

Supplementary Information

A New, Simple and Efficient Method of Steglich Esterification of Juglone with Long-Chain Fatty Acids: Synthesis of a New Class of Non-Polymeric Wax Deposition Inhibitors for Crude Oil

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General considerations

Melting points were determined using a Fisatom 430D melting point apparatus (uncorrected). Infrared (IR) spectra were recorded on an FTLA2000-102-ABB BOMEM FT-IR spectrophotometer with KBr pellets. ¹H and ¹³C nuclear magnetic resonance (NMR)

spectra were recorded using a Varian 400 (400 MHz) spectrometer with tetramethylsilane (TMS) as the internal standard and CDCl₃ as solvent. The starting materials, juglone, acids, 1,3-dicyclohexylcarbodiimide (DCC), 4-dimethylaminopyridine (DMAP) and CeCl₃·7H₂O are commercially available and were used without purification. All organic solvents were used as received.

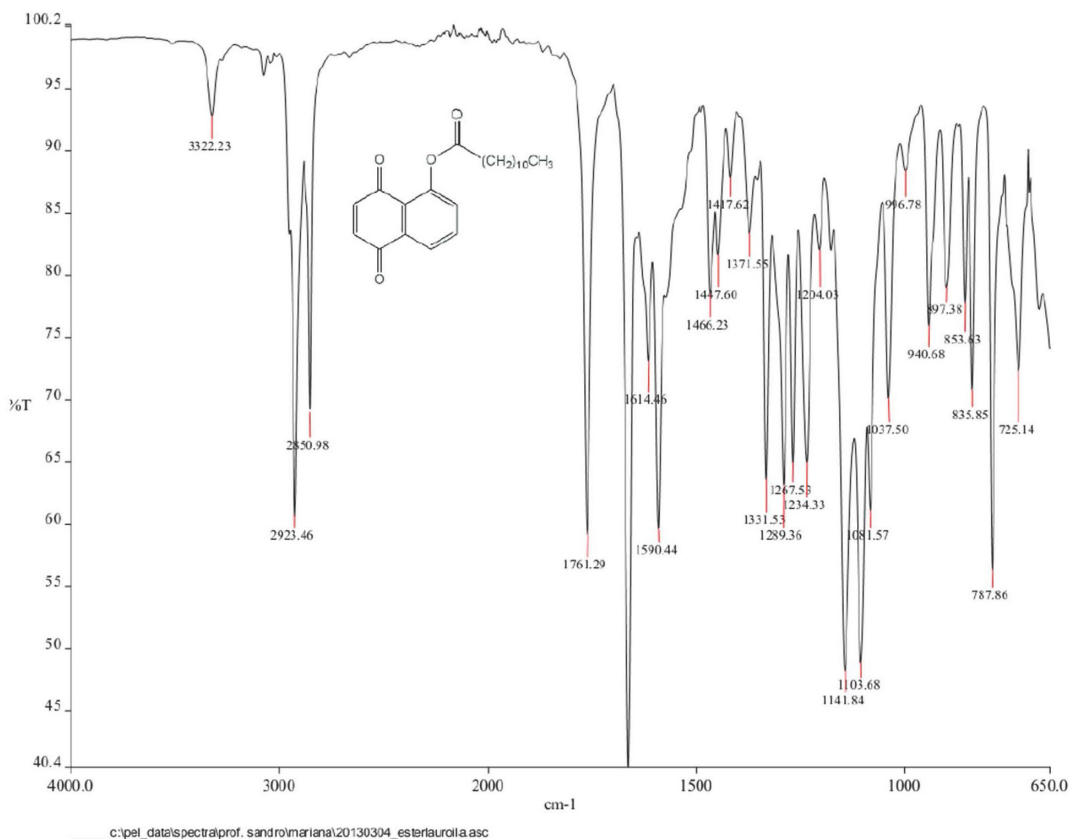


Figure S1. IR spectrum (KBr) of 5-O-dodecanoyloxy-1,4-naphthoquinone.

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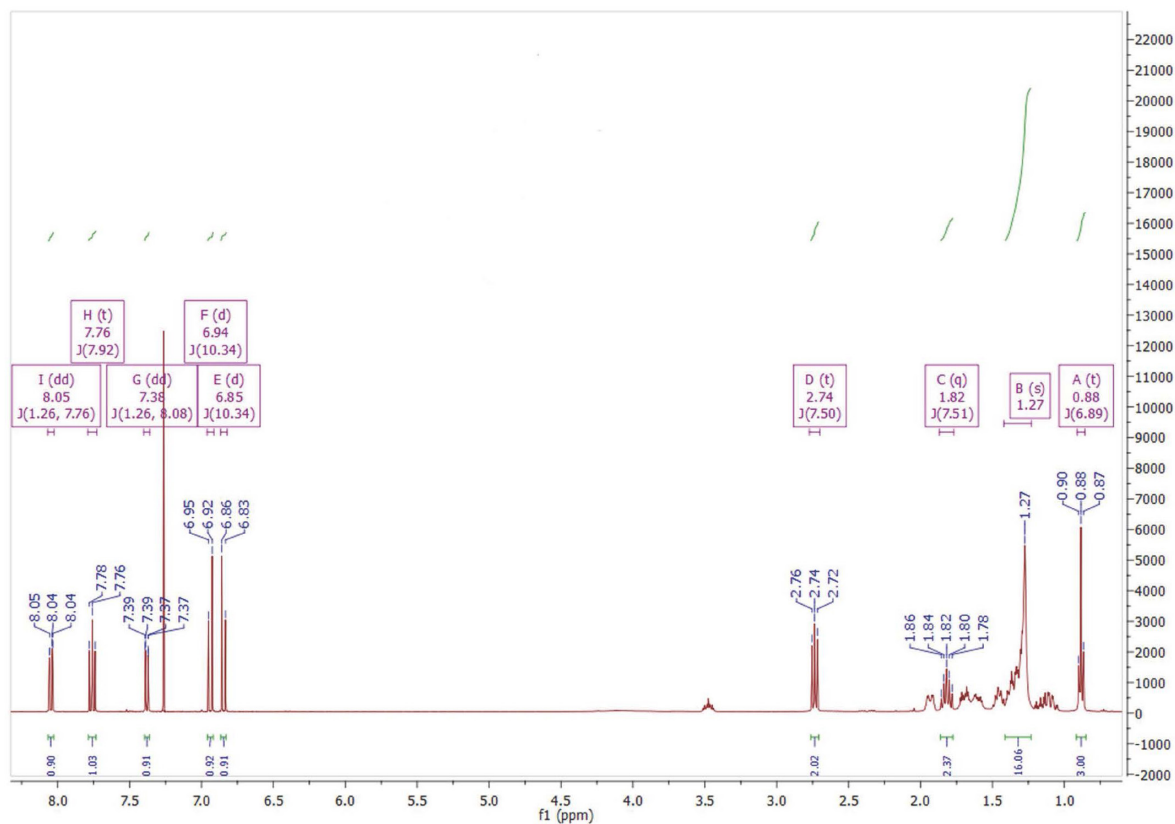


