Supporting Information

α,ε-Hybrid Peptide Foldamers: Self-assembly of Peptide with *trans* Carbon-Carbon Double Bonds in the Backbone and its Saturated Analogue

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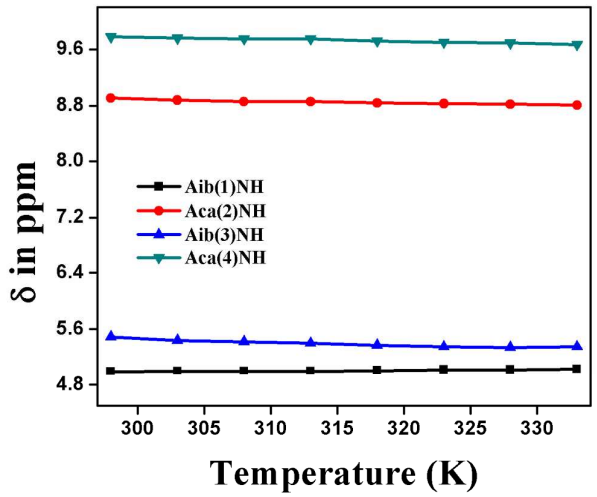

Figure S1: Plot of temperature dependence of NHs chemical shifts of Peptide **1** in $CDCl_3$ solution.

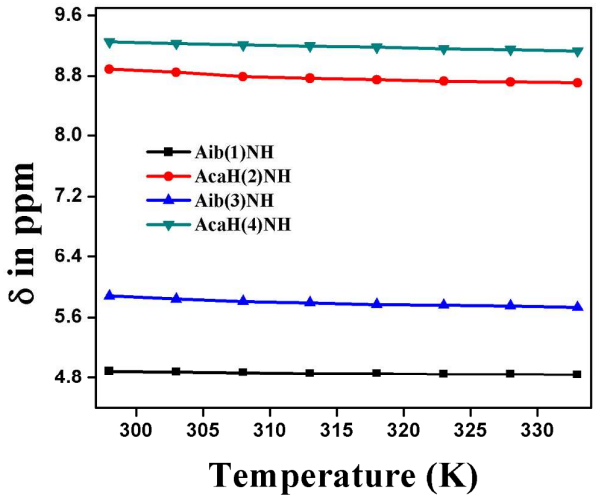

Figure S2: Plot of temperature dependence of NHs chemical shifts of Peptide **2** in $CDCl_3$ solution.

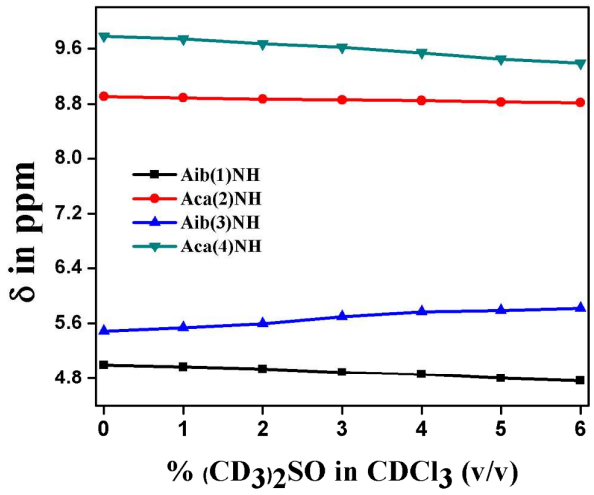

Figure S3: Plot of solvent dependence of NHs chemical shifts of peptide **1** at varying concentrations of $(CD_3)_2SO$ in $CDCl_3$ solution.

Table S1: Characteristic ^1H NMR parameters for peptide **1** (chemical shifts δ)[a]

Residue	δ (NH)	Δδ[b]	Δδ[c]
Aib(1)NH	**4.99**	**-0.23**	**0.04**
Aca(2)NH	**8.91**	**-0.09**	**-0.10**
Aib(3)NH	**5.49**	**0.33**	**-0.17**
Aca(4)NH	**9.78**	**-0.39**	**-0.11**

[a] Chemical shift values of NH proton resonances for peptide **1** in $CDCl_3$.
[b] Δδ is the chemical shift difference for NH protons in $CDCl_3$ and 6% $(CD_3)_2SO/CDCl_3$ for peptide **1**.
[c] Δδ is the chemical shift difference for NH protons in $CDCl_3$ on heating from 298 K to 333 K for peptide **1**.

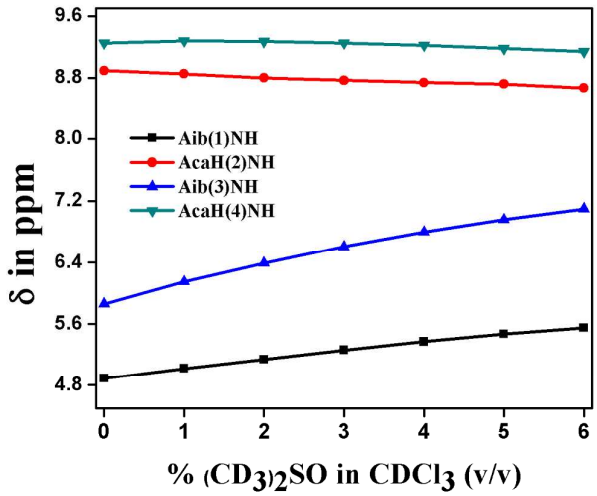

Figure S4: Plot of solvent dependence of NHs chemical shifts of peptide **2** at varying concentrations of $(CD_3)_2SO$ in $CDCl_3$ solution.

Table S2: Characteristic ^{1}H NMR parameters for peptide **2** (chemical shifts δ)[a]

Residue	δ (NH)	Δδ[b]	Δδ[c]
Aib(1)NH	**4.89**	**0.66**	**-0.05**
AcaH(2)NH	**8.89**	**-0.22**	**-0.18**
Aib(3)NH	**5.88**	**1.24**	**-0.15**
AcaH(4)NH	**9.25**	**-0.11**	**-0.12**

[a] Chemical shift values of NH proton resonances for peptide **2** in $CDCl_3$.
[b] Δδ is the chemical shift difference for NH protons in $CDCl_3$ and 6% $(CD_3)_2SO/CDCl_3$ for peptide **2**.
[c] Δδ is the chemical shift difference for NH protons in $CDCl_3$ on heating from 298 K to 333 K for peptide **2**.

