Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Electronic Supplementary Information

Activity and conformation of lysozyme in molecular solvents, protic ionic liquids (PILs) and salt-water systems

Emmy C. Wijaya,[ab] Frances Separovic,[a] Calum J. Drummond[c] and Tamar L. Greaves[c]*

[a] *School of Chemistry, Bio21 Institute, The University of Melbourne, VIC 3010, Australia.*
[b] *CSIRO Manufacturing, Clayton VIC 3169, Australia*
[c] *School of Science, College of Science, Engineering and Health, RMIT University, Victoria 3001, Australia*
Email : tamar.greaves@rmit.edu.au

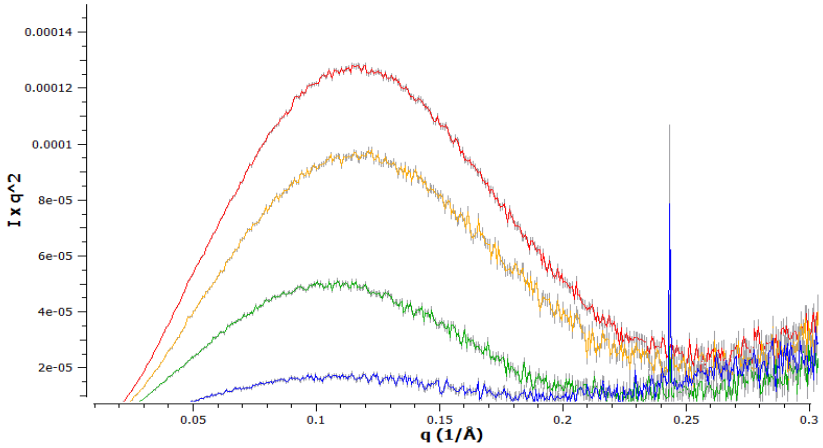

***Figure S1a**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), and 1:1 (blue) glycerol:water mol ratio*

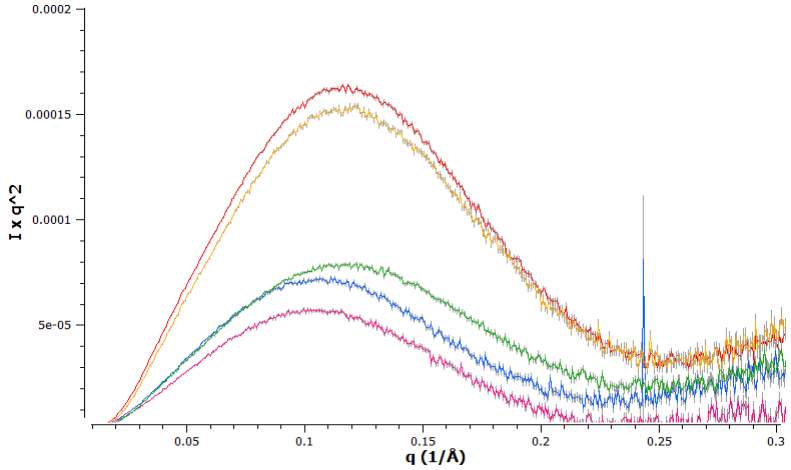

***Figure S1b.** Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) ethylene glycol : water mol ratio and pure ethylene glycol (purple)*

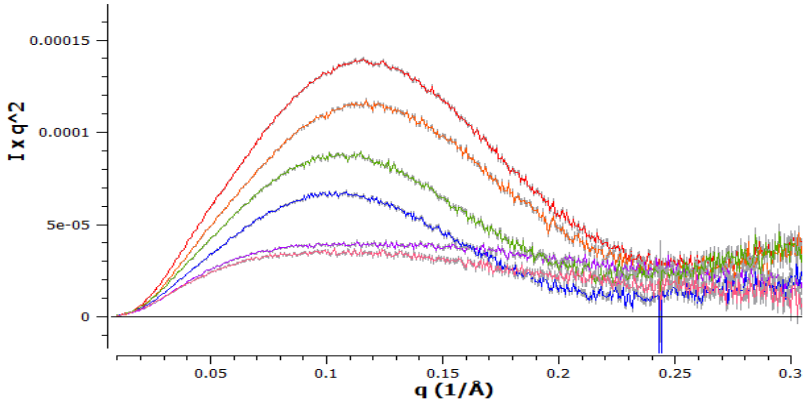

Figure S1c. *Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) diethylene glycol : water mol ratio and pure diethylene glycol (purple)*

