**Supporting information**

**Three new spirocyclic** **terpenoids from *Euphorbia amygdaloides* exhibit cytotoxicity against cancerous cell lines through early and late apoptosis**

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**Table of contents**

**Figure S1.** A diagram of the procedure for purifying Zagrosin I-III

**Figure S2.** LC chromatogram ‎of Zagrosin 1 (up) and its fragmentation pattern (down).

**Figure S3.** 1H NMR (300 MHz, chloroform-d) spectrum of Zagrosin ***1***.

**Figure S4.** 13C NMR(‎75 ‎MHz, chloroform-d) spectrum of Zagrosin ***1.***

**Figure S5.** DEPT 135 spectrum of Zagrosin ***1.***

**Figure S6.** HMBC spectrum of Zagrosin ***1.***

**Figure S7**. ExpandedHMBC spectrum of Zagrosin ***1***

**Figure S8**. ExpandedHMBC spectrum of Zagrosin ***1***

**Figure S9**. ExpandedHMBC spectrum of Zagrosin ***1***

**Figure S10.** ‎ HSQC-TCOSY spectrum of Zagrosin ***1.***

**Figure S11**. ExpandedHSQC-TCOSY spectrum of Zagrosin ***1.***

**Figure S12**. ExpandedHSQC-TCOSY spectrum of Zagrosin ***1.***

**Figure S13.** ‎ UV spectra ‎of Zagrosin ***1***.

**Figure S14.** LC chromatogram ‎of Zagrosin 2 (up) and its fragmentation pattern (down).

**Figure S15.** 1H NMR (300 MHz, chloroform-d) spectrum of Zagrosin ***2***.

**Figure S16.** 13C NMR(‎75 ‎MHz, chloroform-d) spectrum of Zagrosin ***2.***

**Figure S17.** DEPT 135 spectrum of Zagrosin ***2.***

**Figure S18.** HMBC spectrum of Zagrosin ***2.***

**Figure S19.** Expanded HMBC spectrum of Zagrosin ***2.***

**Figure S20.** Expanded HMBC spectrum of Zagrosin ***2.***

**Figure S21.** Expanded HMBC spectrum of Zagrosin ***2.***

**Figure S22.** ‎ HSQC-TCOSY spectrum of Zagrosin ***2.***

**Figure S23.** Expanded HSQC-TCOSY spectrum of Zagrosin ***2.***

**Figure S24.** Expanded HSQC-TCOSY spectrum of Zagrosin ***2.***

**Figure S25.** ‎ UV spectra ‎of Zagrosin ***2***.

**Figure S26.** LC chromatogram of Zagrosin 3 and its fragmentation pattern.

**Figure S27.** 1H NMR (300 MHz, chloroform-d) spectrum of Zagrosin ***3***.

**Figure S28.** 13C NMR(‎75 ‎MHz, chloroform-d) spectrum of Zagrosin ***3.***

**Figure S29.** DEPT 135 spectrum of Zagrosin ***3.***

**Figure S30.** HMBC spectrum of Zagrosin ***3.***

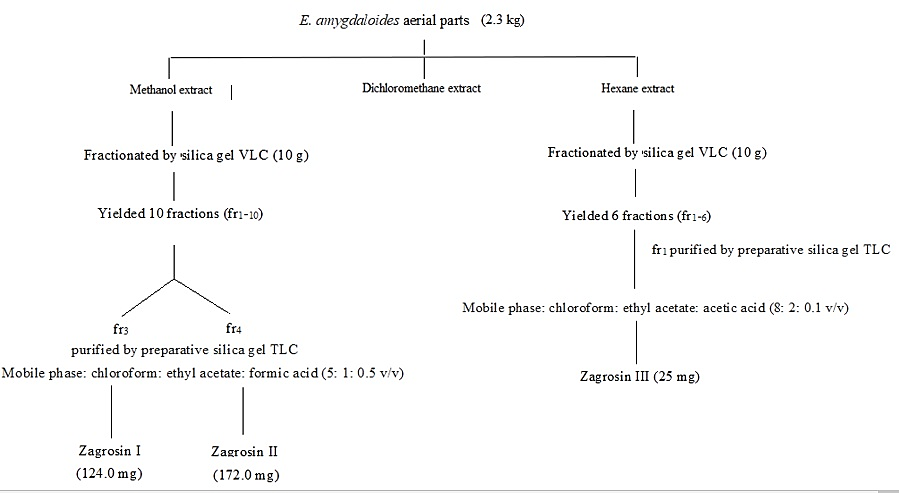
**Figure S31.** Expanded HMBC spectrum of Zagrosin ***3.***

**Figure S32.** ‎ HSQC-TCOSY spectrum of Zagrosin ***3.***

**Figure S33.** ExpandedHSQC-TCOSY spectrum of Zagrosin ***3.***

**Figure S34.** ExpandedHSQC-TCOSY spectrum of Zagrosin ***3.***

**Figure S35.** UV spectra ‎of Zagrosin ***3***.



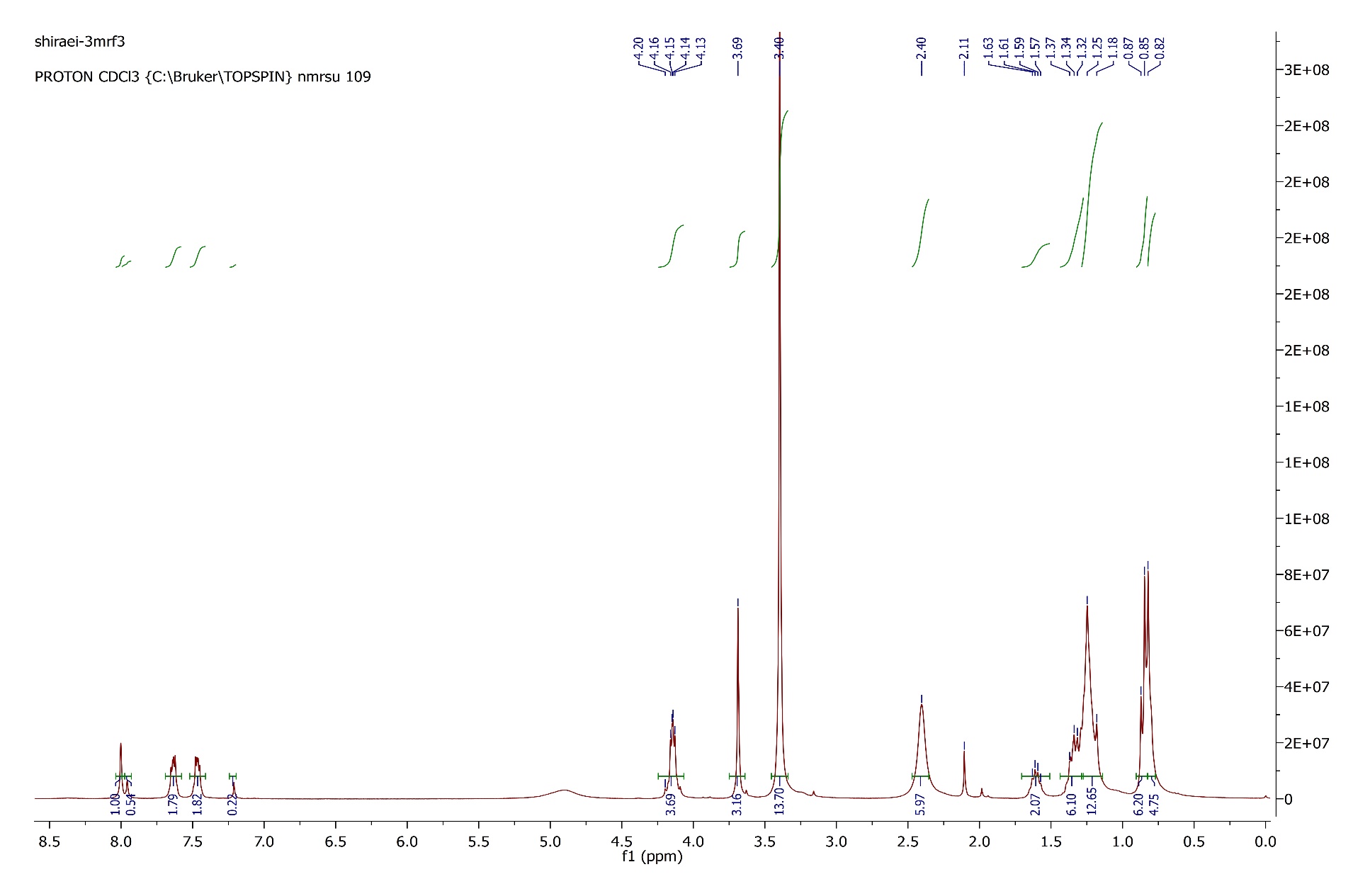
**Figure S1.** A diagram of the procedure for purifying Zagrosin I-III



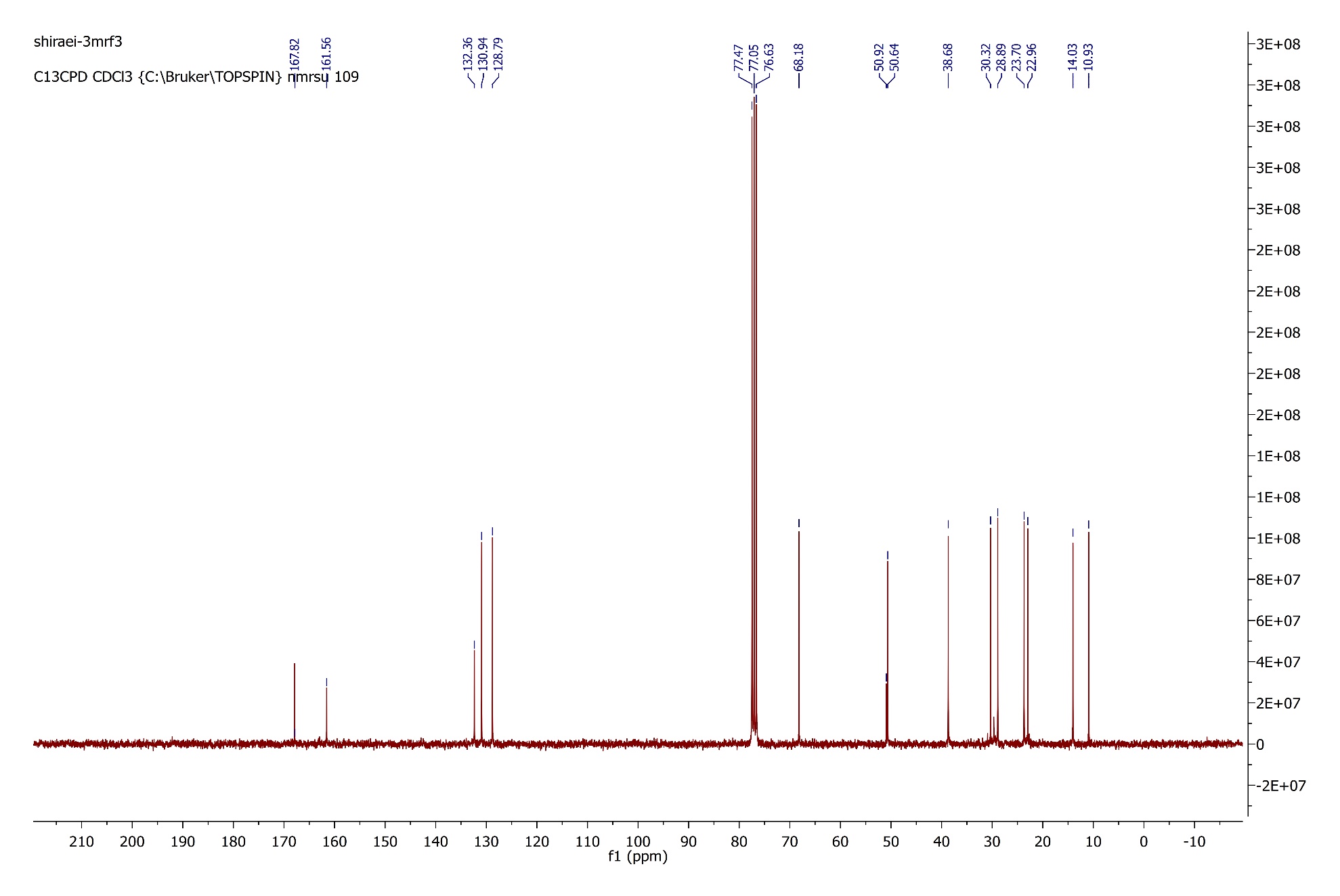
**A group of stars in a line

Description automatically generated with medium confidence**

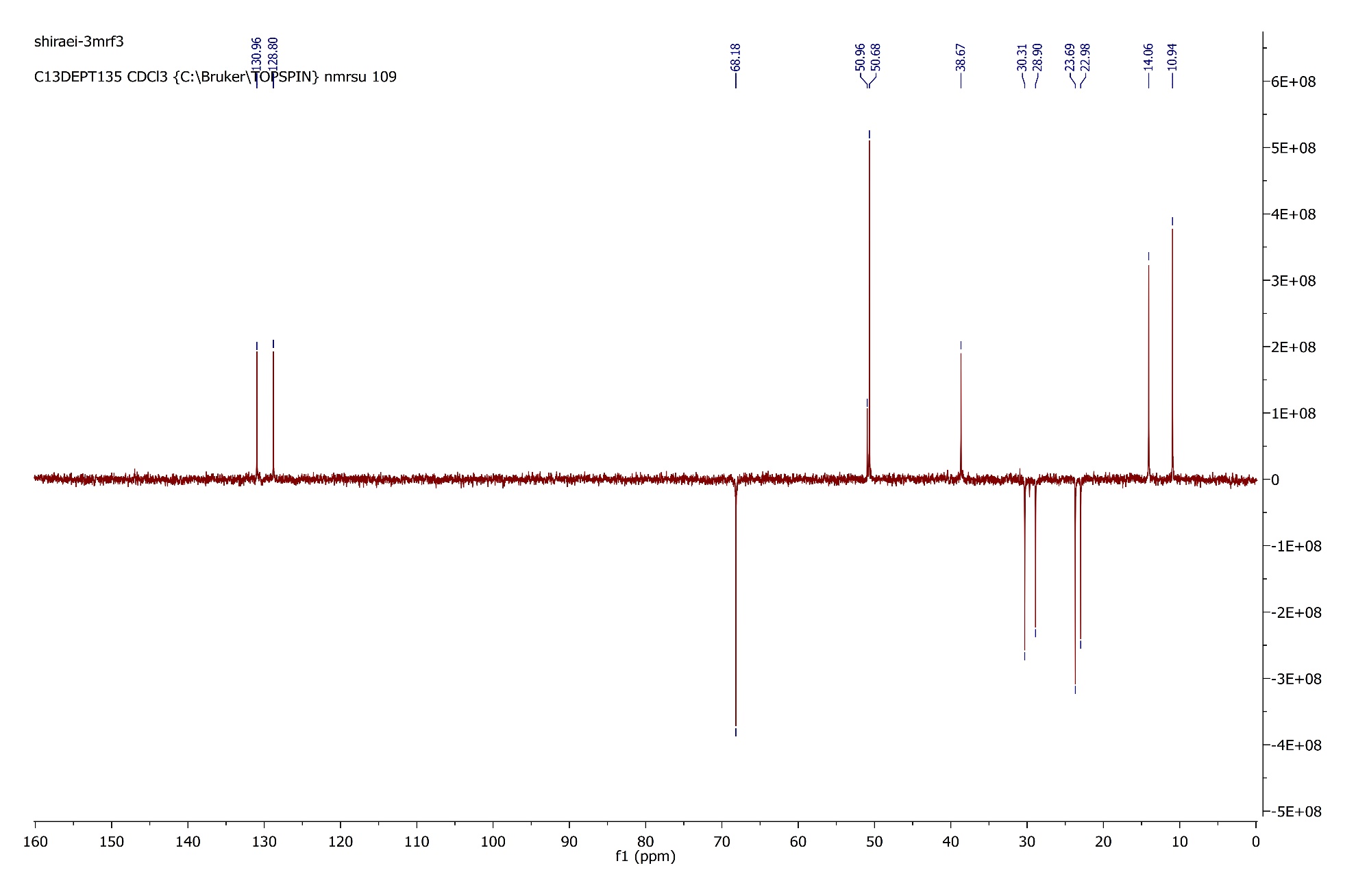
**Figure S2.** LC chromatogram ‎of Zagrosin 1 (up) and its fragmentation pattern (down).