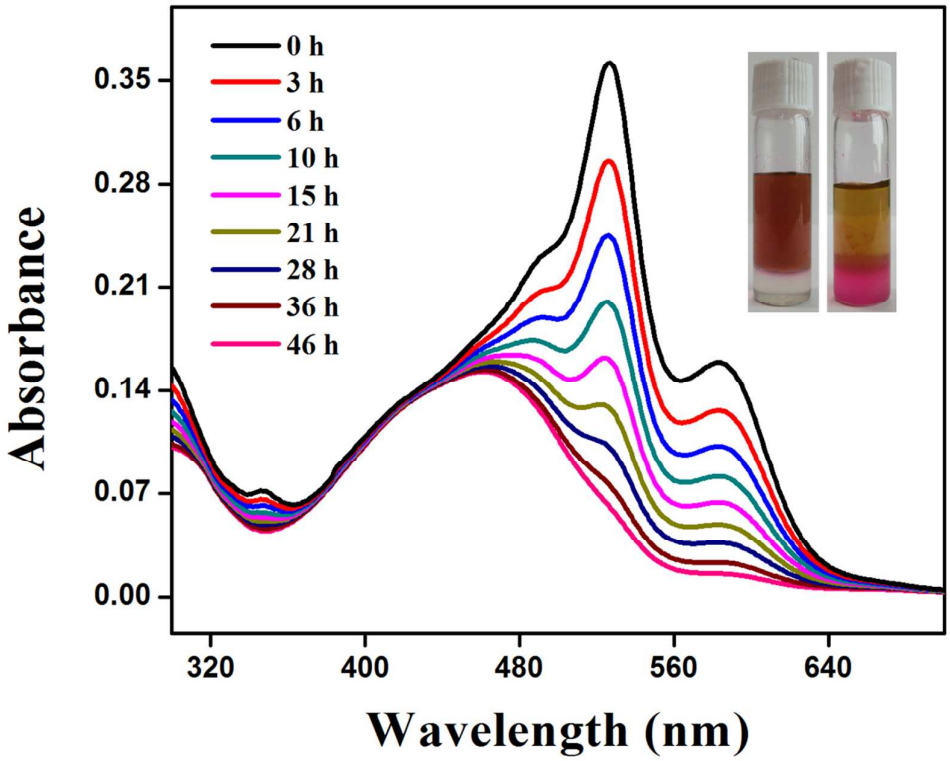

Figure S5: Removal of cationic dyes (rhodamine 6G and methyl violet) selectively from waste water (a mixture of rhodamine 6G, methyl violet, methyl orange and pyrocatechol violet) using peptide **2** gel from xylene.

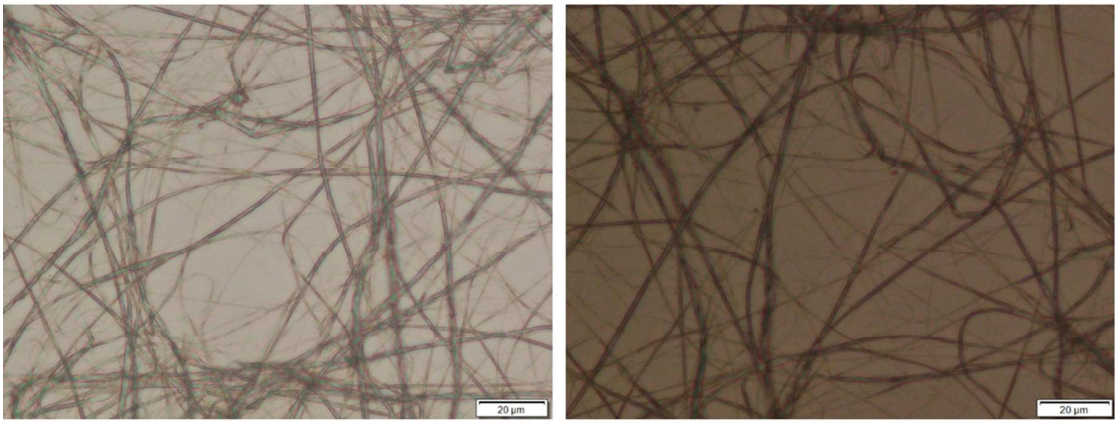

Figure S6: The POM images of peptide **2** xerogel showing fibrous network.

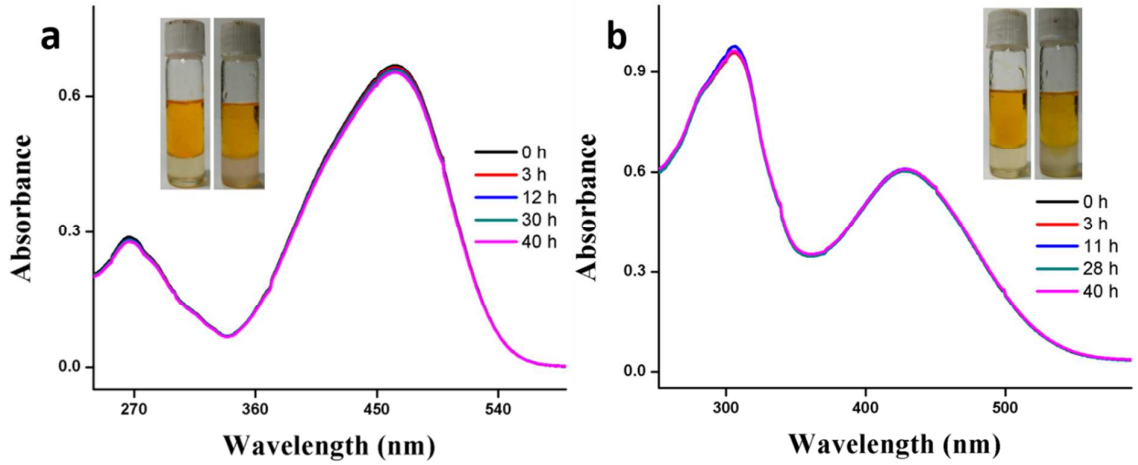

Figure S7: Dye removal studies using peptide **2** gel from xylene showing no absorption; (a) Methyl orange (anionic) and (b) pyrocatechol violet (neutral).

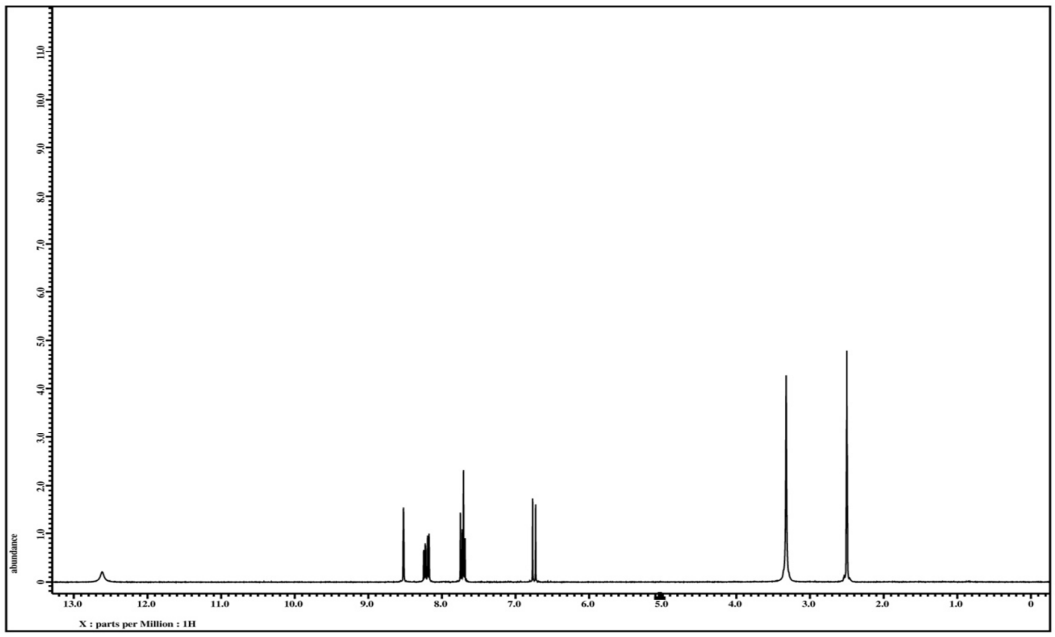

Figure S8: ^{1}H NMR (400 MHz, DMSO-*d6*, δppm) spectrum of ***trans*-3-Nitrocinnamic acid 4.**