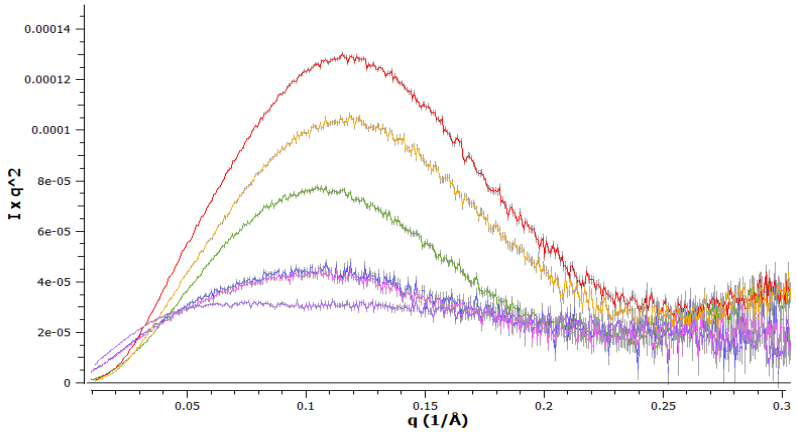

Figure S1d. *Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) triethylene glycol : water mol ratio and pure triethylene glycol (purple)*

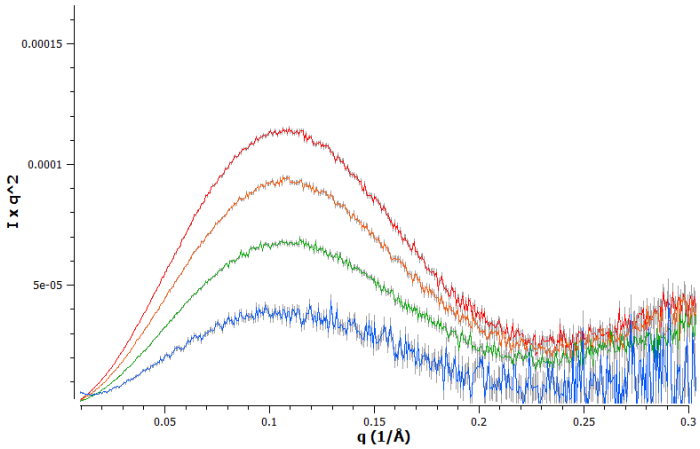

Figure S1e. *Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), and 1:1 (blue) diethanolamine : water mol ratio*