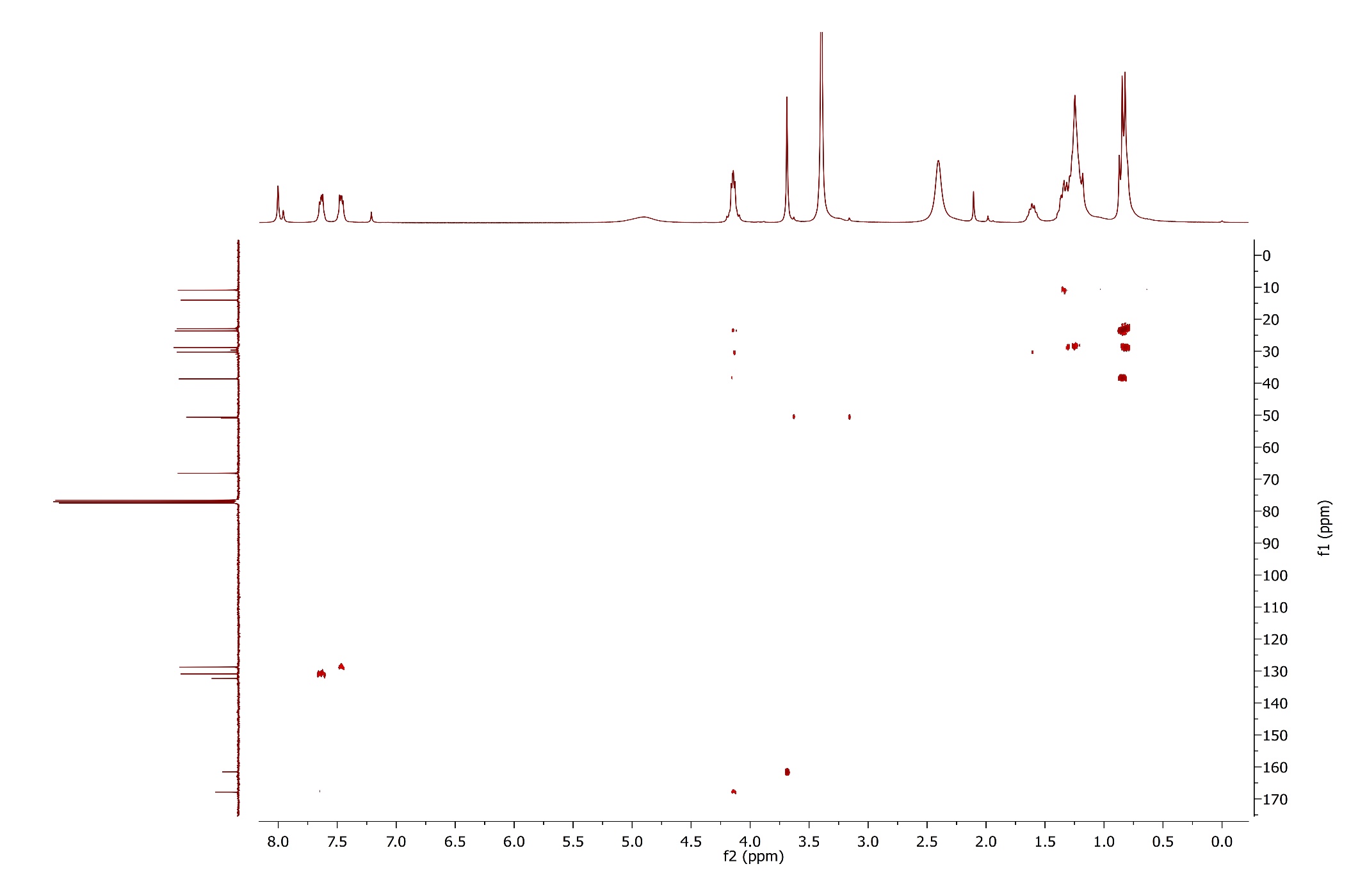
**Figure S3.** 1H NMR (300 MHz, chloroform-d) spectrum of Zagrosin ***1***.



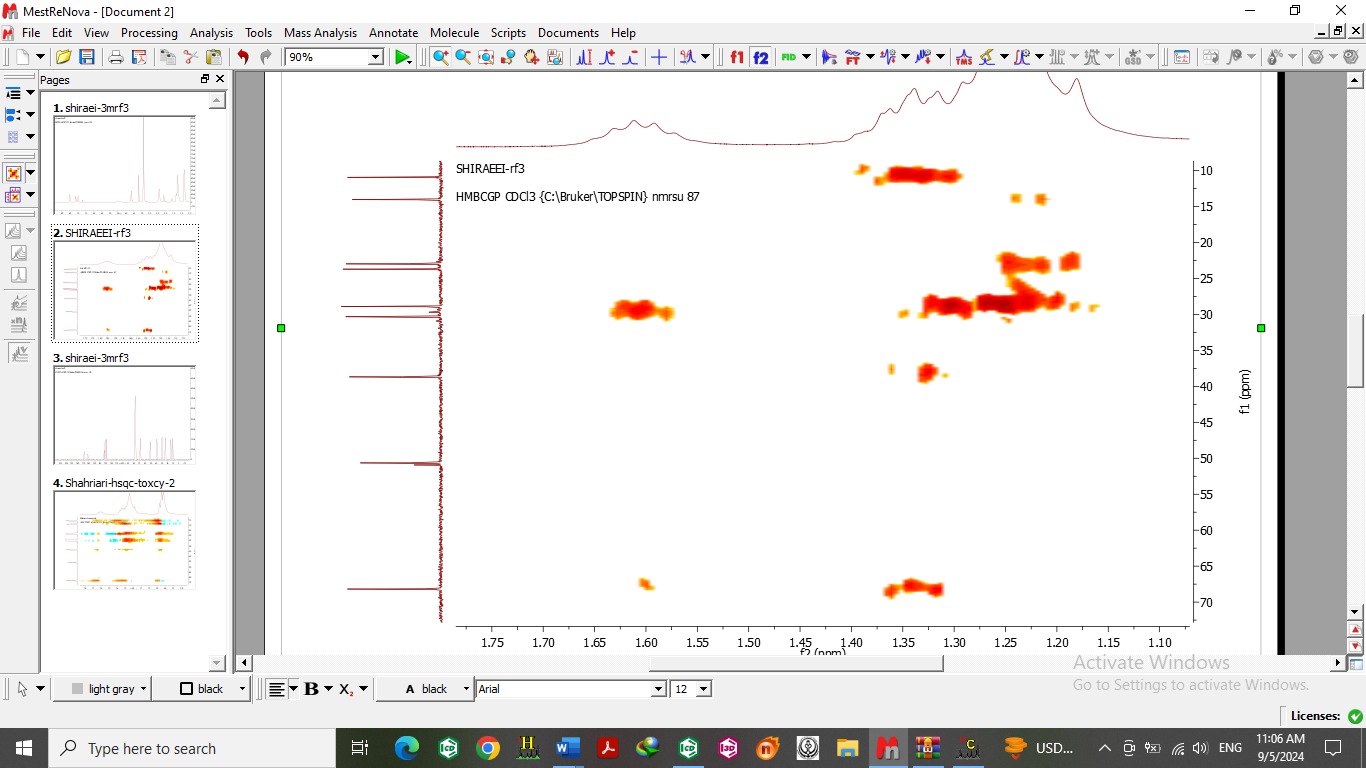
**Figure S4.** 13C NMR(‎75 ‎MHz, chloroform-d) spectrum of Zagrosin ***1.***



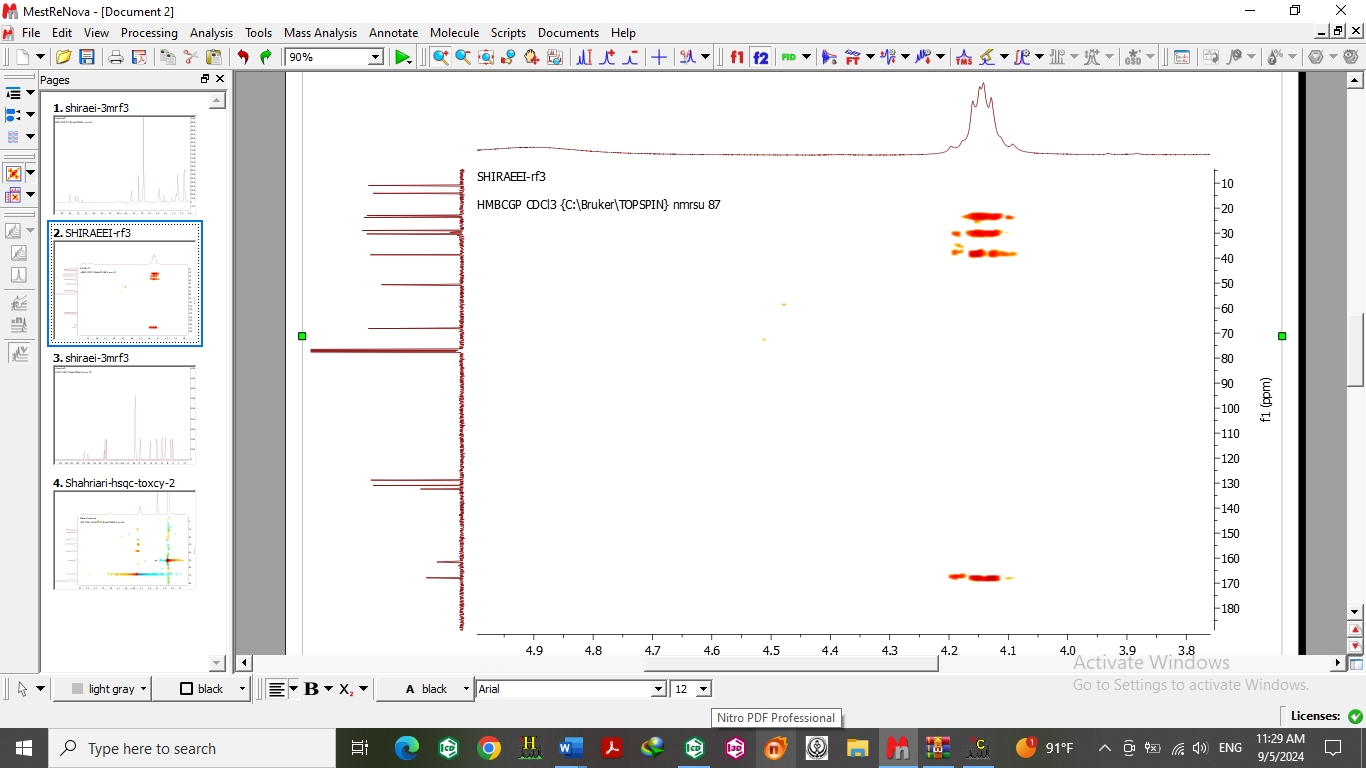
**Figure S5.** DEPT 135 spectrum of Zagrosin ***1.***



