, NH).



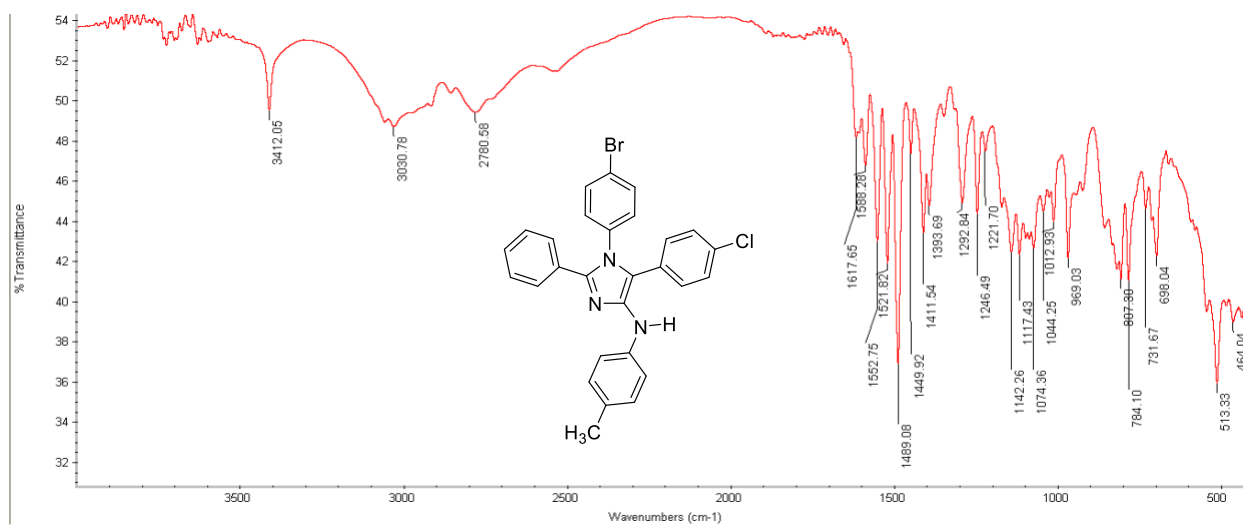
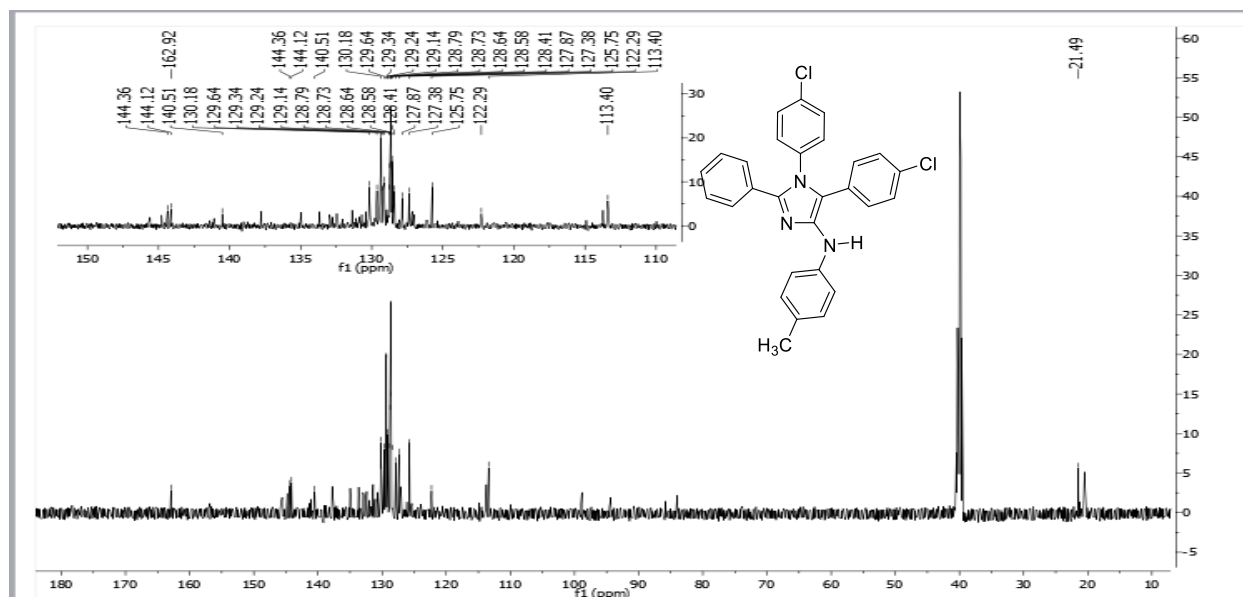
¹³C NMR (125 MHz, DMSO-*d*₆) for compound **(6b)**: δ_{C} 55.9, 115.1, 124.4, 125.7, 127.0, 127.9, 128.3, 128.6, 129.0, 129.3, 130.0, 130.6, 131.1, 131.4, 131.7, 132.5, 134.5, 138.8, 140.9, 141.5, 154.8, 160.6.

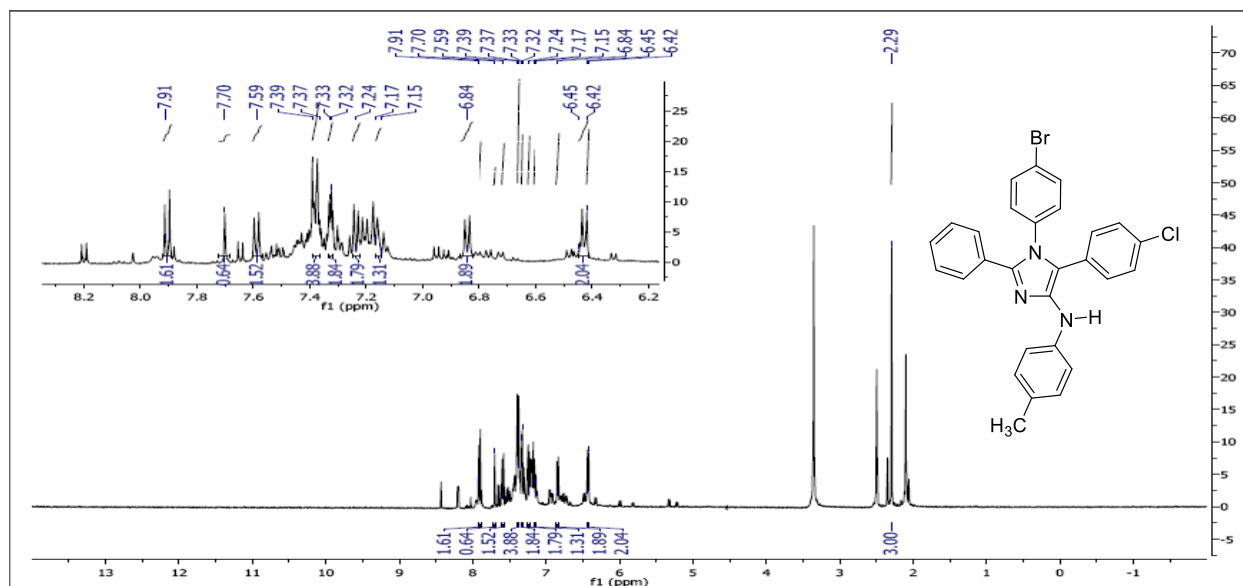


IR ν /cm⁻¹ (KBr) for compound **(6c)**: 3409 (NH), 1617 (C=N) cm⁻¹.

