

SUPPLEMENTARY DATA

Anti-inflammatory and Antioxidant Properties of *Malapterurus electricus* Skin Fish Methanolic Extract in Arthritic Rats: Therapeutic and protective effects

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Abstract

The protective and therapeutic anti-inflammatory and antioxidant potency of *Malapterurus electricus* (F. Malapteruridae) skin fish methanolic extract (FE) (300mg/kg.b.wt/day for 7days, orally) was tested in monosodium urate(MSU)-induced arthritic Wistar albino male rats' joints. Serum uric acid, TNF- α , IL-1 β , NF- κ B, MDA, GSH, catalase, SOD, and glutathione reductase levels were all measured. According to the findings, FE significantly reduced uric acid levels and ankle swelling in both protective and therapeutic groups. Furthermore, it has anti-inflammatory effects by downregulating inflammatory cytokines, primarily through decreased oxidative stress and increased antioxidant status. All the aforementioned lesions were significantly improved in protected and treated rats with FE, according to histopathological findings. iNOS immunostaining revealed that protected and treated arthritic rats with FE had weak positive immune-reactive cells. Phytochemical analysis revealed that FE was high in fatty and amino acids. The most abundant compounds were vaccenic (24.52%), 9-octadecenoic (11.66%), palmitic (34.66%), stearic acids (14.63%), glycine (0.813mg/100mg), and alanine (1.645mg/100mg). Extensive molecular modelling and dynamics simulation experiments revealed that compound 4 has the potential to target and inhibit COX isoforms with a higher affinity for COX-2. As a result, we contend that FE could be a promising protective and therapeutic option for arthritis, aiding in the prevention and progression of this chronic inflammatory disease.

Keywords: *Malapterurus electricus*; anti-inflammatory; COX-2; molecular dynamics simulation.

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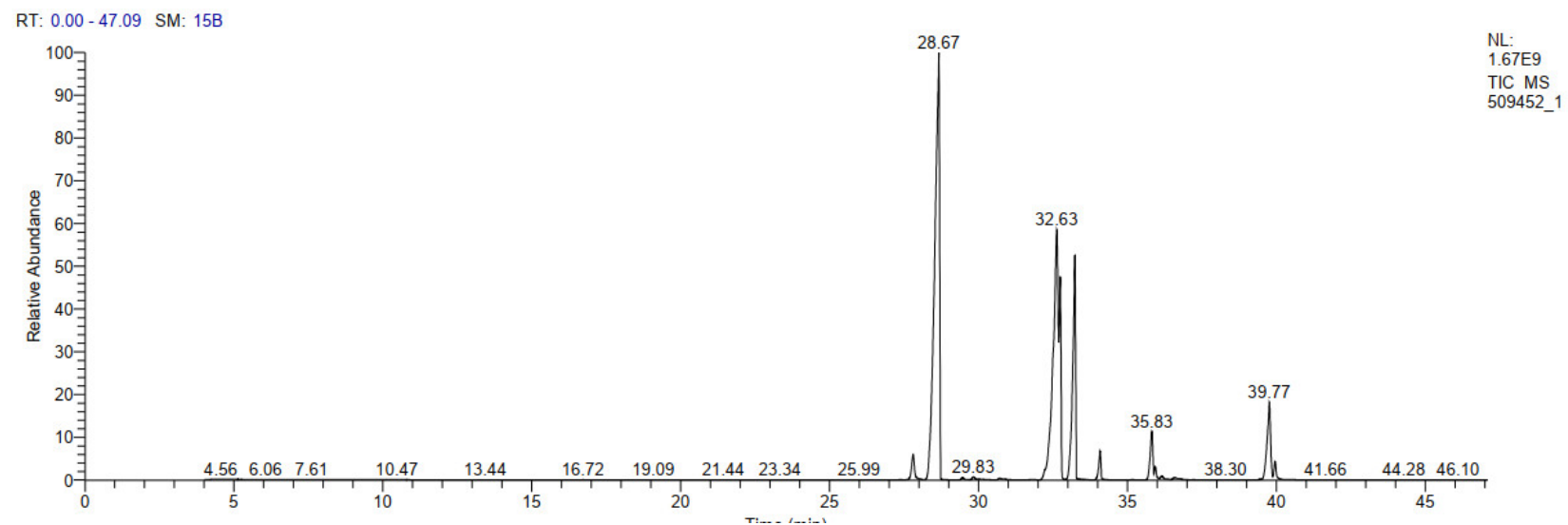