Figure S2. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-O-dodecanoyloxy-1,4-naphthoquinone (full spectrum).

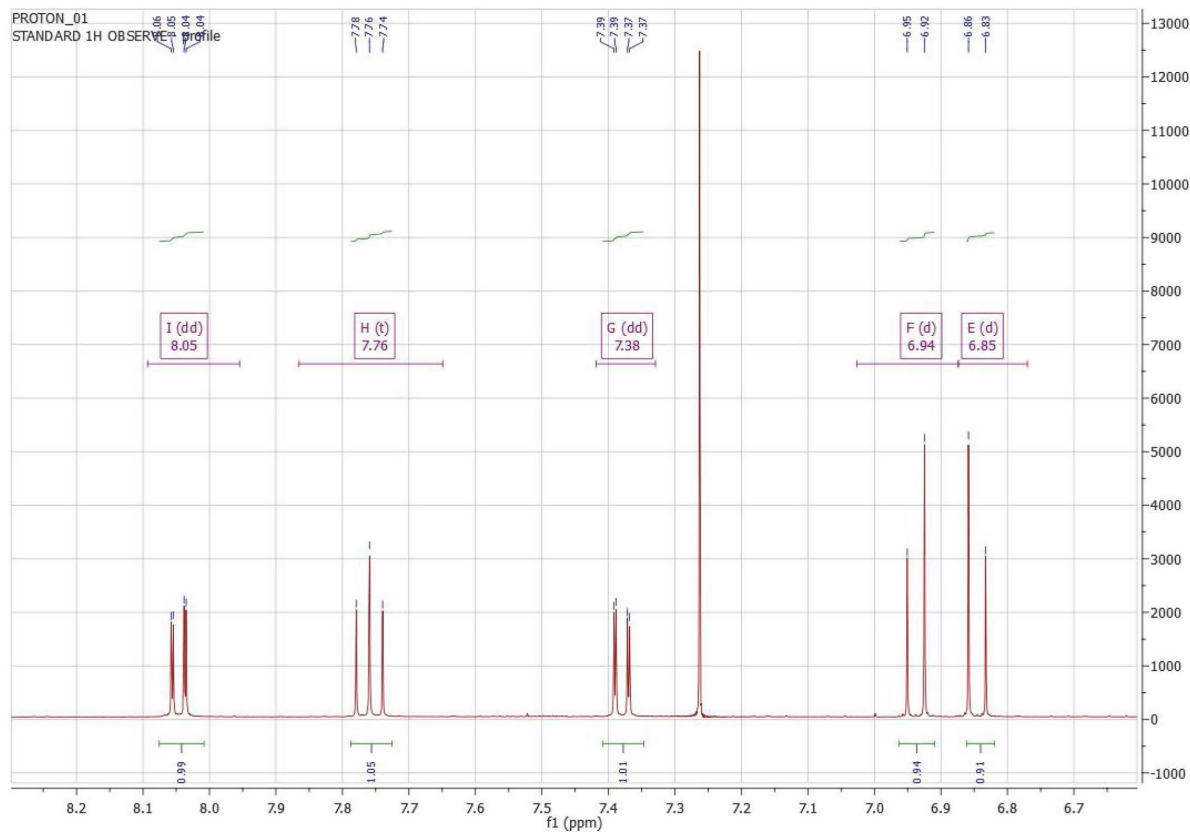


Figure S3. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-O-dodecanoyloxy-1,4-naphthoquinone (expanded aromatic region).

