

Article

# Magnetic Sulfonated Melamine-Formaldehyde Resin as an Efficient Catalyst for the Synthesis of Antioxidant and Antimicrobial Pyrazolone Derivatives

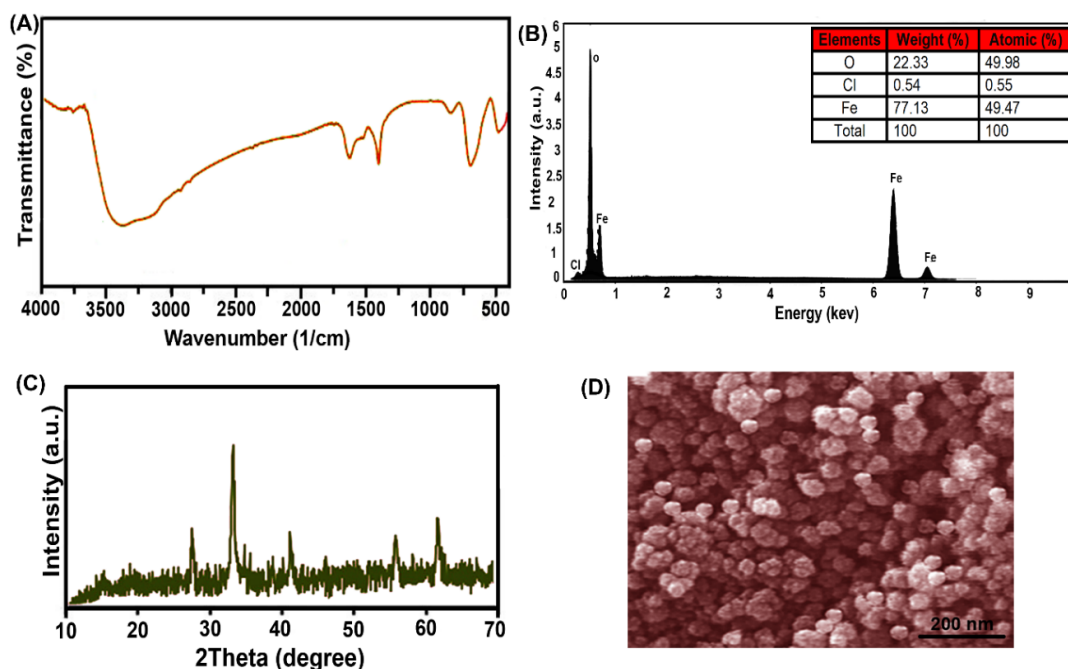
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<sup>3</sup> Istituto Italiano di Tecnologia, Centre for Materials Interfaces, Viale Rinaldo Piaggio 34, 56025 Pontedera, Italy; pooyanmakvandi@gmail.com

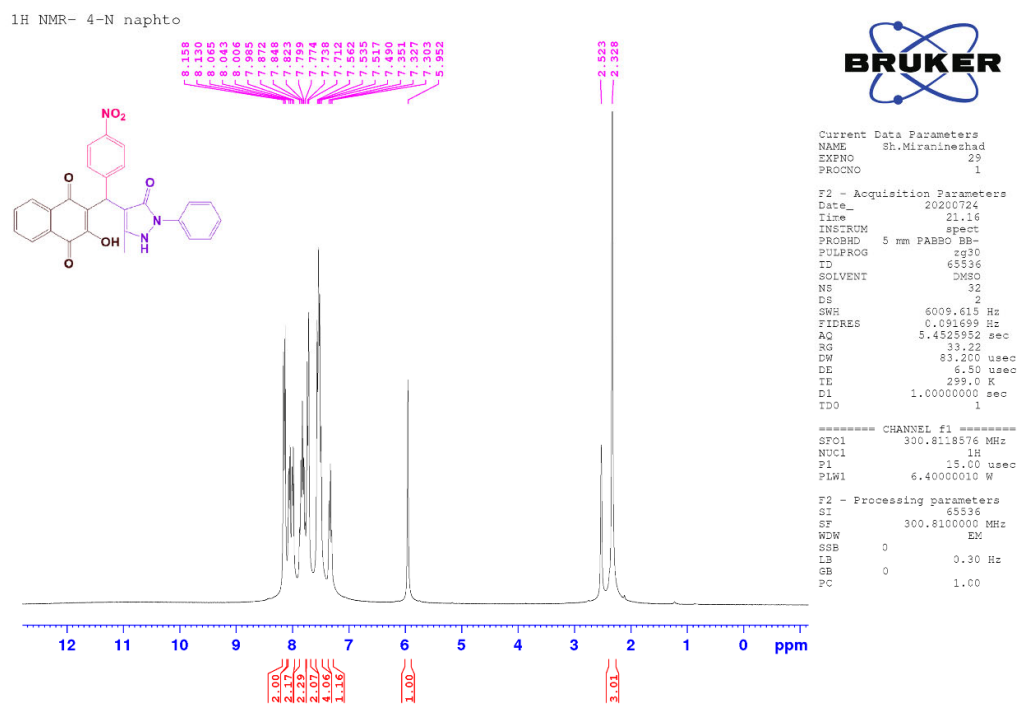
\* Correspondence: ehsan.nazarzadehzare@gmail.com or e.nazarzadeh@du.ac.ir

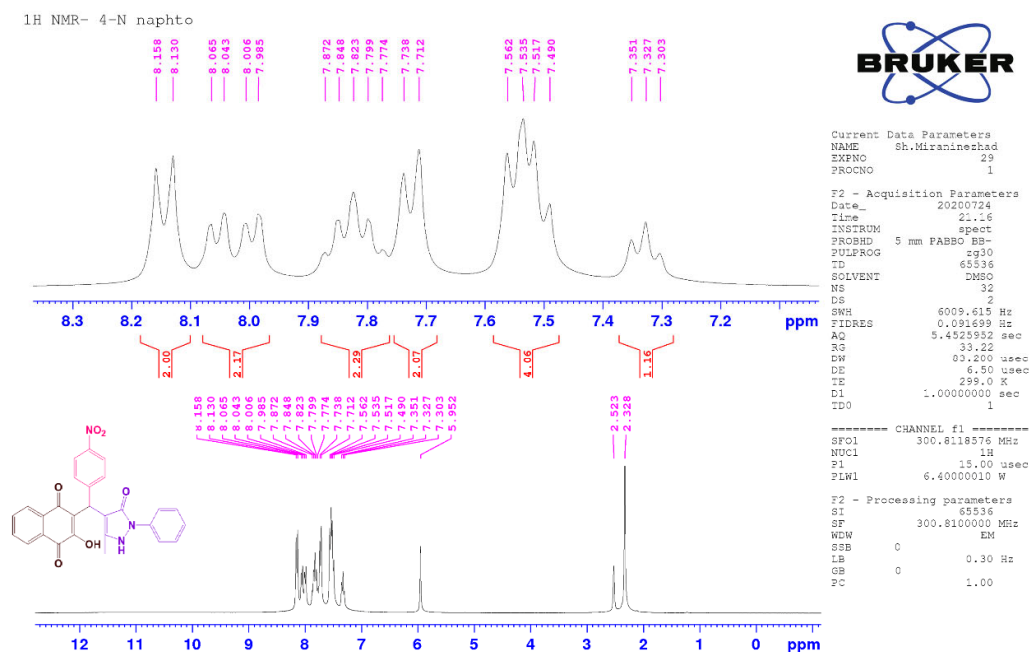
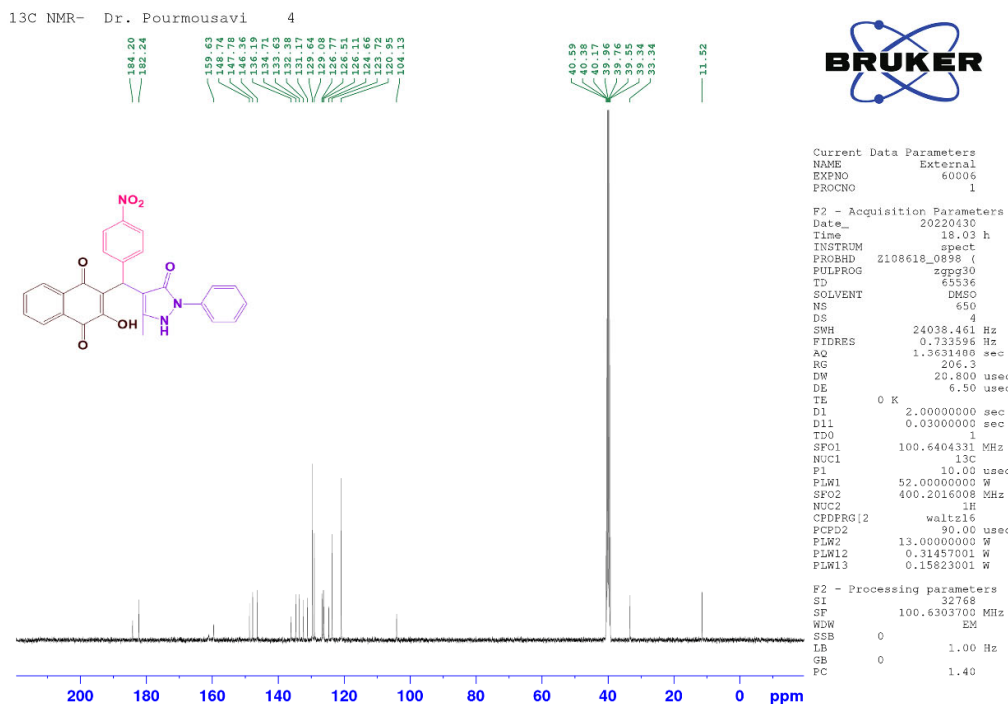


**Figure S1.** FTIR spectrum (A), EDX spectrum (B), XRD pattern (C), and SEM image (D) of Fe<sub>3</sub>O<sub>4</sub> nanoparticles.



**Figure S2.** mixture of the sulfonated melamine–formaldehyde (SMF) in distilled water, mixture of SMF and Fe<sub>3</sub>O<sub>4</sub> nanoparticles (A), magnetic property of Fe<sub>3</sub>O<sub>4</sub> nanoparticles and MSMF(B).



Figure S3. <sup>1</sup>H-NMR spectrum of 4e.Figure S4. <sup>13</sup>C-NMR spectrum of 4e.