Figure S1. GC/MS spectrum *Malapterurus electricus* skin oil

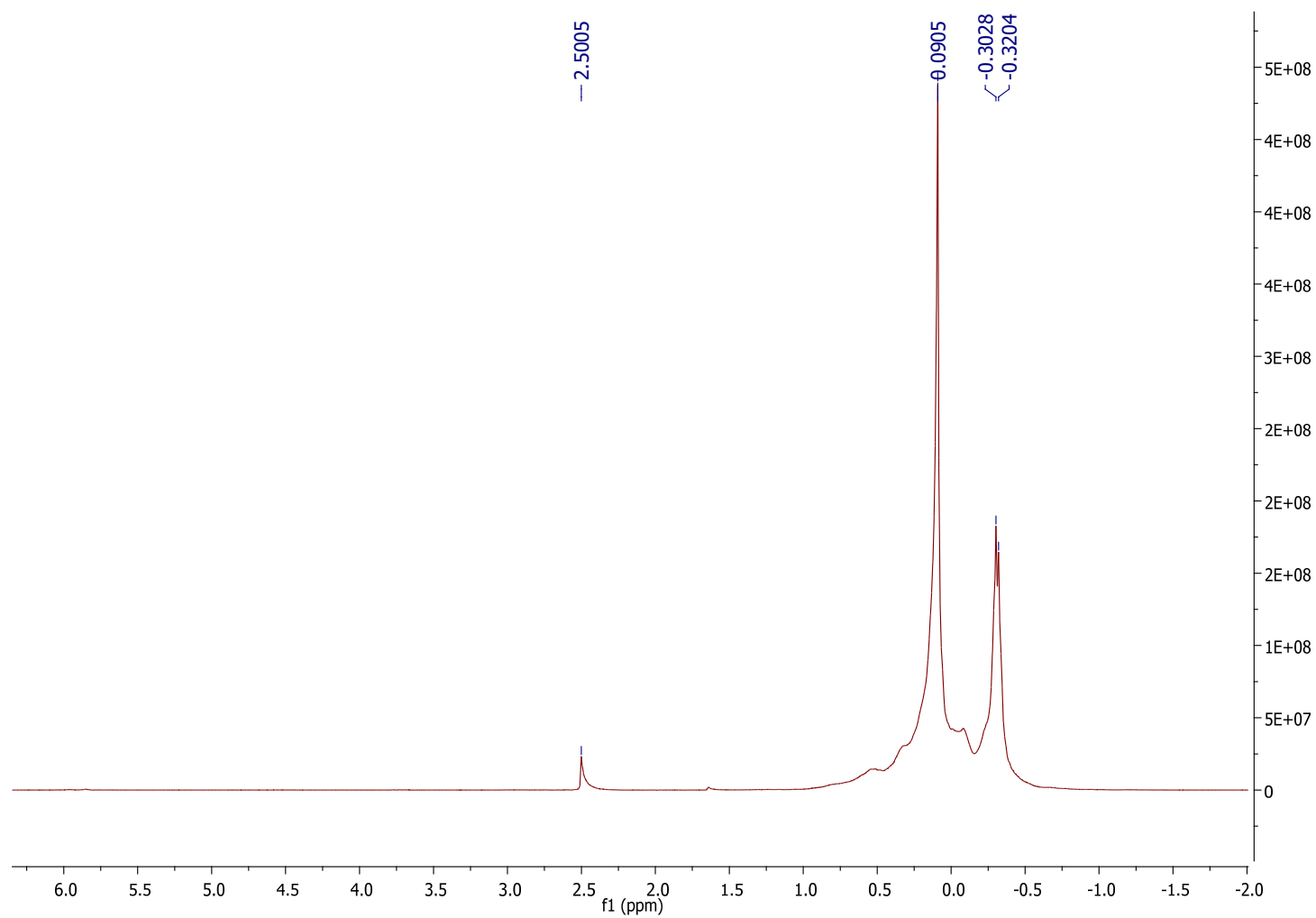


Figure S2. ^1H NMR spectrum of compound 1 measured in $\text{DMSO}-d_6$ at 400 MHz