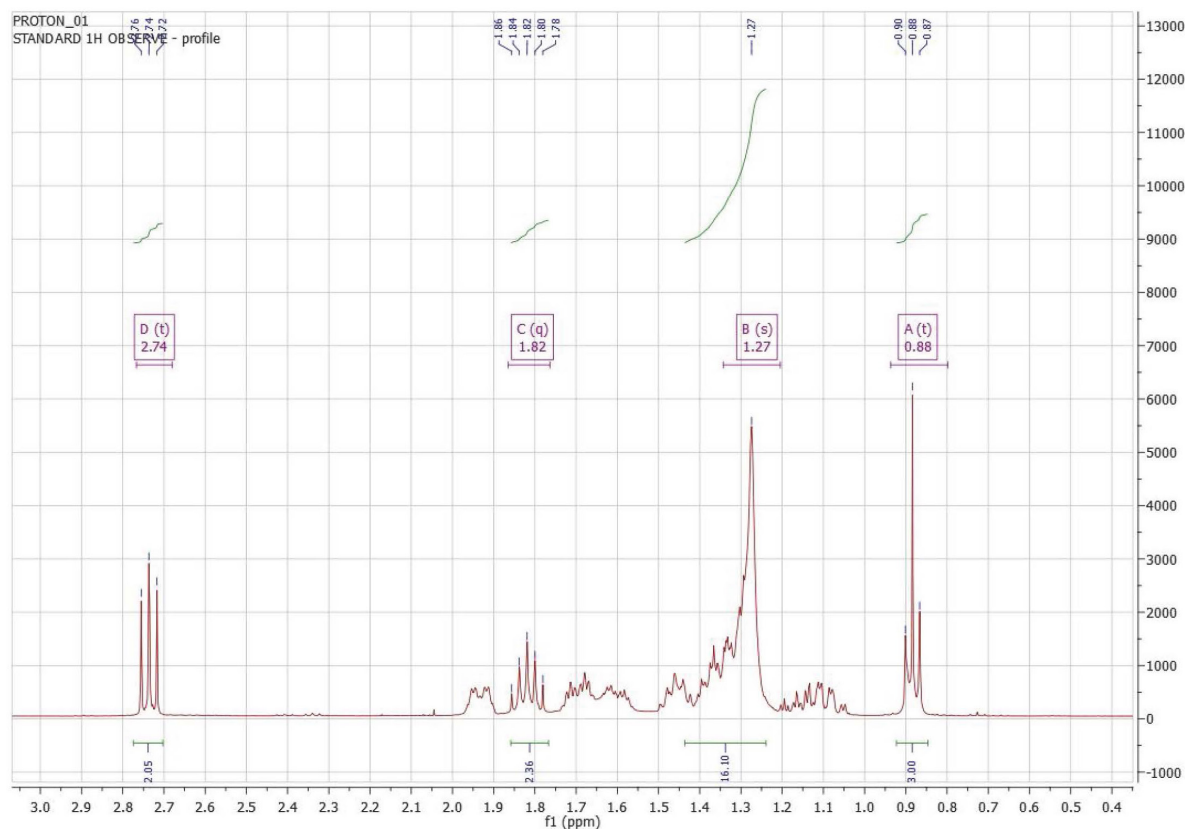


Figure S4. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-*O*-dodecanoyloxy-1,4-naphthoquinone (expanded aliphatic region).

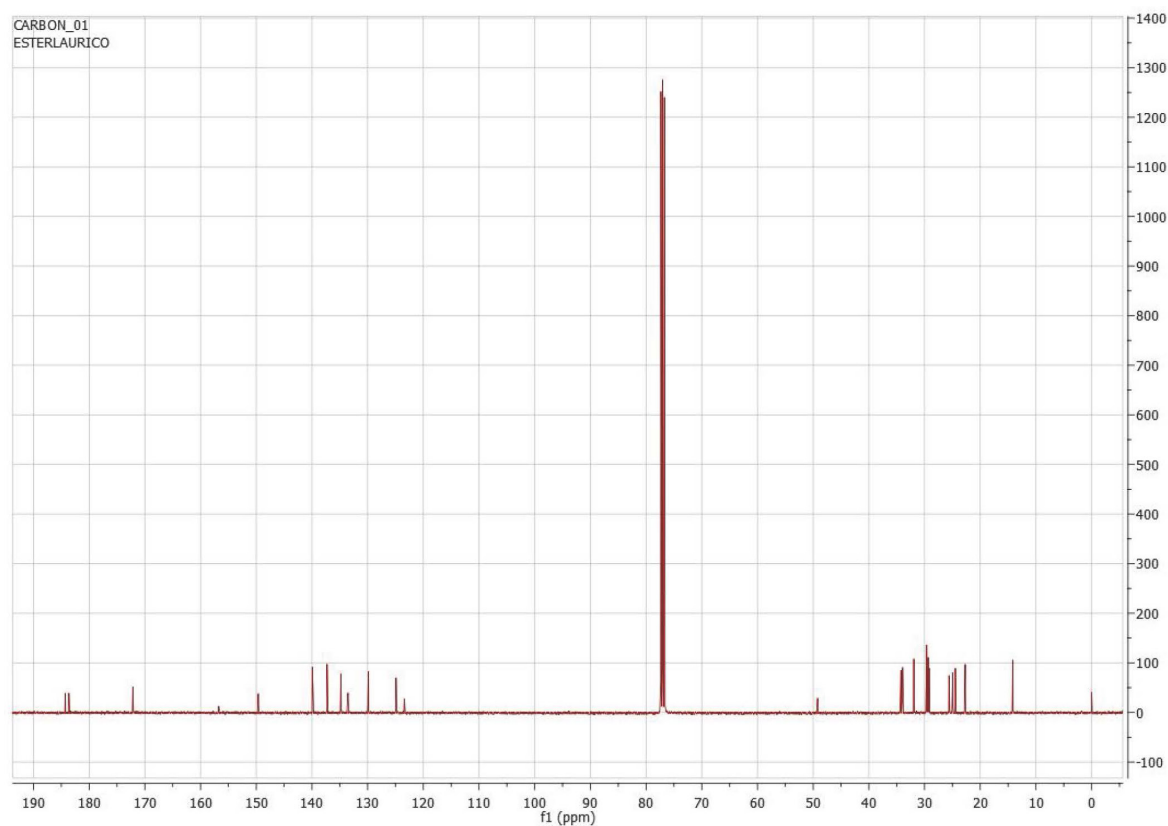


Figure S5. ¹³C NMR spectrum (100 MHz, CDCl₃) of 5-*O*-dodecanoyloxy-1,4-naphthoquinone.