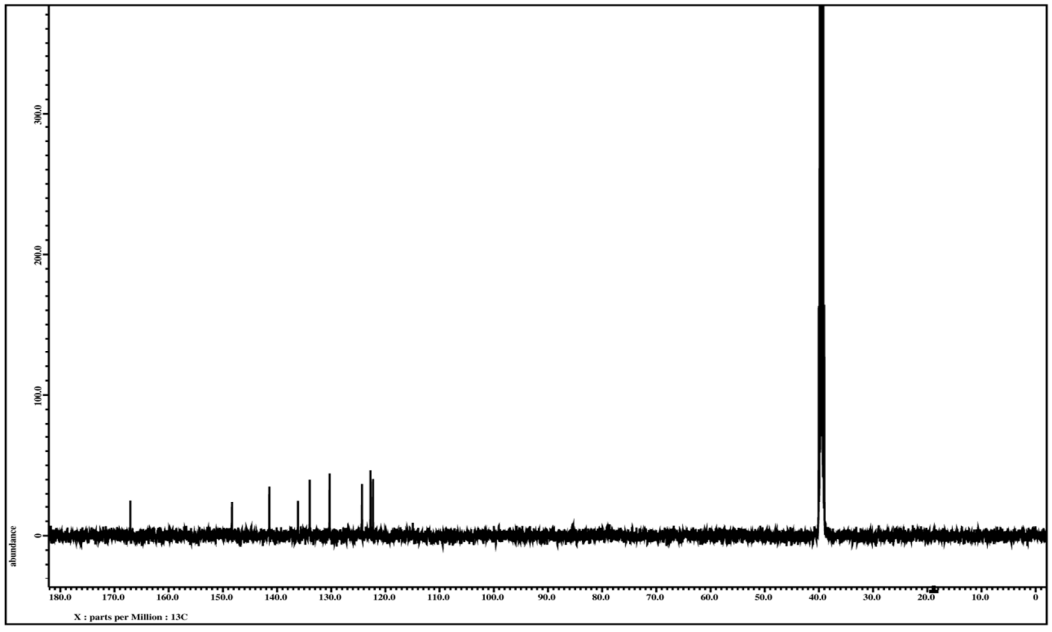

Figure S9: ^{13}C NMR (125 MHz, DMSO-*d6*, δppm) spectrum of ***trans*-3-Nitrocinnamic acid 4.**

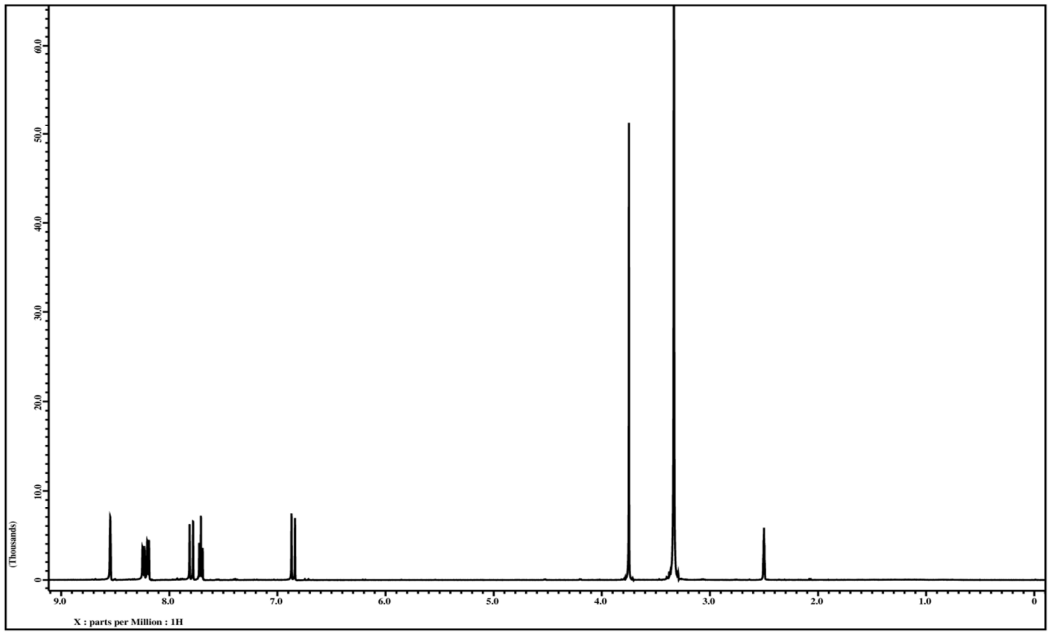

Figure S10: ^{1}H NMR (500 MHz, DMSO-*d6*, δppm) spectrum of **Methyl (E)-3-nitrocinnamate 5.**

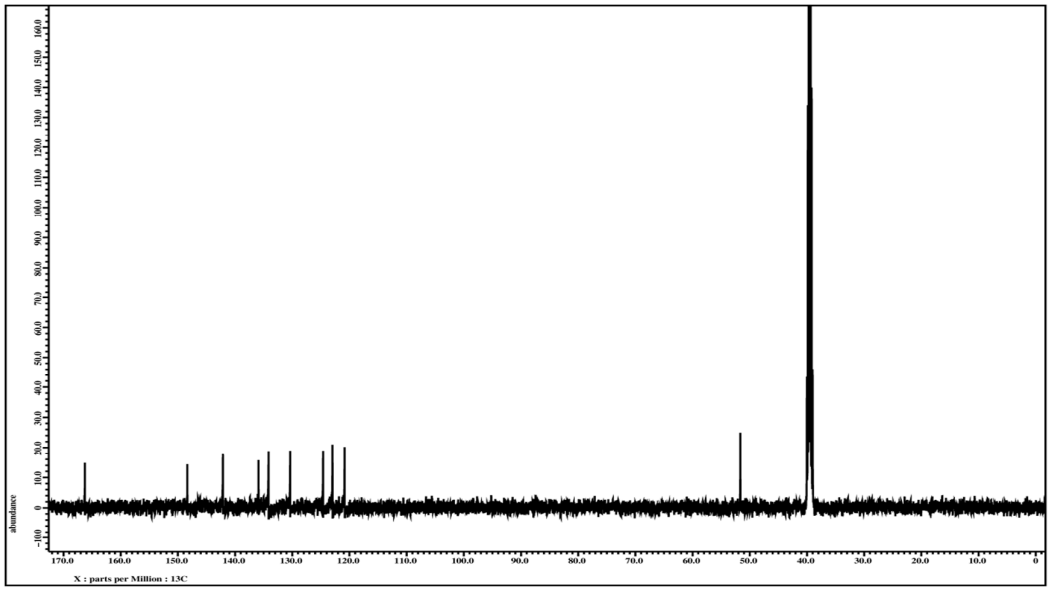

Figure S11: ^{13}C NMR (125 MHz, DMSO-*d6*, δppm) spectrum of **Methyl (E)-3-nitrocinnamate 5.**