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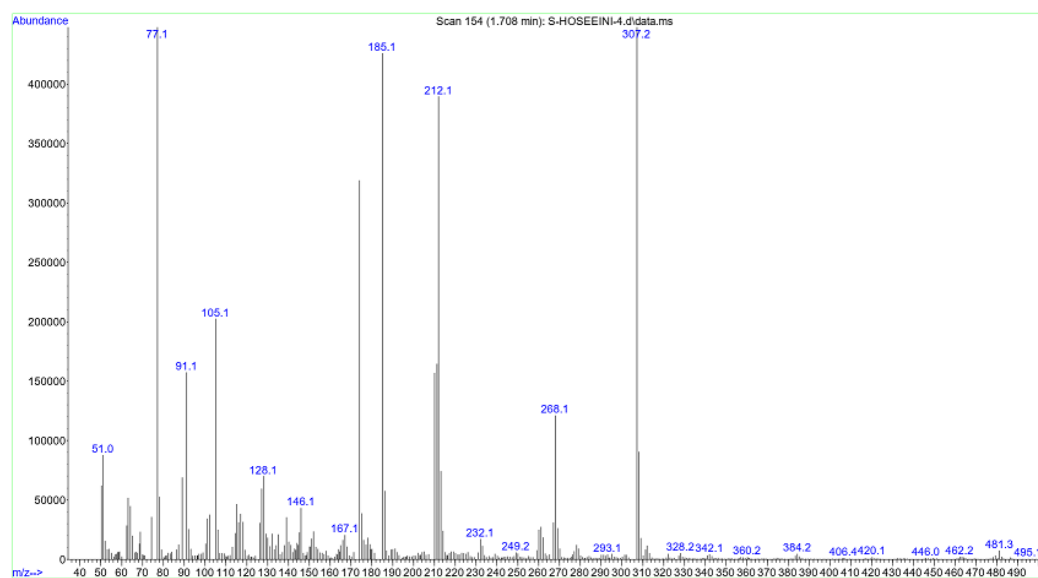
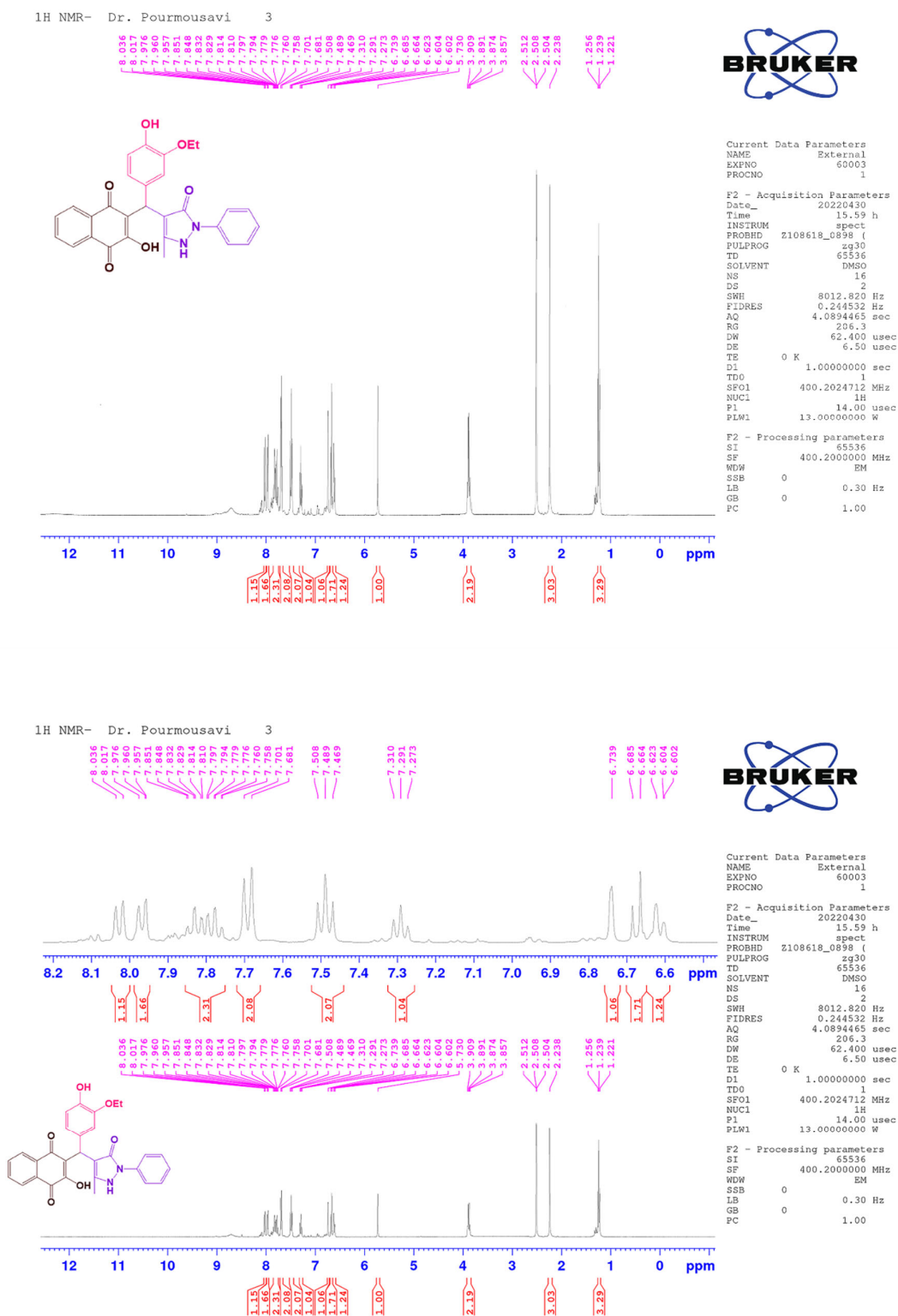


Figure S5. MASS Spectrum of 4e.



Figure S6. <sup>1</sup>H-NMR spectrum of 4j.

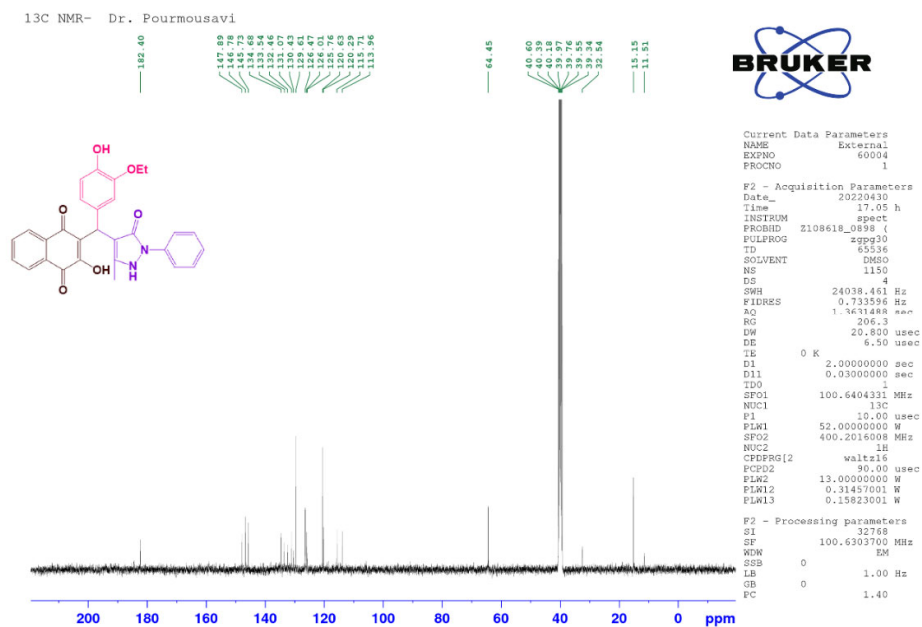
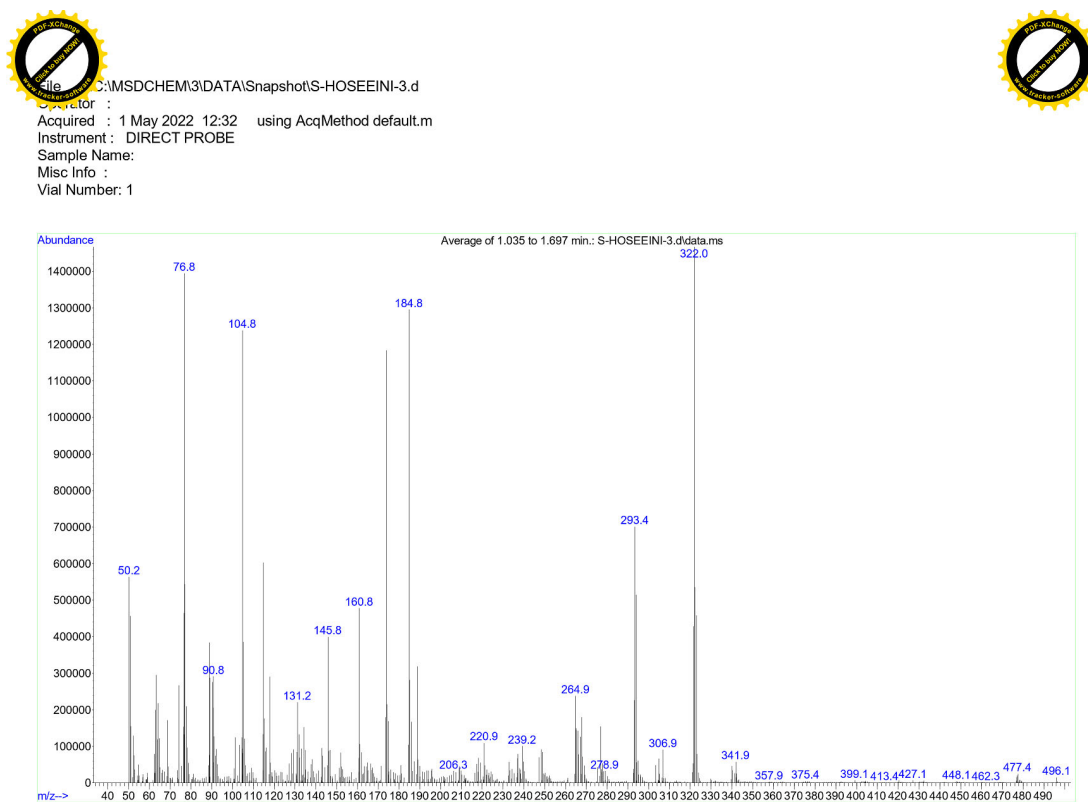
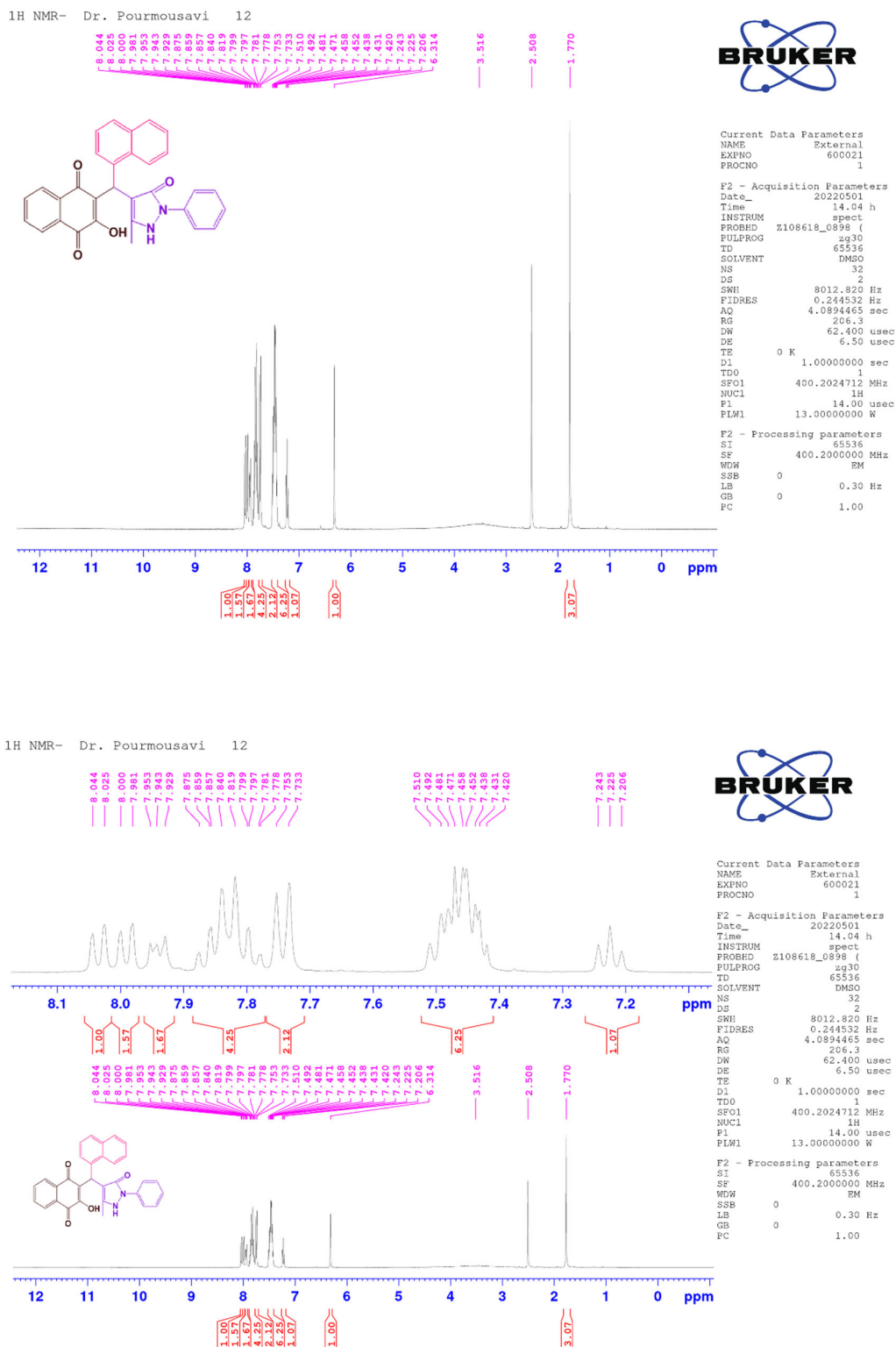
Figure S7. <sup>13</sup>C-NMR spectrum of 4j.

Figure S8. MASS Spectrum of 4j.