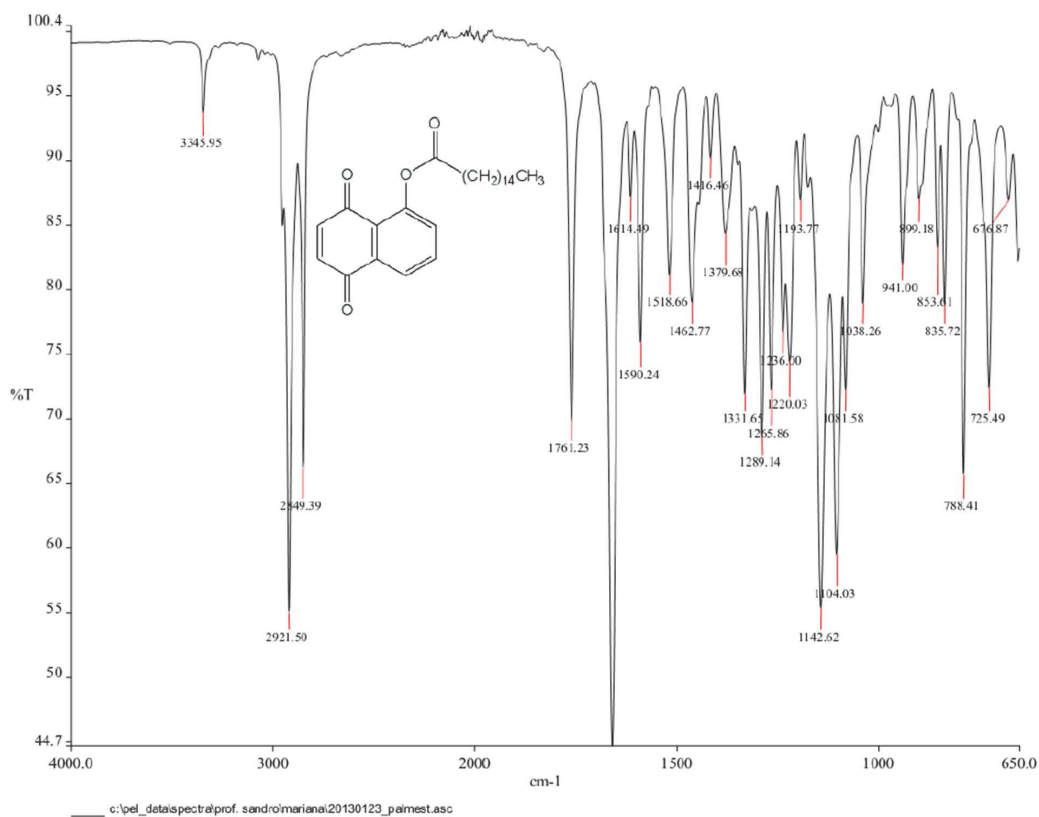


Figure S6. IR spectrum (KBr) of 5-O-hexadecanoyloxy-1,4-naphthoquinone.

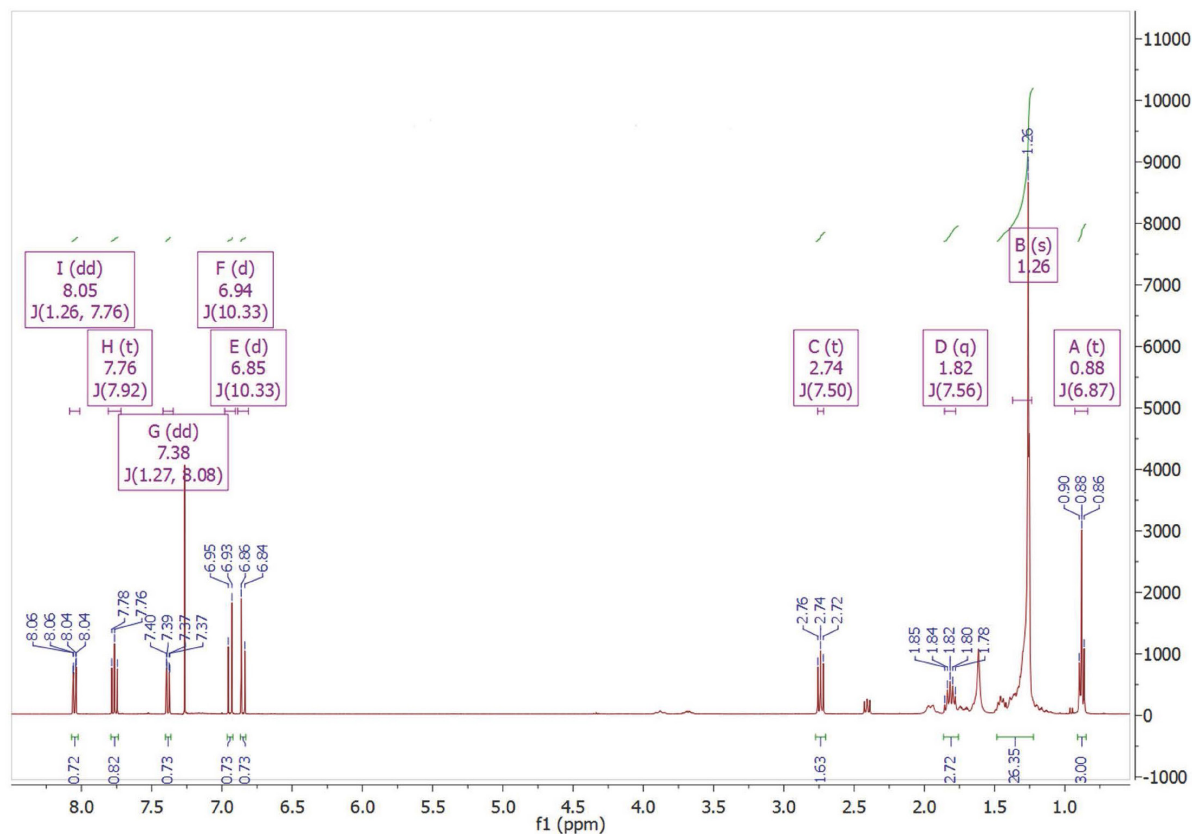


Figure S7. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-O-hexadecanoyloxy-1,4-naphthoquinone (full spectrum).