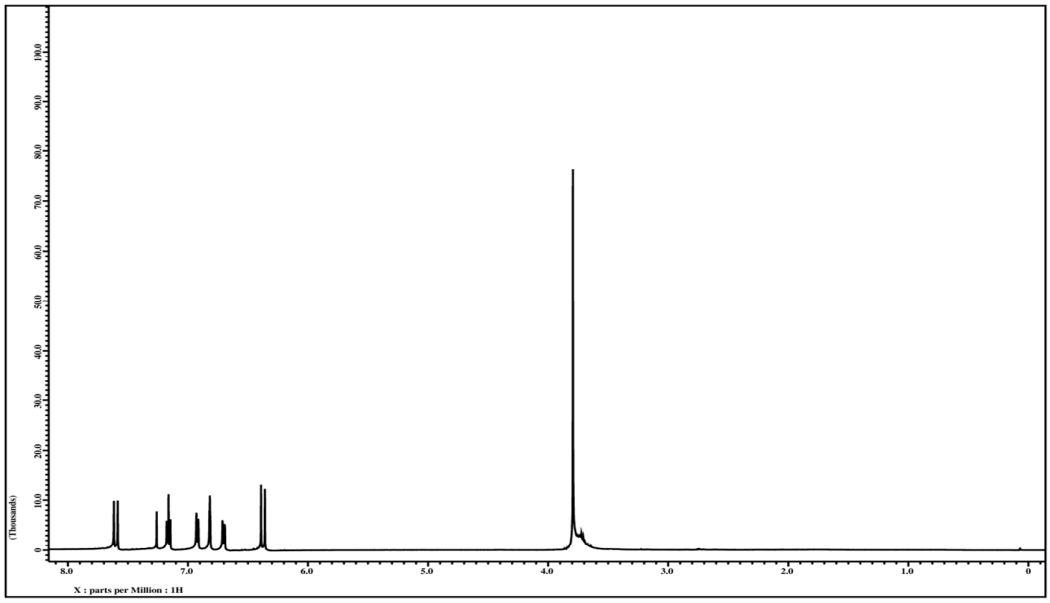

Figure S12: ^{1}H NMR (500 MHz, CDCl3, δppm) spectrum of **Methyl (E)-3-aminocinnamate 6.**

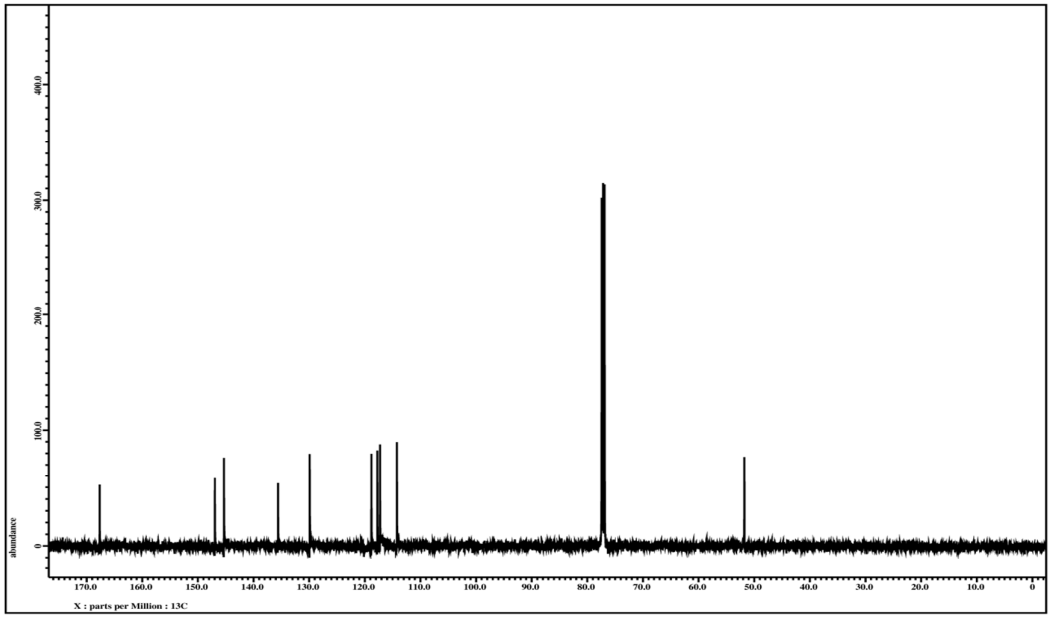

Figure S13: ^{13}C NMR (125 MHz, CDCl3, δppm) spectrum of **Methyl (E)-3-aminocinnamate 6.**