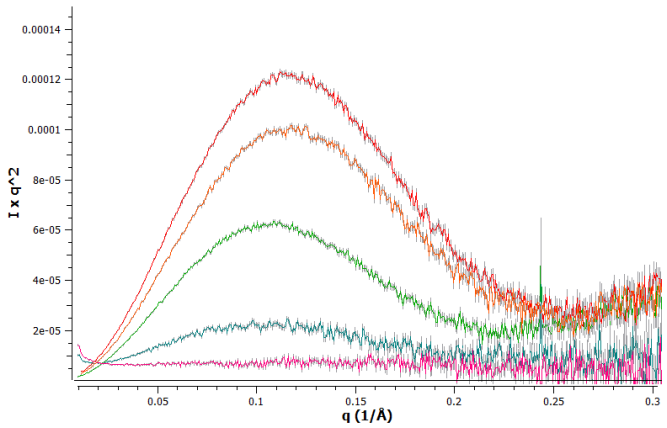

***Figure S1f**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), and 5:1 (pink) triethanolamine : water mol ratio*

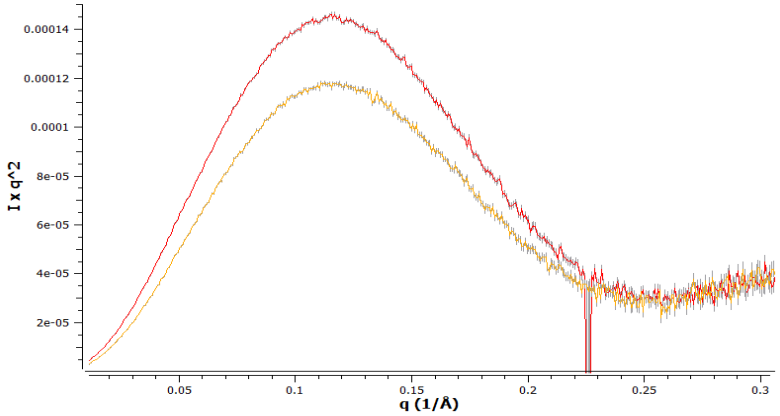

***Figure S1g**. Kratky plot of lysozyme in 1:20 (red), and 1:10 (orange) diethylene triamine : water mol ratio*

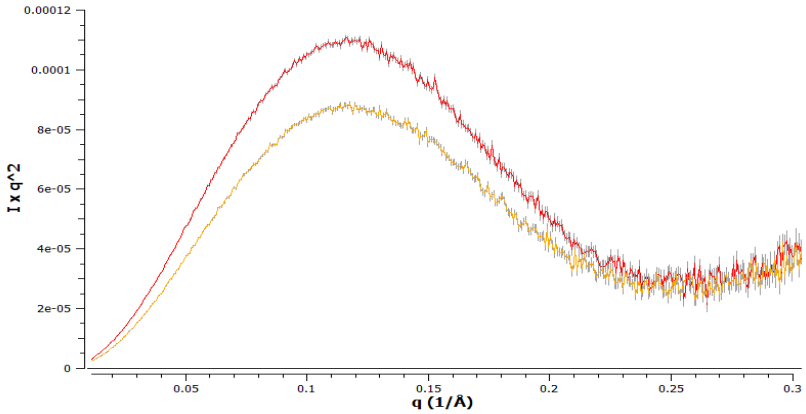

***Figure S1h.** Kratky plot of lysozyme in 1:20 (red), and 1:10 (orange) triethylene tetramine : water mol ratio*

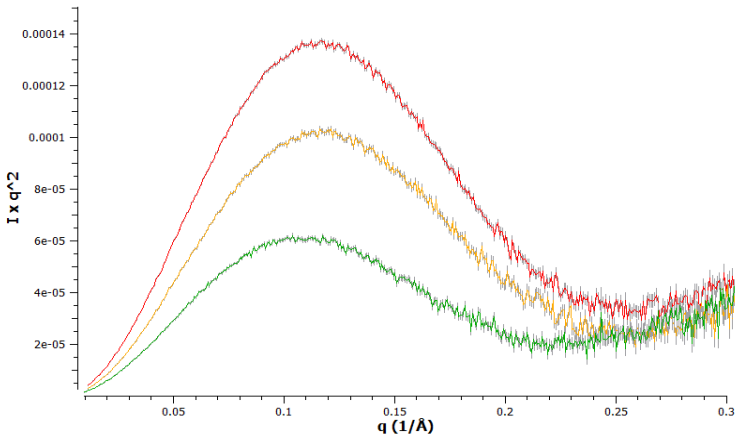

Figure S1i. *Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), and 1:5 (green) 3-amino-1,2-propanediol : water mol ratio*

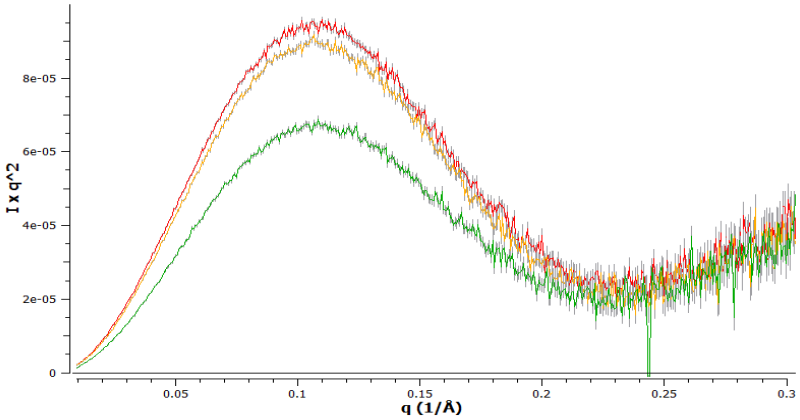

Figure S1j. *Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), and 1:5 (green) 2-amino-1,3-propanediol : water mol ratio*