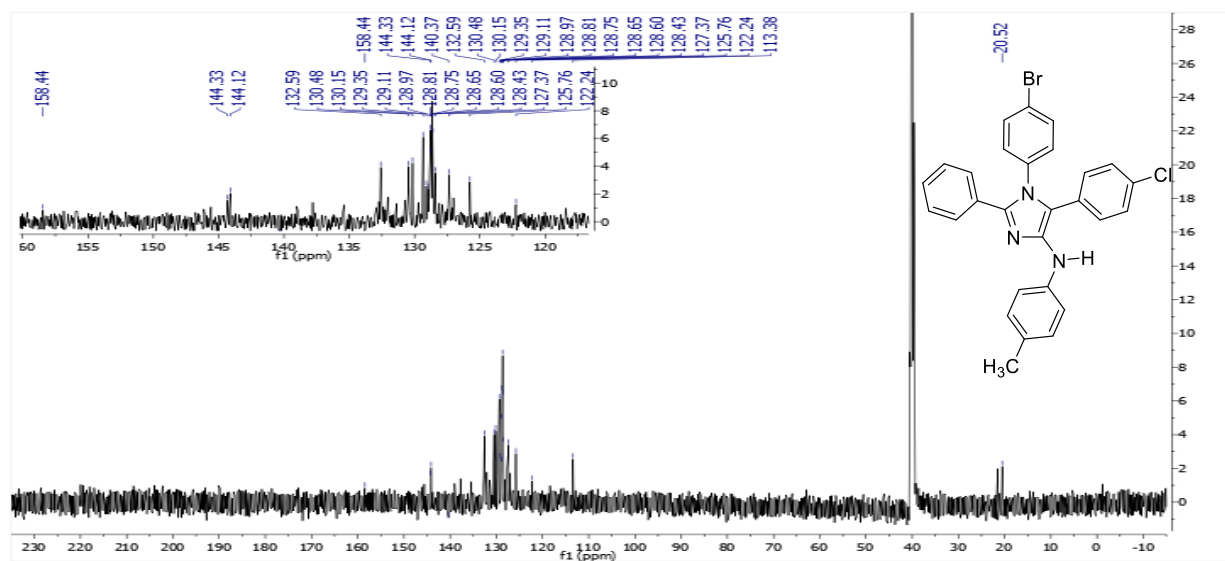


¹H NMR (500 MHz, DMSO-*d*₆) for compound **(6c)**: δ _H 2.28 (s, 3H, CH₃), 6.33 (d, *J* 8.5, 1H, ArH), 6.43 (d, *J* 8.5, 2H, ArH), 6.75 (d, *J* 8.5, 2H, ArH), 6.83 (d, *J* 8.5, 2H, ArH), 7.01 (d, *J* 8.5, 2H, ArH), 7.15-7.22 (m, 4H, ArH), 7.53 (d, *J* 8.5, 2H, ArH), 7.70 (bs, 1H, NH), 7.92 (d, *J* 8.5, 2H).