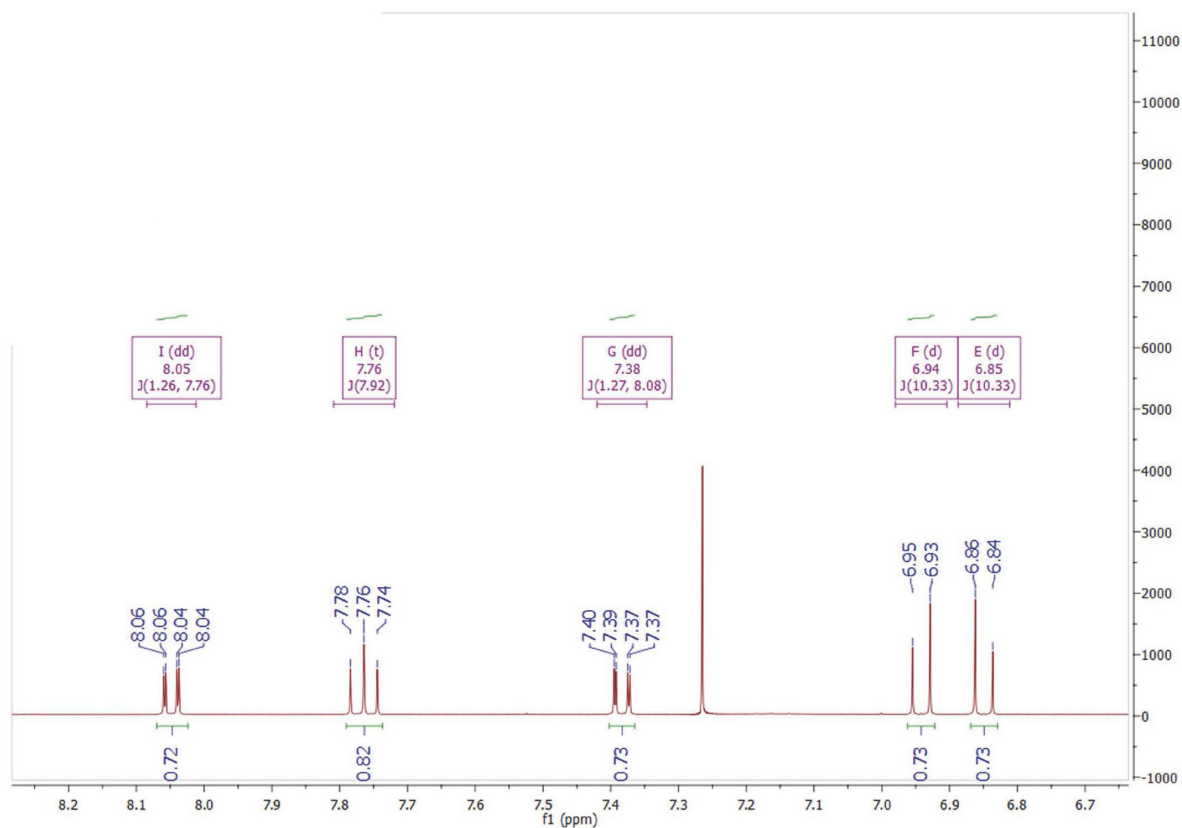


Figure S8. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-*O*-hexadecanoyloxy-1,4-naphthoquinone (expanded aromatic region).

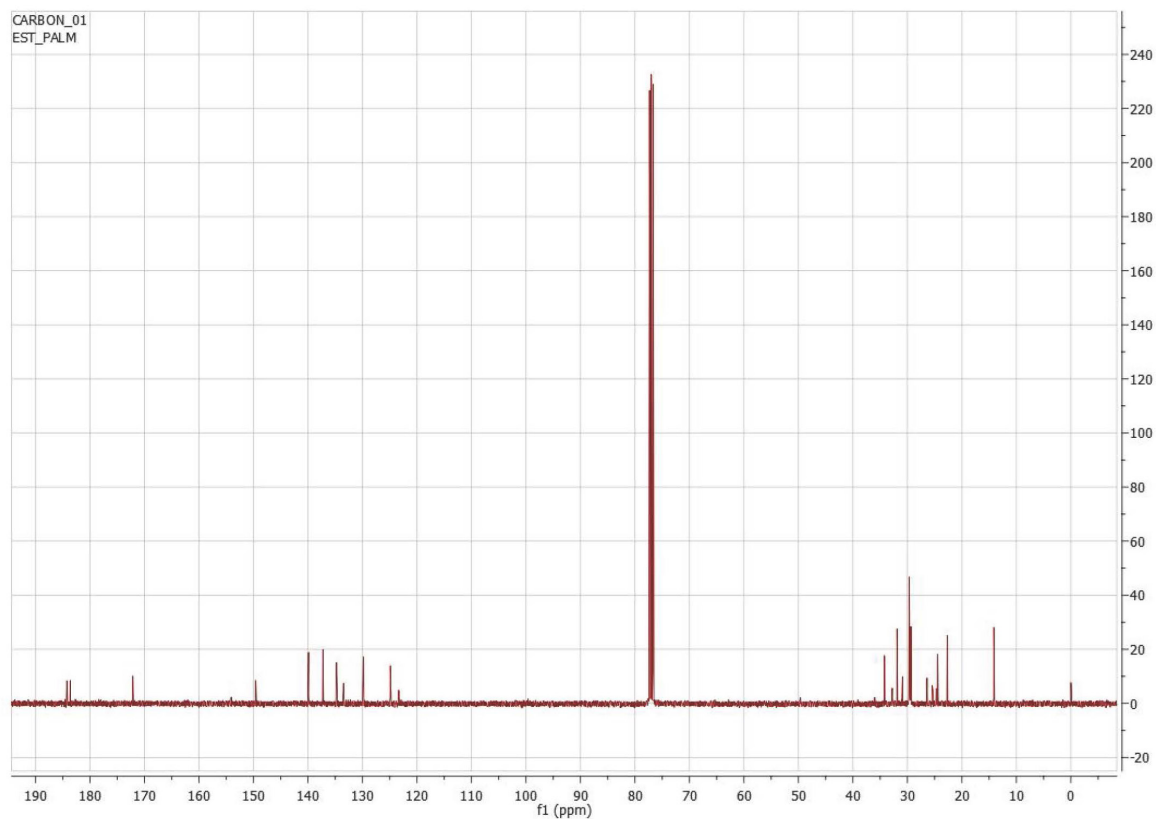


Figure S9. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-*O*-hexadecanoyloxy-1,4-naphthoquinone (expanded aliphatic region).