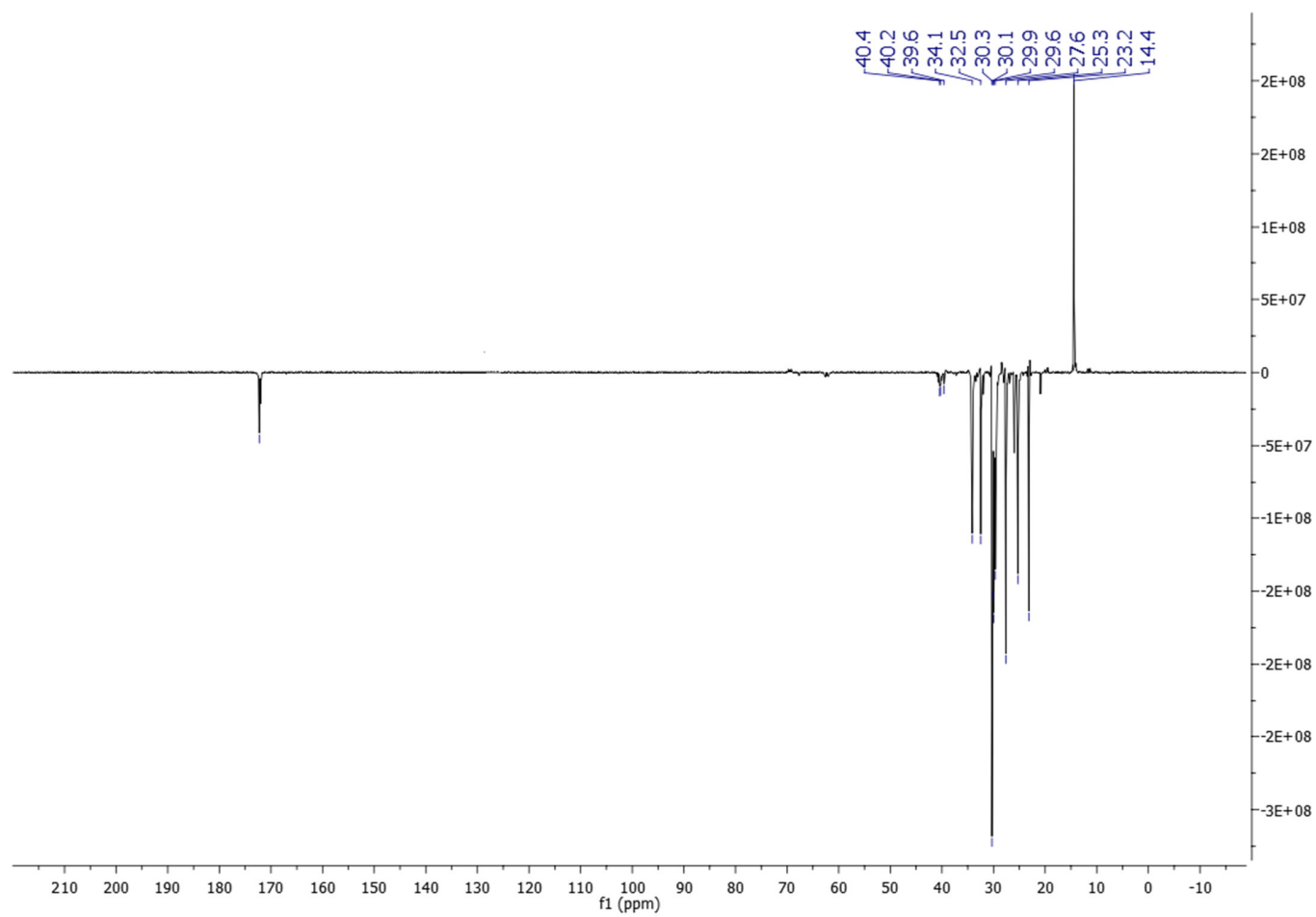


Figure S3. DEPT-Q NMR spectrum of compound **1** measured in DMSO- d_6 at 100 MHz