**Figure S6.** HMBC spectrum of Zagrosin ***1.***



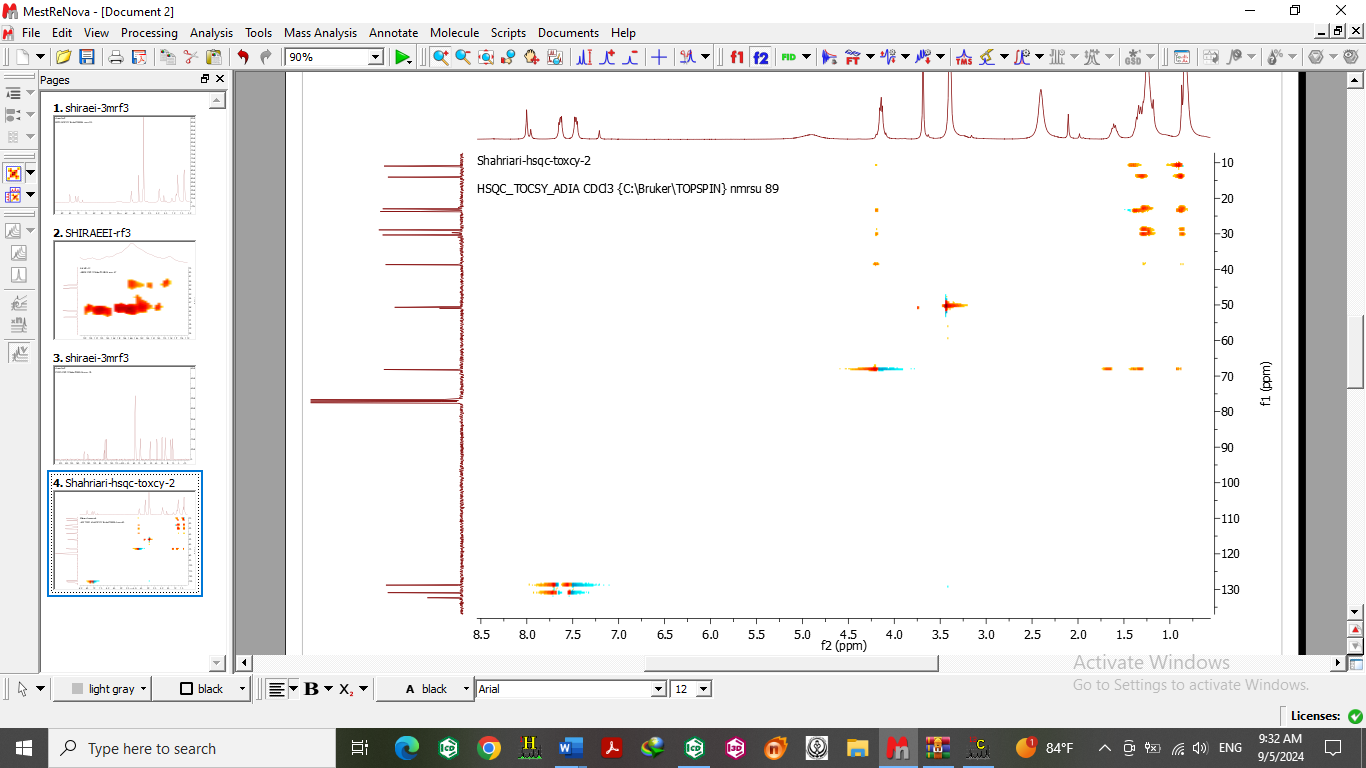
**Figure S7**. ExpandedHMBC spectrum of Zagrosin ***1.***



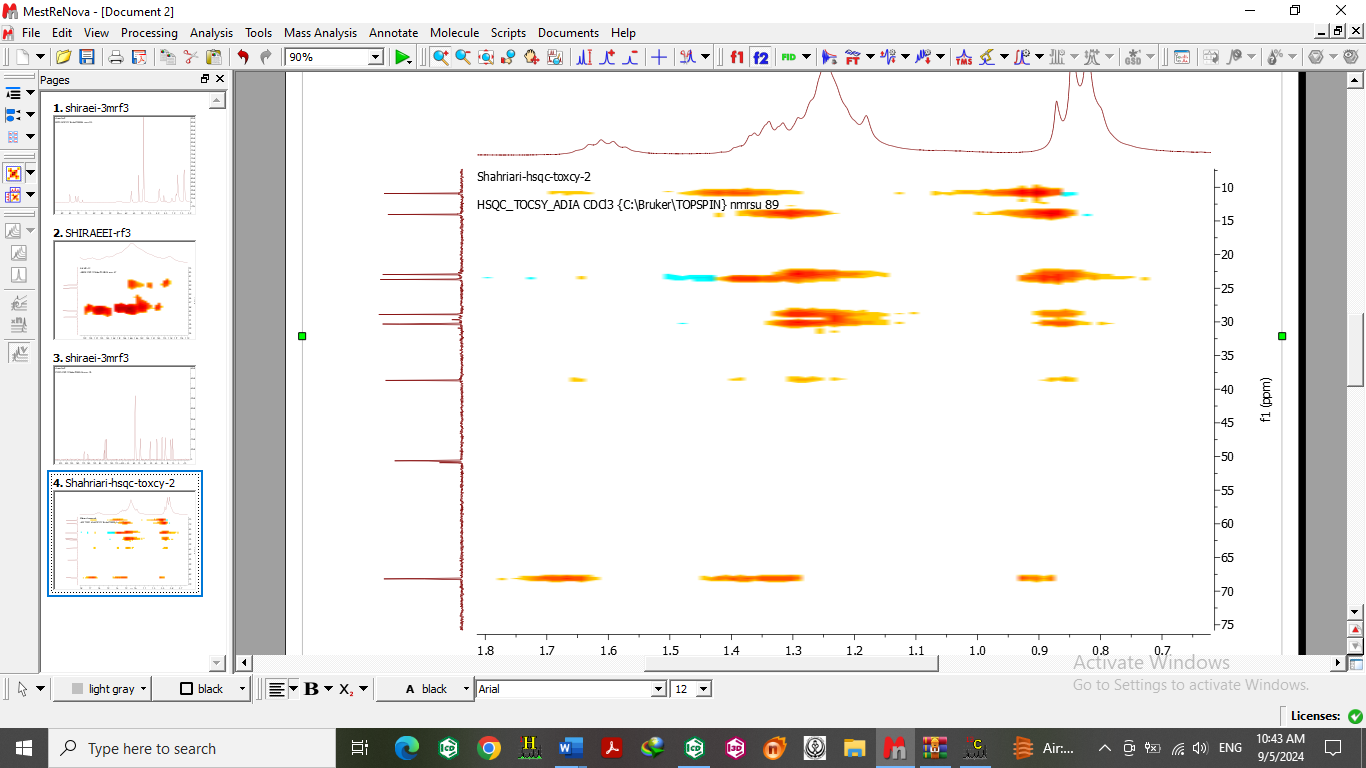
**Figure S8**. ExpandedHMBC spectrum of Zagrosin ***1.***



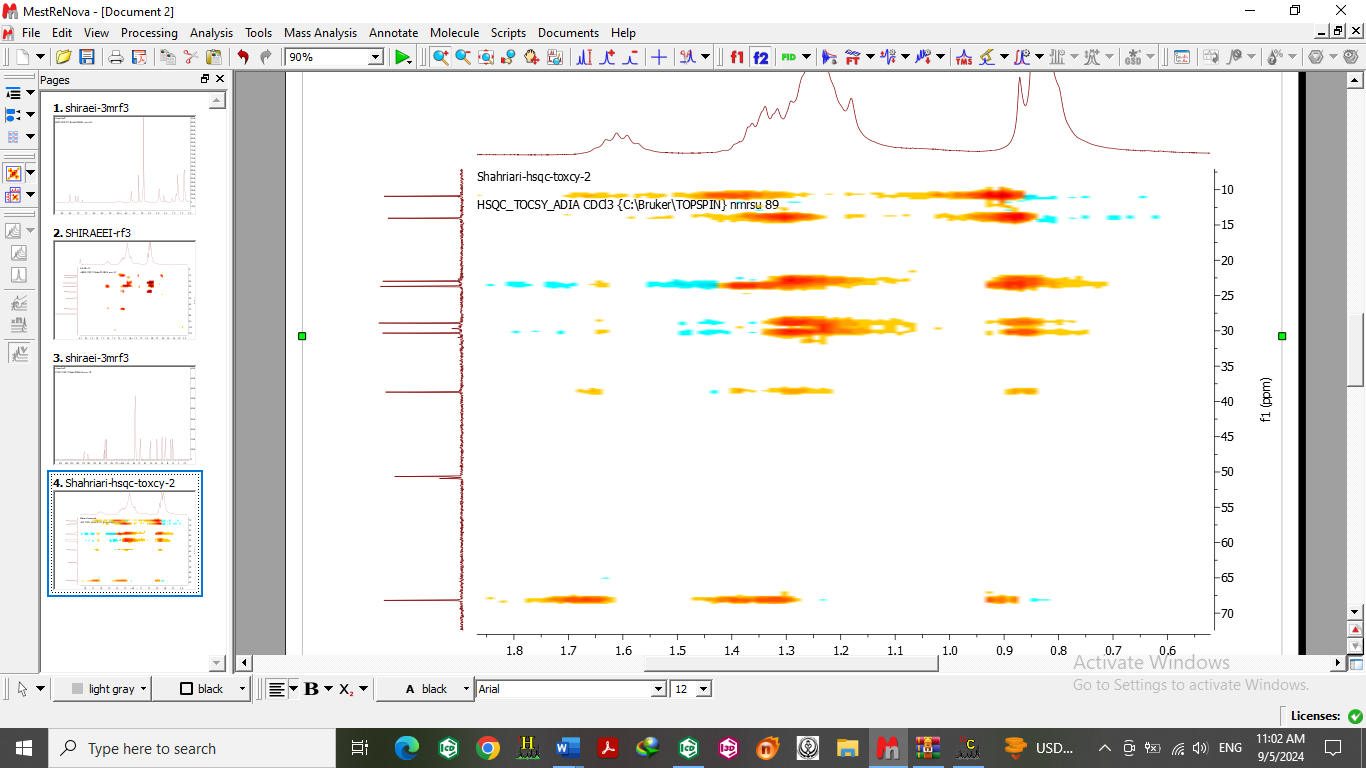
**Figure S9**. ExpandedHMBC spectrum of Zagrosin ***1.***



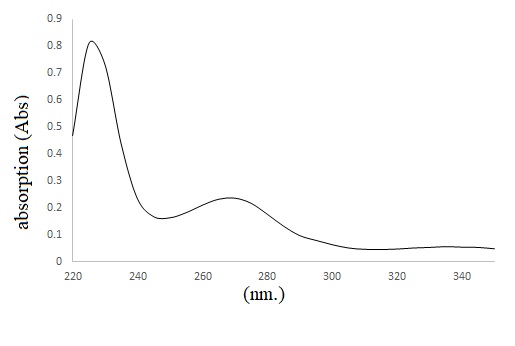
**Figure S10.** HSQC-TCOSY spectrum of Zagrosin ***1.***



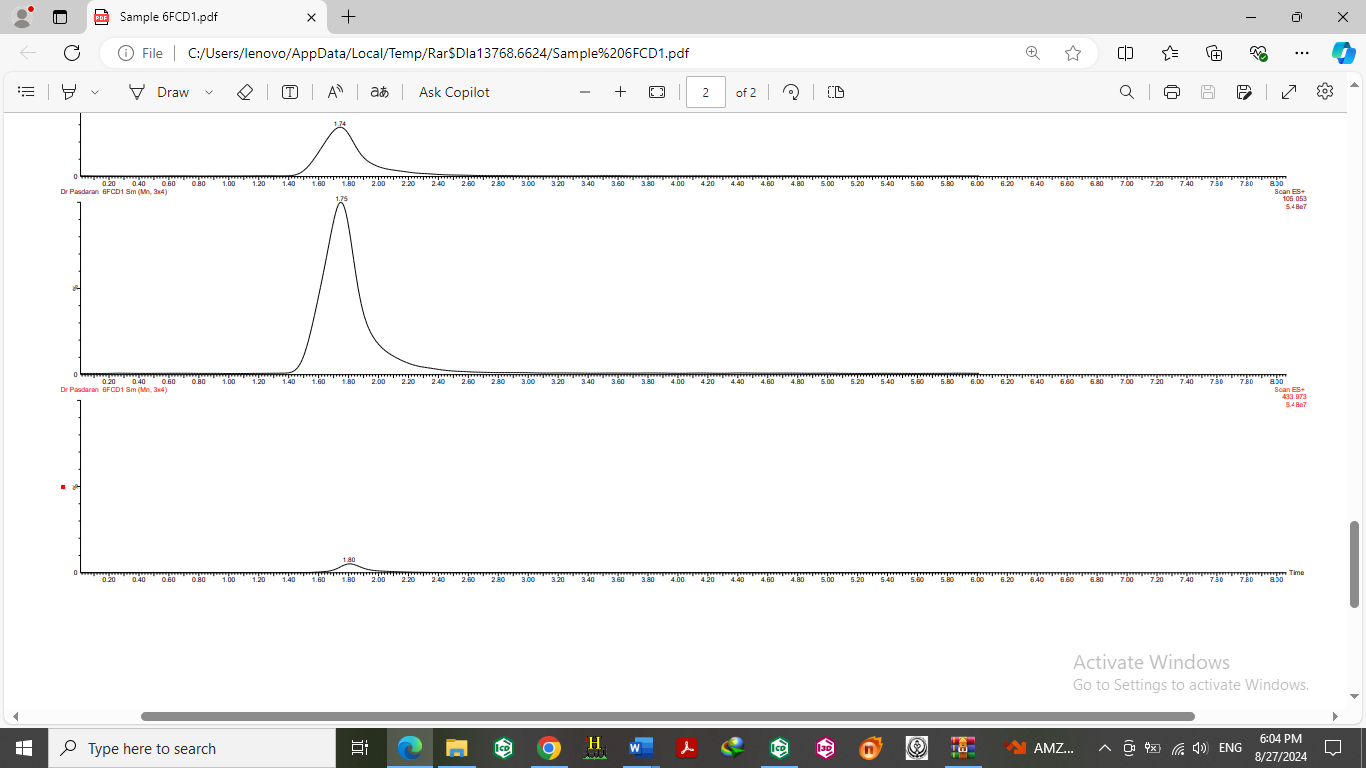
**Figure S11**. ExpandedHSQC-TCOSY spectrum of Zagrosin ***1.***