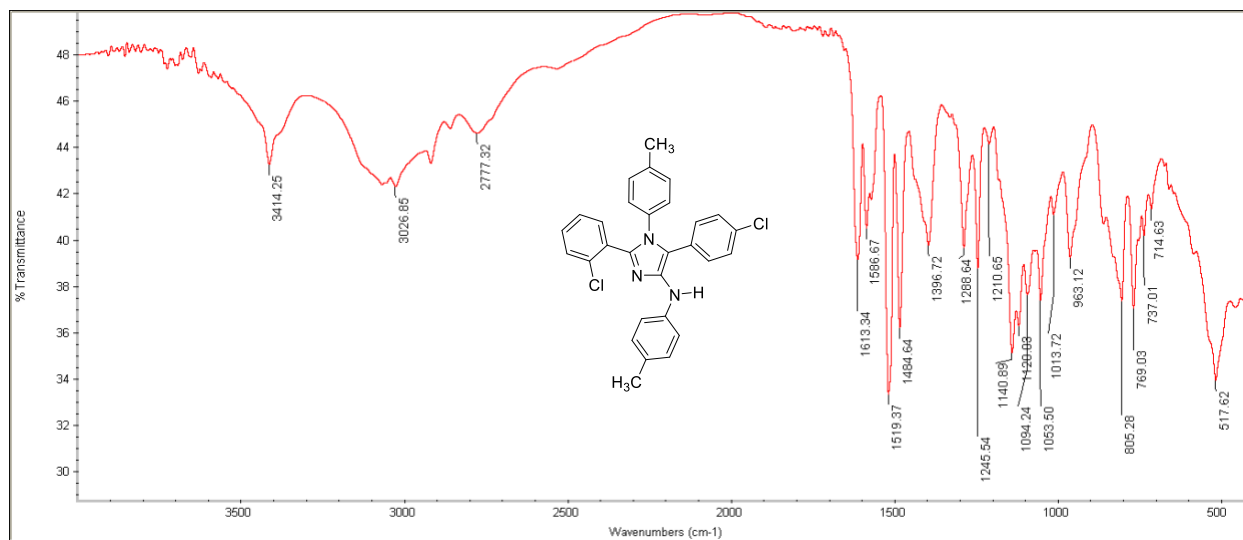




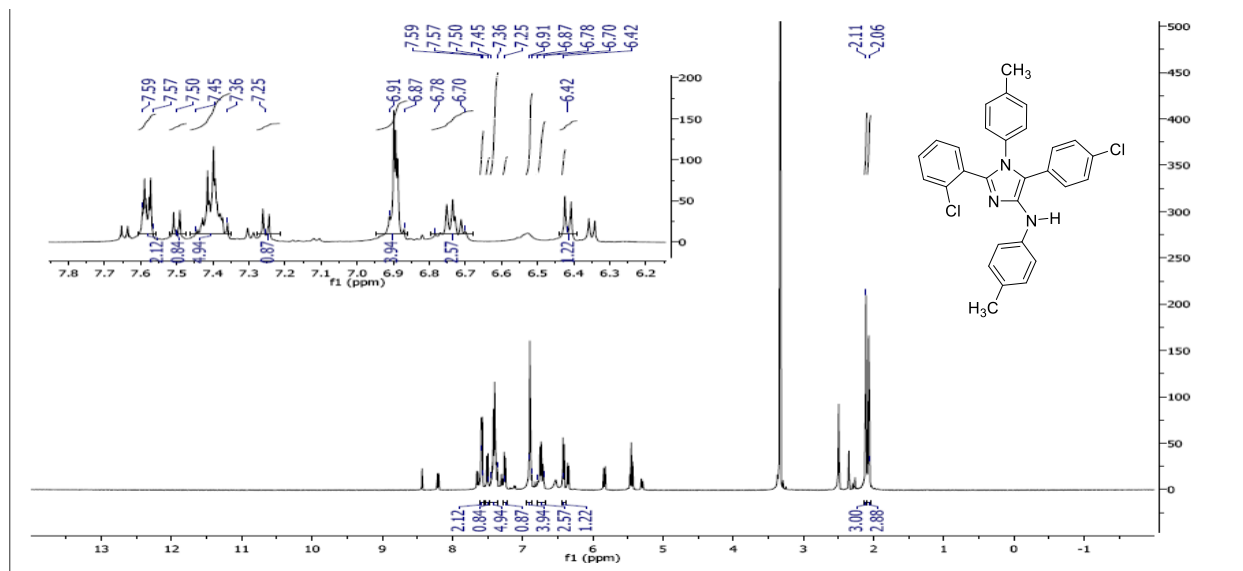
¹H NMR (500 MHz, DMSO-*d*₆) for compound (6d): δ_{H} 2.29 (s, 3H, CH₃), 6.43 (d, *J* 8.5, 2H, ArH), 6.84 (d, *J* 8.5, 2H, ArH), 7.15-7.39 (m, 9H, ArH), 7.59 (d, *J* 9.0, 2H, ArH), 7.70 (bs, 1H, NH), 7.91 (d, *J* 9.0, 2H, ArH).



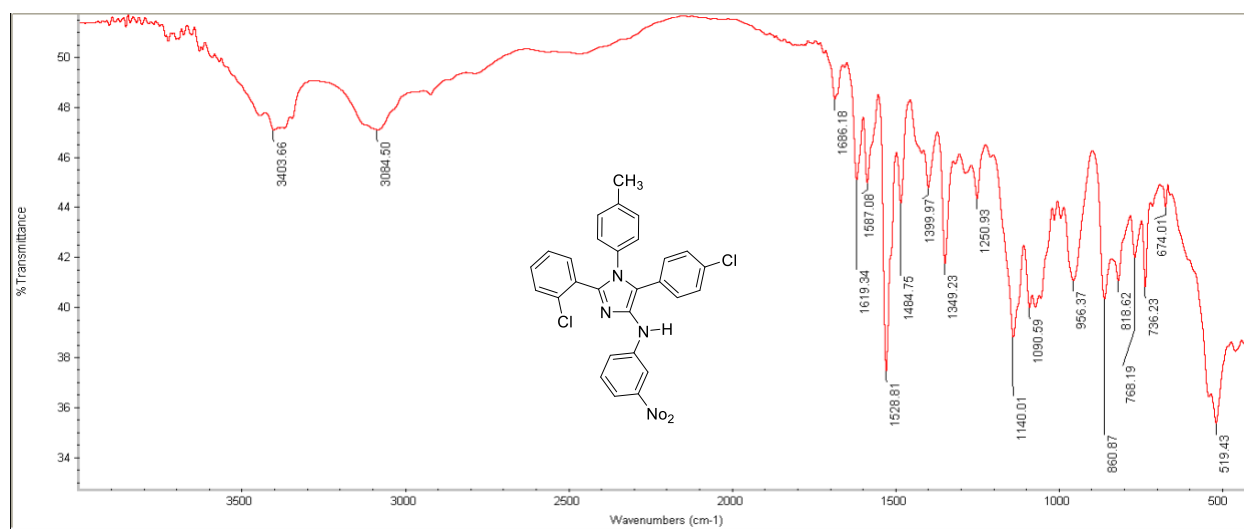
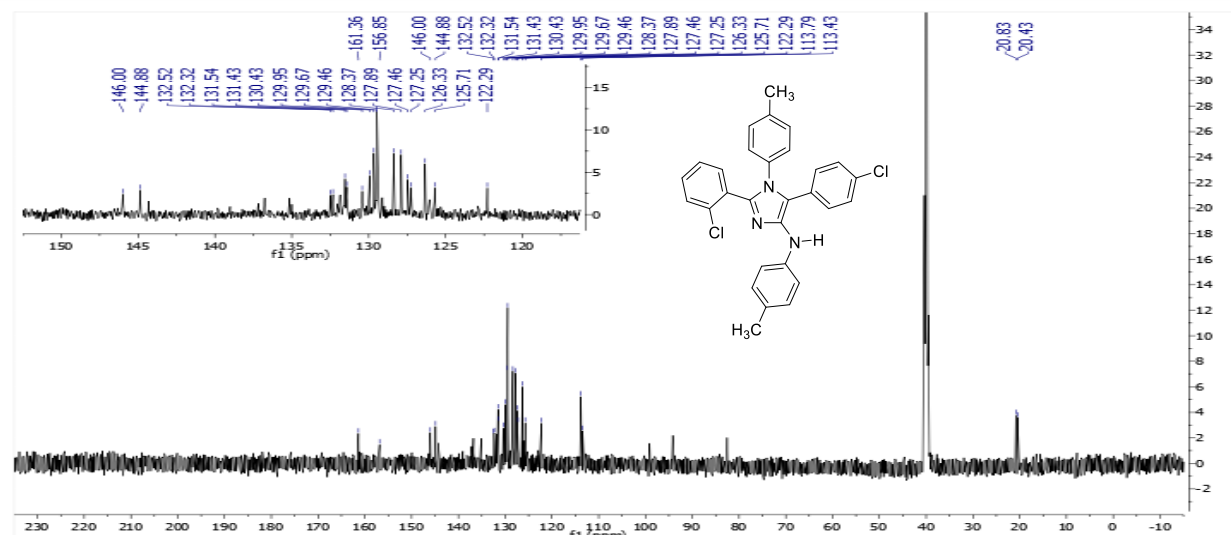
¹³C NMR (125 MHz, DMSO-*d*₆) for compound (6d): δ_{C} 20.5, 113.3, 122.2, 125.7, 127.3, 128.4, 128.6, 128.6, 128.7, 128.8, 128.9, 129.1, 129.3, 130.1, 130.4, 132.5, 140.3, 144.1, 144.3, 158.4.