Figure S9. <sup>1</sup>H-NMR spectrum of 4k.

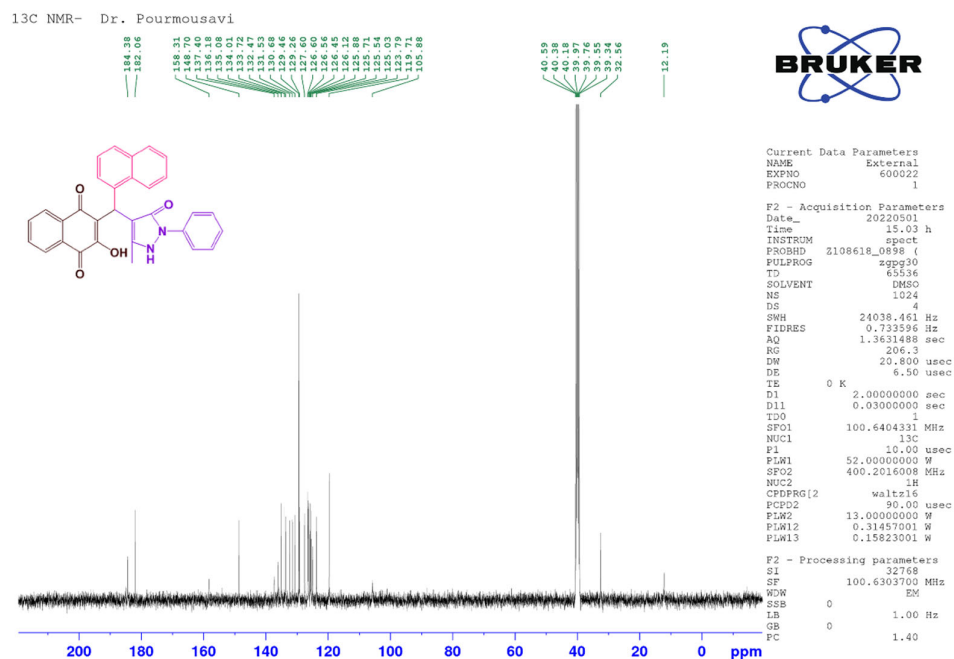
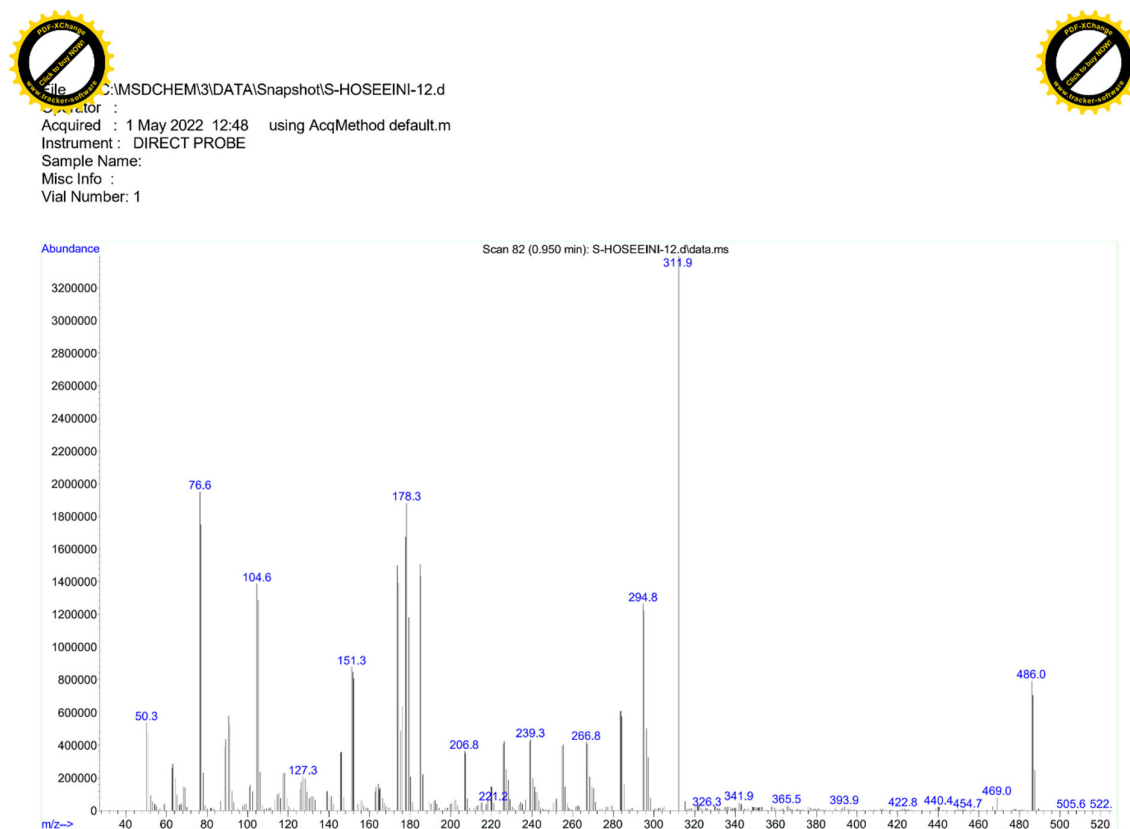
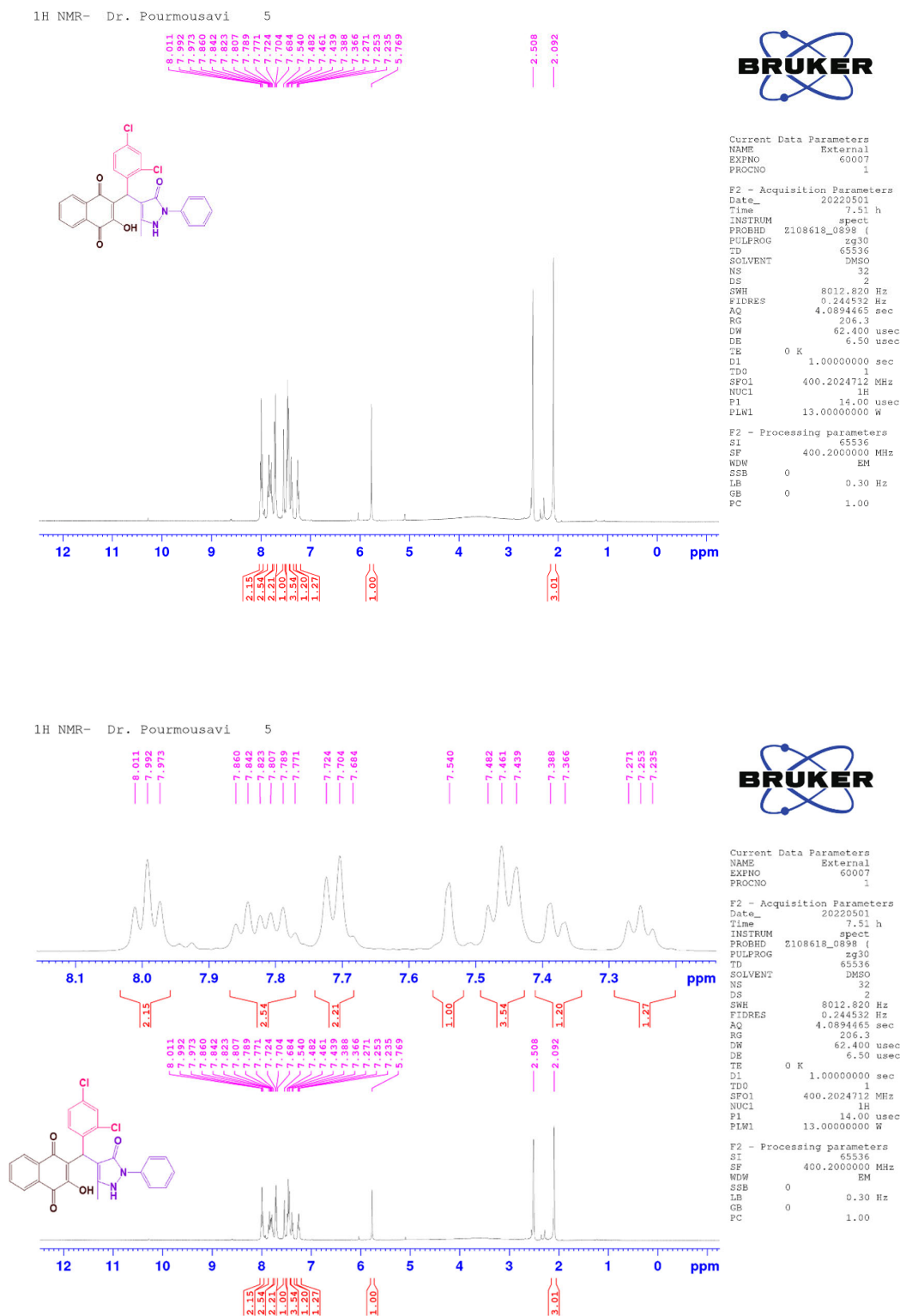
Figure S10. <sup>13</sup>C-NMR spectrum of 4k.

Figure S11. MASS Spectrum of 4k.

Figure S12. <sup>1</sup>H-NMR spectrum of 4l.