**Figure S12**. ExpandedHSQC-TCOSY spectrum of Zagrosin ***1.***



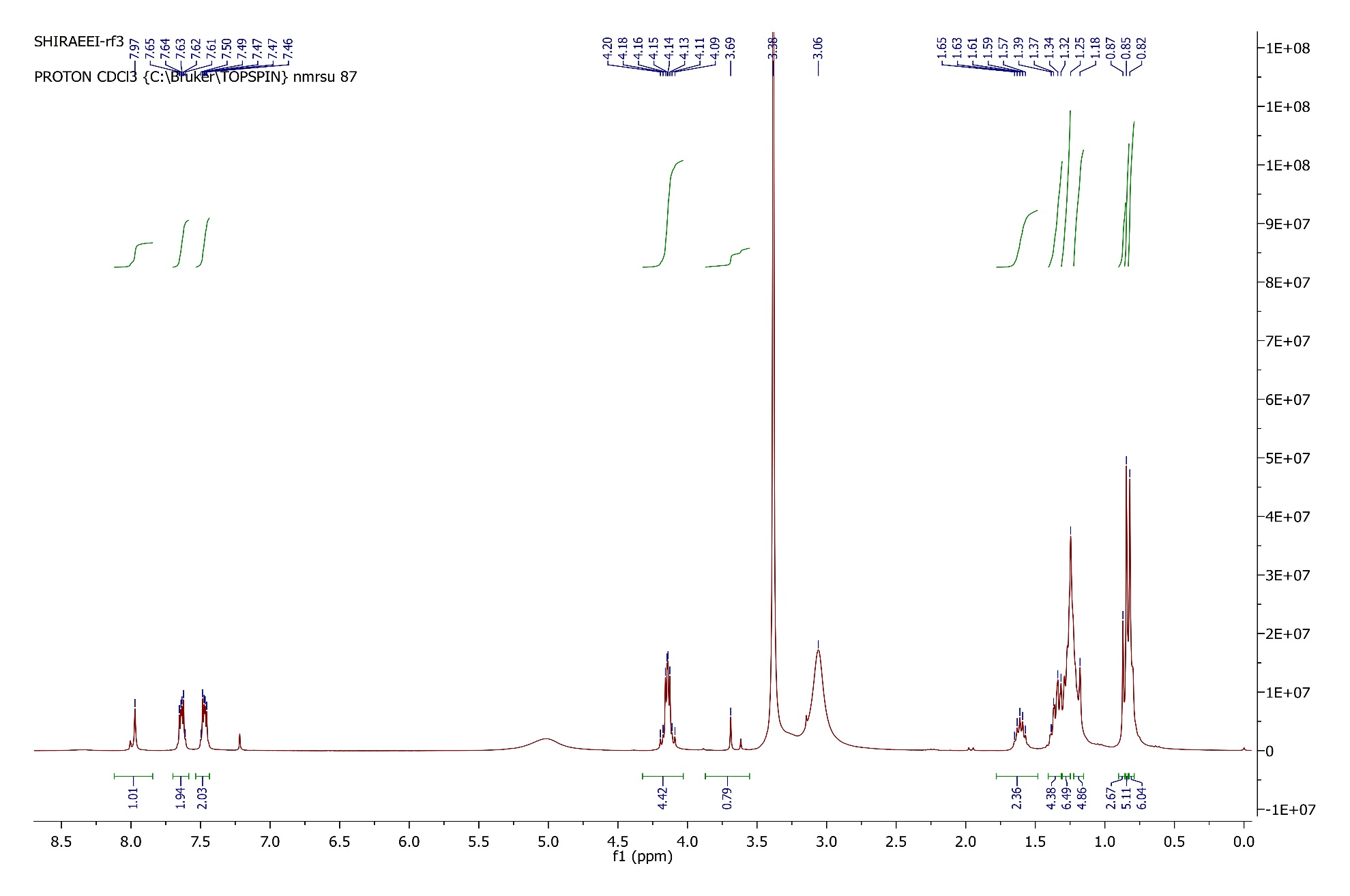
**Figure S13.** ‎ UV spectra ‎of Zagrosin ***1***.



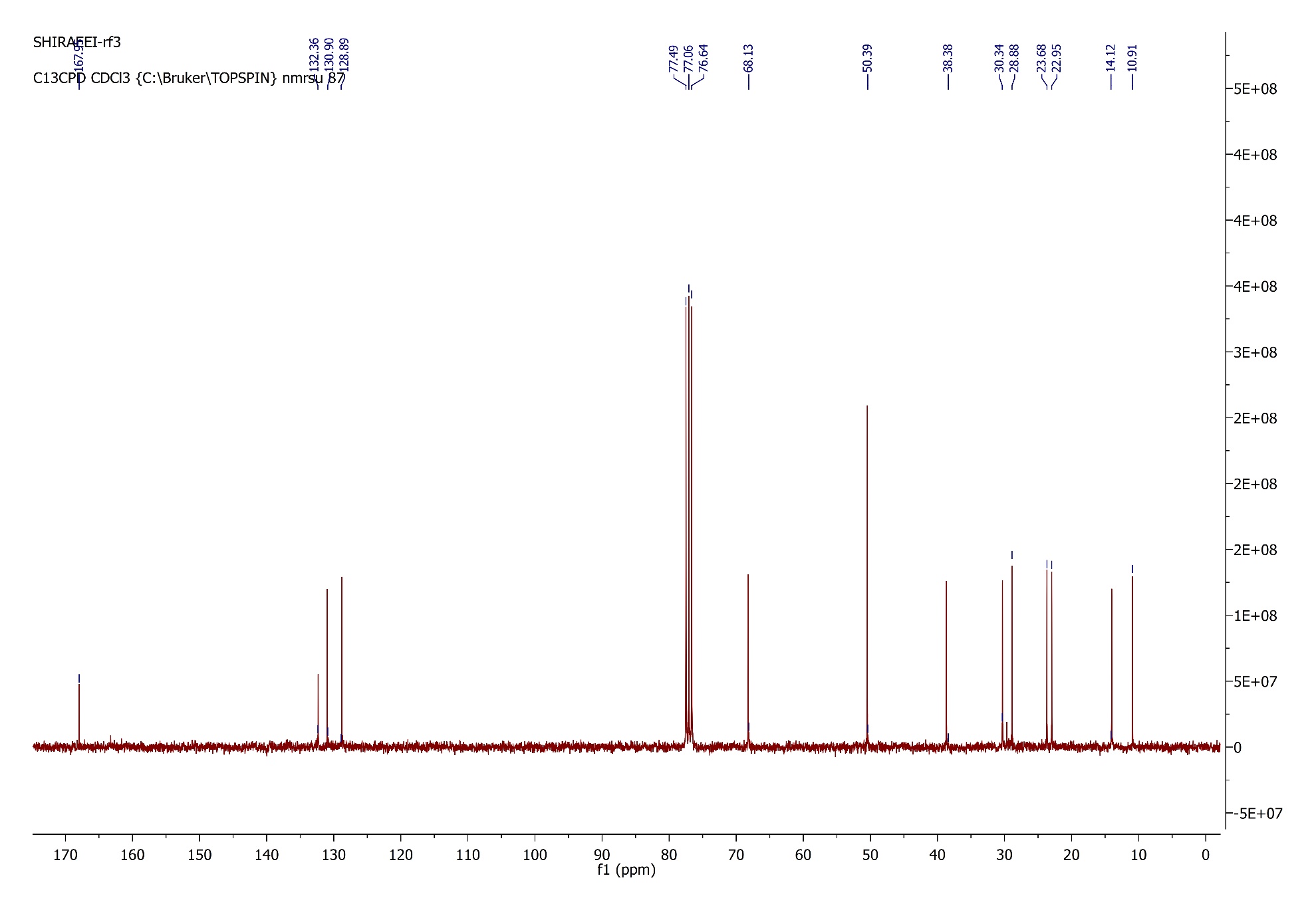
A diagram of a chemical structure

Description automatically generated

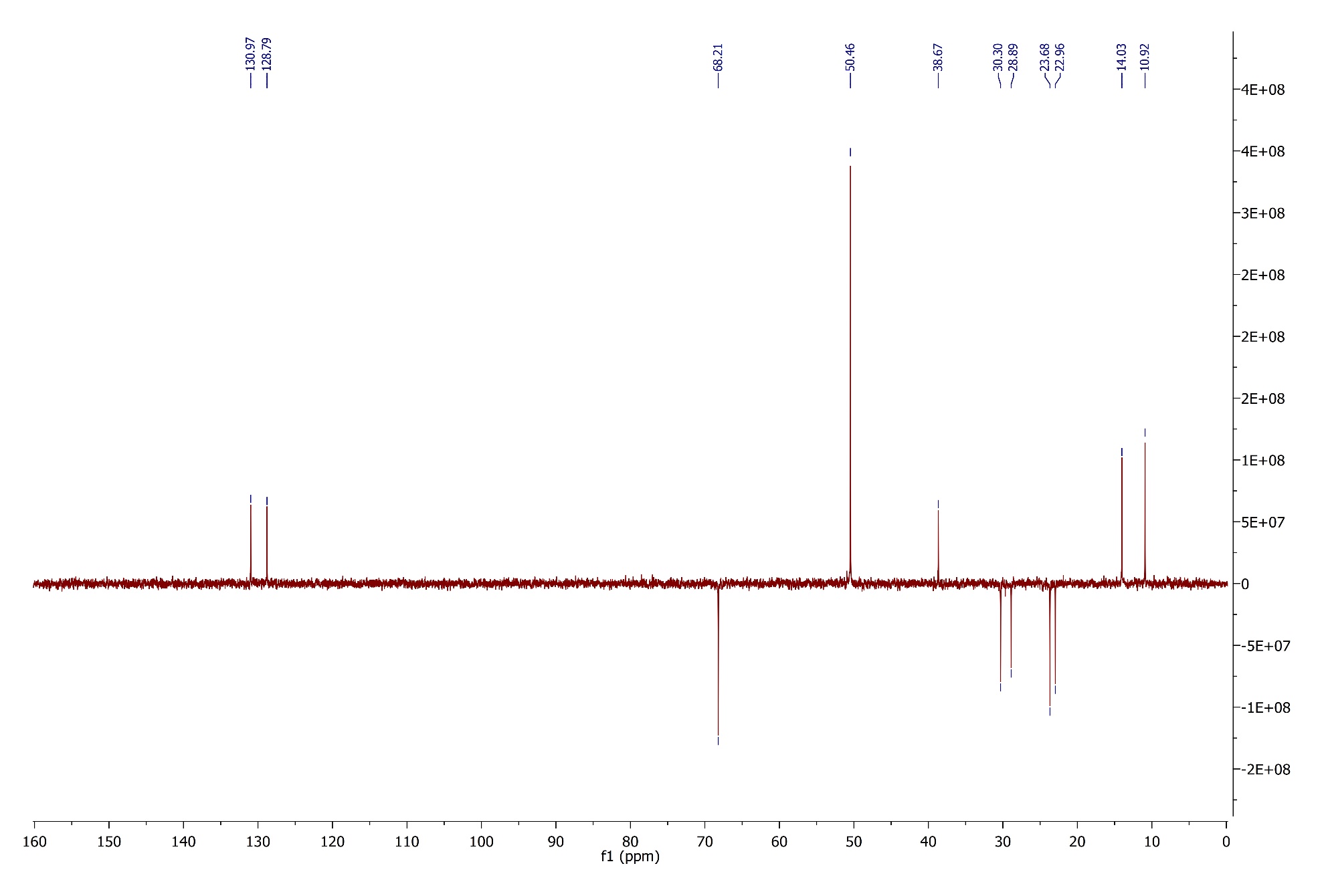
**Figure S14.** ‎ LC chromatogram ‎of Zagrosin 2 (up) and its fragmentation pattern (down).



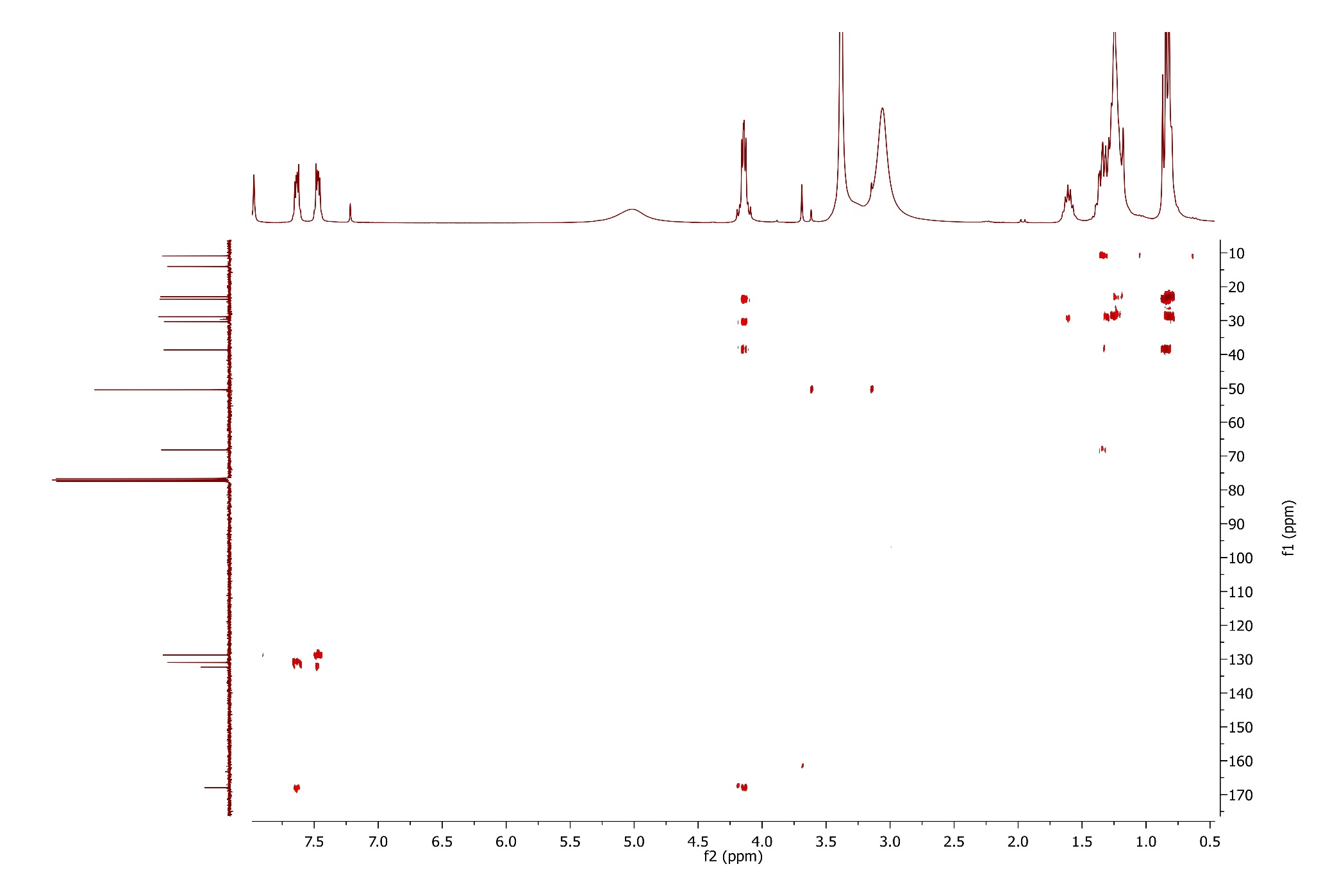
**Figure S15.** 1H NMR (300 MHz, chloroform-d) spectrum of Zagrosin ***2***.