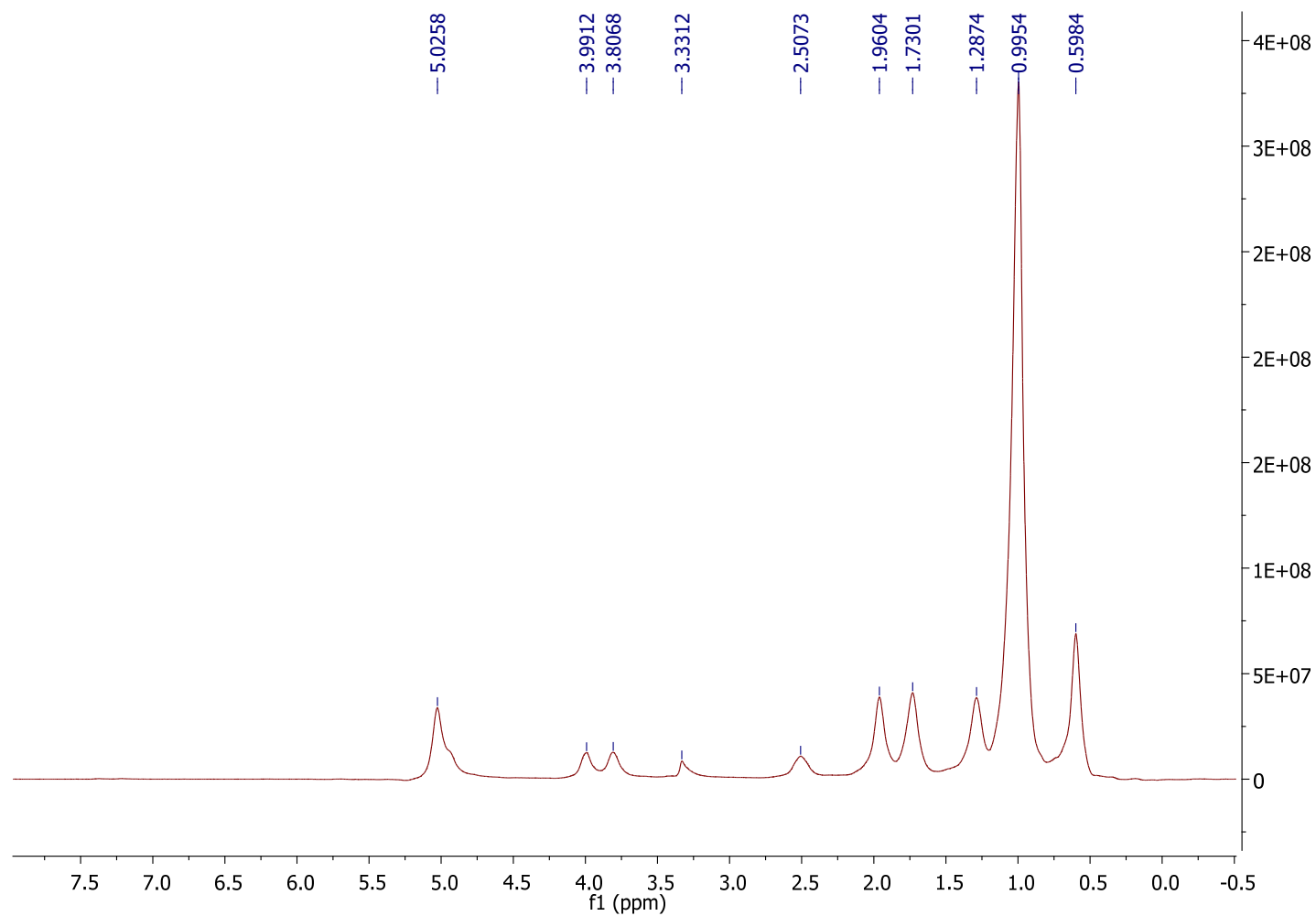


Figure S4. ^1H NMR spectrum of compound 2 measured in $\text{DMSO}-d_6$ at 400 MHz

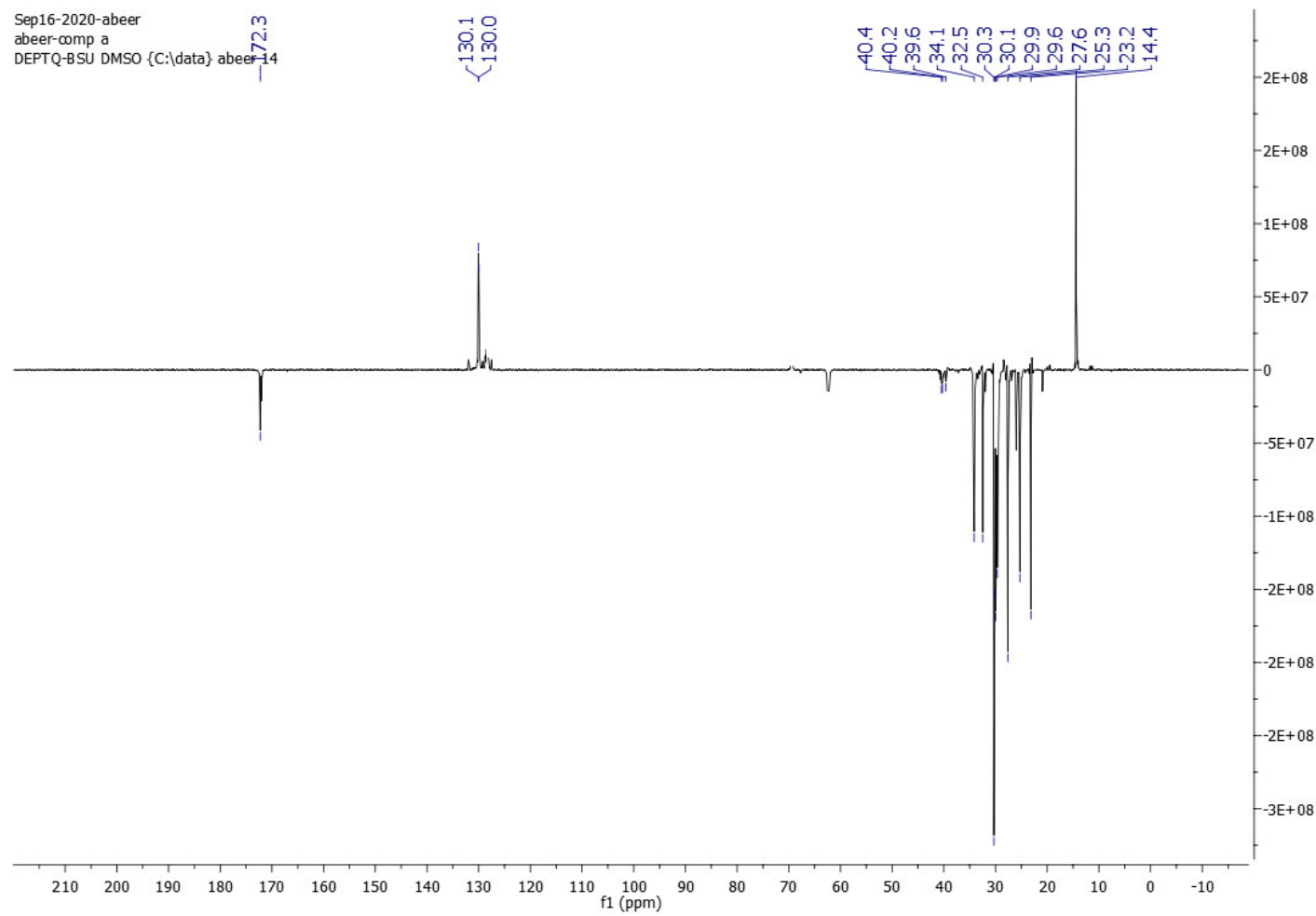


Figure S5. DEPT-Q NMR spectrum of compound **2** measured in DMSO- d_6 at 100 MHz