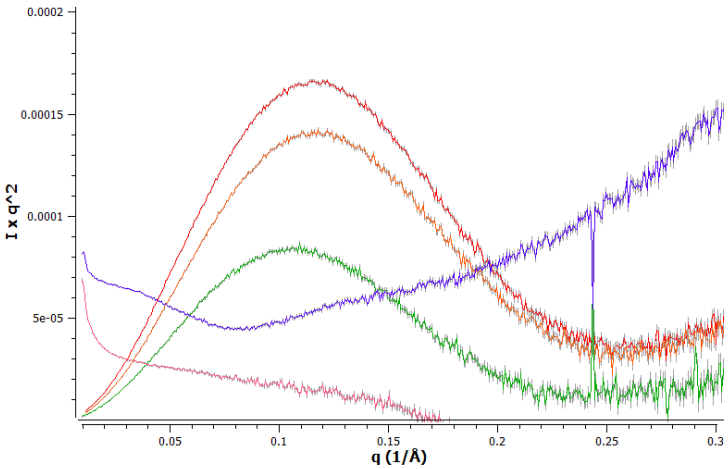

Figure S1k*. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (pink), and 5:1 (purple) 3-amino-1-propanol : water mol ratio*

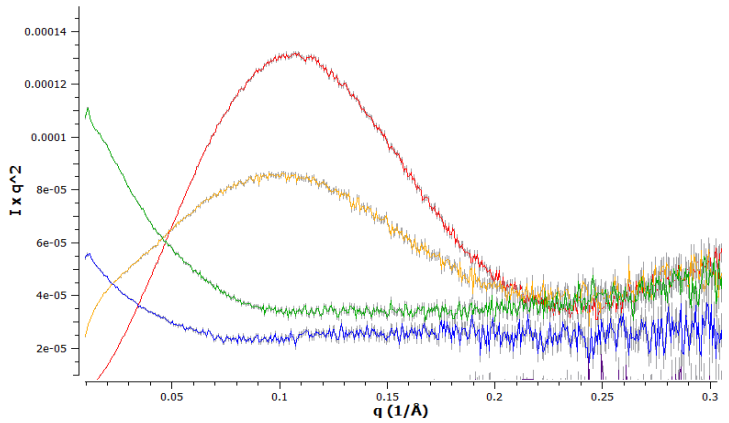

***Figure S1l**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), and 1:1 (blue) 4-amino-1-butanol : water mol ratio*

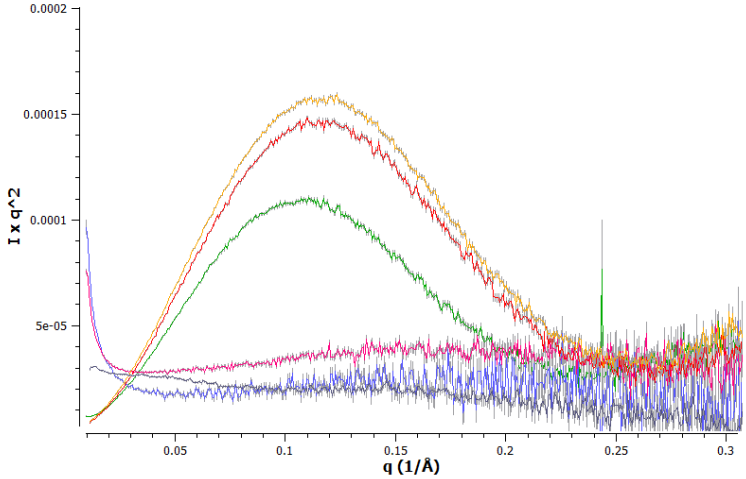

***Figure S1m.** Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) 1-amino-2-propanol : water mol ratio and pure 1-amino-2-propanol (purple)*