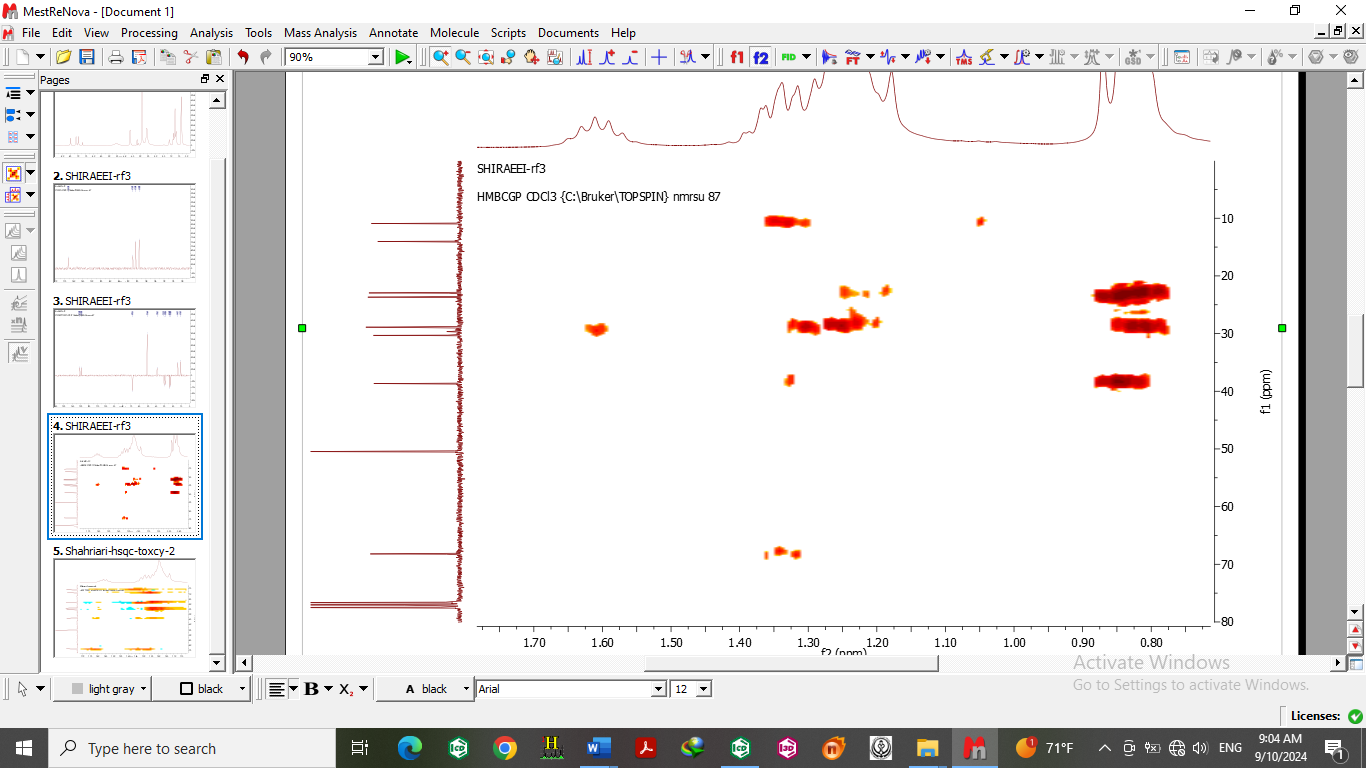
**Figure S16.** 13C NMR(‎75 ‎MHz, chloroform-d) spectrum of Zagrosin ***2.***



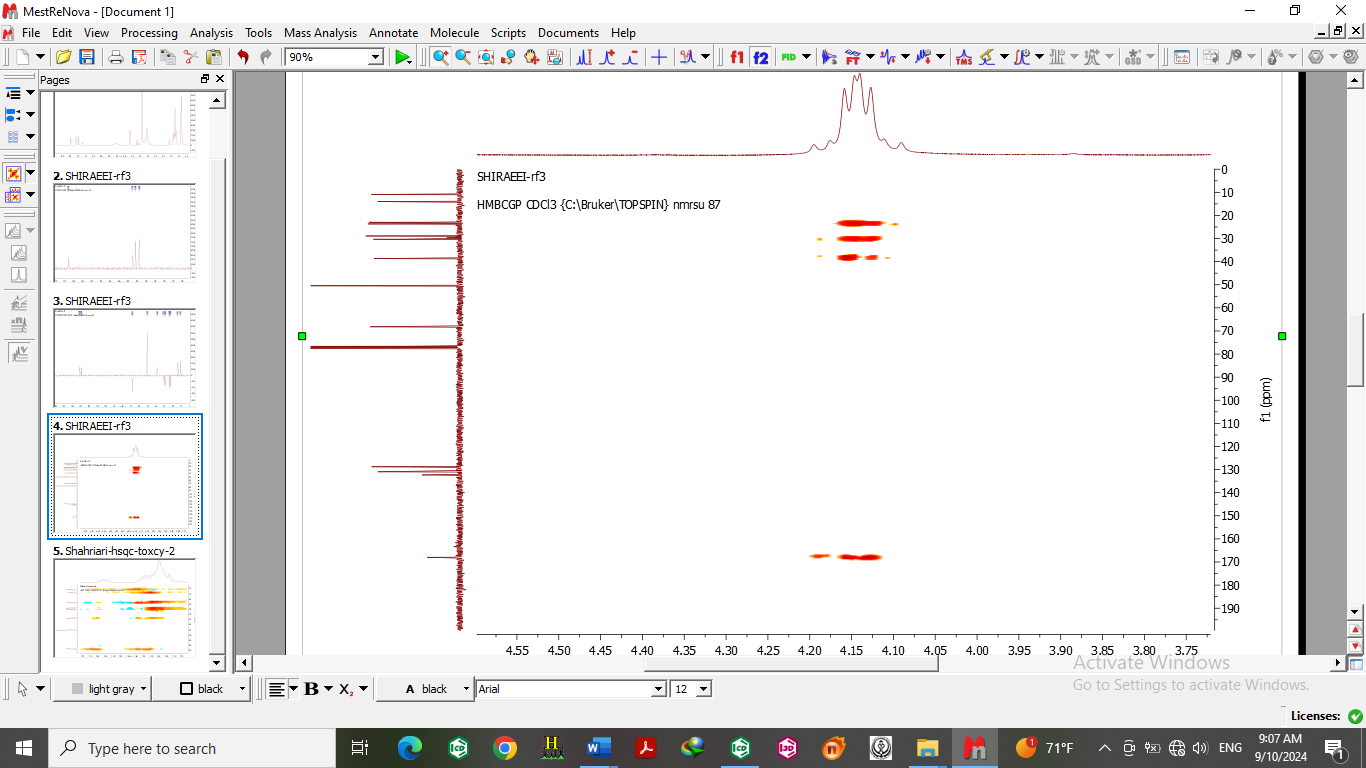
**Figure S17.** DEPT 135 spectrum of Zagrosin ***2.***



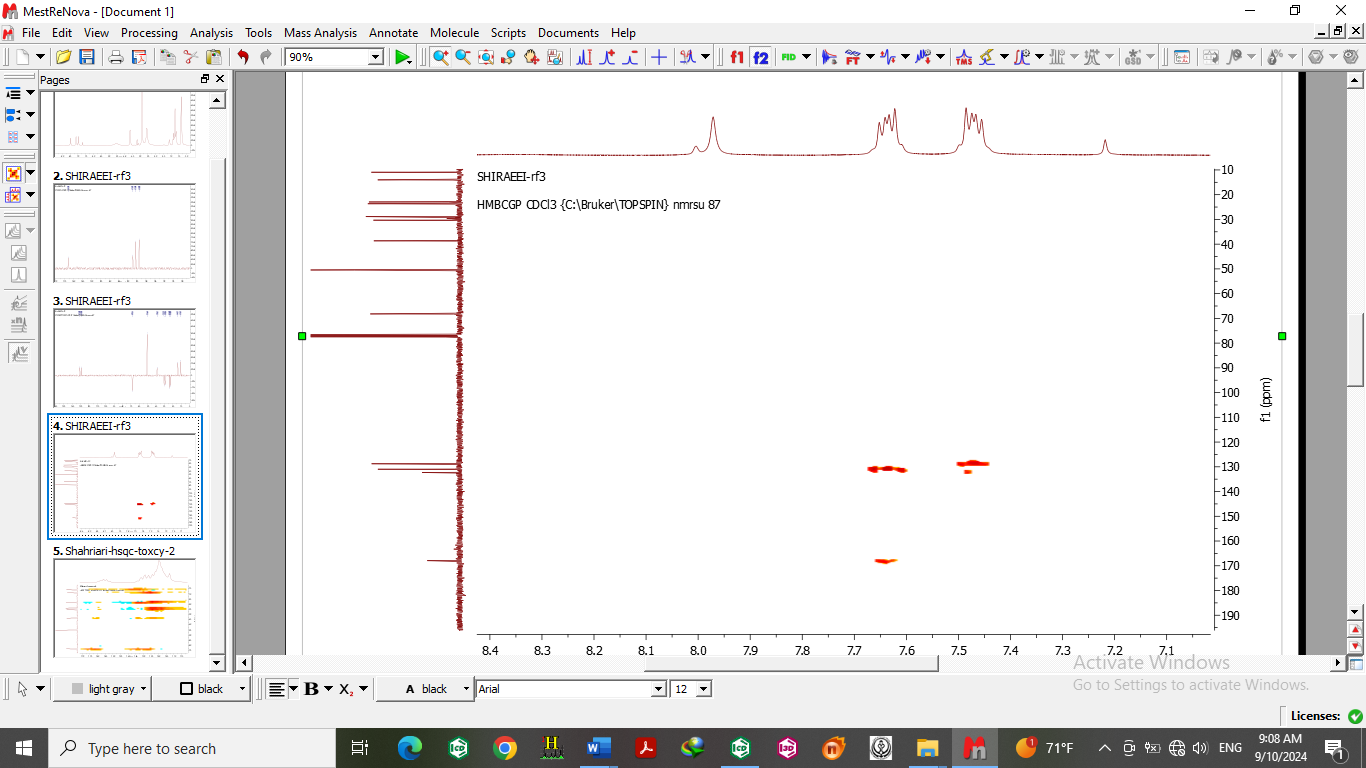
**Figure S18.** HMBC spectrum of Zagrosin ***2.***



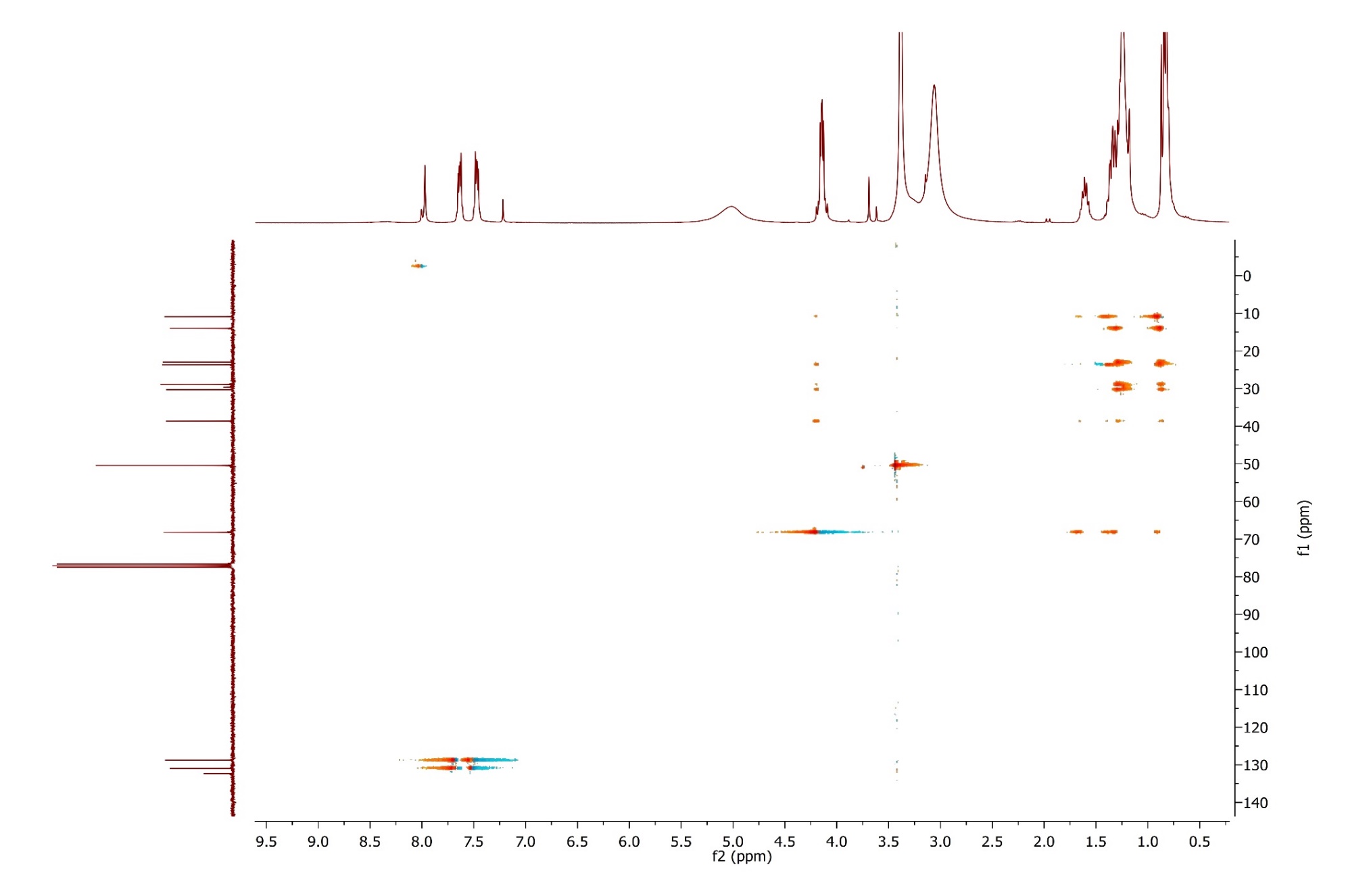
**Figure S19.** Expanded HMBC spectrum of Zagrosin ***2.***