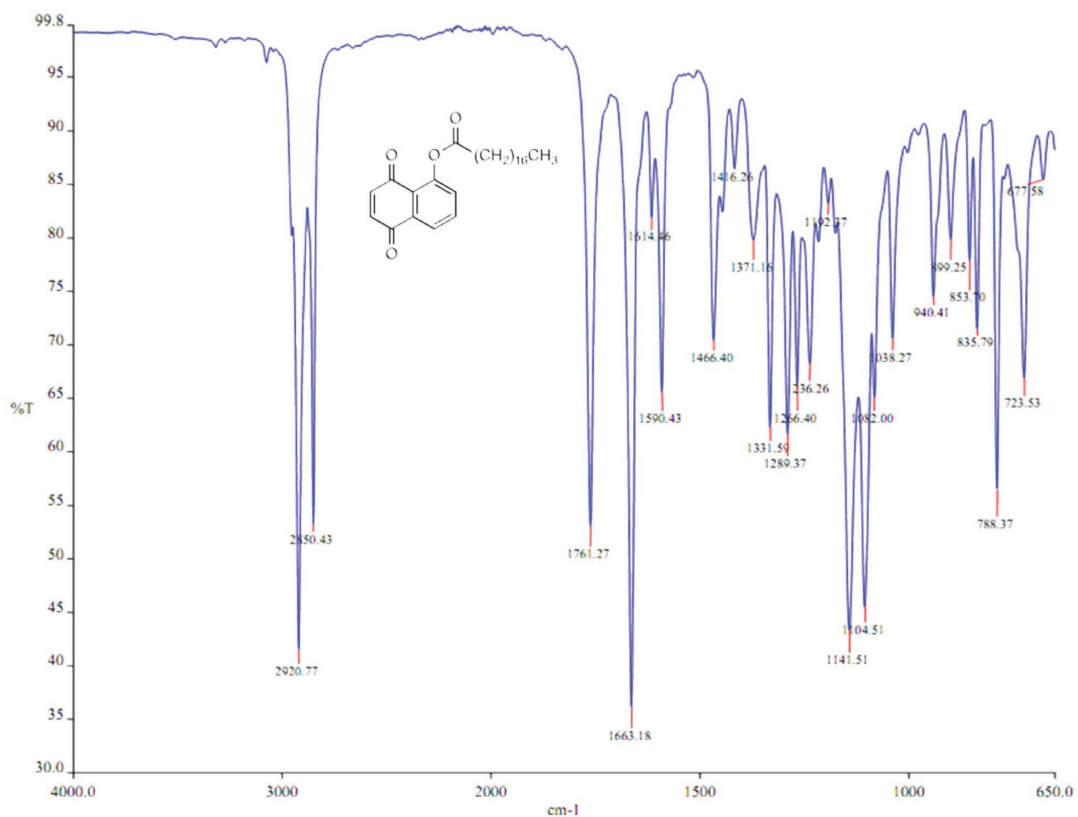


Figure S10. ^{13}C NMR spectrum (100 MHz, CDCl_3) of 5-O-hexadecanoyloxy-1,4-naphthoquinone.

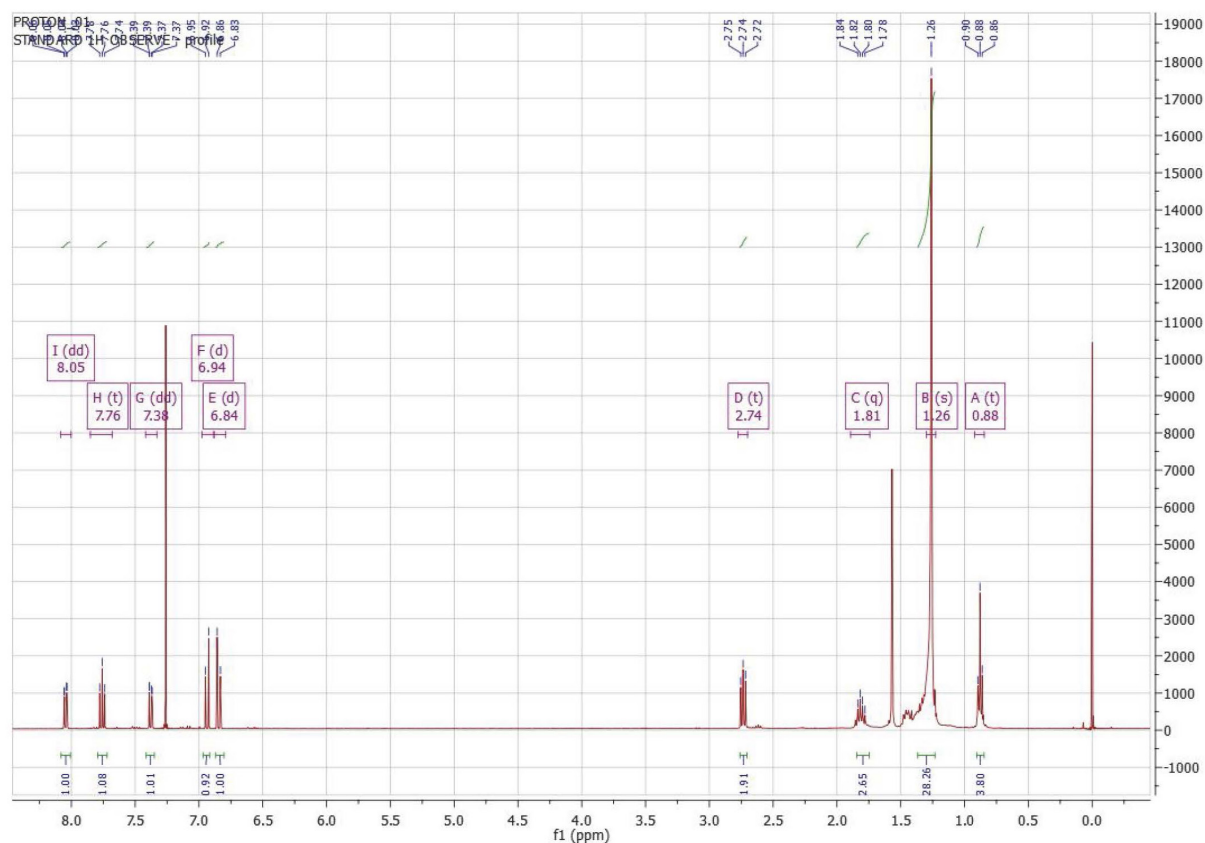


Figure S11. IR spectrum (KBr) of 5-O-octadecanoyloxy-1,4-naphthoquinone.