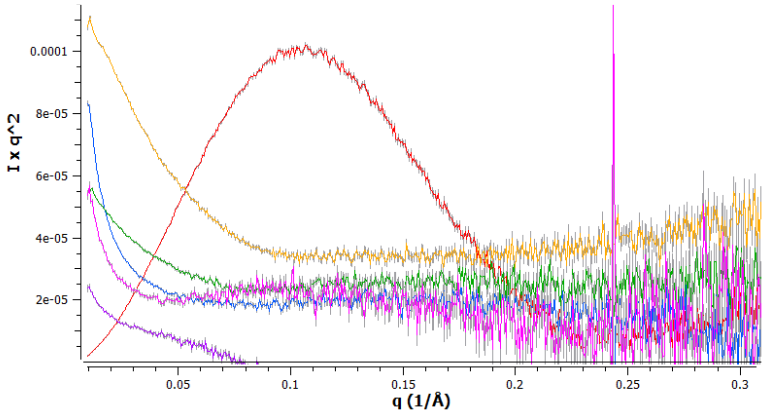

***Figure S1n**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) 2-amino-1-propanol : water mol ratio and pure 2-amino-1-propanol (purple)*

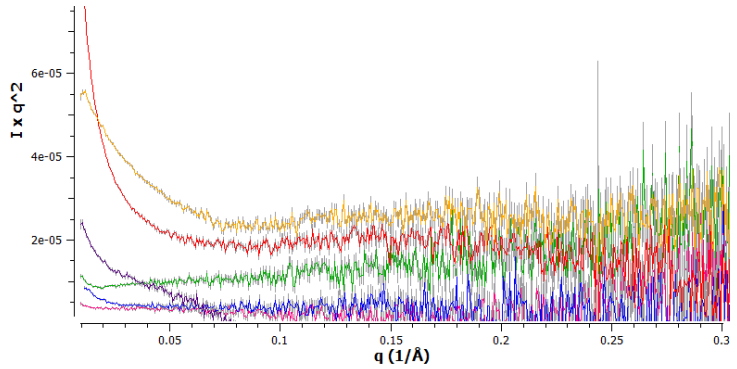

***Figure S1o**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) 1-amino-2-butanol : water mol ratio and pure 1-amino-2-butanol (purple)*

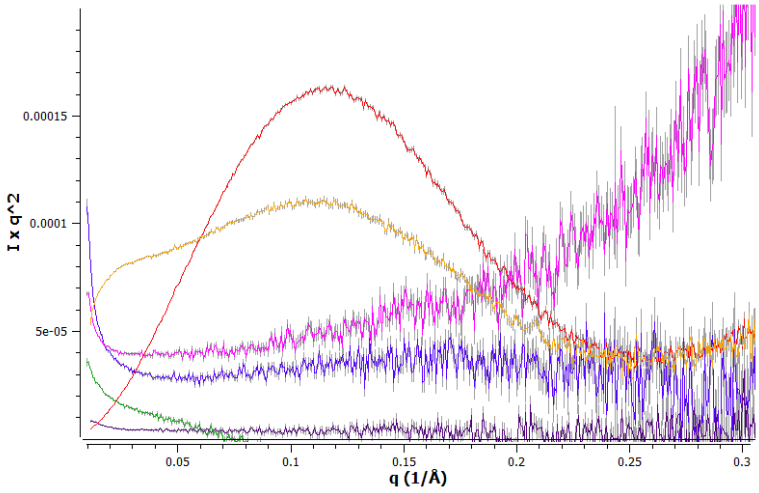

***Figure S1p.** Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) 2-amino-1-butanol : water mol ratio and pure 2-amino-1-butanol (purple)*

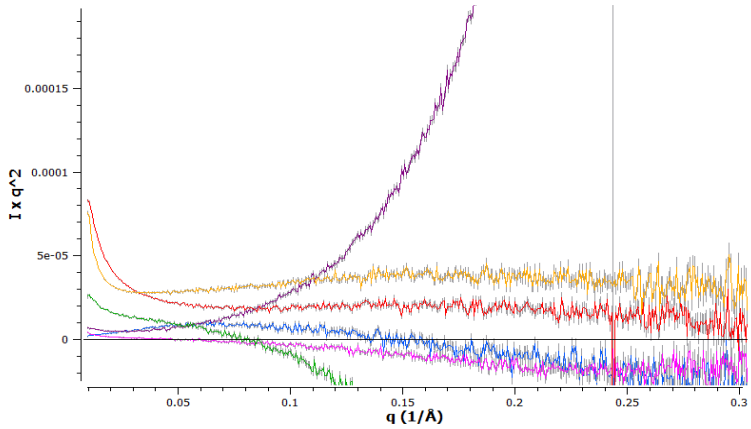

***Figure S1q**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) 2-amino-1-pentanol : water mol ratio and pure 2-amino-1-pentanol (purple)*