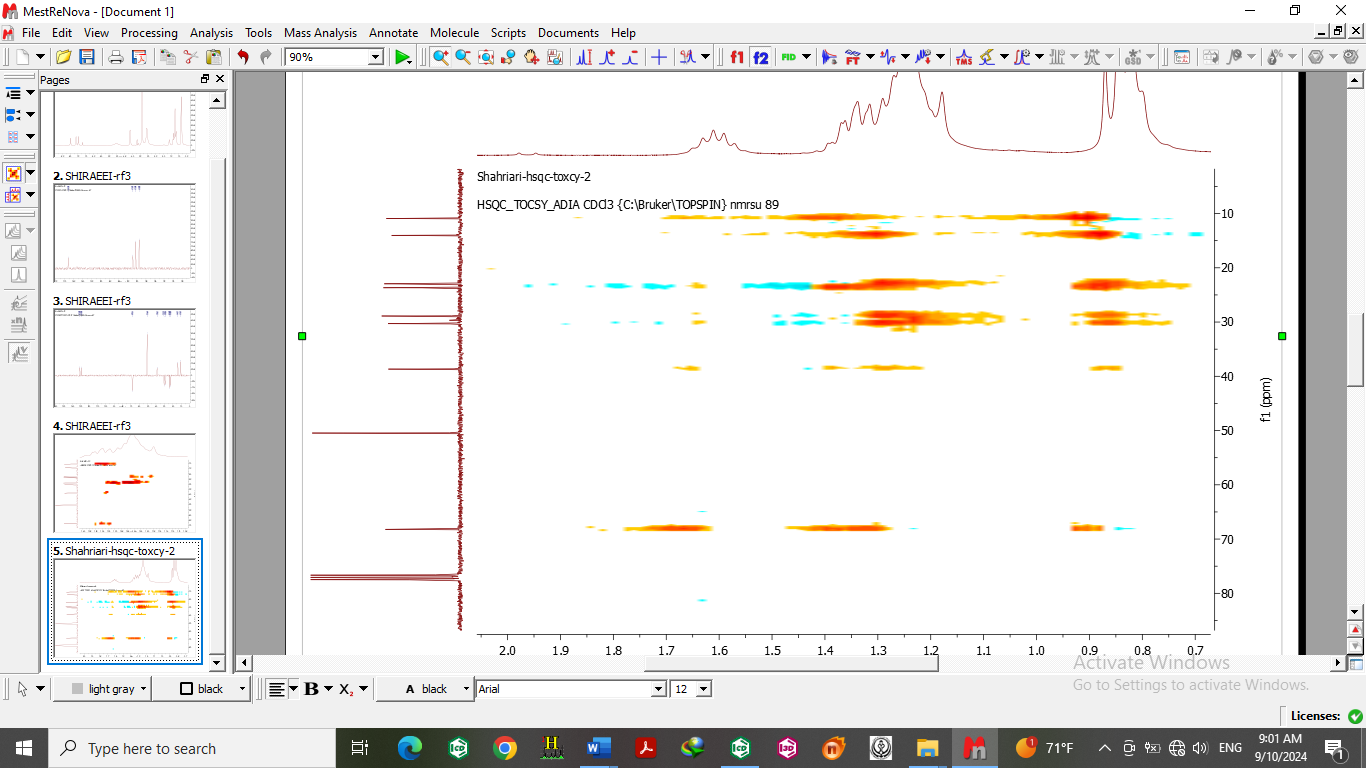
**Figure S20.** Expanded HMBC spectrum of Zagrosin ***2.***



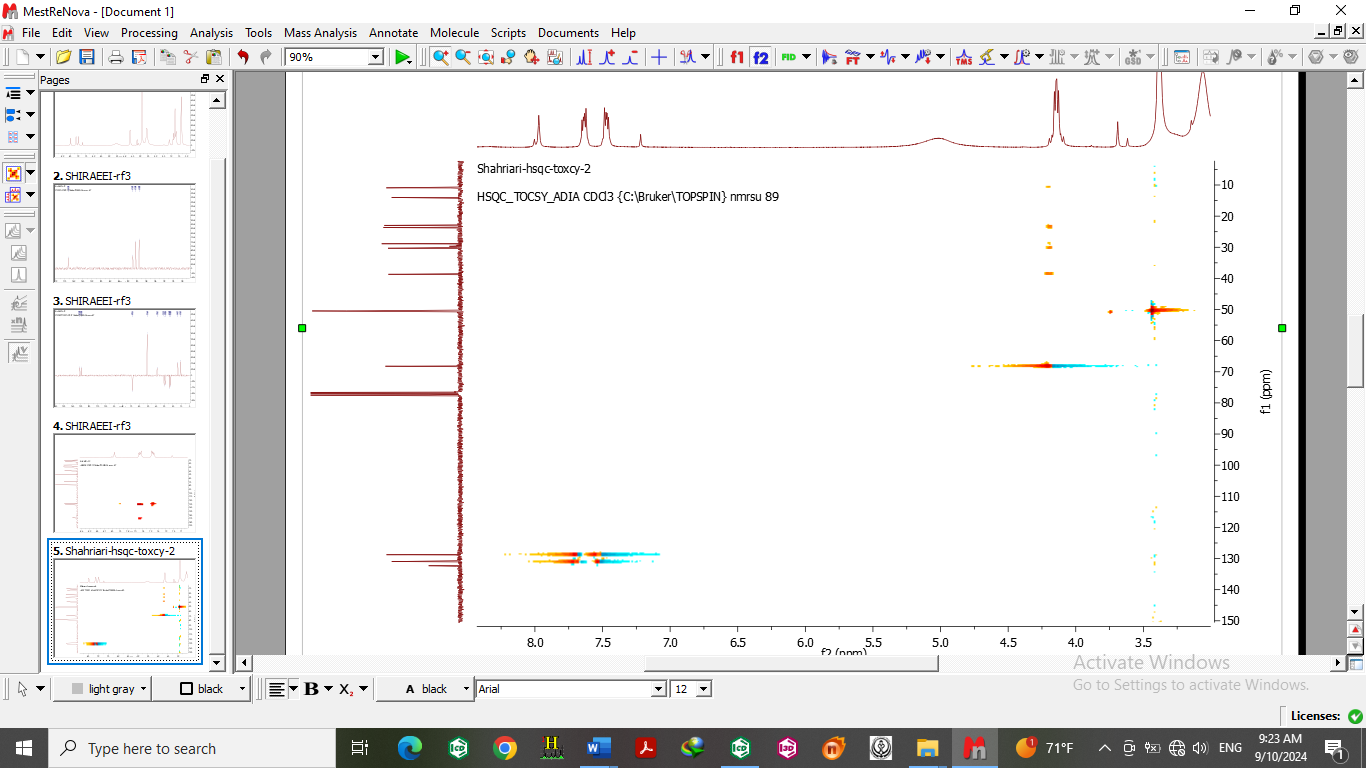
**Figure S21.** Expanded HMBC spectrum of Zagrosin ***2.***



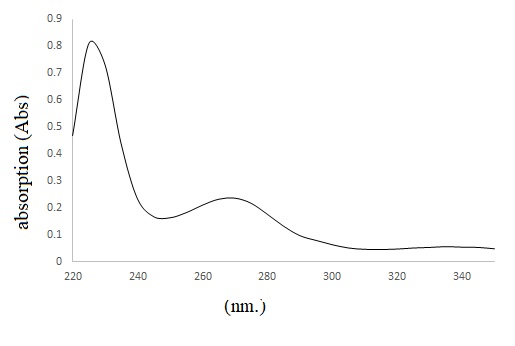
**Figure S22.** HSQC-TCOSY spectrum of Zagrosin ***2.***



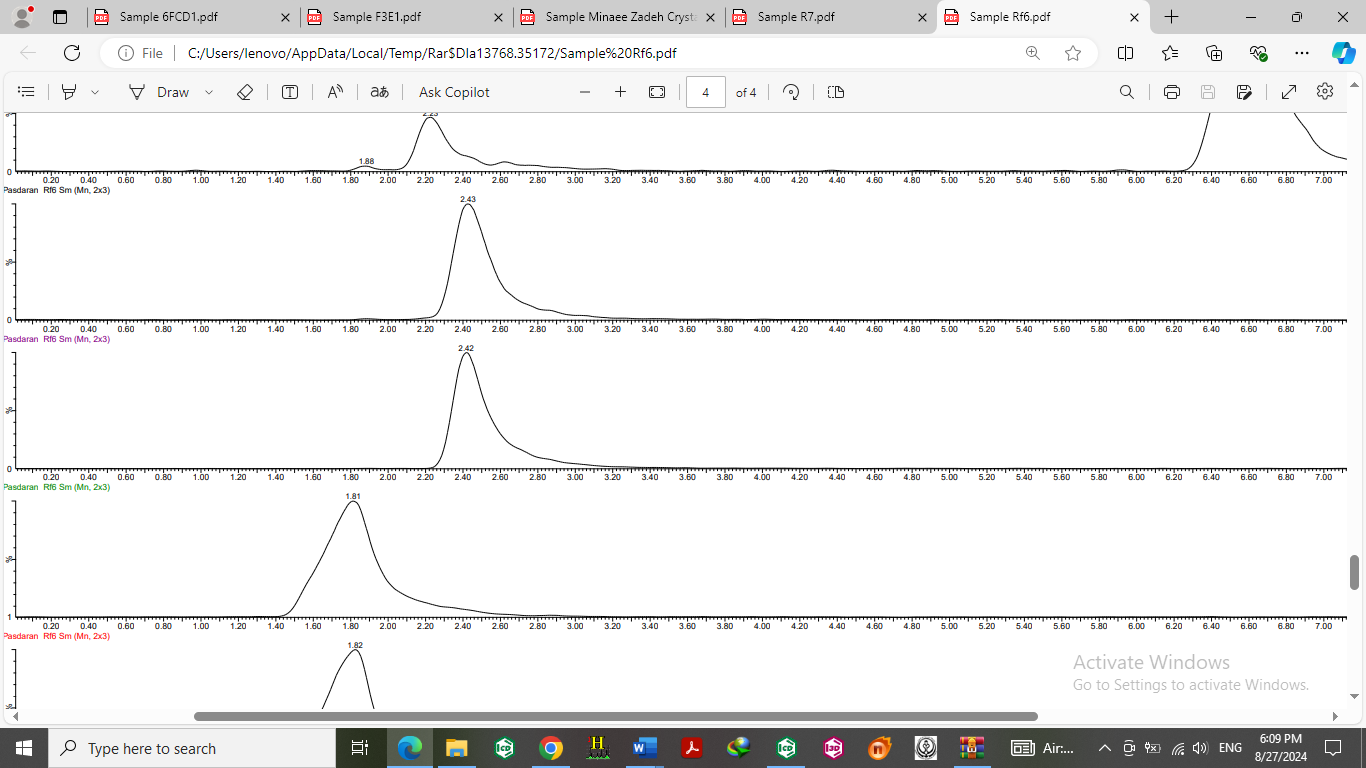
**Figure S23.** ExpandedHSQC-TCOSY spectrum of Zagrosin ***2.***