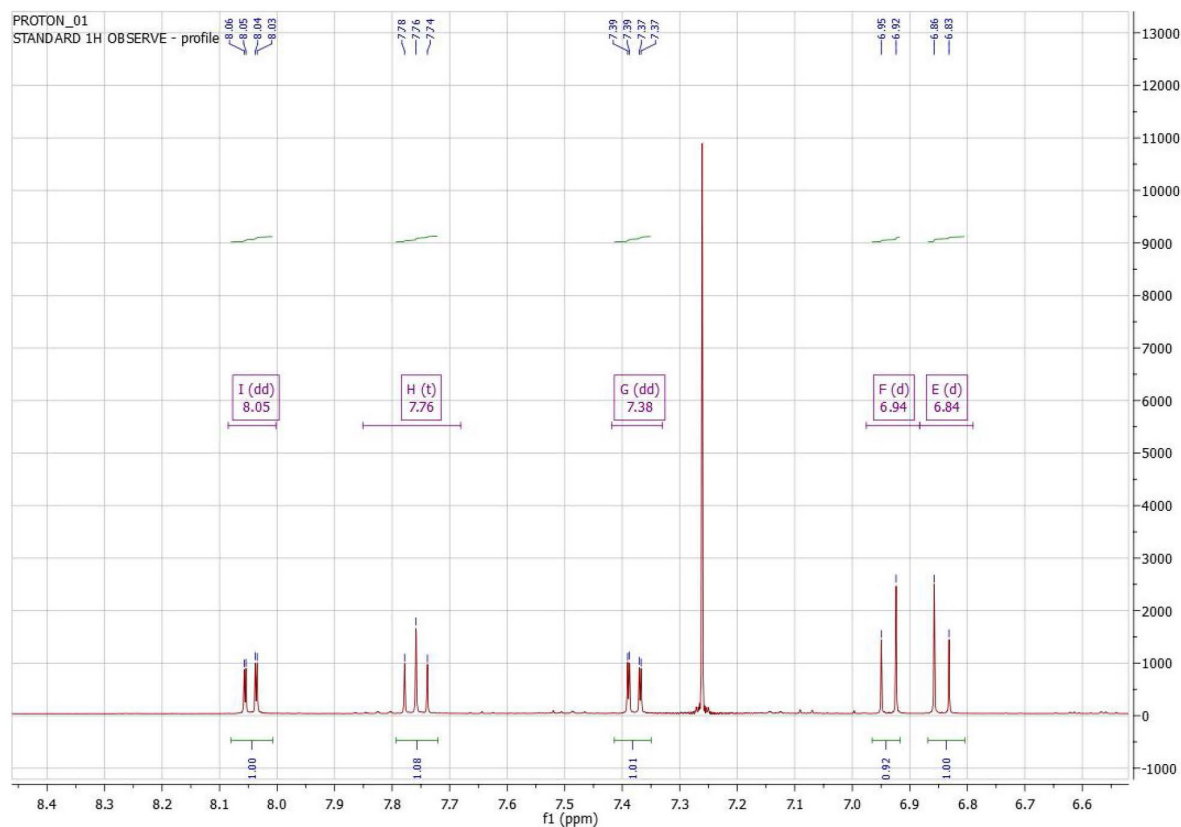


Figure S12. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-O-octadecanoyloxy-1,4-naphthoquinone (full spectrum).

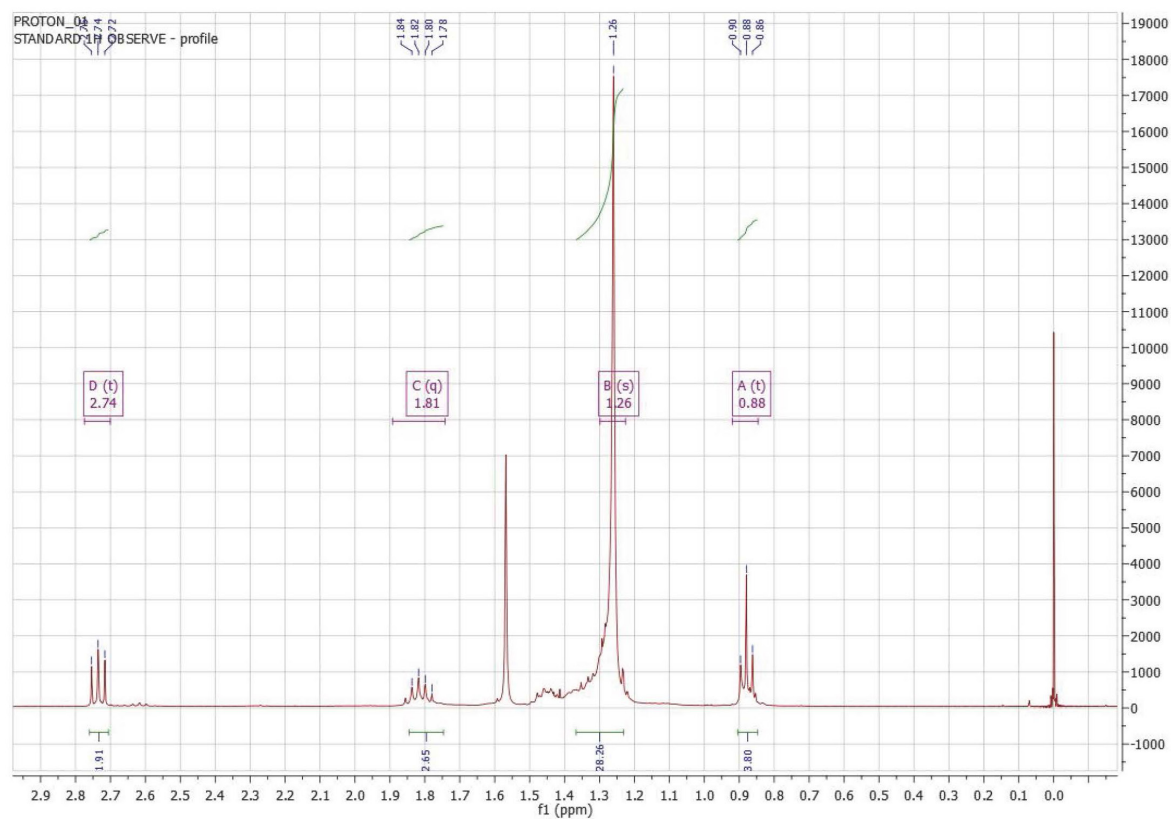


Figure S13. ¹H NMR spectrum (400 MHz, CDCl₃) of 5-O-octadecanoyloxy-1,4-naphthoquinone (expanded aromatic region).