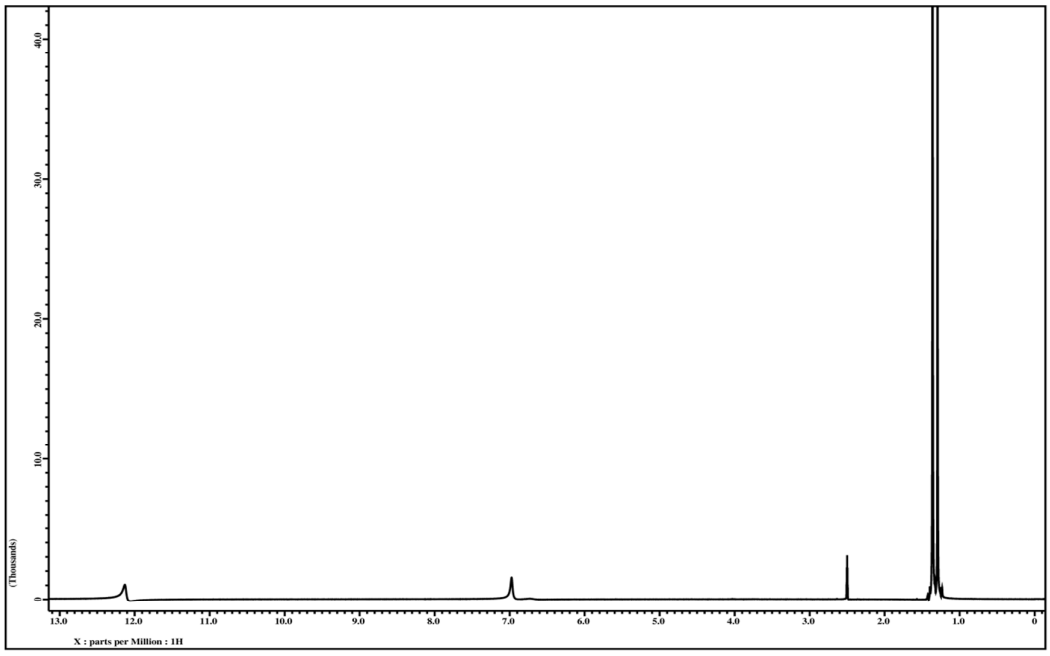

Figure S14: ^{1}H NMR (500 MHz, DMSO-*d6*, δppm) spectrum of **Boc-Aib-OH 7.**

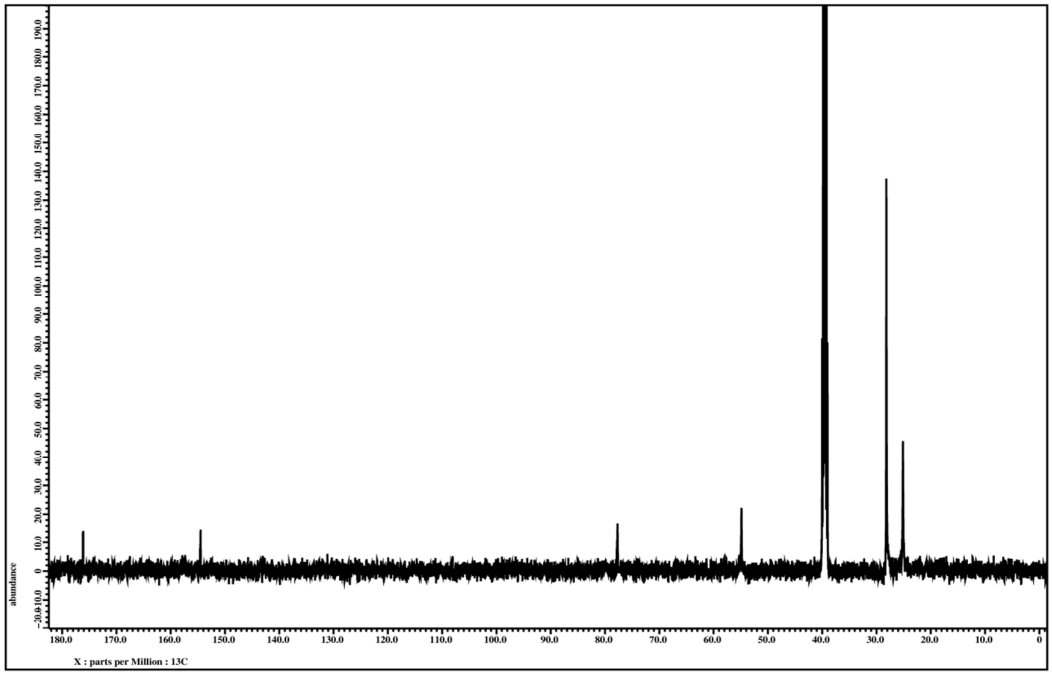

Figure S15: ^{13}C NMR (125 MHz, DMSO-*d6*, δppm) spectrum of **Boc-Aib-OH 7.**

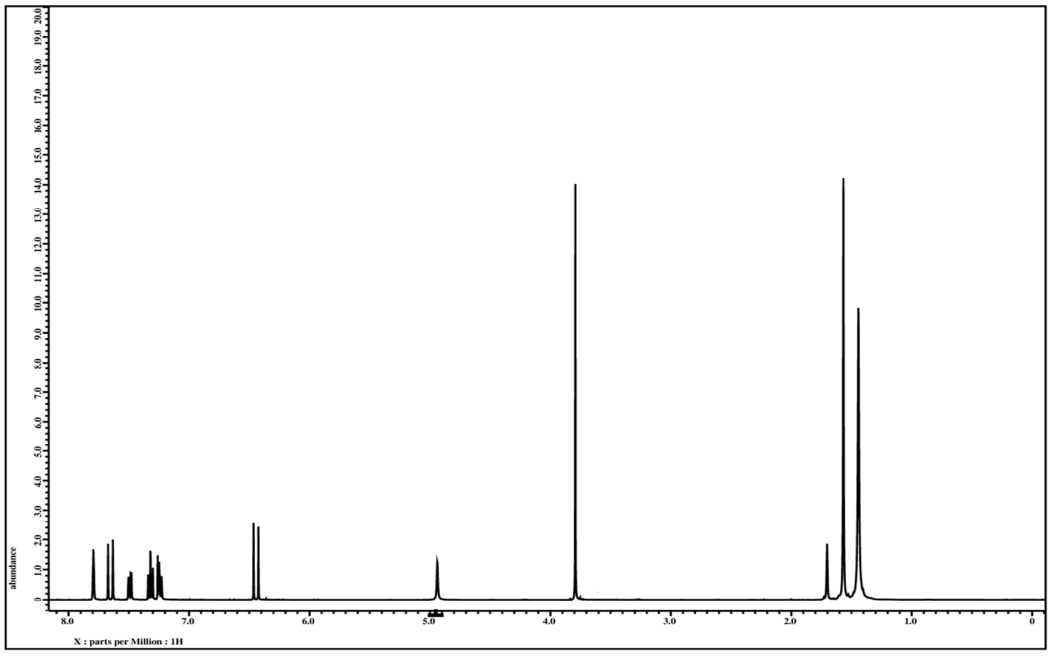

Figure S16: ^{1}H NMR (400 MHz, CDCl3, δppm) spectrum of **8.**

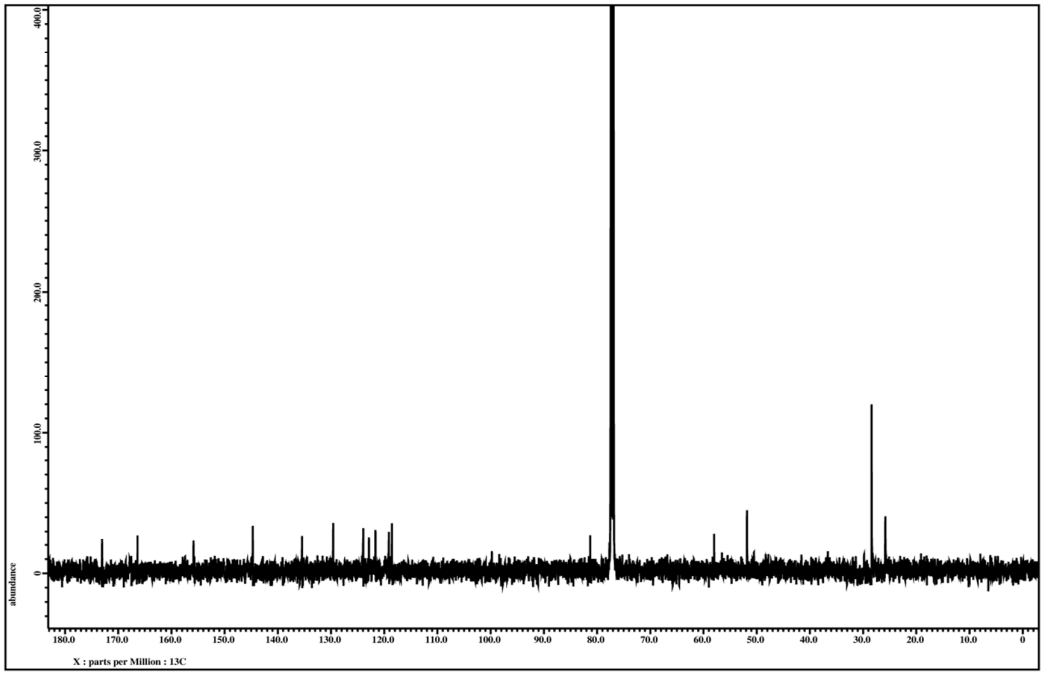

Figure S17: ^{13}C NMR (125 MHz, CDCl3, δppm) spectrum of **8.**