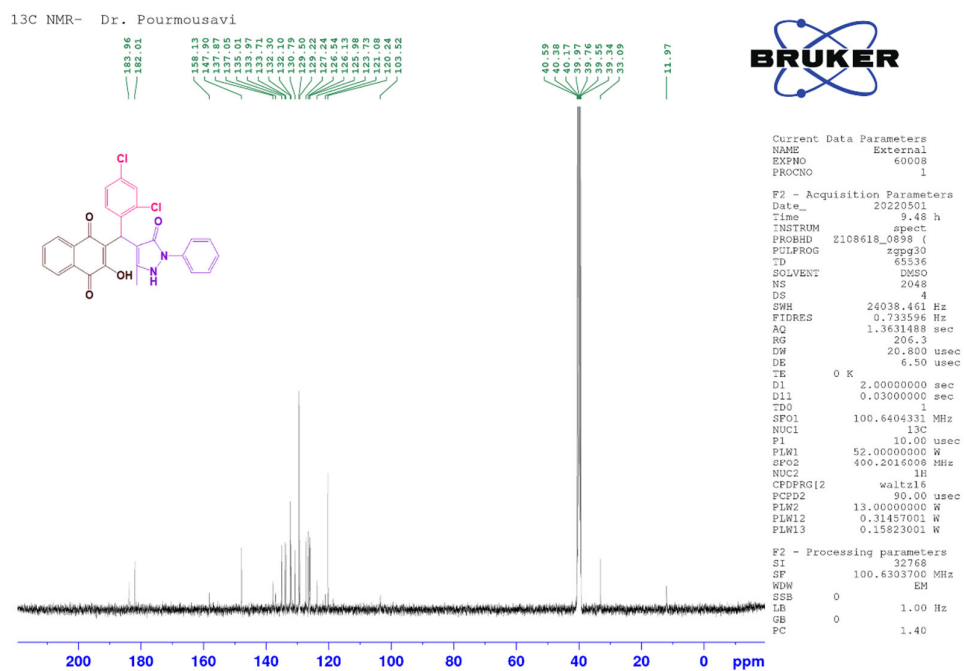
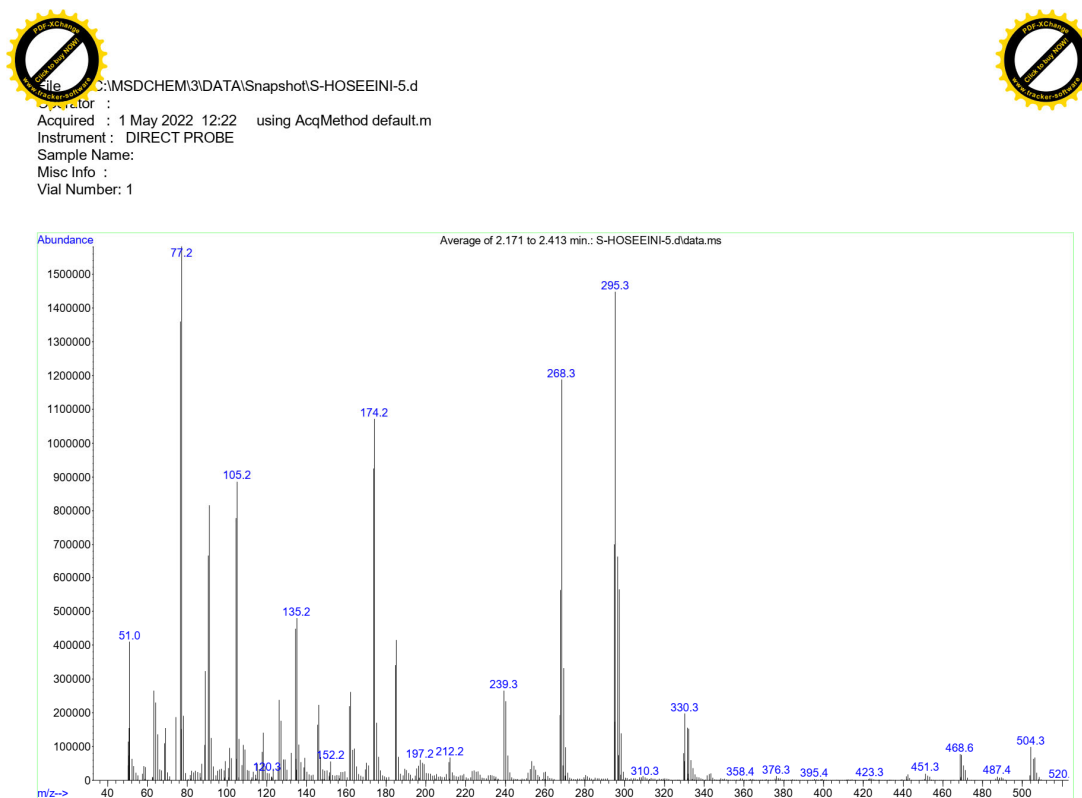
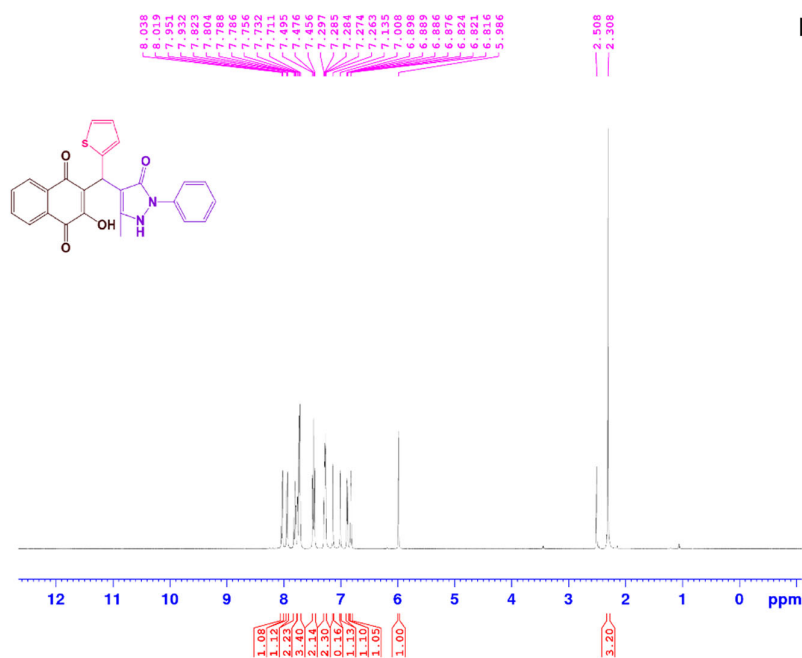
Figure S13. <sup>13</sup>C-NMR spectrum of 4l.

Figure S14. MASS Spectrum of 4l.

<sup>1</sup>H NMR- Dr. Pourmousavi 2

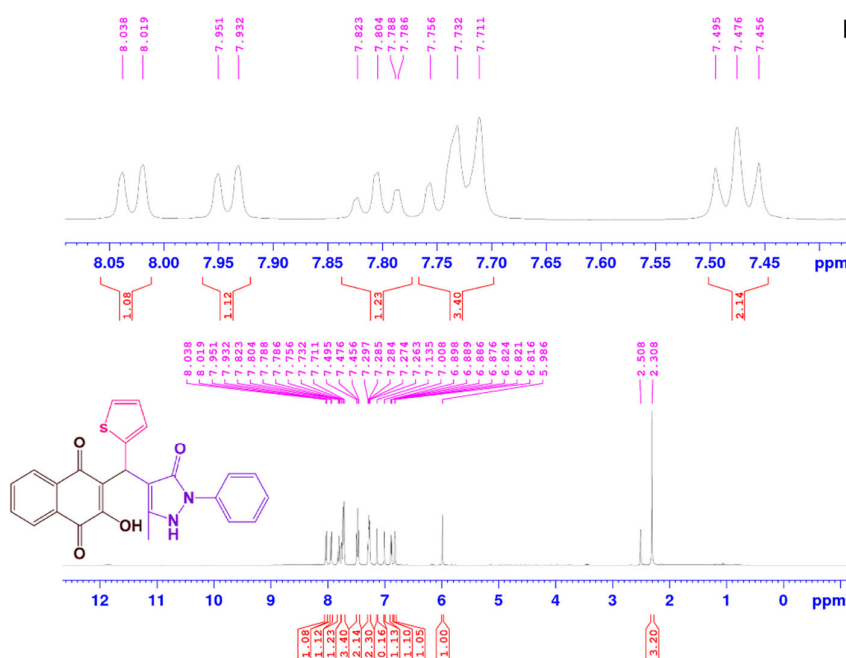


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<sup>1</sup>H NMR- Dr. Pourmousavi 2

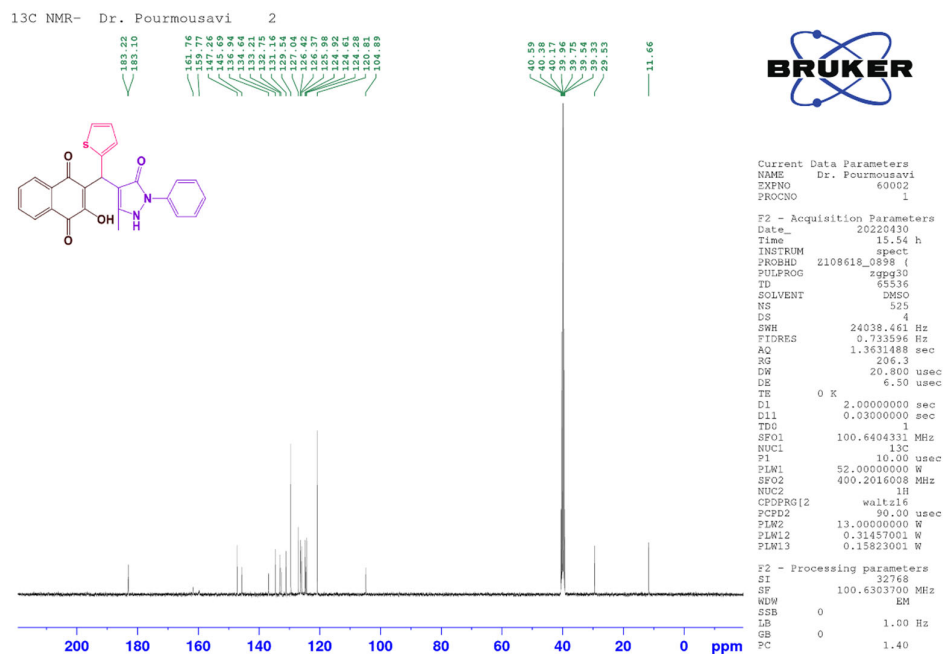


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Figure S15. <sup>1</sup>H-NMR spectrum of 4n.

Figure S16. <sup>13</sup>C-NMR spectrum of 4n.

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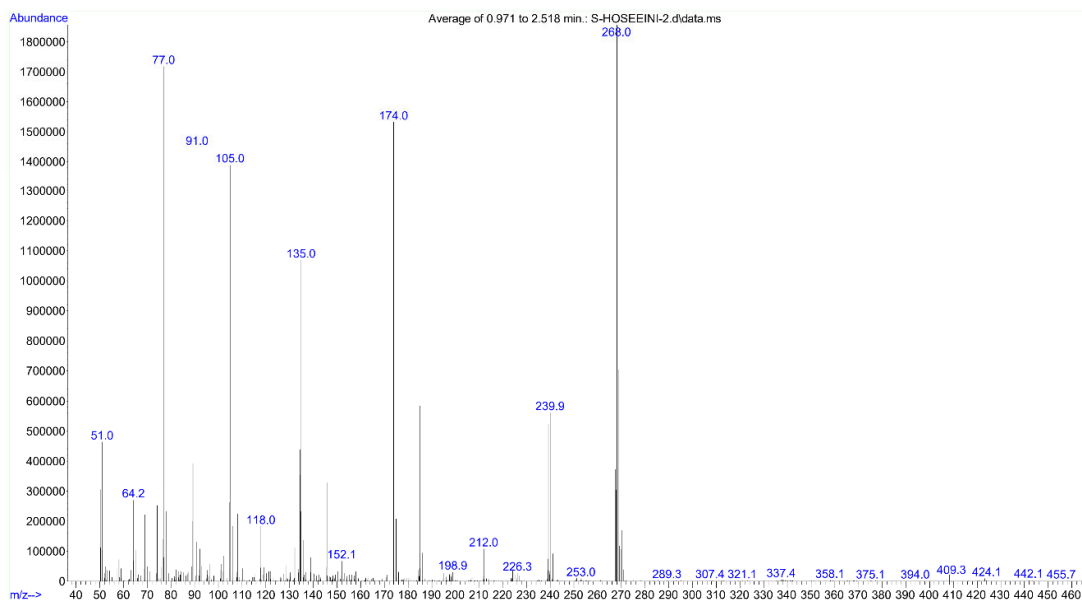
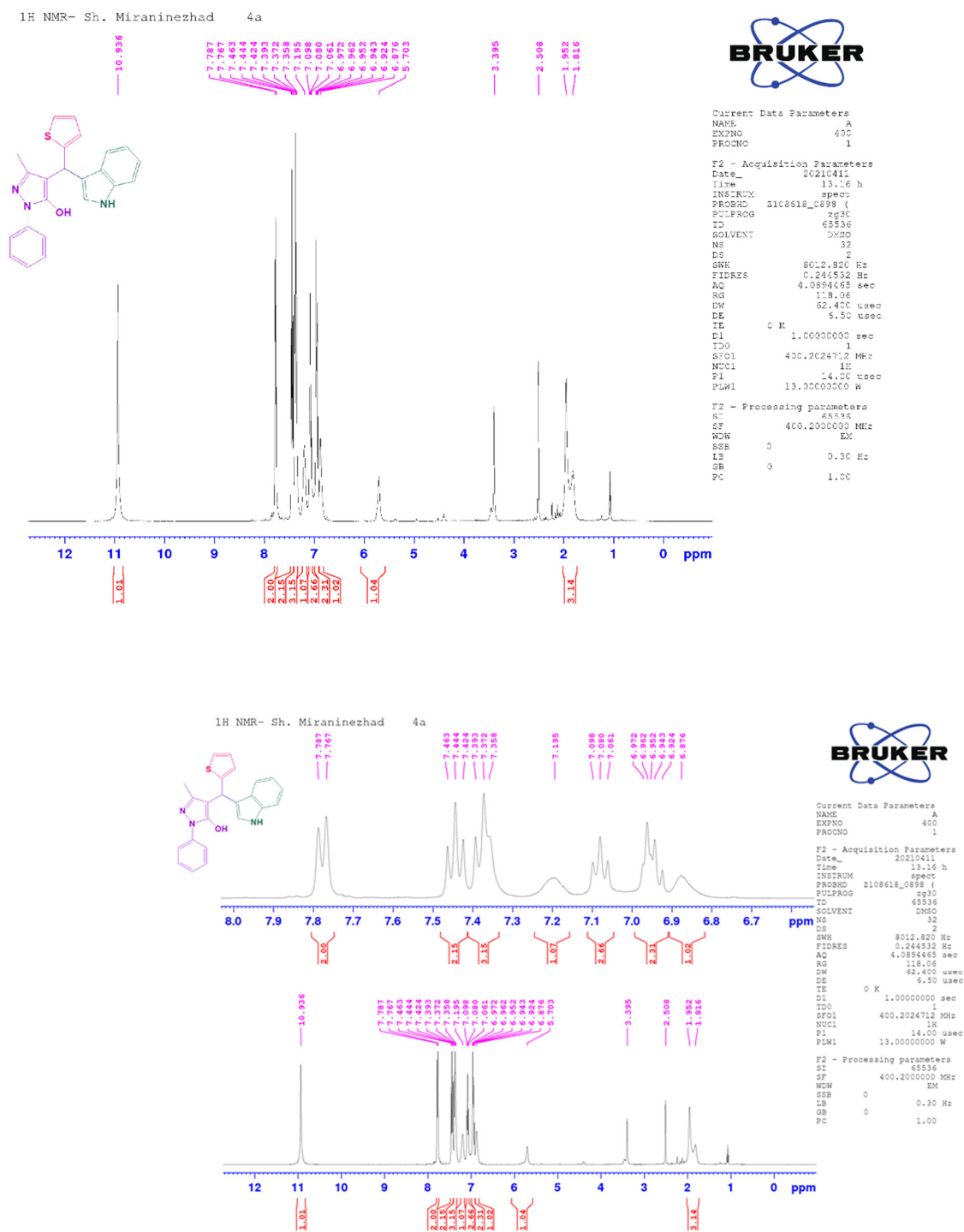


Figure S17. MASS Spectrum of 4n.