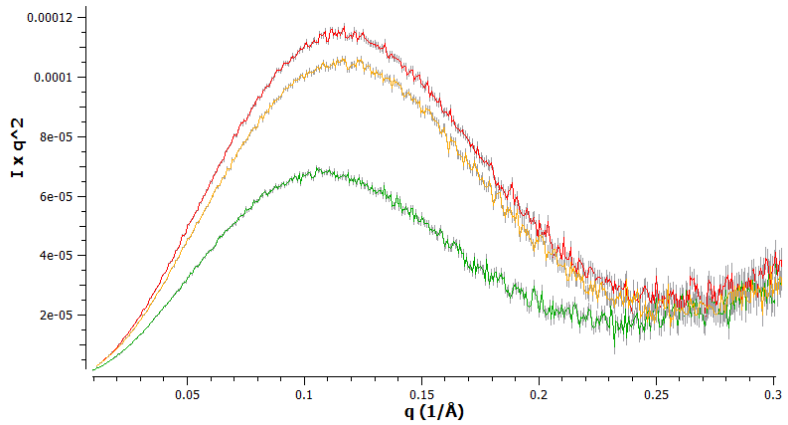

***Figure S1r**. Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), and 1:5 (green) 2-amino-2-ethyl-1,3-propanediol : water mol ratio*

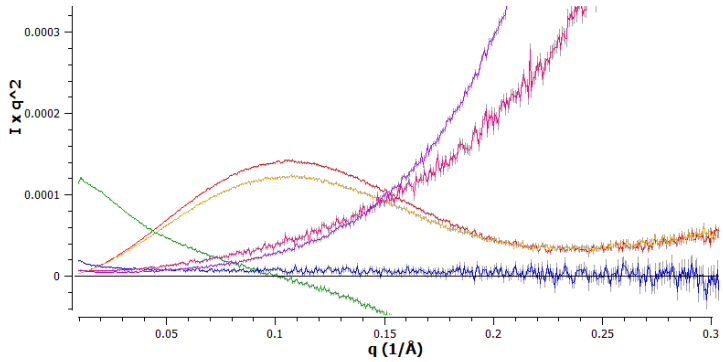

***Figure S1s.** Kratky plot of lysozyme in 1:20 (red), 1:10 (orange), 1:5 (green), 1:1 (blue), 5:1 (pink) 2-amino-2-methyl-1-propanol : water mol ratio and pure 2-amino-2-methyl-1-propanol (purple)*

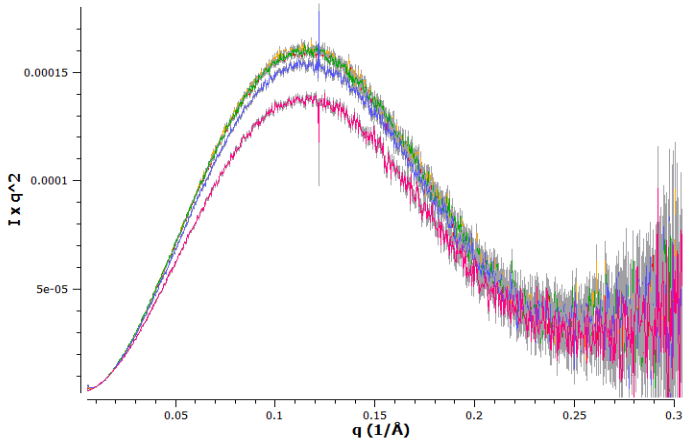

***Figure S1t**. Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (green), 1:10 (blue), and 1:5 (pink) EACl : water mol ratio*