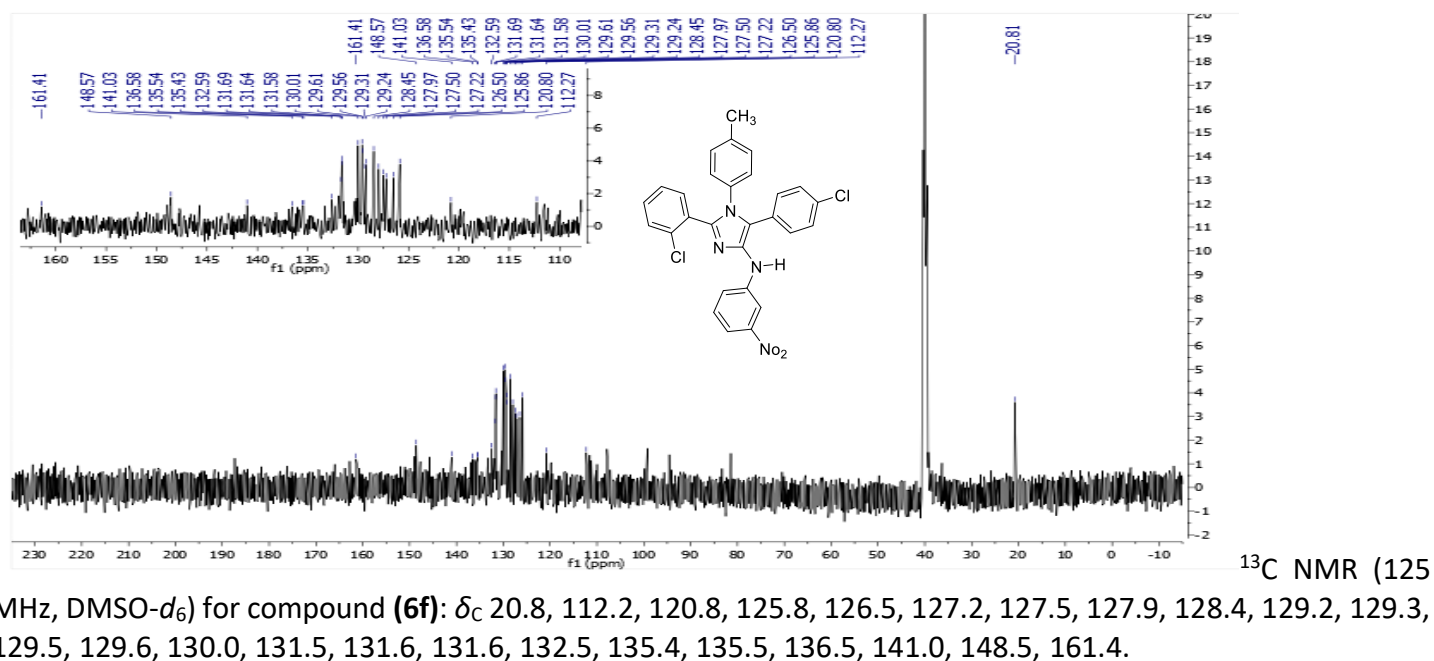
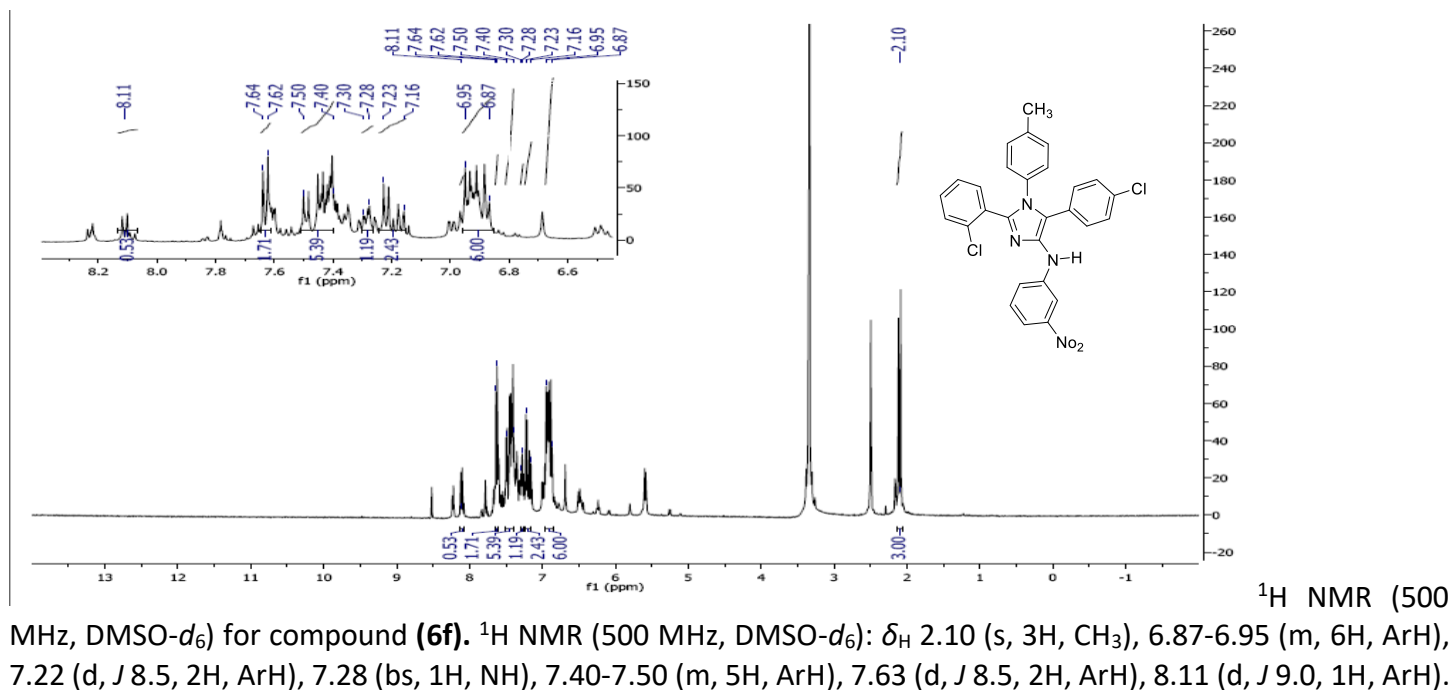