Figure S18. <sup>1</sup>H-NMR spectrum of 6j.

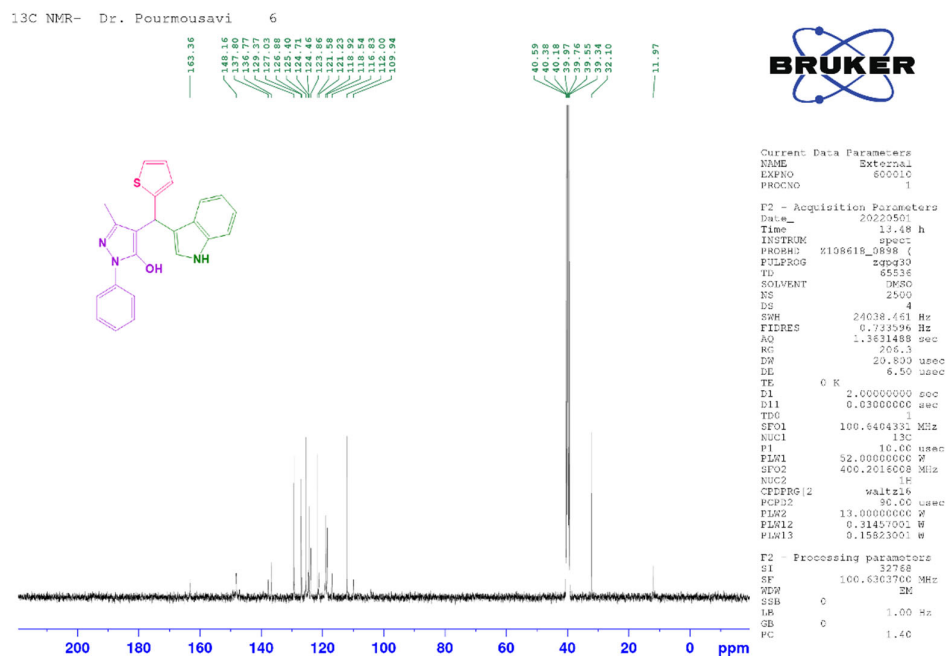
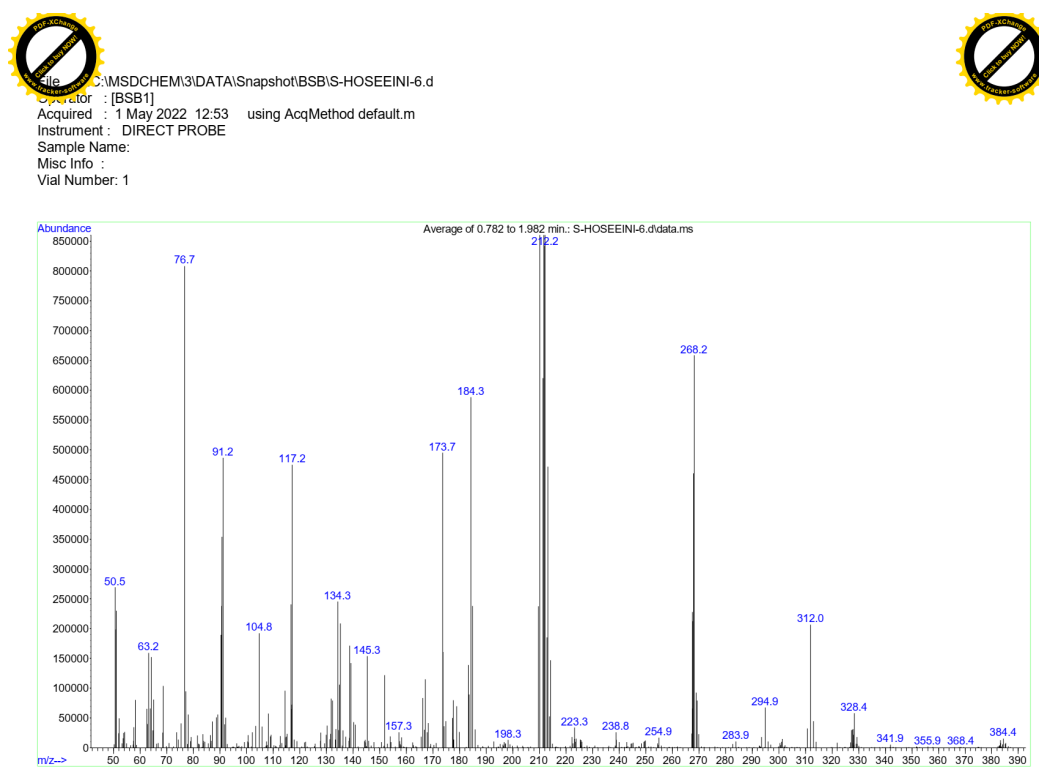
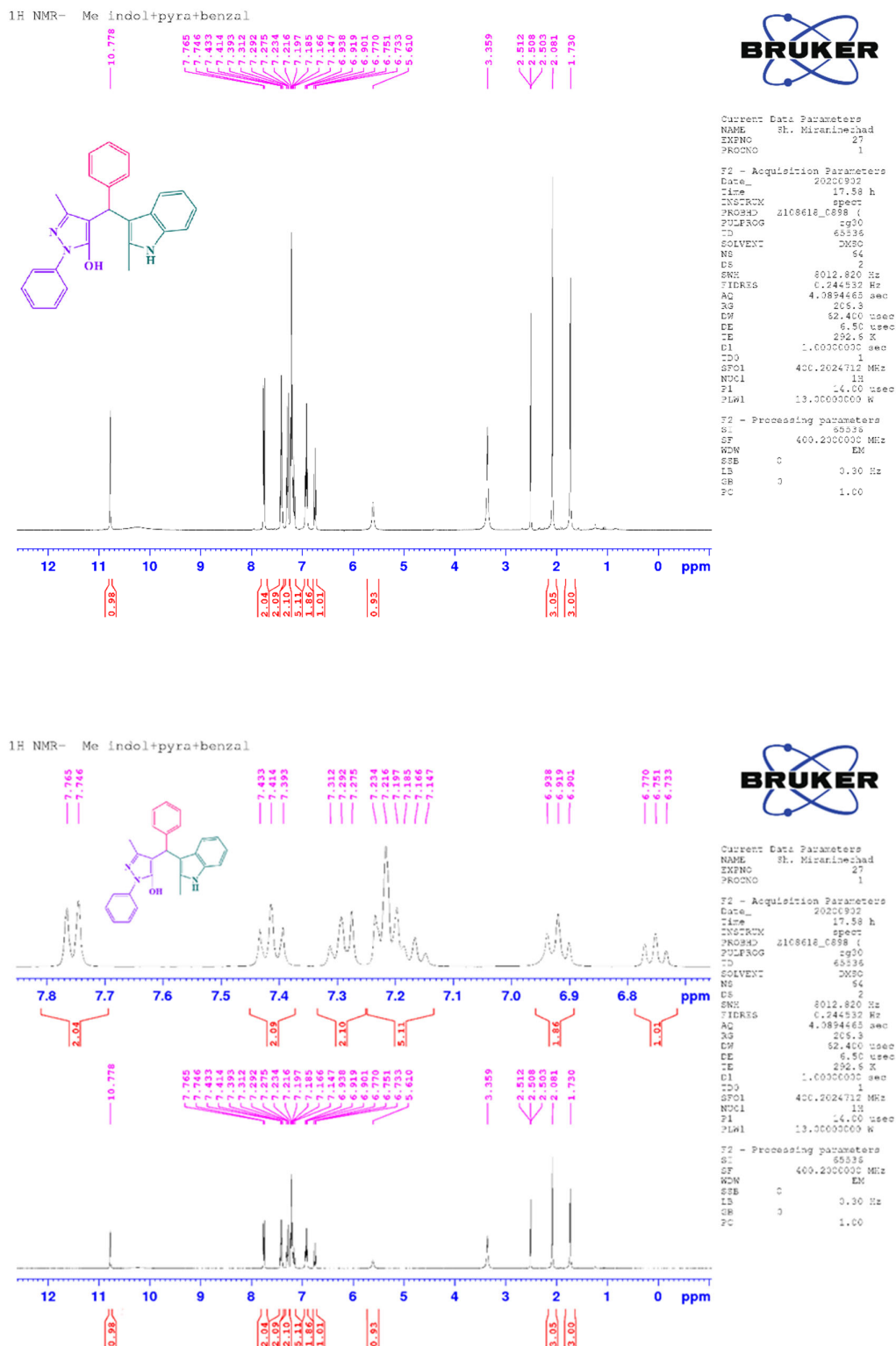
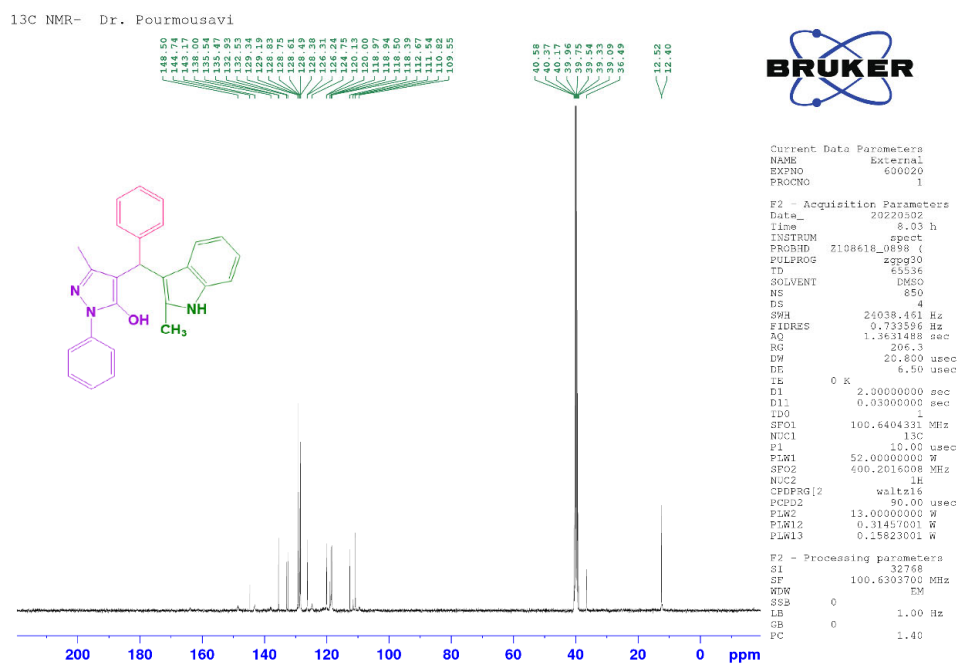
Figure S19. <sup>13</sup>C-NMR spectrum of 4j.

Figure S20. MASS Spectrum of 4o.

Figure S21. <sup>1</sup>H-NMR spectrum of 6l.

Figure S22. <sup>13</sup>C-NMR spectrum of 6l.