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PROTON_BSU DMSO {C:\data} abeer 18

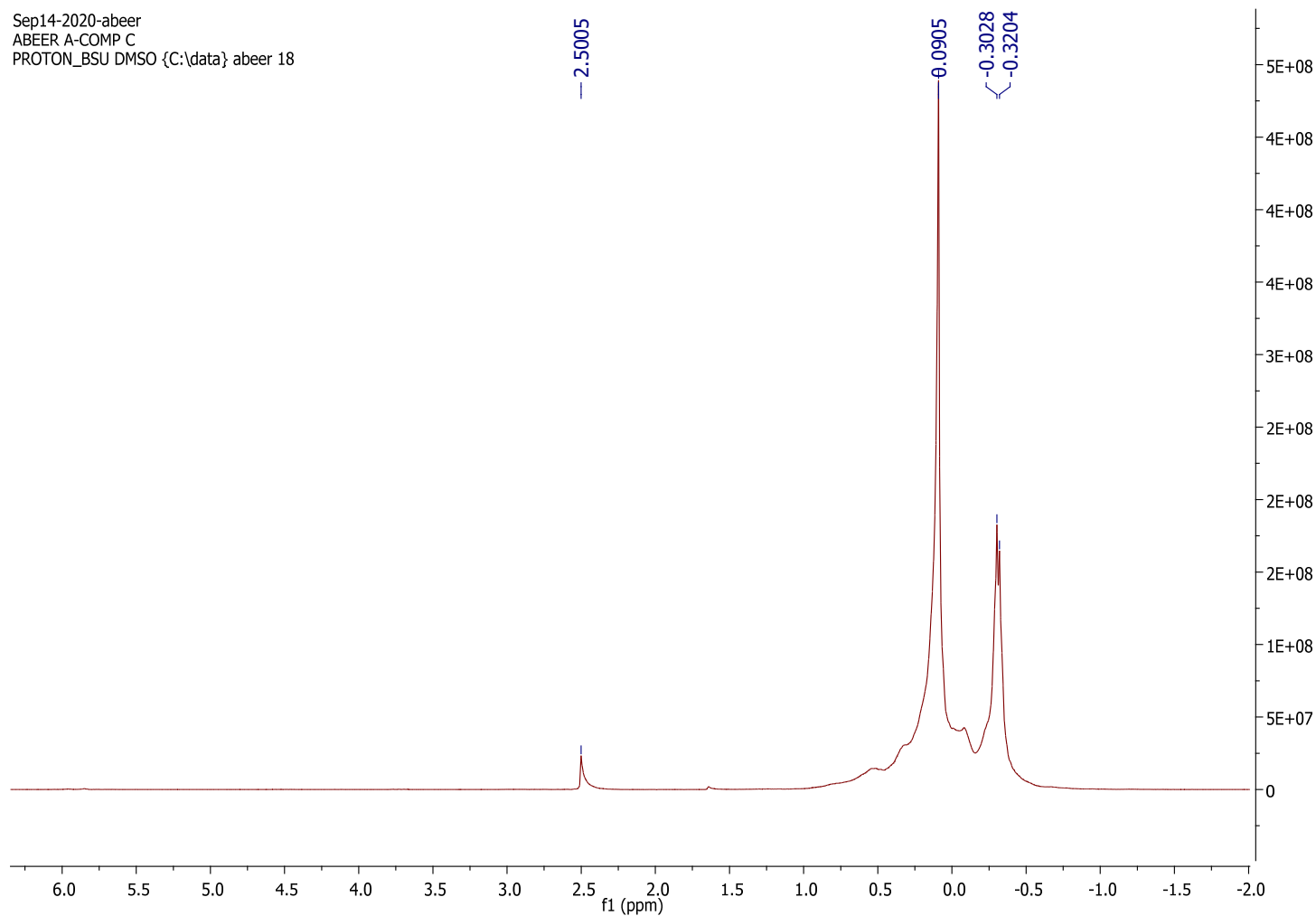


Figure S6. ¹H NMR spectrum of