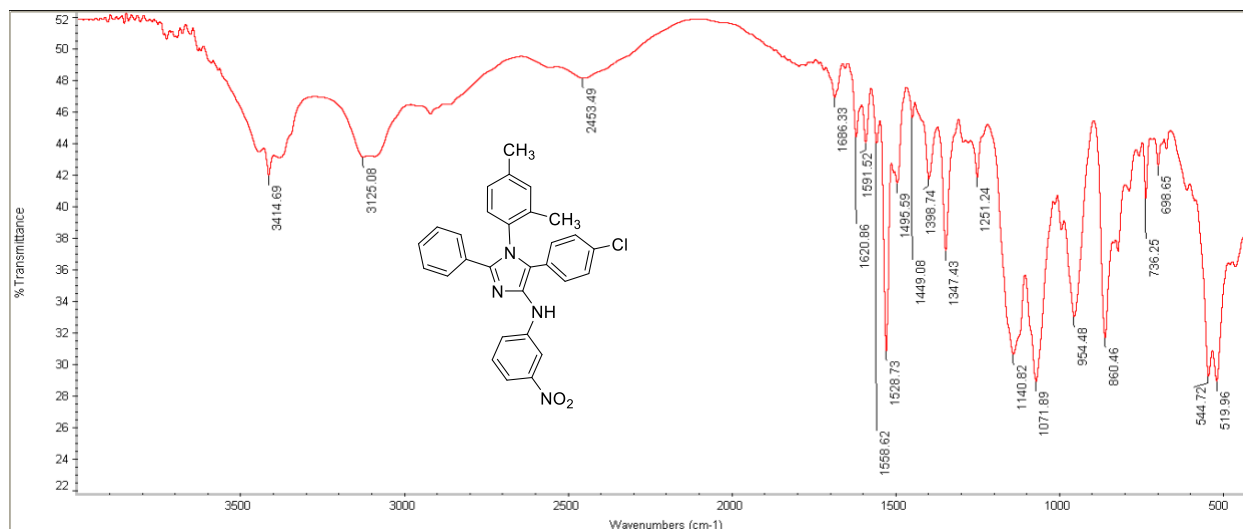
IR ν /cm⁻¹ (KBr) for compound **(6e)**: 3414 (NH), 1613 (C=N) cm⁻¹.



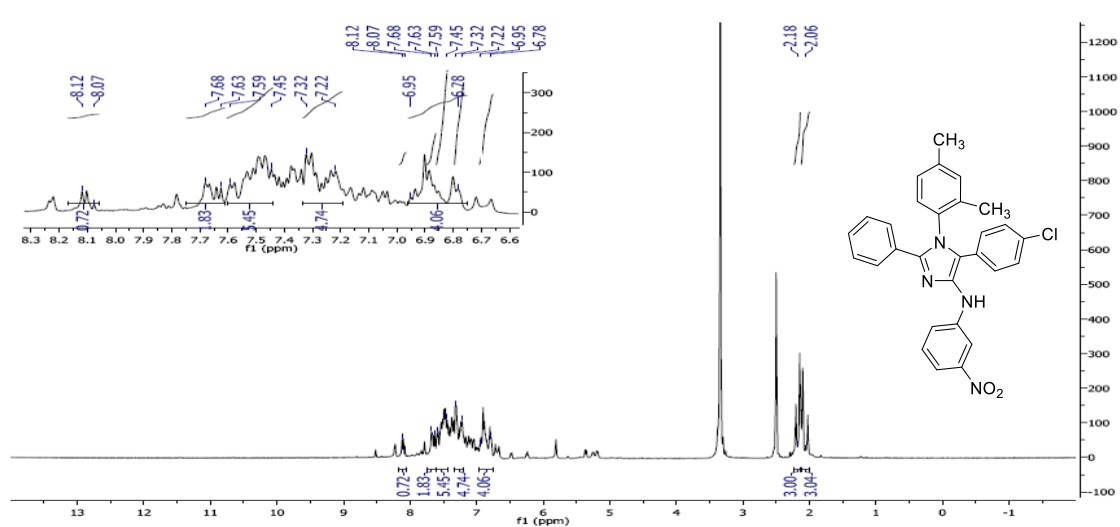
¹H NMR (500 MHz, DMSO-*d*₆) for compound **(6e)**: δ_{H} 2.06 (s, 3H, CH₃), 2.11 (s, 3H, CH₃), 6.42 (d, *J* 9.0, 1H, ArH), 6.70-6.78 (m, 3H, ArH), 6.87-6.91 (m, 4H, ArH), 7.25 (d, *J* 9.0, 1H, ArH), 7.36-7.50 (m, 5H, ArH), 7.50 (bs, 1H, NH), 7.58 (d, *J* 8.5, 2H, ArH).



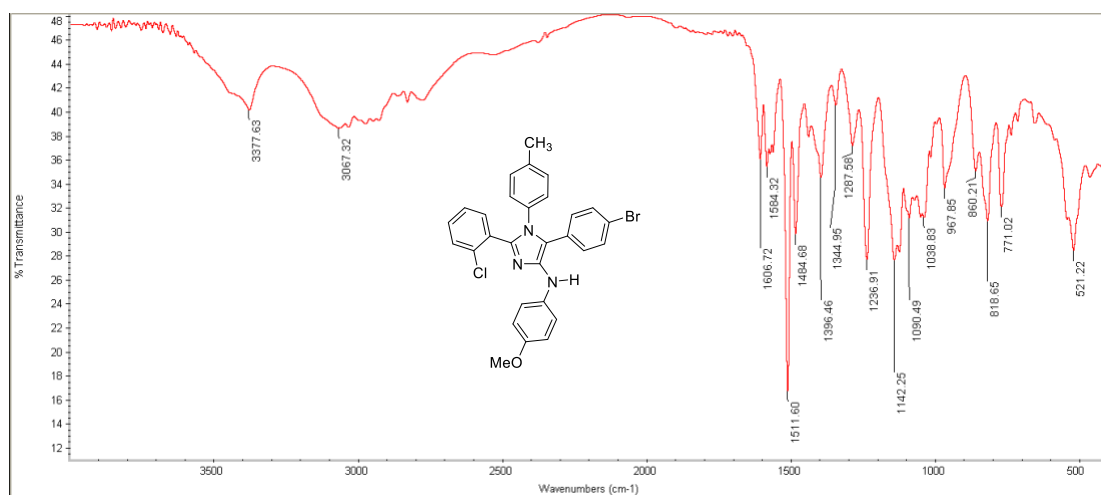
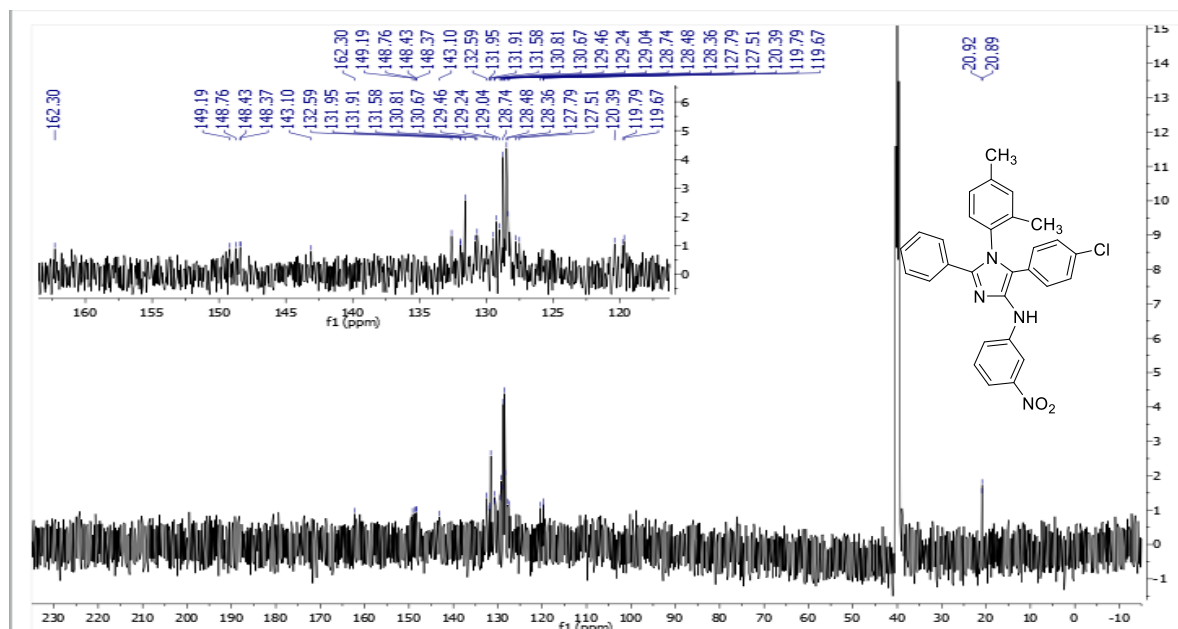