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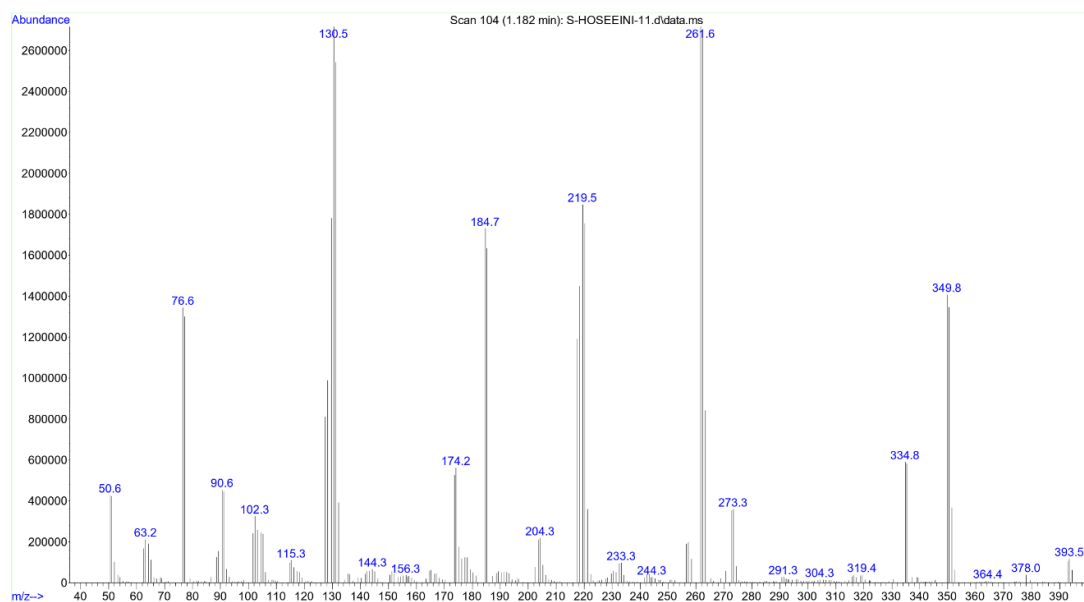
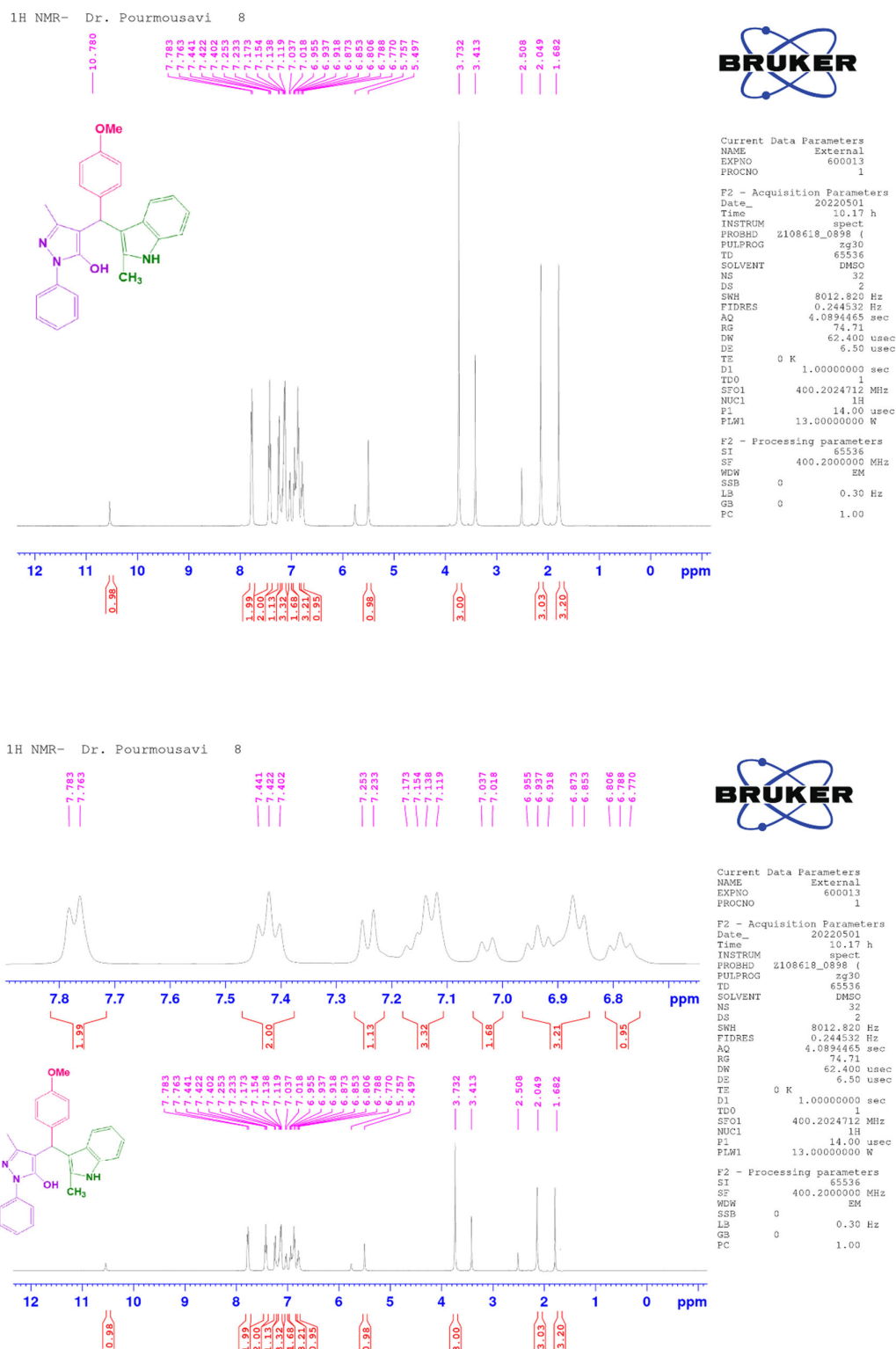


Figure S23. MASS Spectrum of 6l.

Figure S24. <sup>1</sup>H-NMR spectrum of 6m.

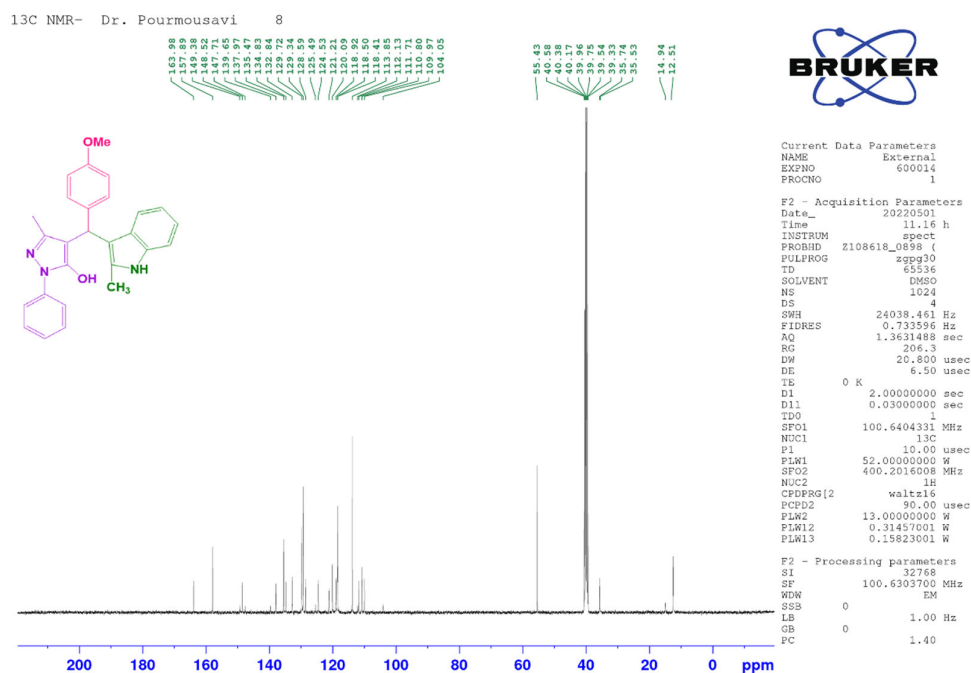
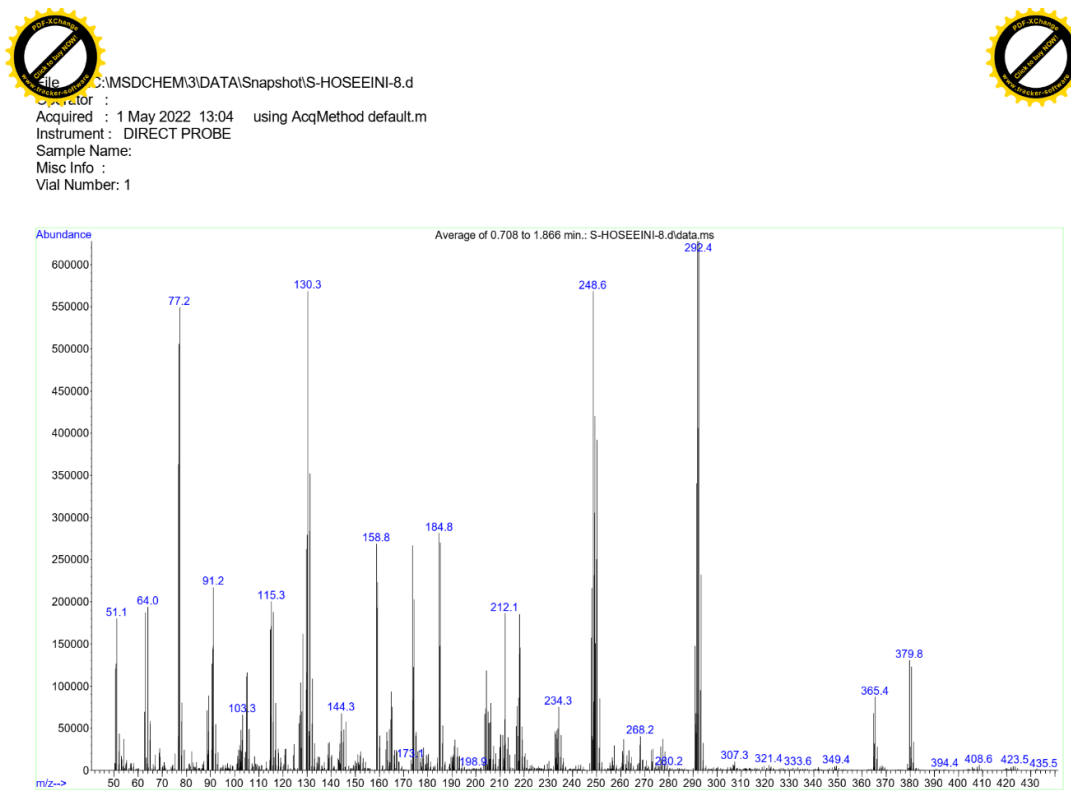
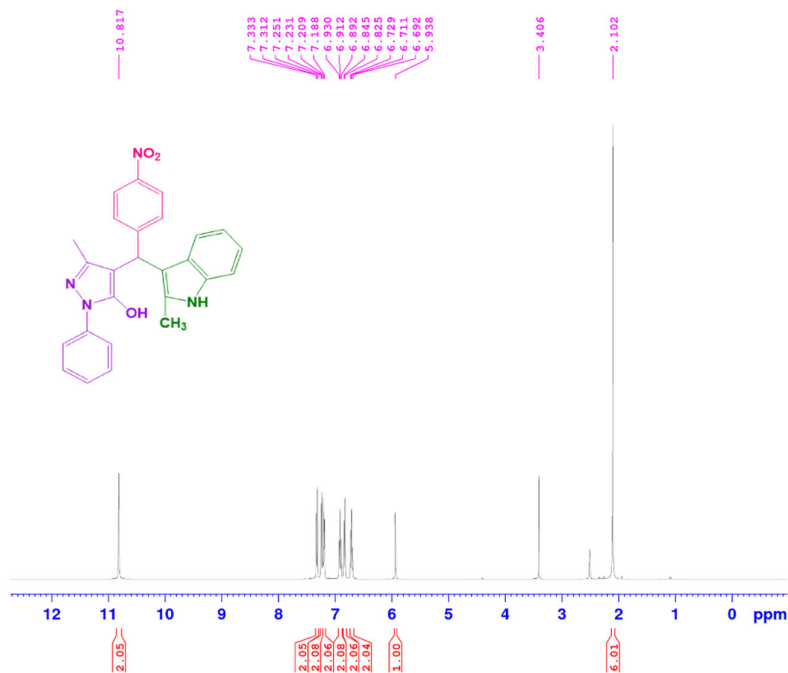
Figure S25. <sup>13</sup>C-NMR spectrum of 6m.