compound 3 measured in DMSO-*d*₆ at 400 MHz

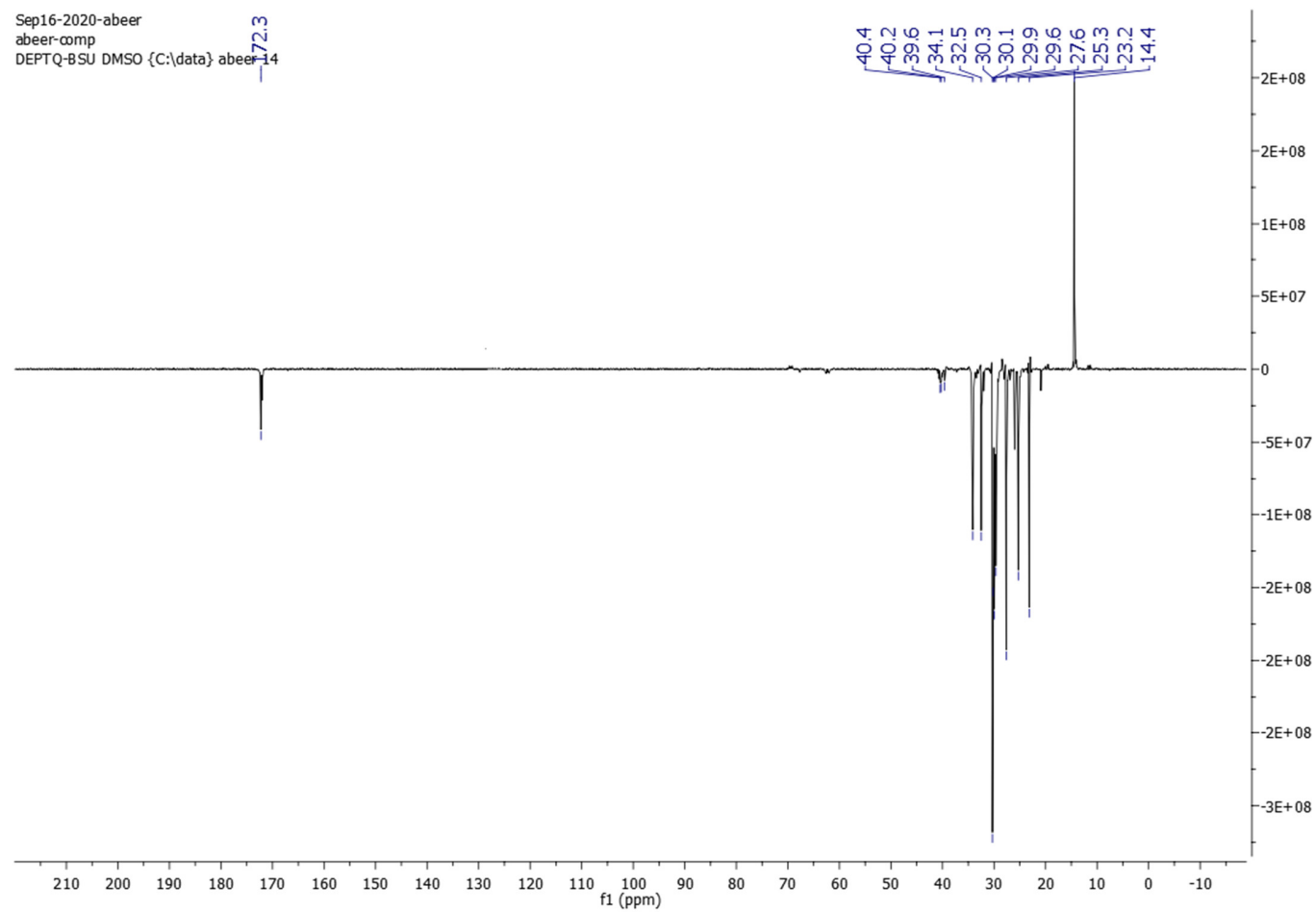


Figure S7. DEPT-Q NMR spectrum of compound **3** measured in DMSO- d_6 at 100 MHz