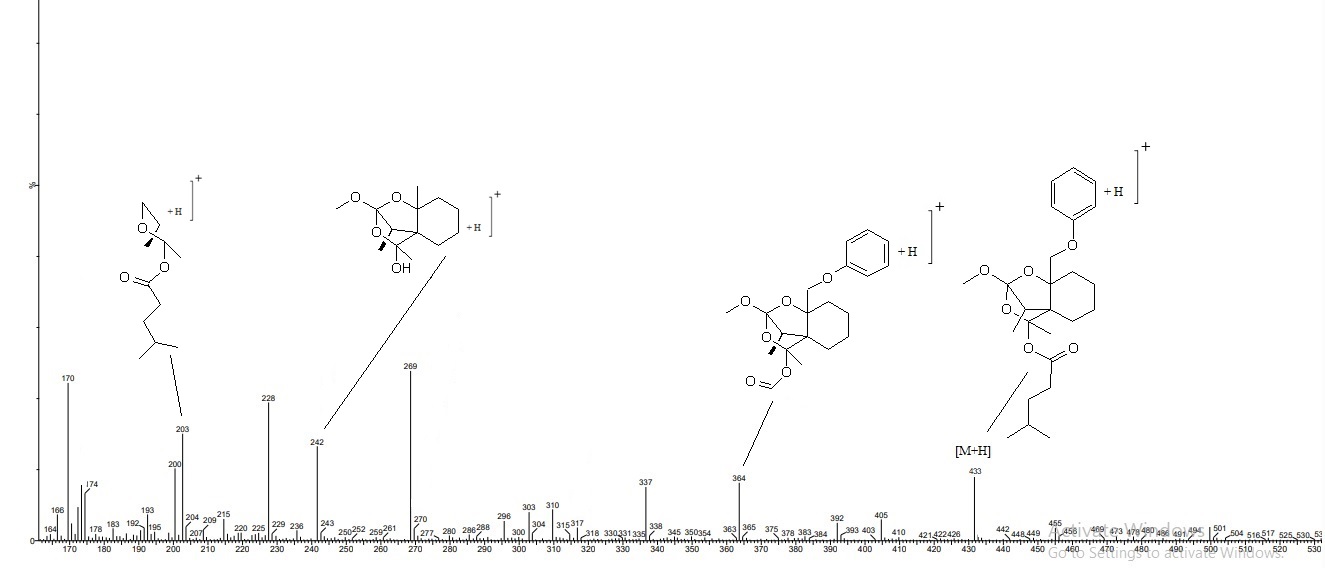


**Figure S24.** ExpandedHSQC-TCOSY spectrum of Zagrosin ***2.***

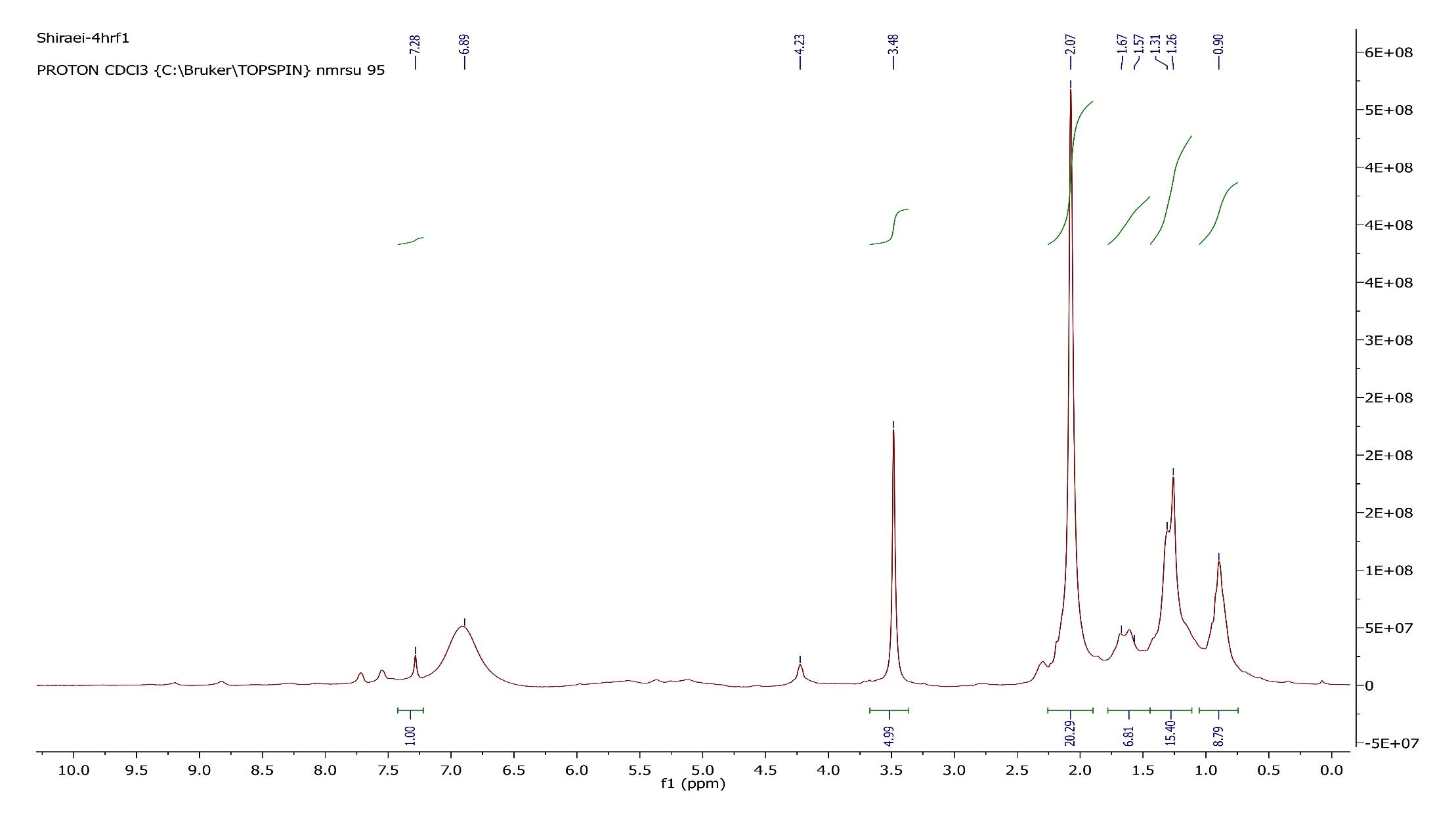
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**Figure S25.** ‎ UV spectra ‎of Zagrosin ***2***.

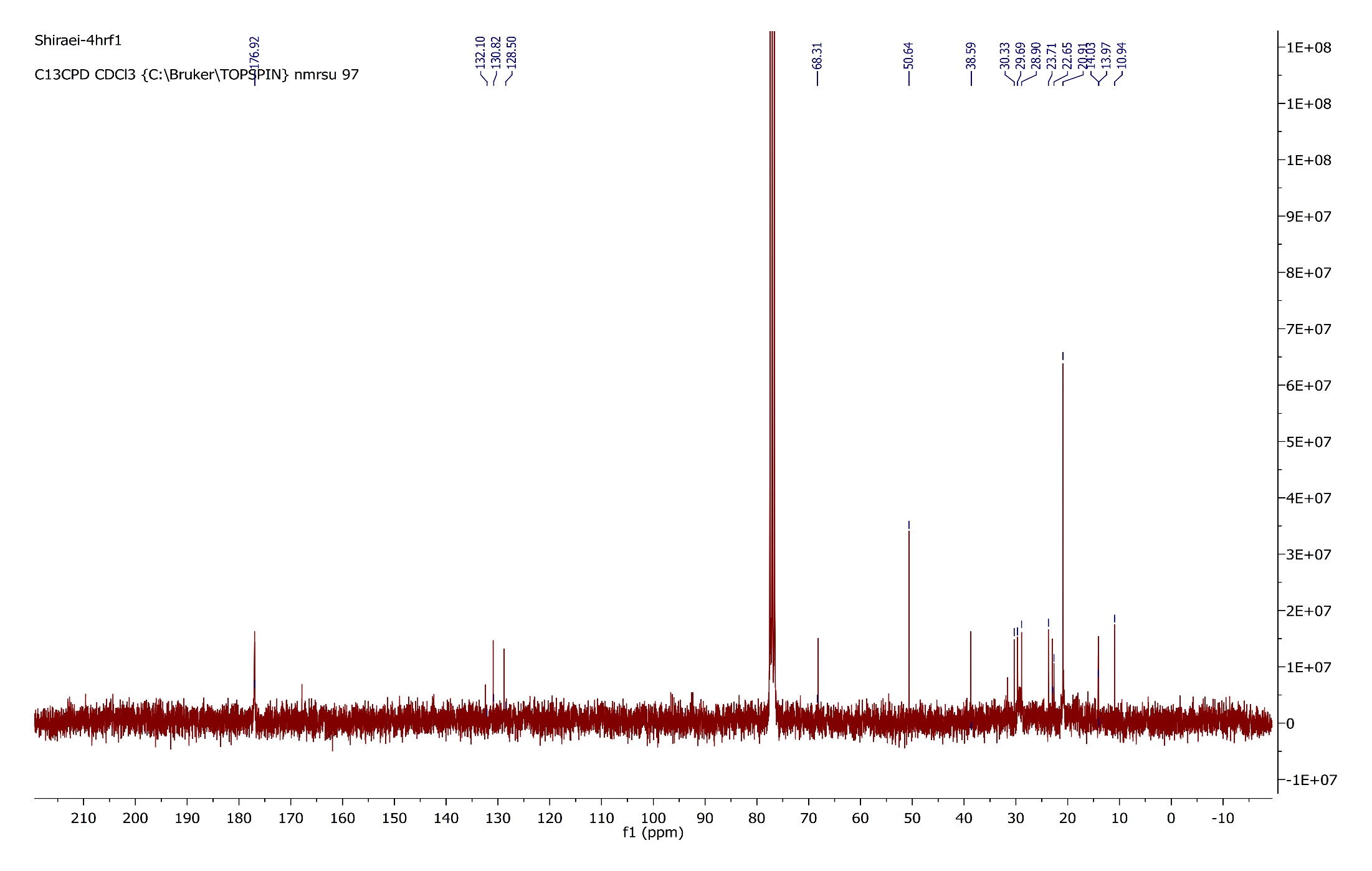




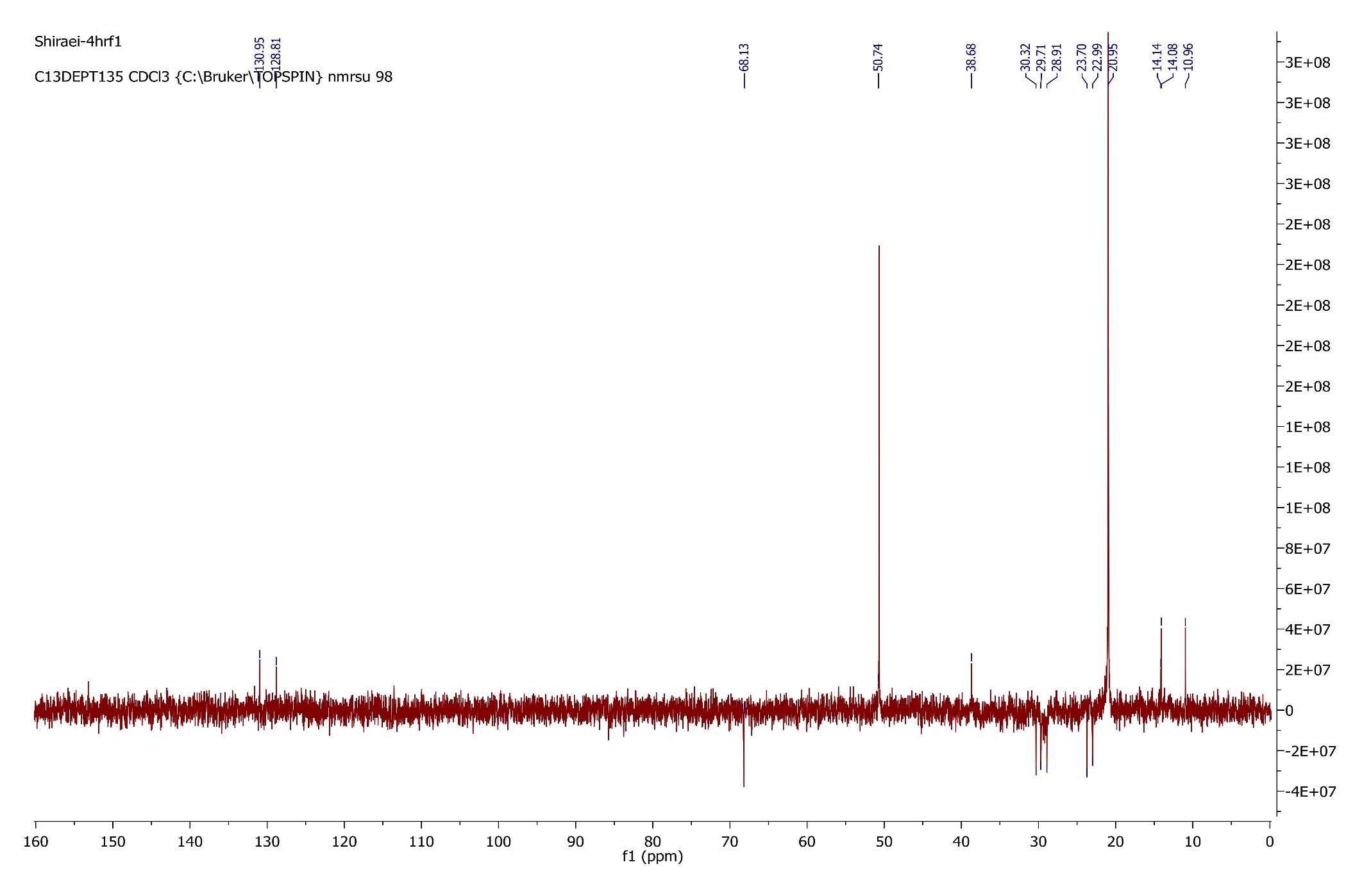
**Figure S 26.** LC chromatogram of Zagrosin 3 (up)and Its fragmentation pattern (down).



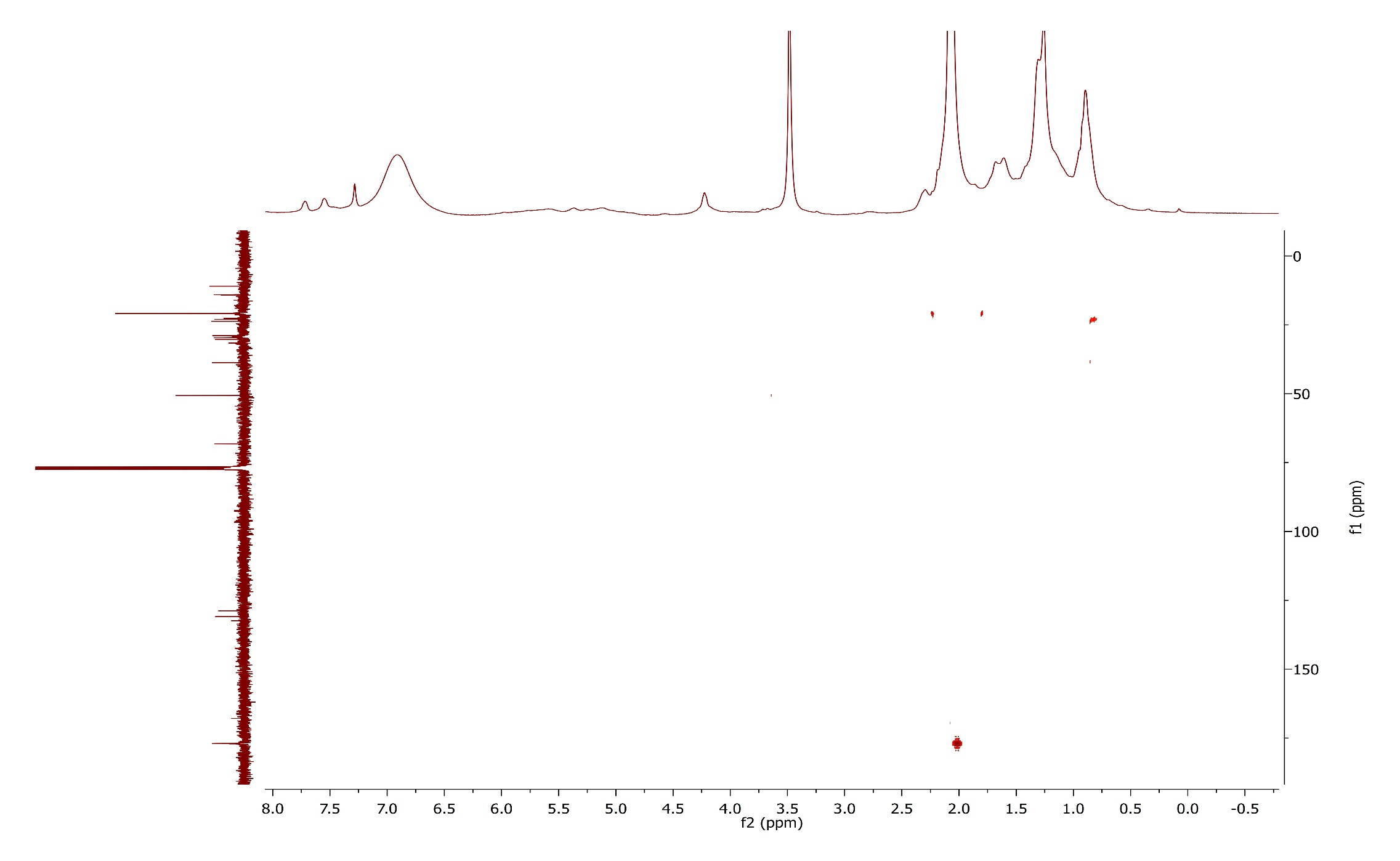
**Figure S27.** 1H NMR (300 MHz, chloroform-d) spectrum of Zagrosin ***3***.