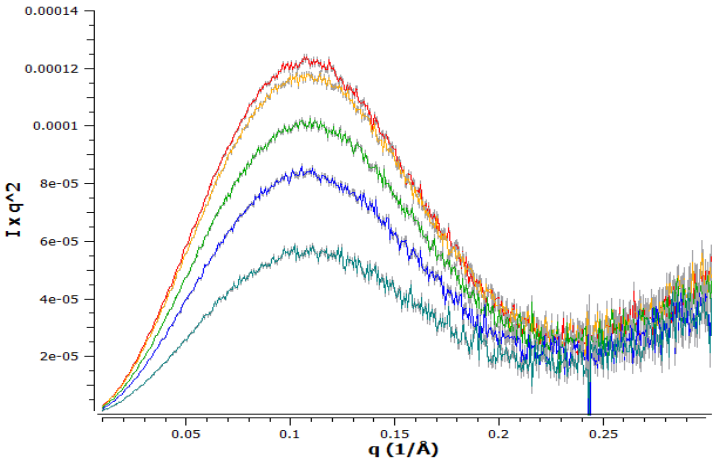

***Figure S1u**. Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (green), 1:10 (blue), and 1:5 (dark blue) EOACl : water mol ratio*

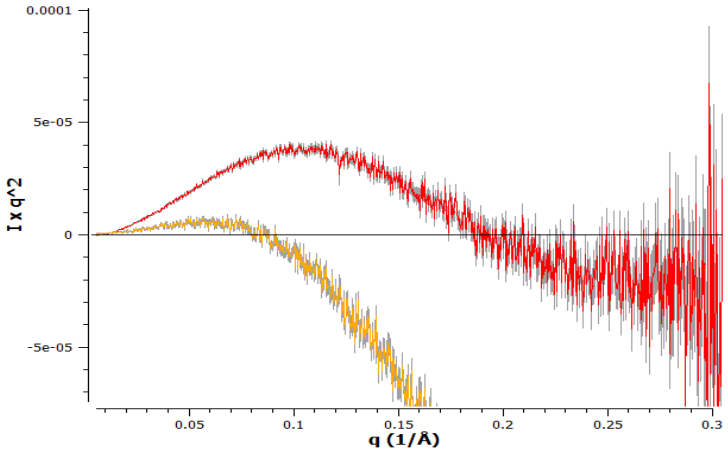

***Figure S1v.** Kratky plot of lysozyme in 1:25 (red) and 1:20 (orange) KNO_3 : water mol ratio*

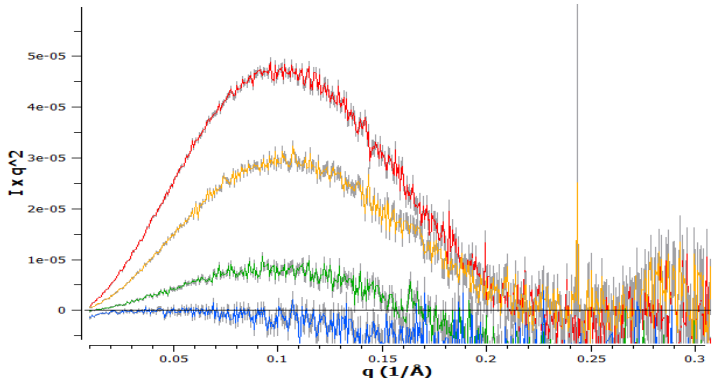

***Figure S1w**. Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (green), and 1:10 (blue) $KHCO_2$: water mol ratio*

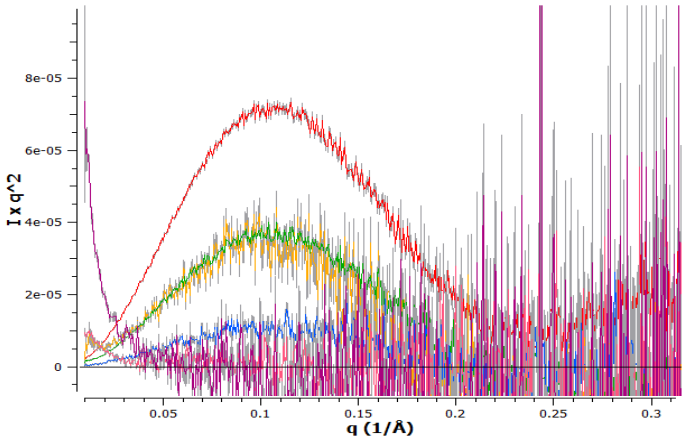

Figure S1x. *Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (green), 1:10 (blue), 1:5 (pink) and 1:1 (purple) $NaNO_3$: water mol ratio*