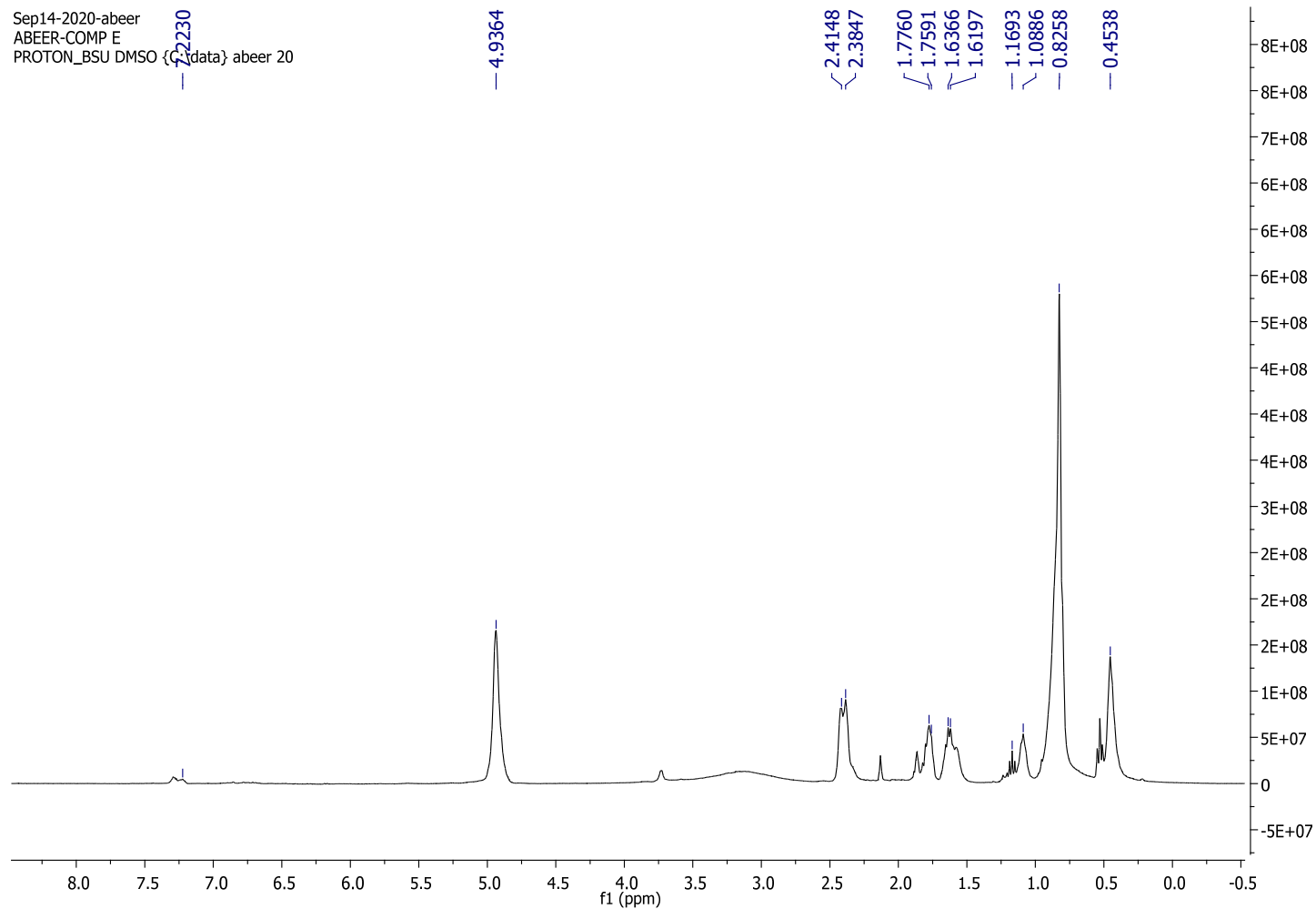


Figure S8. ^1H NMR spectrum of compound **4** measured in $\text{DMSO}-d_6$ at 400 MHz