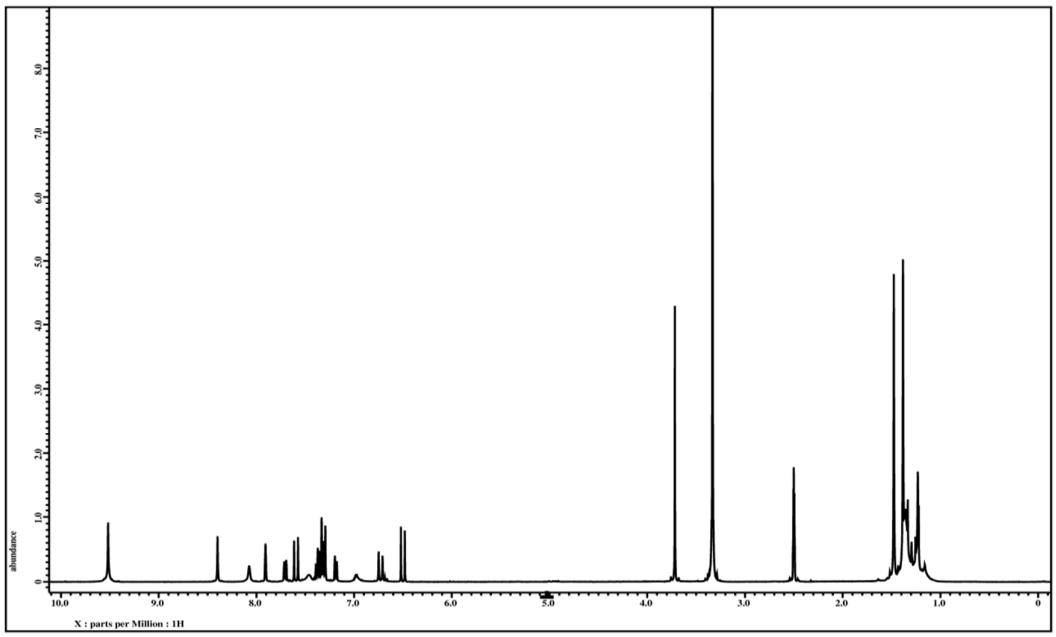

Figure S18: ^{1}H NMR (400 MHz, DMSO-*d6*, δppm) spectrum of **1.**

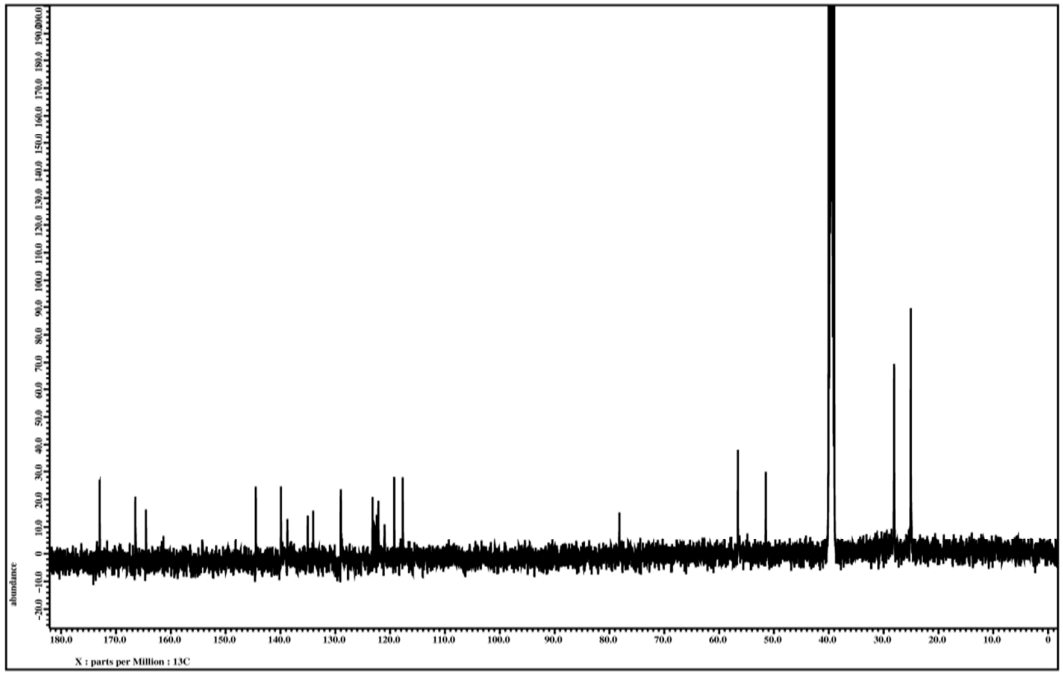

Figure S19: ^{13}C NMR (125 MHz, DMSO-*d6*, δppm) spectrum of **1.**

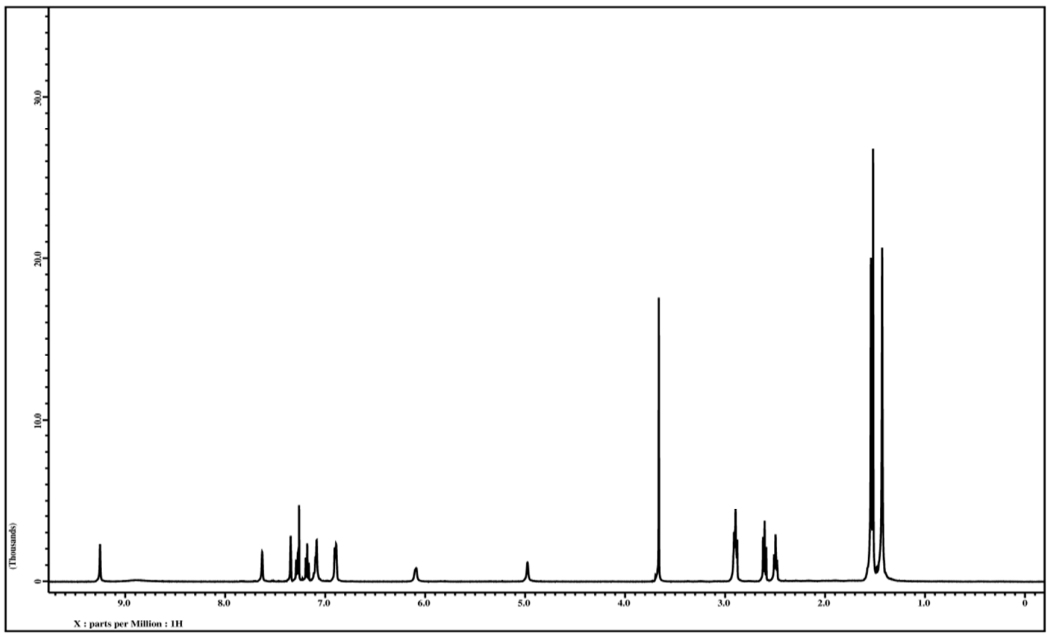

Figure S20: ^{1}H NMR (500 MHz, CDCl3, δppm) spectrum of **2.**

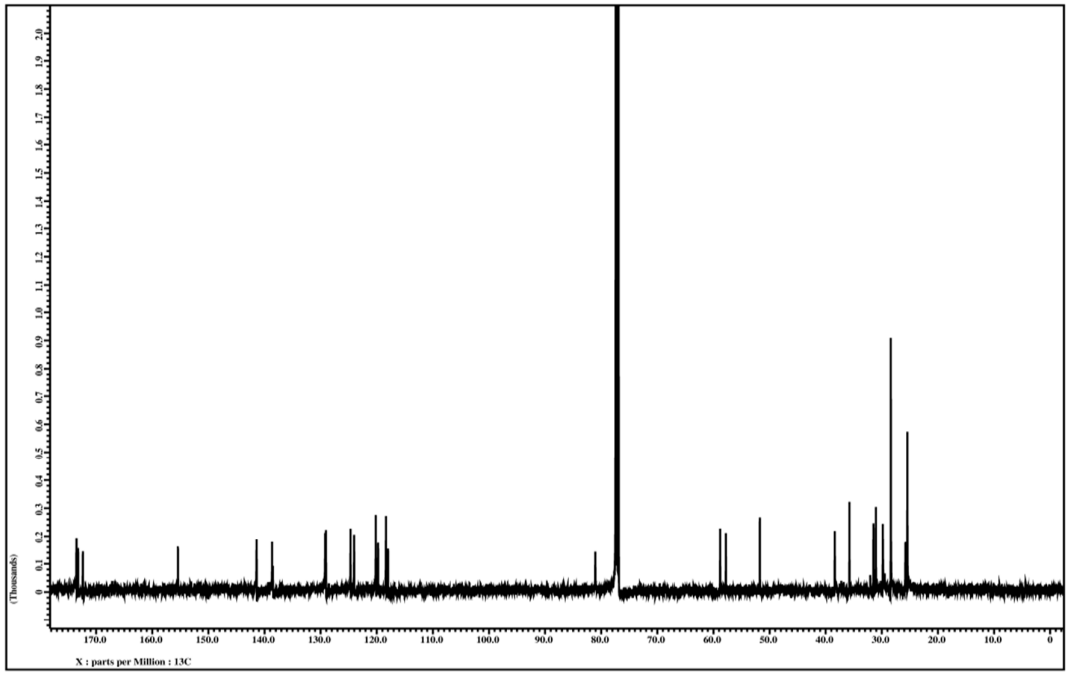

Figure S21: ^{13}C NMR (125 MHz, CDCl3, δppm) spectrum of **2.**