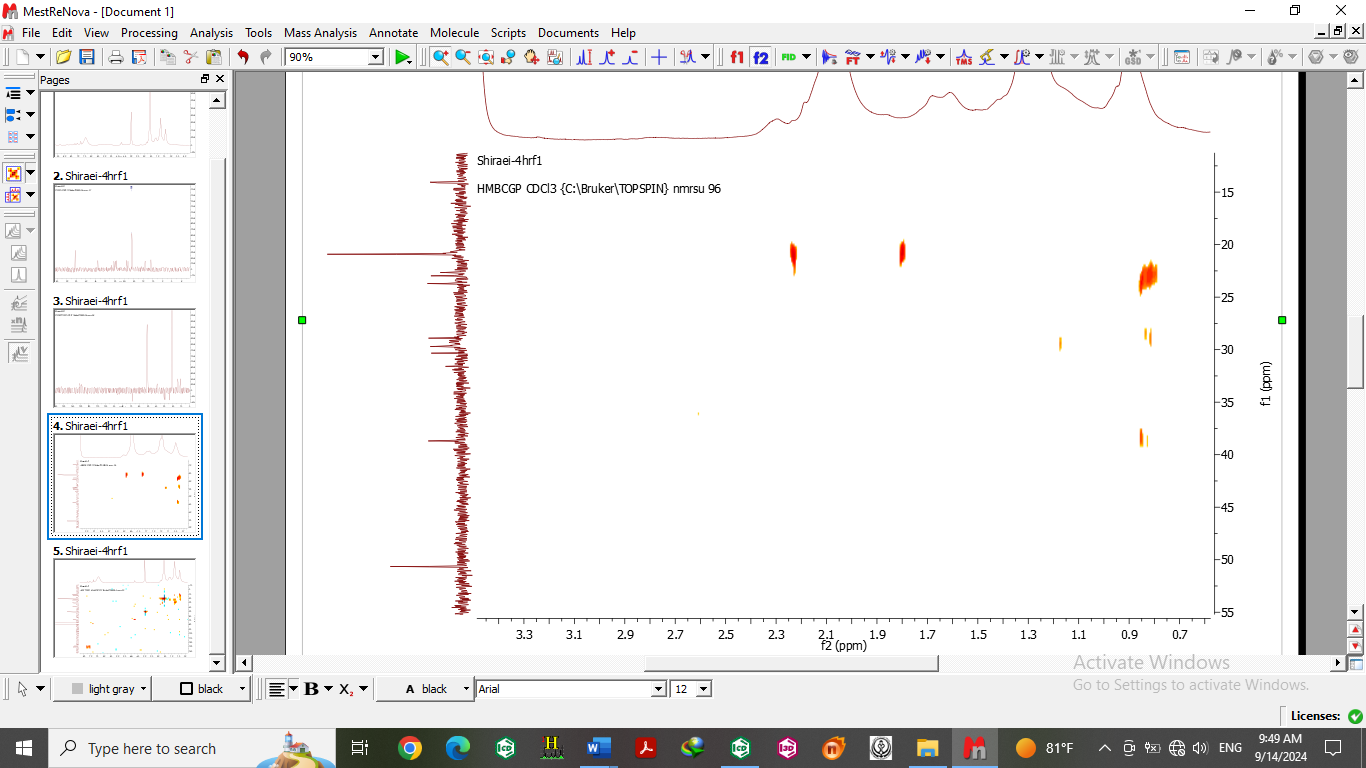
**Figure S28.** 13C NMR(‎75 ‎MHz, chloroform-d) spectrum of Zagrosin ***3.***



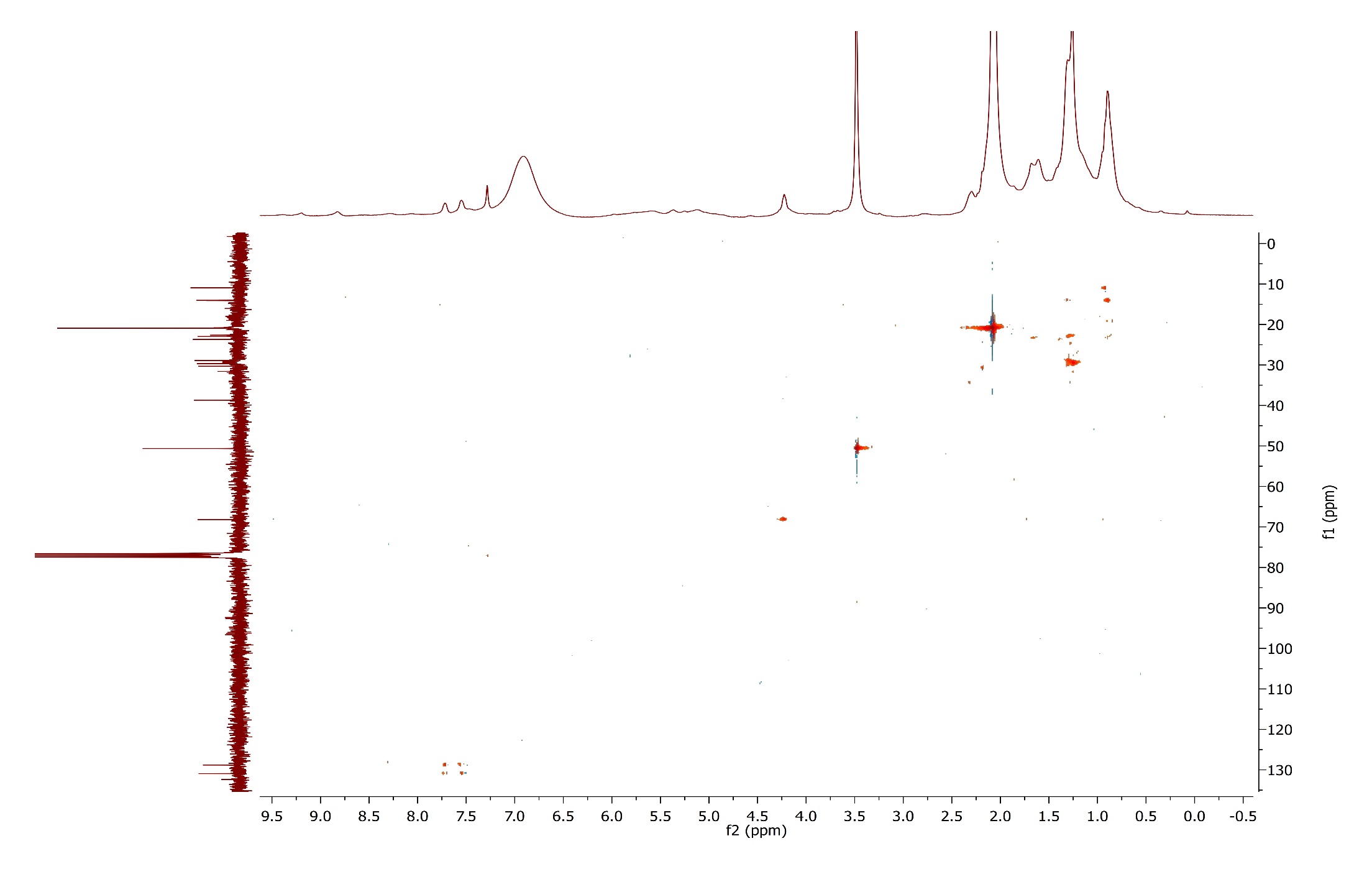
**Figure S29.** DEPT 135 spectrum of Zagrosin ***3.***



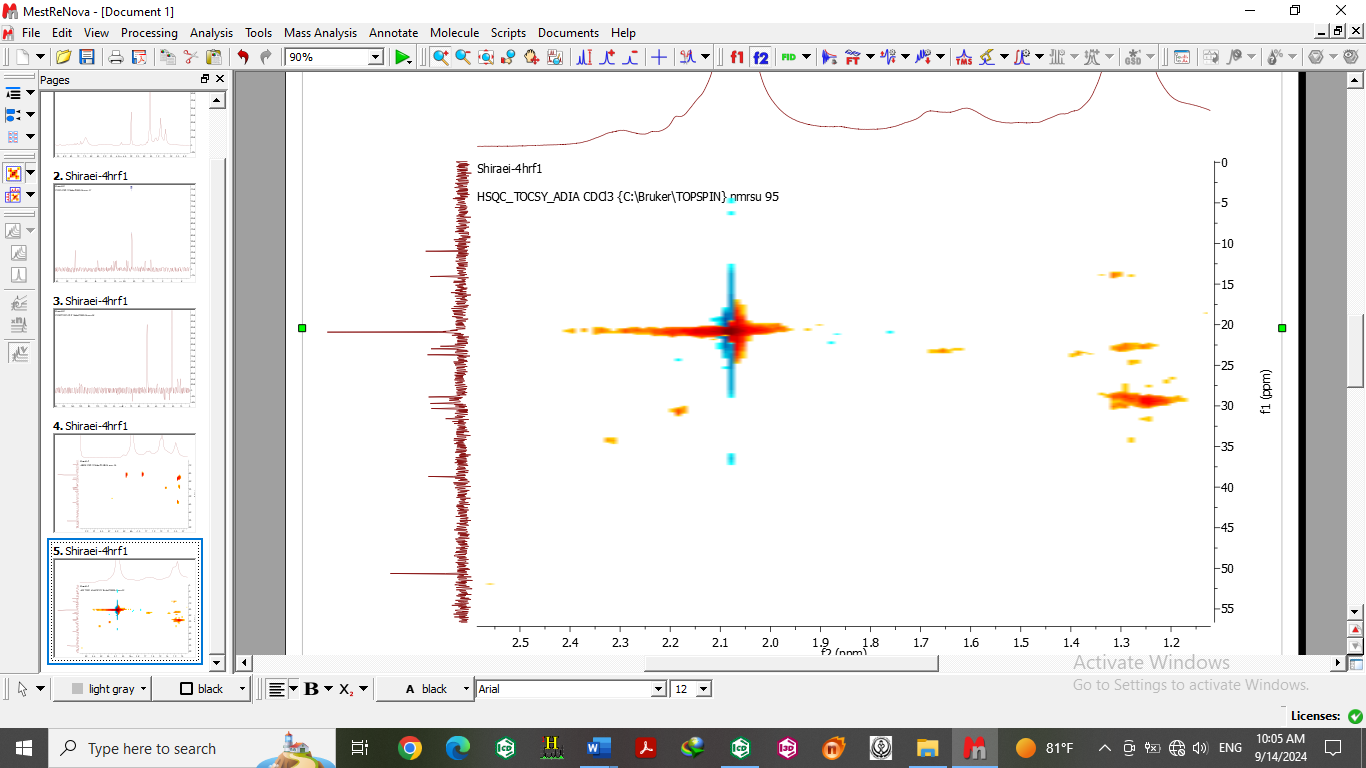
**Figure S30.** HMBC spectrum of Zagrosin ***3.***



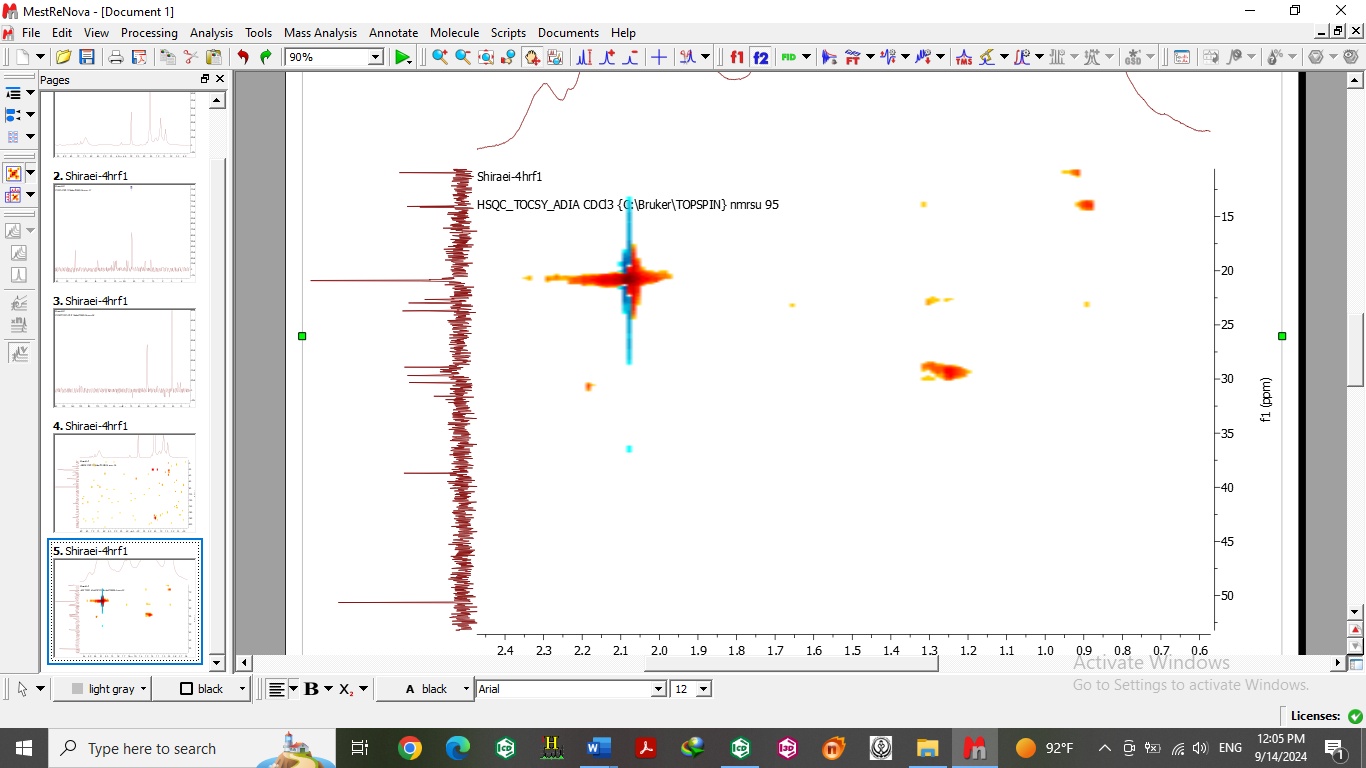
**Figure S31.** Expanded HMBC spectrum of Zagrosin ***3.***



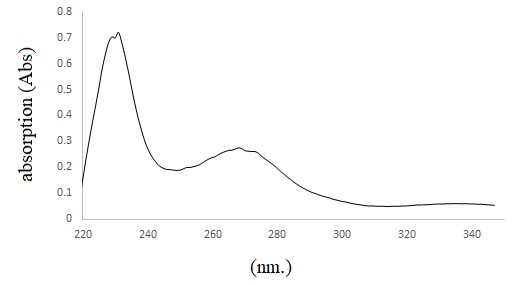
**Figure S32.** HSQC-TCOSY spectrum of Zagrosin ***3.***



**Figure S33.** ExpandedHSQC-TCOSY spectrum of Zagrosin ***3.***



**Figure S34.** ExpandedHSQC-TCOSY spectrum of Zagrosin ***3.***

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**Figure S35.** UV spectra of Zagrosin ***3***.