Figure S26. MASS Spectrum of 6m.

<sup>1</sup>H NMR— Dr. Pourmousavi

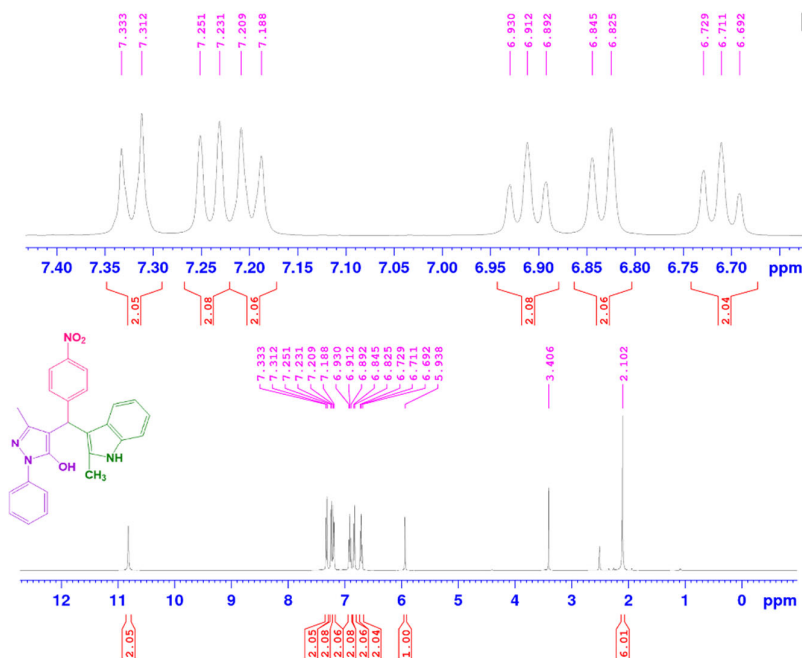


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<sup>1</sup>H NMR— Dr. Pourmousavi



Current Data Parameters  
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Figure S27. <sup>1</sup>H-NMR spectrum of **6n**.

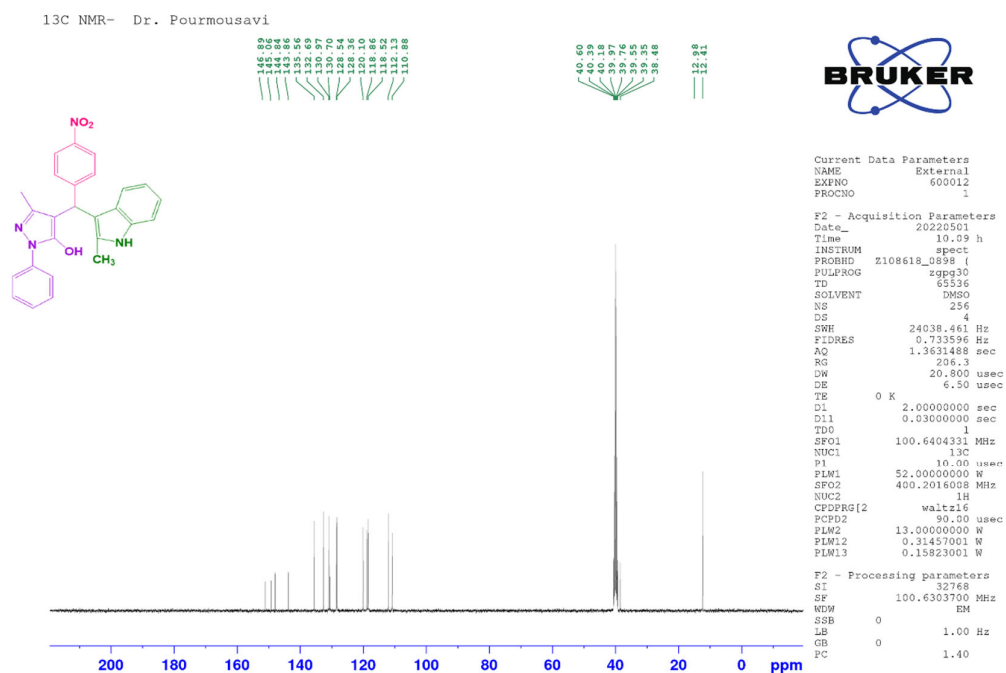
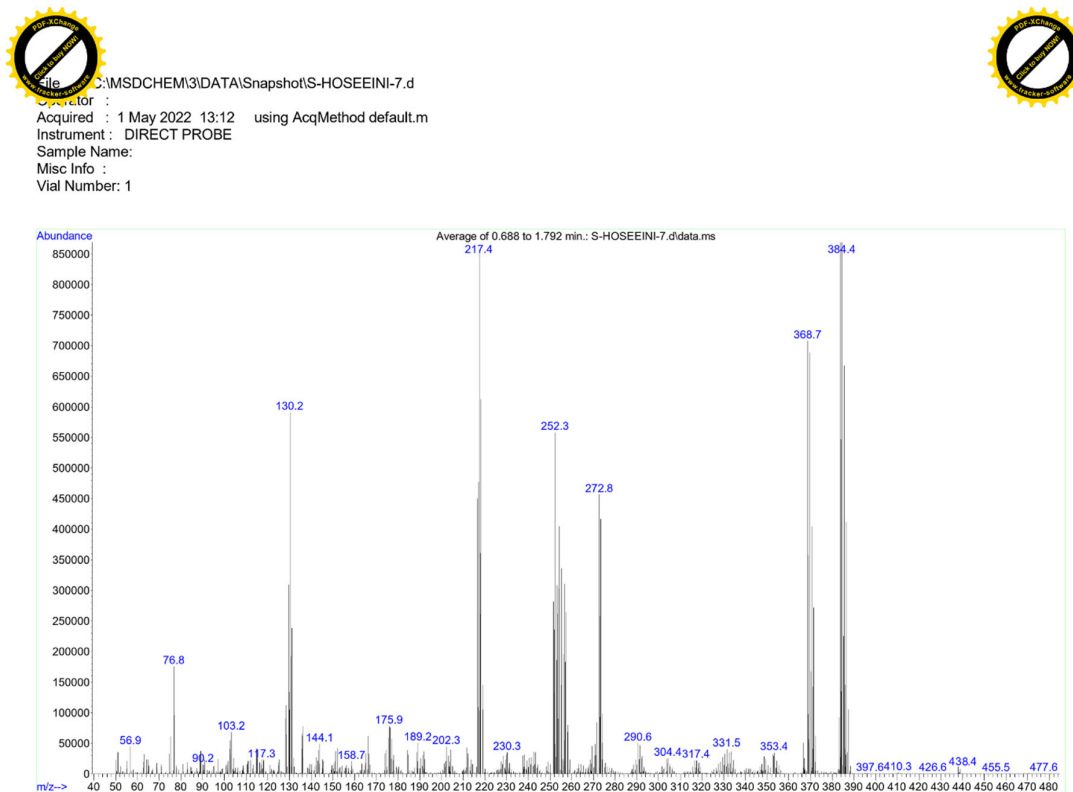
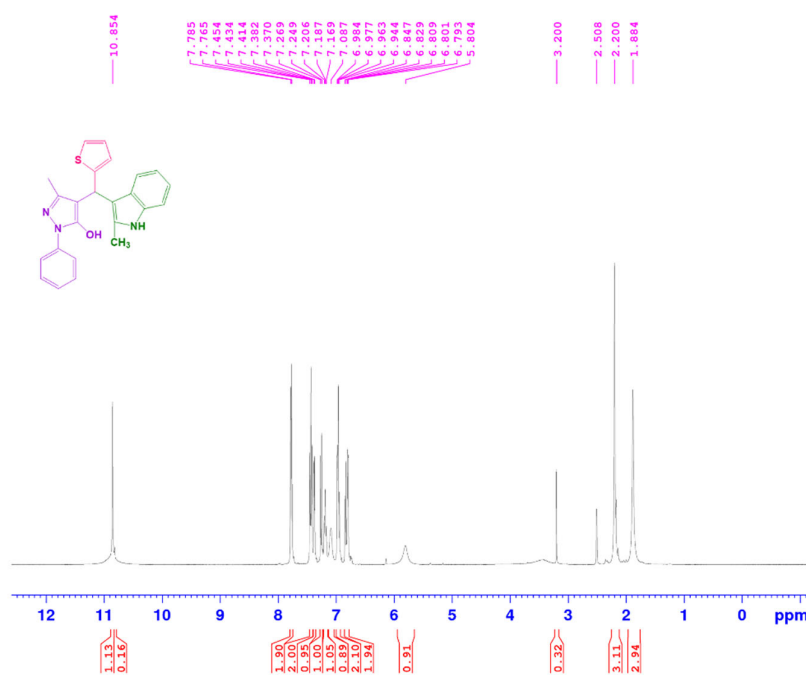
Figure S28. <sup>13</sup>C-NMR spectrum of 6n.

Figure S29. MASS Spectrum of 6n.



1H NMR- Dr. Pourmousavi

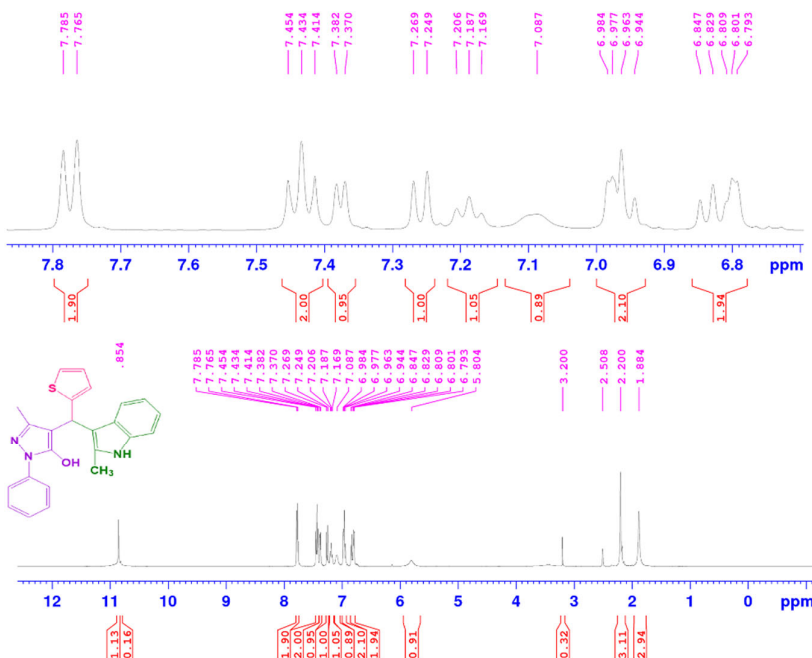


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 PLN1 13.00000000 W

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1H NMR- Dr. Pourmousavi



Current Data Parameters  
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Figure S30. <sup>1</sup>H-NMR spectrum 60.