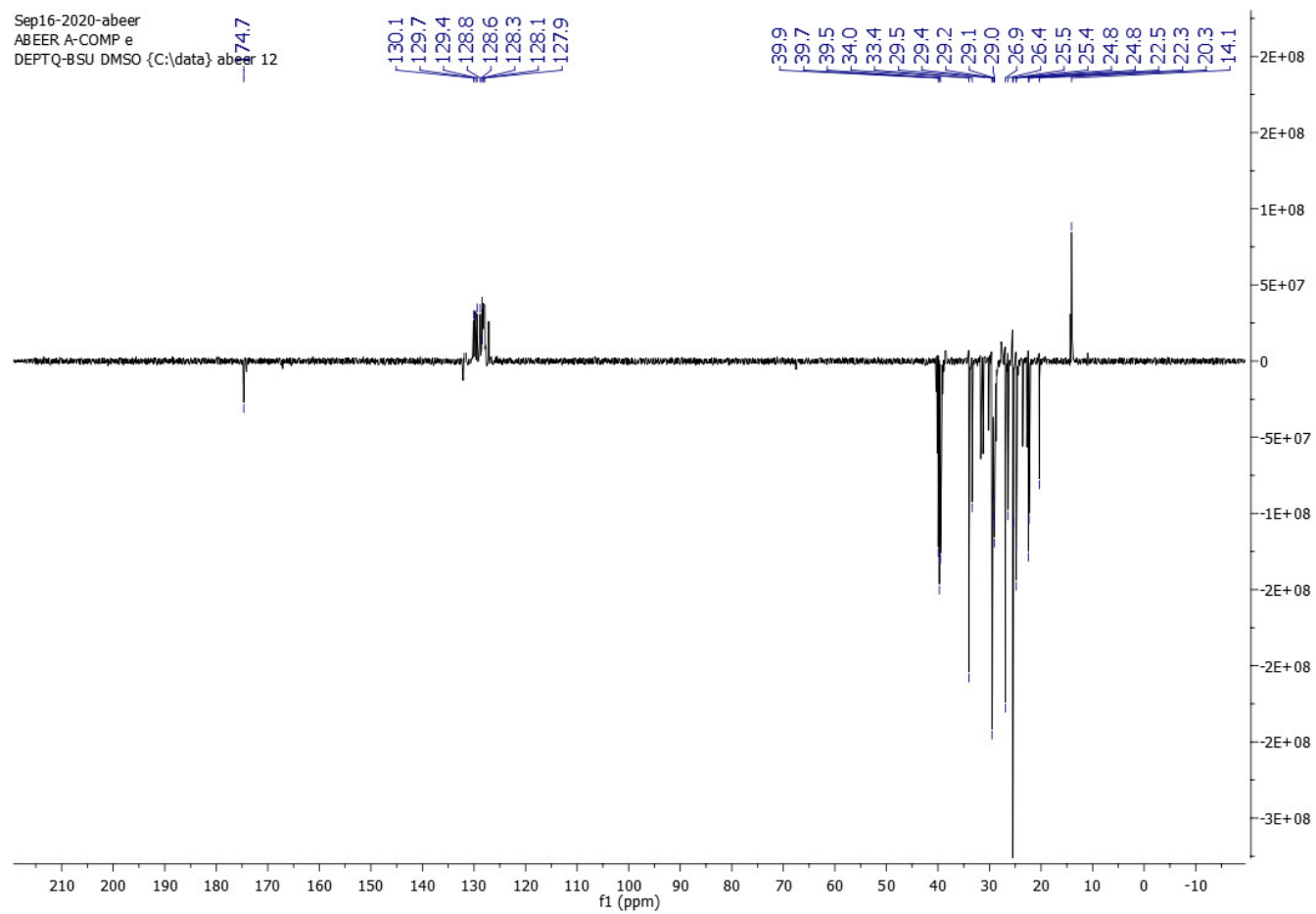


Figure S9. DEPT-Q NMR spectrum of compound **4** measured in DMSO- d_6 at 100 MHz

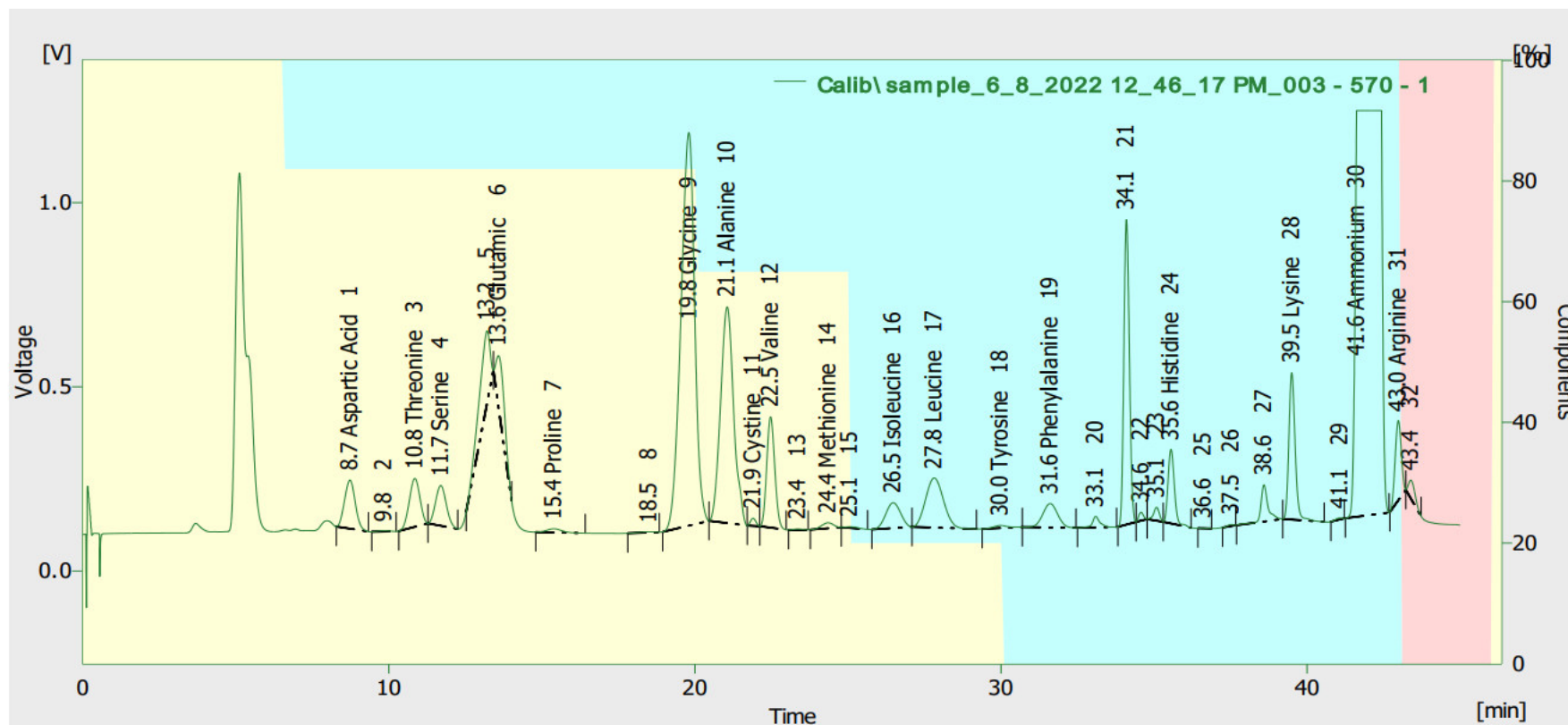


Figure S10. Amino acid sample analysis.