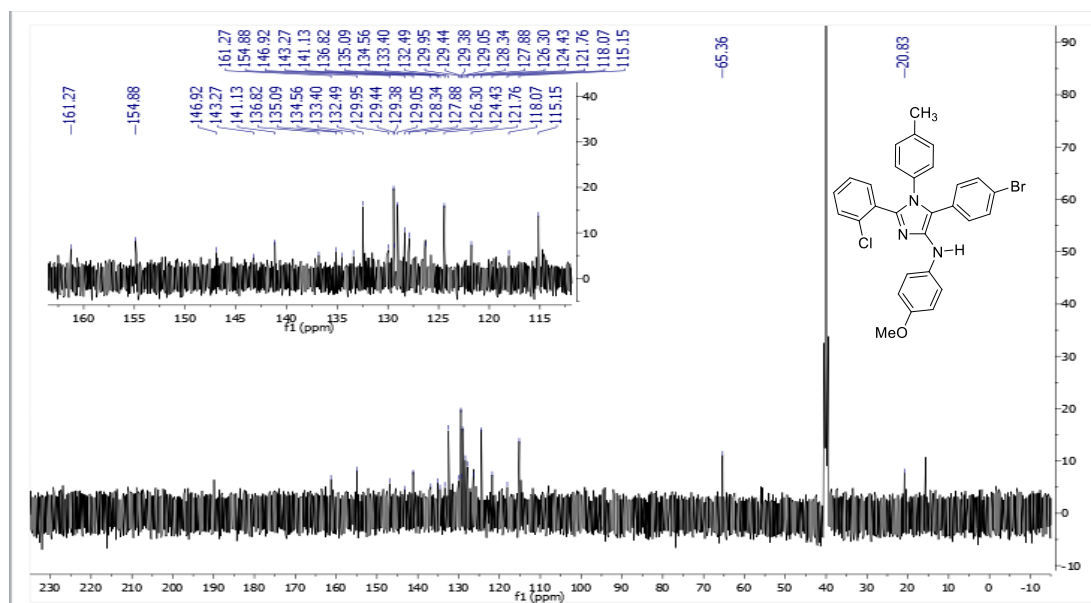
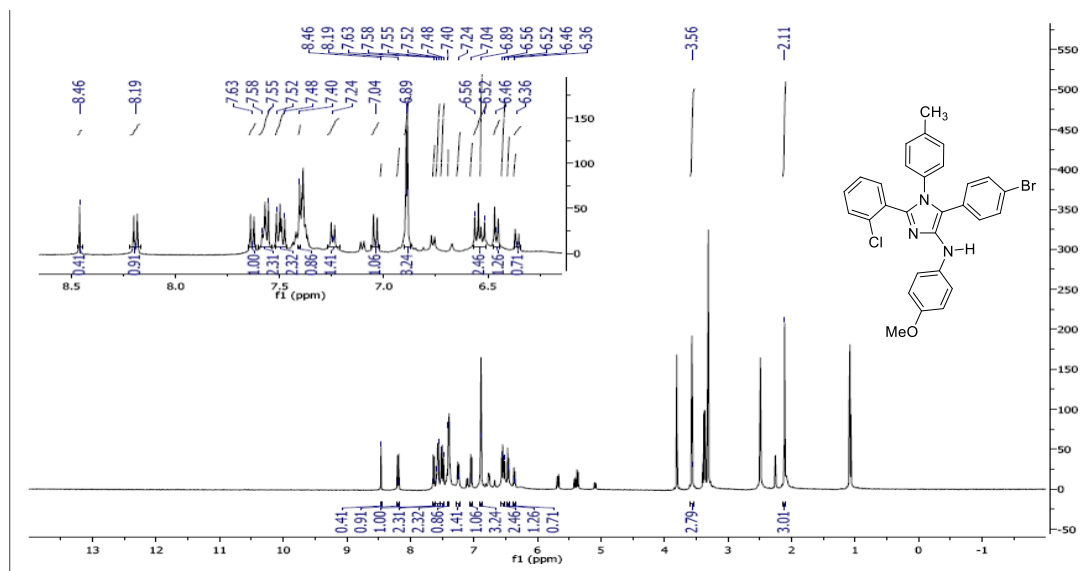