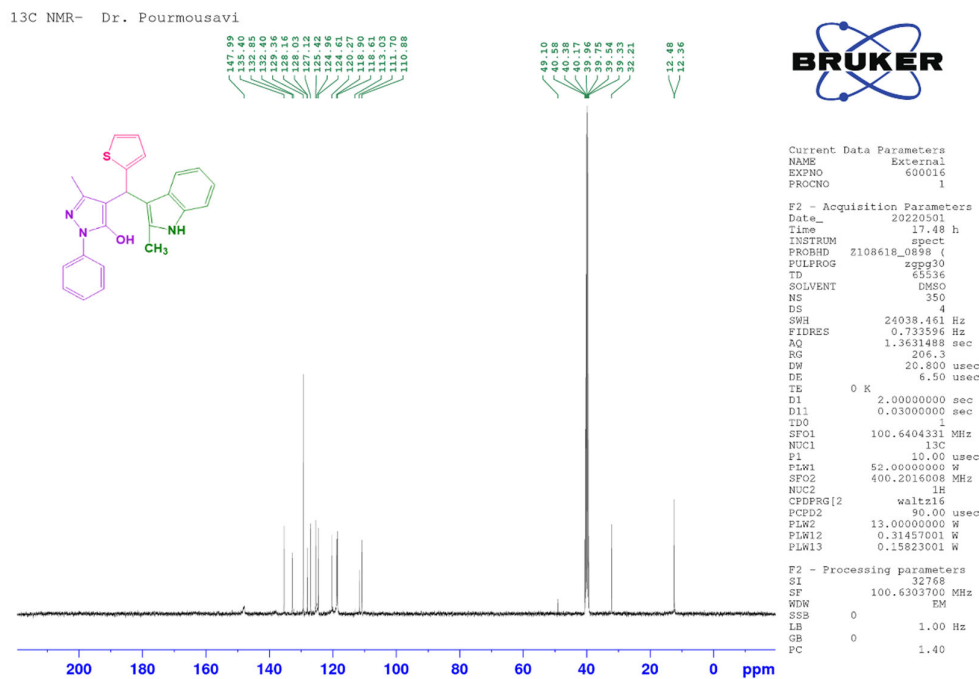
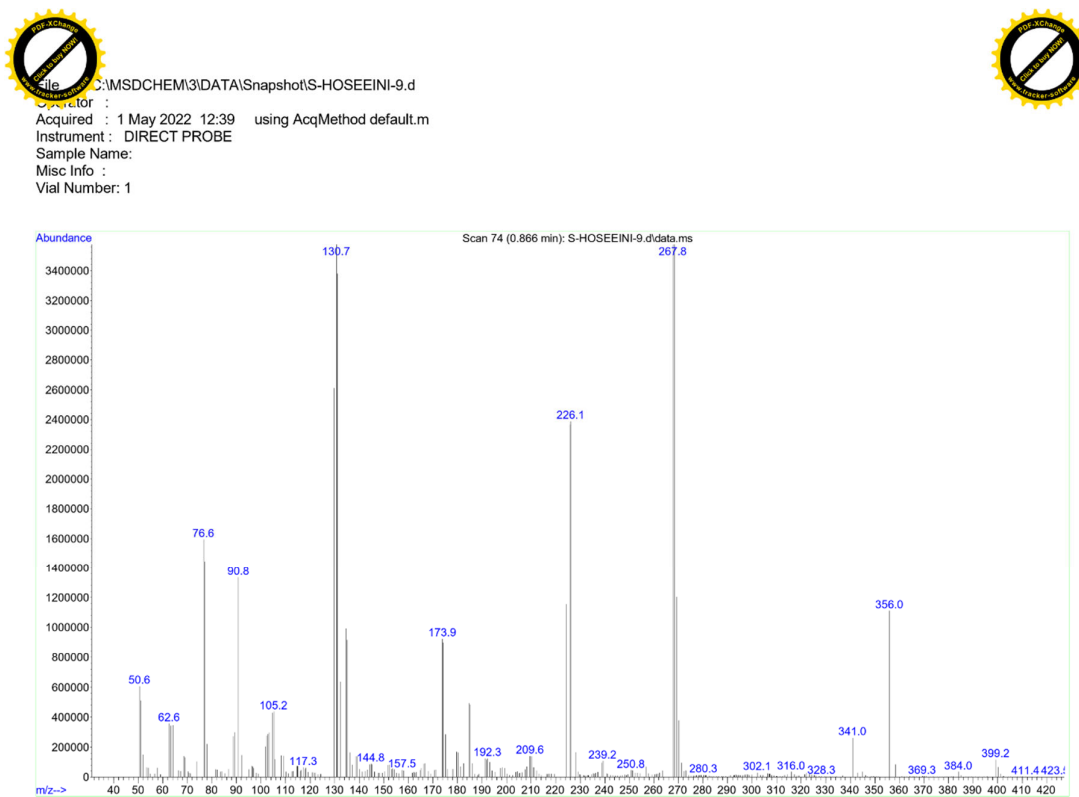
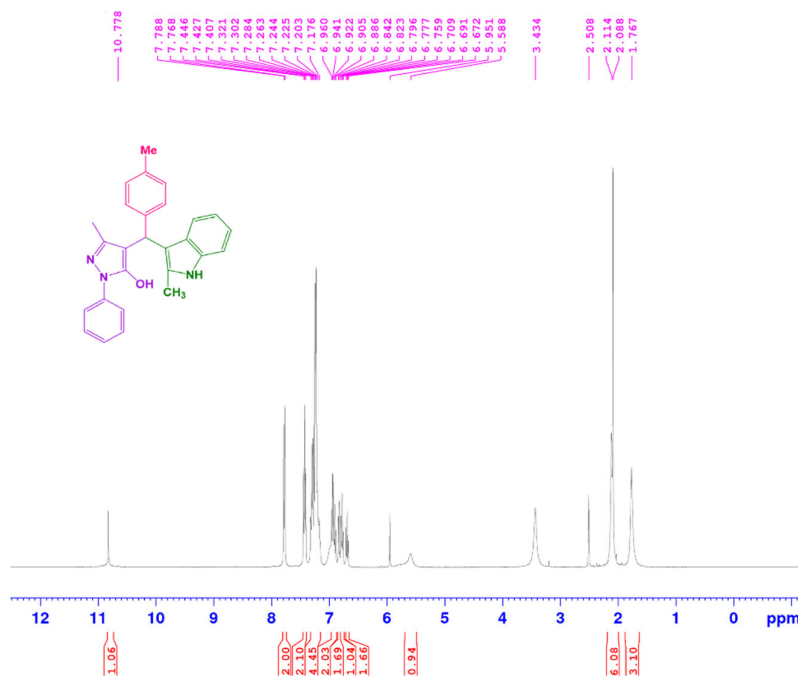
Figure S31. <sup>13</sup>C-NMR spectrum of 60.

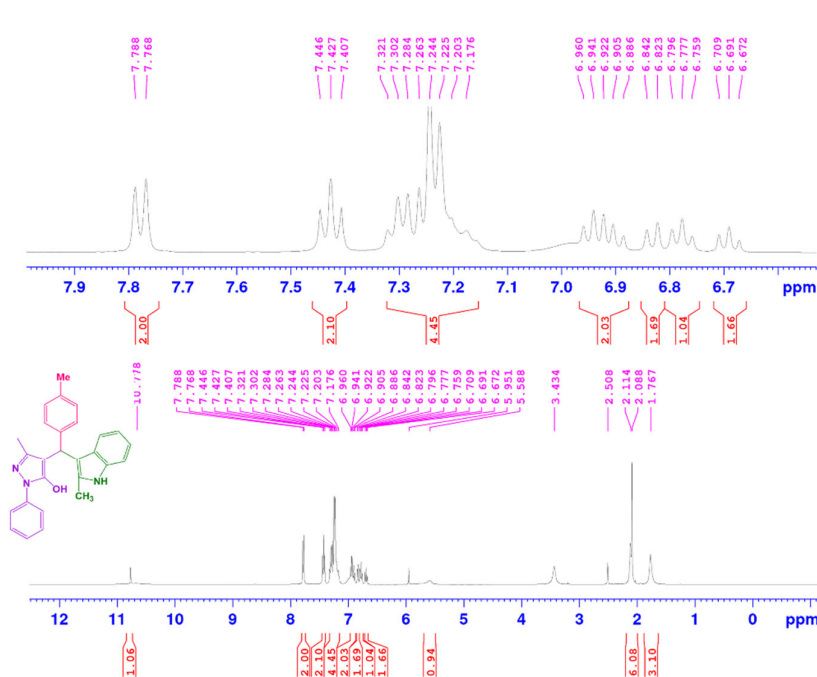
Figure S32. MASS Spectrum of 60.

<sup>1</sup>H NMR— Dr. Pourmousavi



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 RG 63.53  
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 DE 6.50 usec  
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 PC 1.00

<sup>1</sup>H NMR— Dr. Pourmousavi



Current Data Parameters  
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Figure S33. <sup>1</sup>H-NMR spectrum 6p.

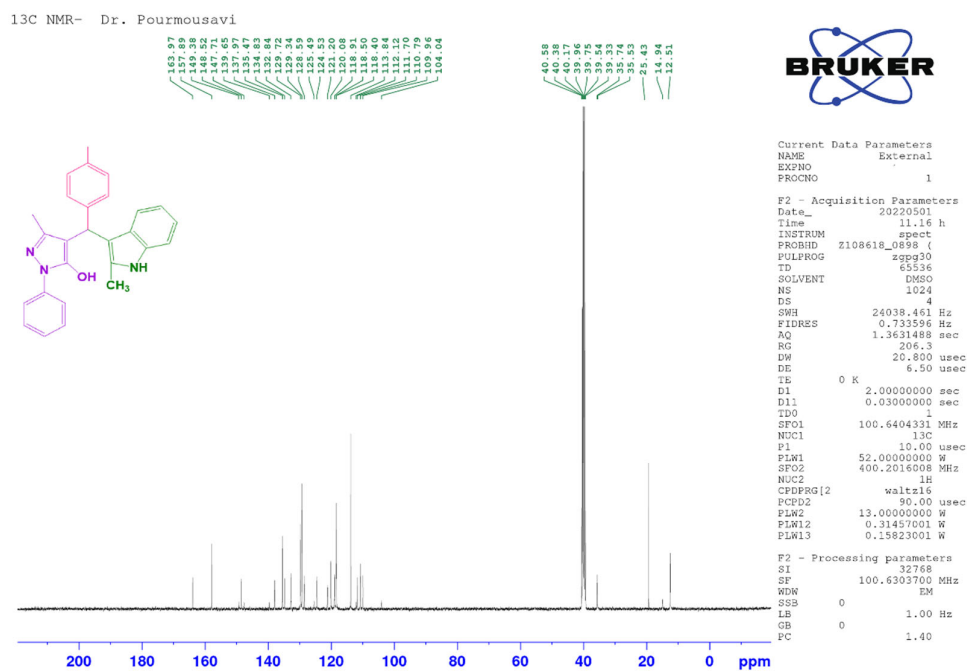
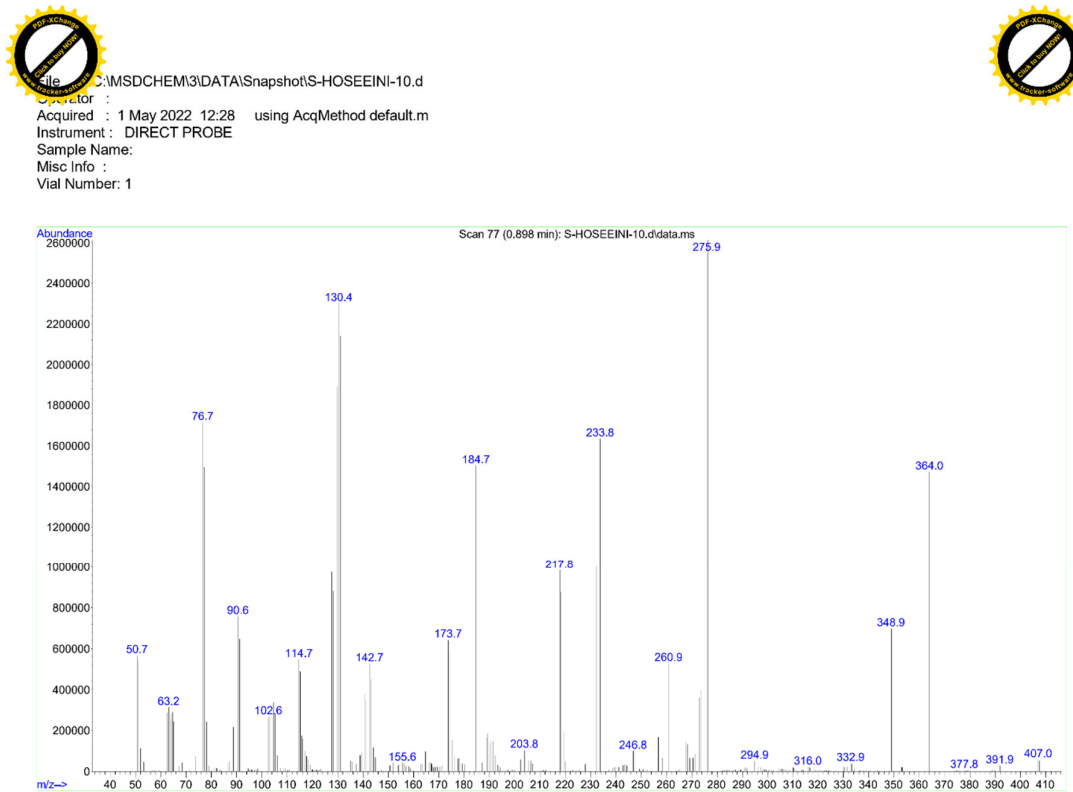
Figure S34. <sup>13</sup>C-NMR spectrum of 6p.

Figure S35. MASS Spectrum of 6p.