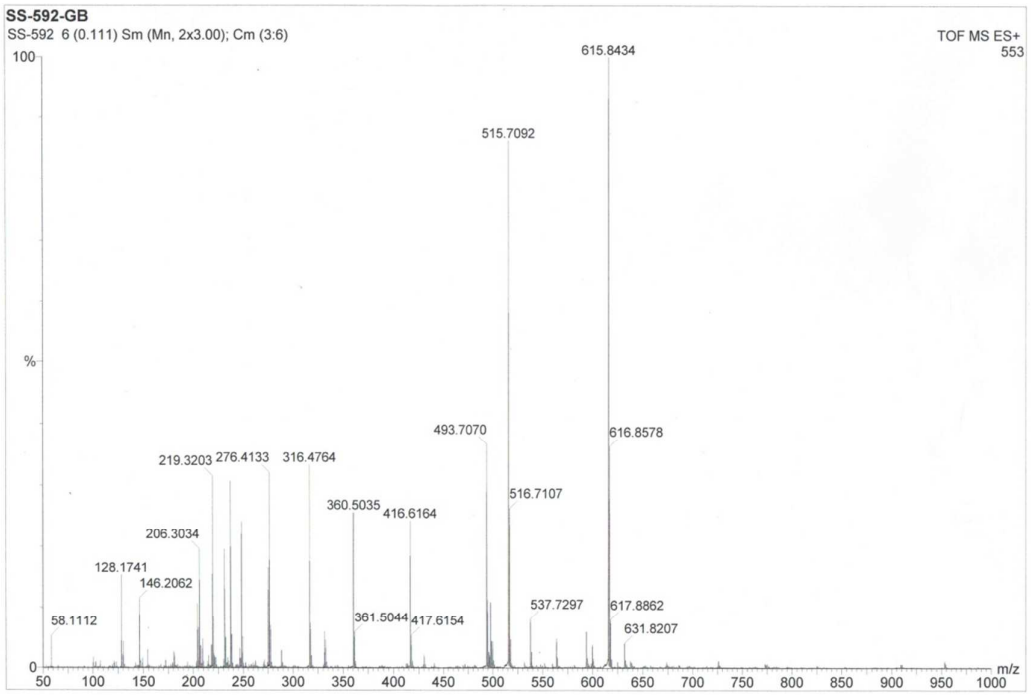

Figure S22: Mass spectrum of peptide **1.**

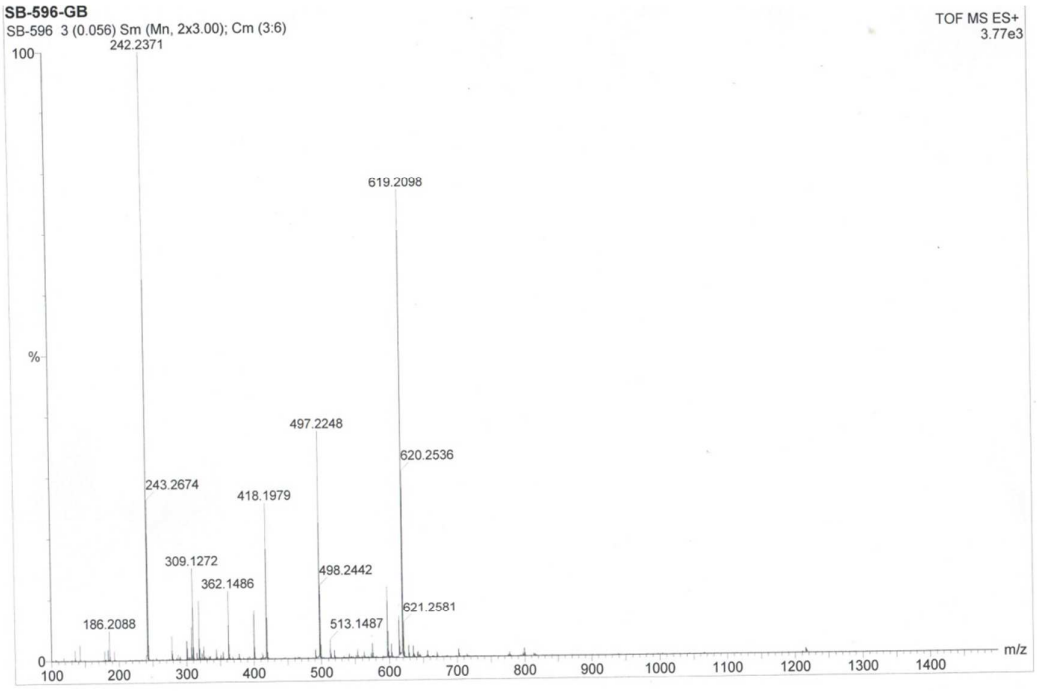

Figure S23: Mass spectrum of peptide **2.**

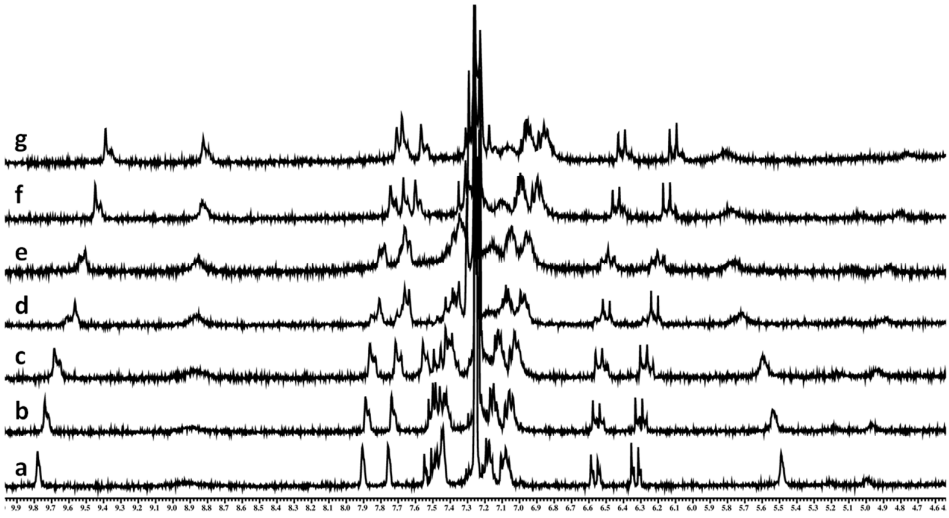

Figure S24: Part of ^{1}H NMR (400 MHz) solvent titration spectra of peptide **1** in $CDCl_3$ solution. % of DMSO-d_6 a) 0, b) 1, c) 2, d) 3, e) 4, f) 5 and g) 6.

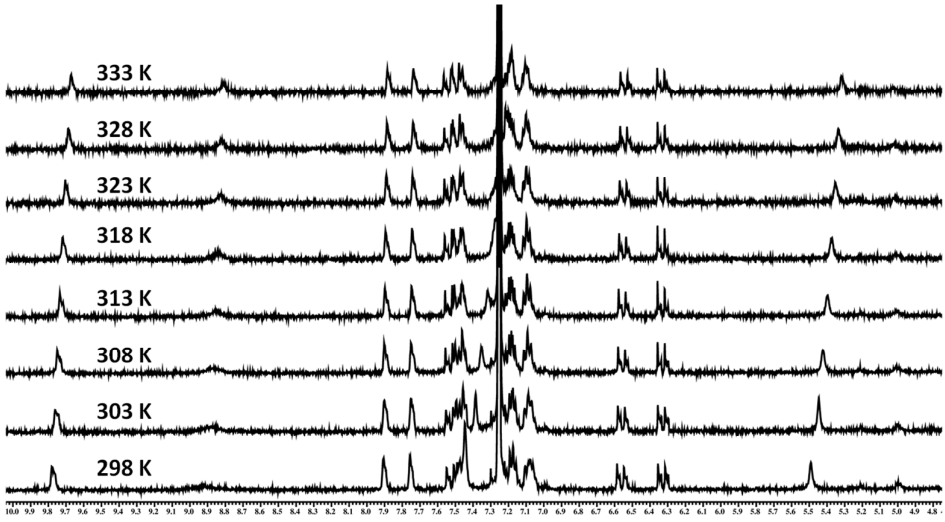