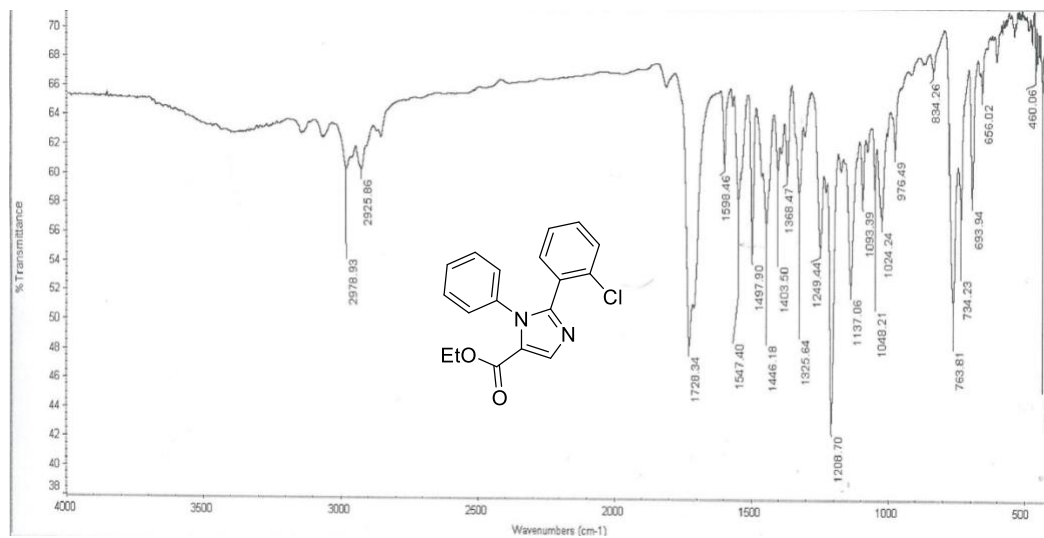
IR ν /cm⁻¹ (KBr) for compound (**6g**): 3414 (NH), 1620 (C=N) cm⁻¹.



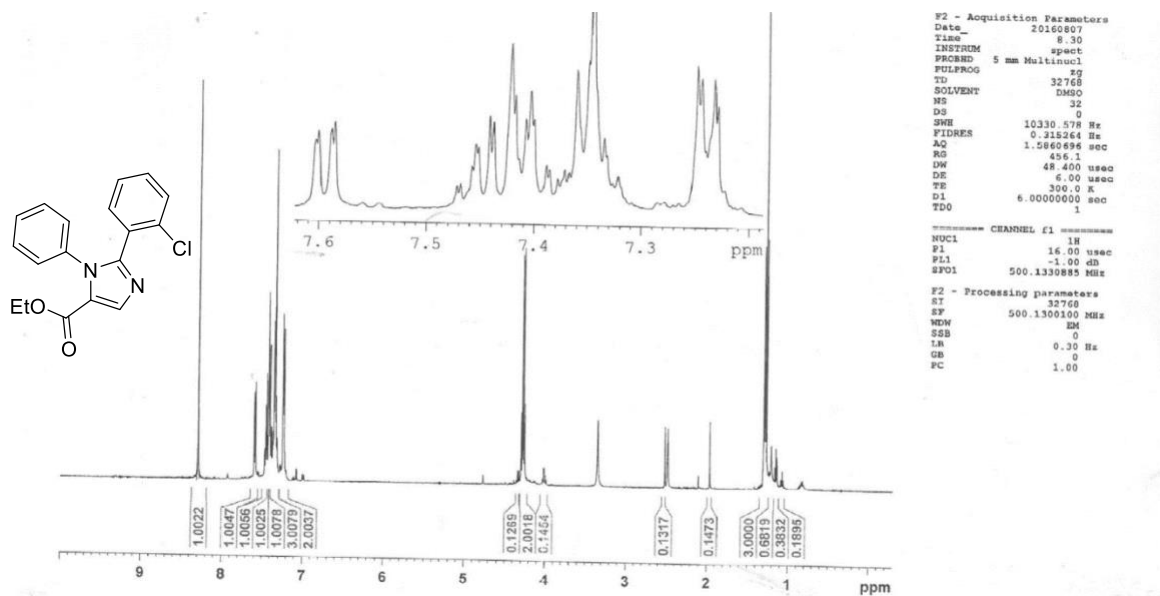
¹H NMR (500 MHz, DMSO-*d*₆) for compound (**6g**): δ_{H} 2.06 (s, 3H, CH₃), 2.18 (s, 3H, CH₃), 6.78-6.95 (m, 4H, ArH), 7.22-7.32 (m, 5H, ArH), 7.45-7.59 (m, 5H, ArH, NH), 7.68 (d, *J* 8.5, 2H, ArH), 8.11 (d, *J* 8.5, 1H, ArH).



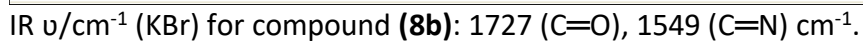
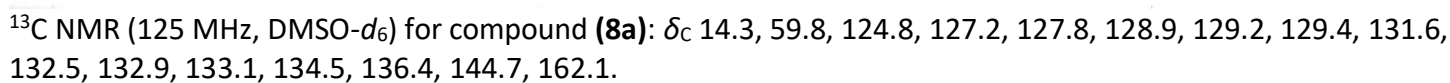


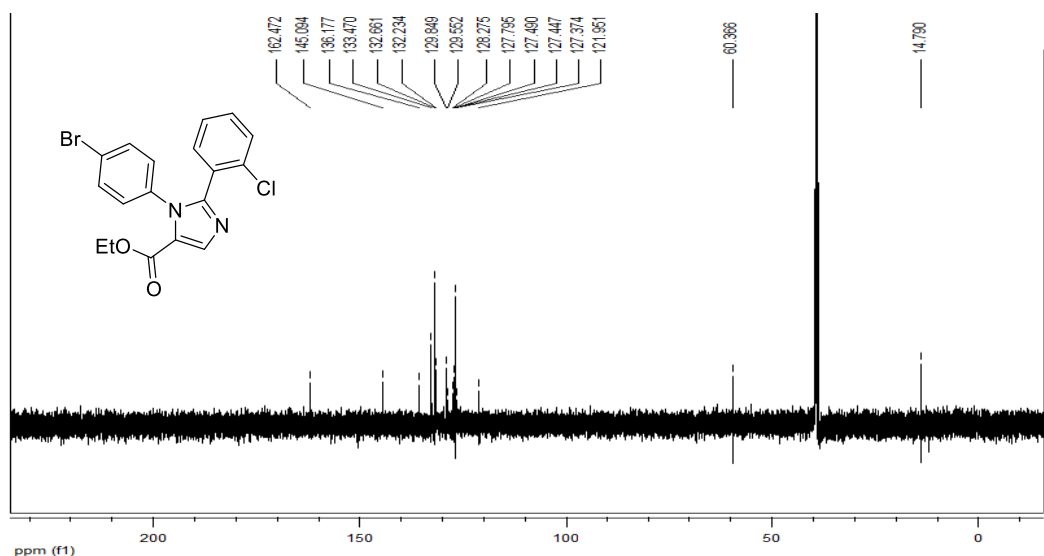
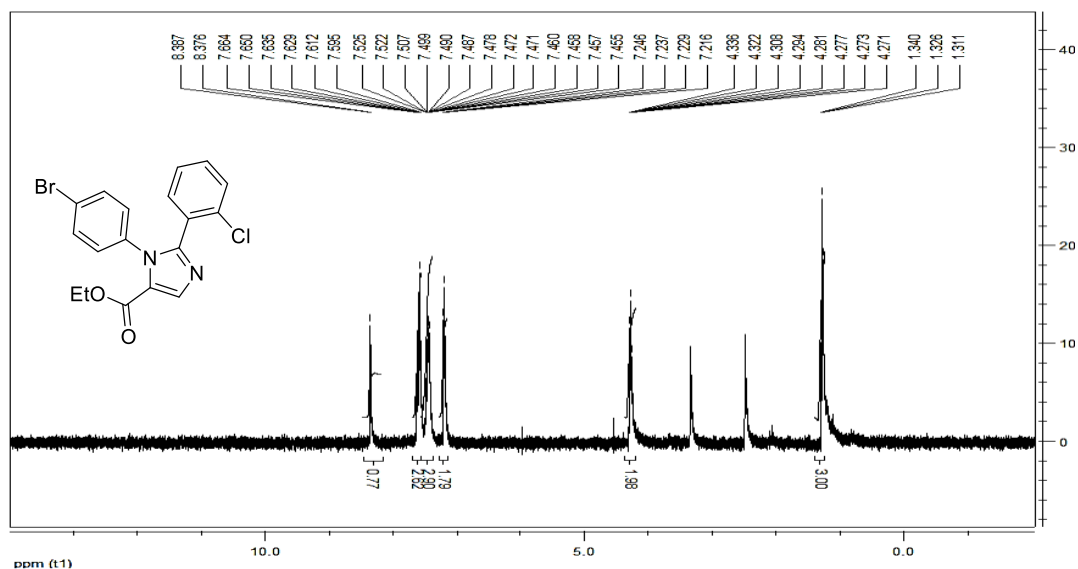