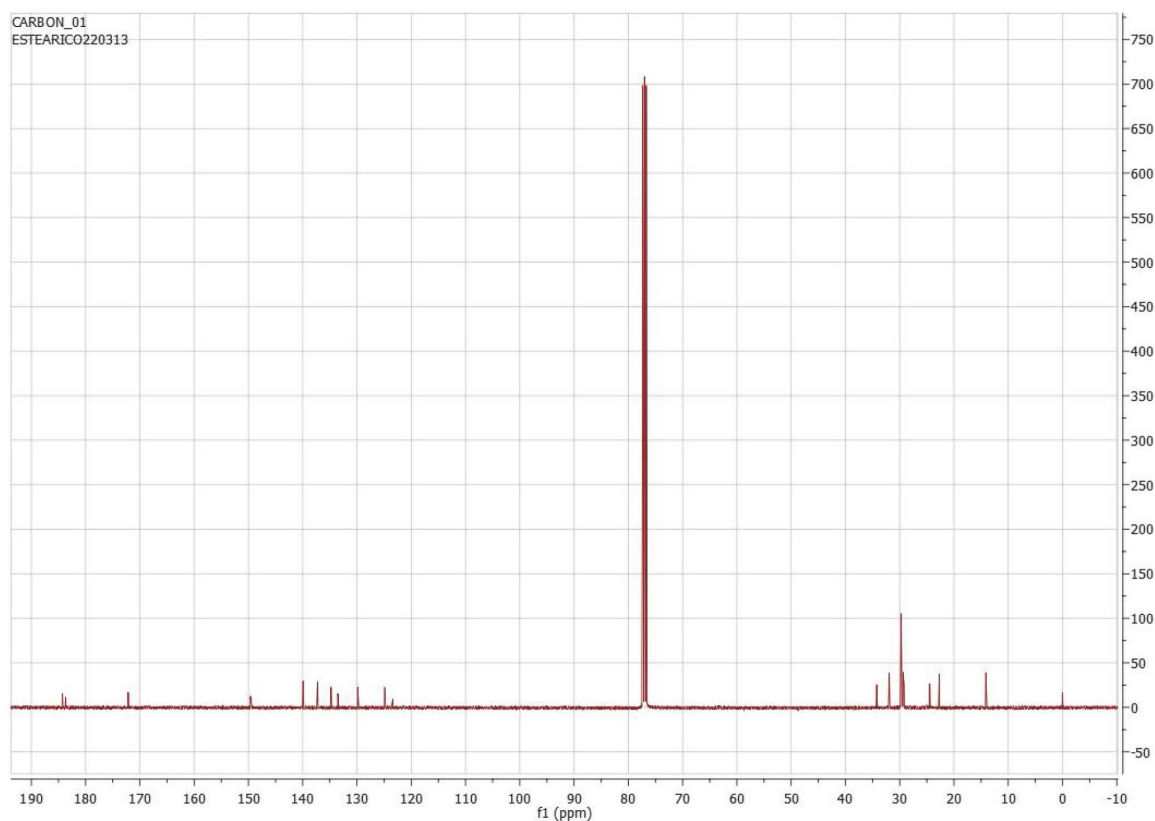


Figure S14. ^1H NMR spectrum (400 MHz, CDCl_3) of 5-*O*-octadecanoyloxy-1,4-naphthoquinone (expanded aliphatic region).

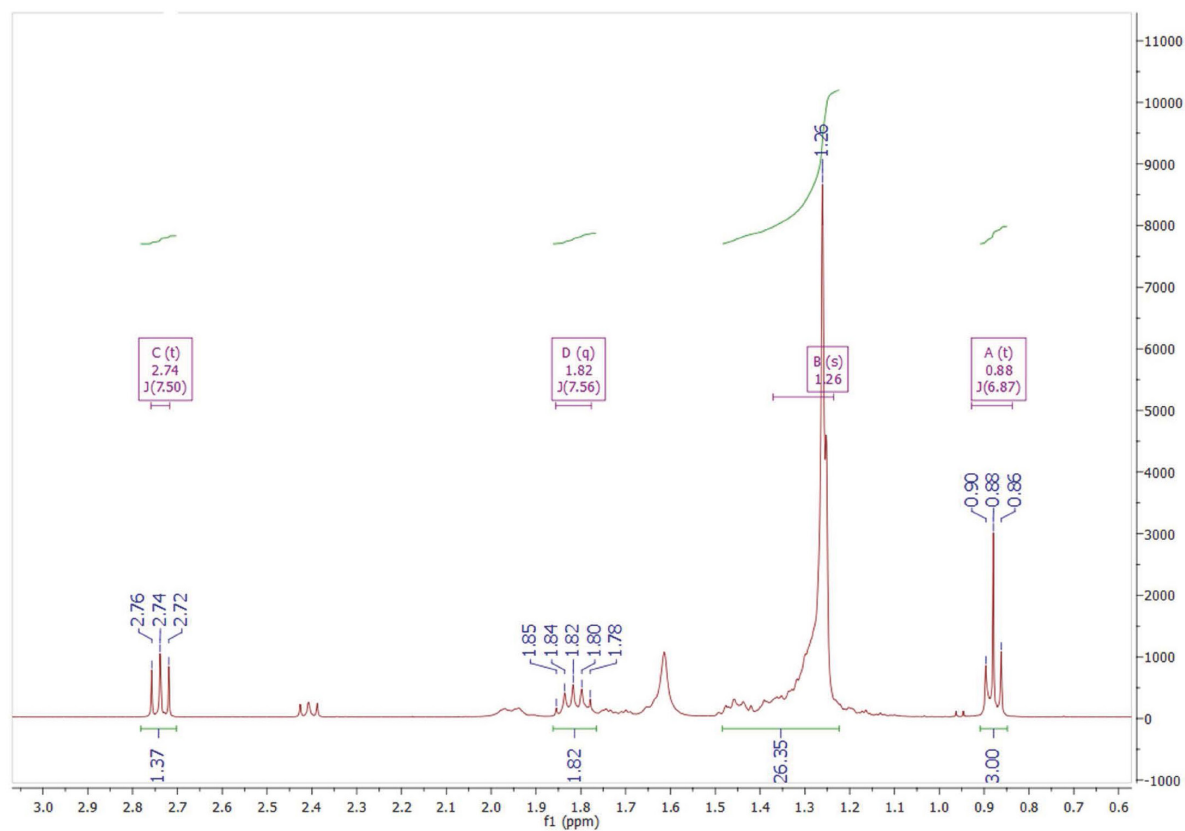


Figure S15. ^{13}C NMR spectrum (100 MHz, CDCl_3) of 5-*O*-octadecanoyloxy-1,4-naphthoquinone.