Figure S25: Part of ^{1}H NMR (400 MHz) spectra of peptide **1** at variable temperature in $CDCl_3$.

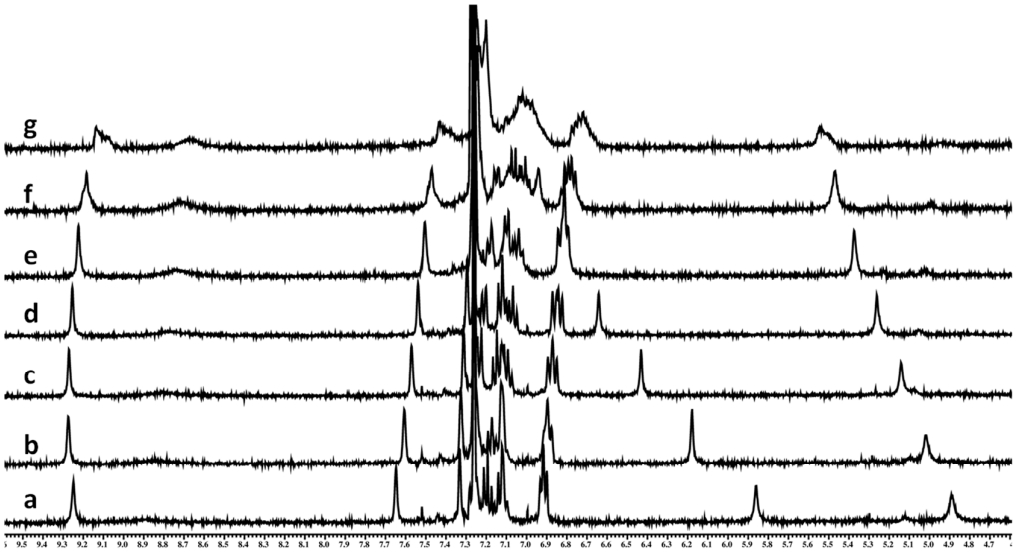

Figure S26: Part of ^{1}H NMR (400 MHz) solvent titration spectra of peptide **2** in $CDCl_3$ solution. % of DMSO-d_6 a) 0, b) 1, c) 2, d) 3, e) 4, f) 5 and g) 6.

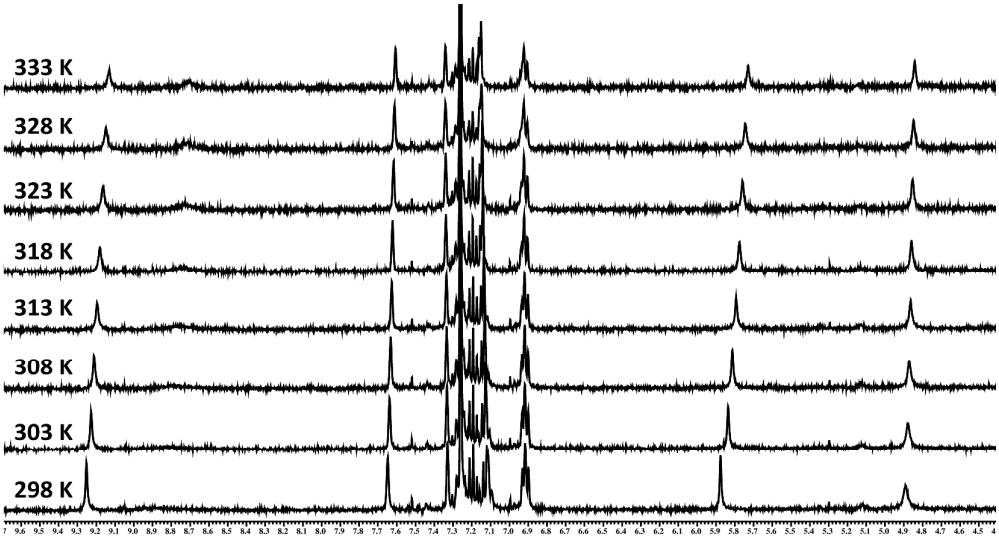

Figure S27: Part of ^{1}H NMR (400 MHz) spectra of peptide **2** at variable temperature in $CDCl_3$.