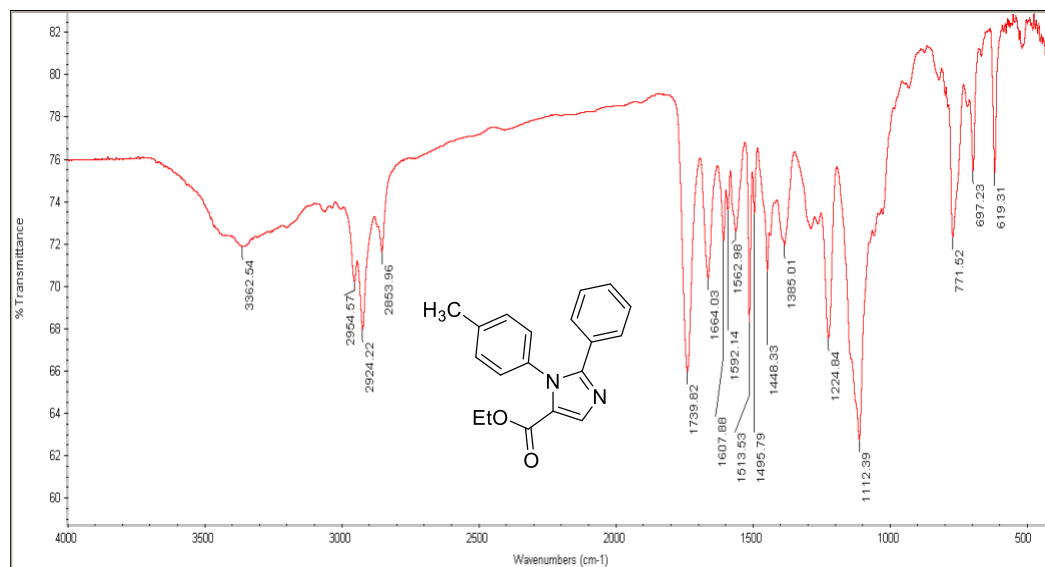
IR ν/cm^{-1} (KBr) for compound (**8a**): 1728 (C=O), 1598 (C=N) cm^{-1} .



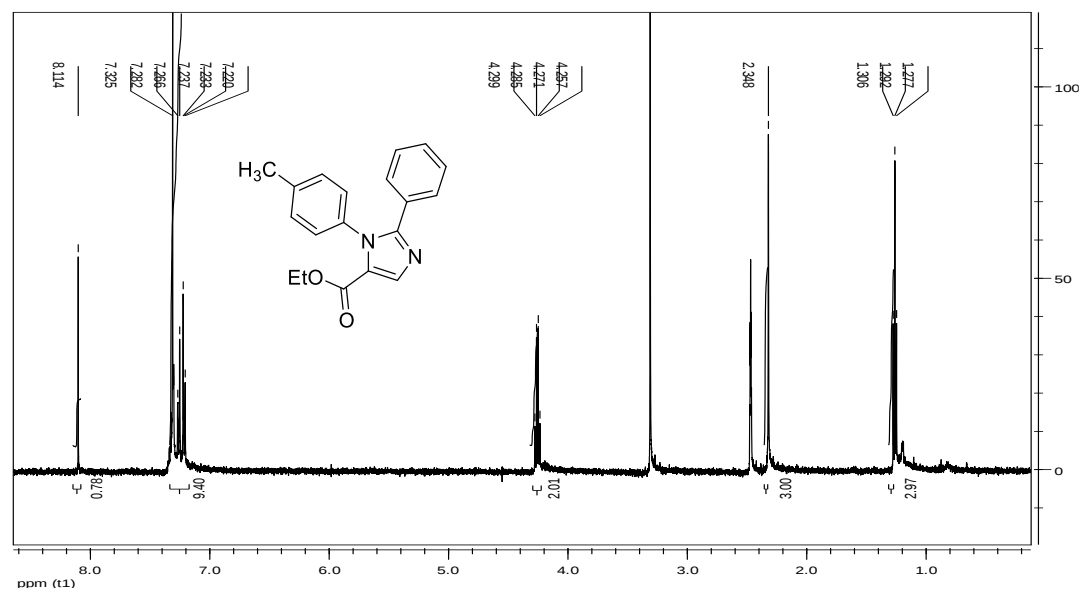
^1H NMR (500 MHz, $\text{DMSO}-d_6$) for compound (**8a**): δ_{H} 1.32 (t, J 5.6, 3H, CH_3), 4.36 (q, J 5.6, 2H, CH_2), 7.23-7.48 (m, 7H, ArH), 7.59 (d, J 8.5, 2H, ArH), 8.33 (s, 1H, CH).







IR ν /cm⁻¹ (KBr) for compound **(8d)**: 1739 (C=O), 1592 (C=N) cm⁻¹.



¹H NMR (500 MHz, DMSO-*d*₆) for compound **(8d)**: δ_{H} 1.29 (t, *J* 5.6, 3H, CH₃), 2.34 (s, 3H, CH₃), 4.27 (q, *J* 5.6, 2H, CH₂), 7.22 (d, *J* 8.5, 2H, ArH), 7.27 (d, *J* 8.5, 2H, ArH), 7.32-7.37 (m, 5H, ArH), 8.11 (s, 1H, CH).