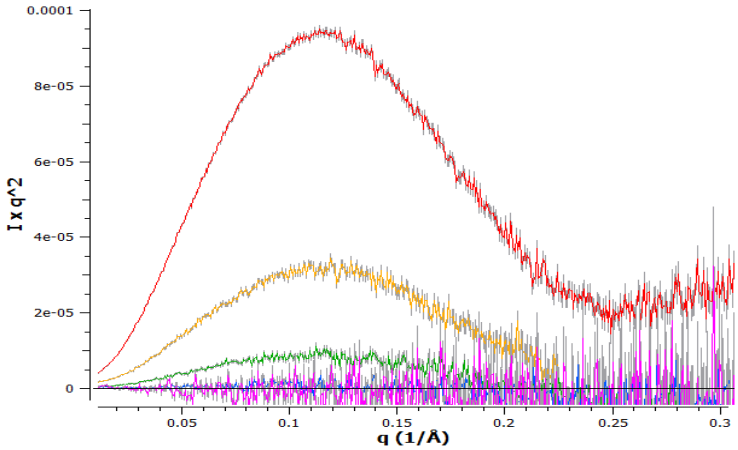

Figure S1y. *Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (green), 1:10 (blue), and 1:5 (pink) $NaHCO_2$: water mol ratio*

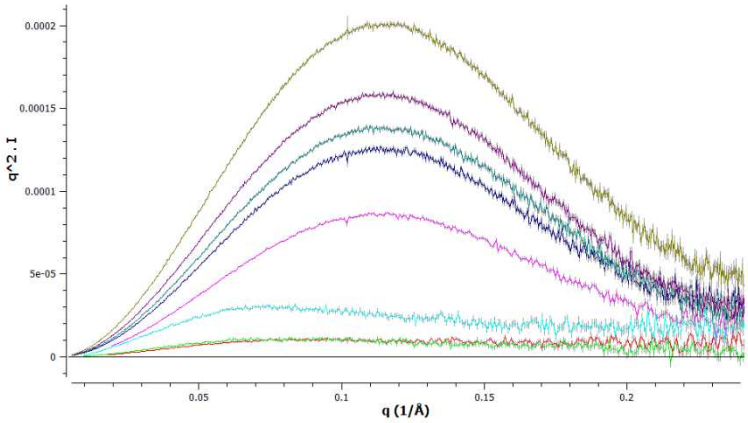

Figure S1z. *Kratky plot of lysozyme in 1:25 (dark green), 1:20 (purple), 1:15 (blue), 1:10 (dark blue), 5:1 (pink), 1:1 (light blue), 5:1 (green), 10:1 (red) EAN : water mol ratio and pure EAN (grey)*

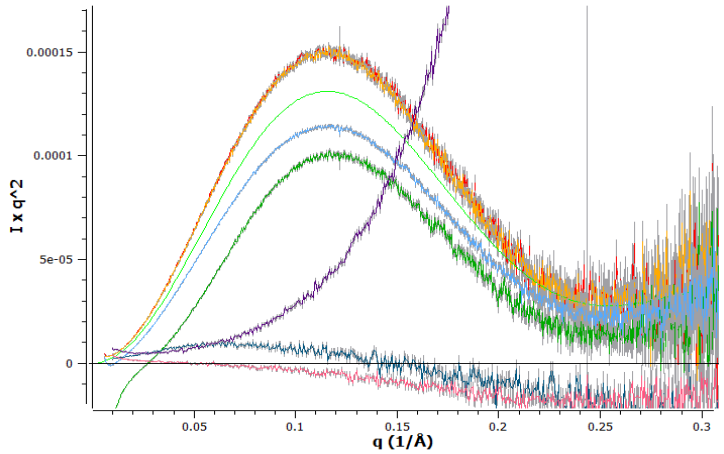

***Figure S1aa**. Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (yellow), 1:10 (light green), 5:1 (dark green), 1:1 (blue), 5:1 (dark blue), 10: (pink) EAF : water mol ratio and pure EAF (purple)*

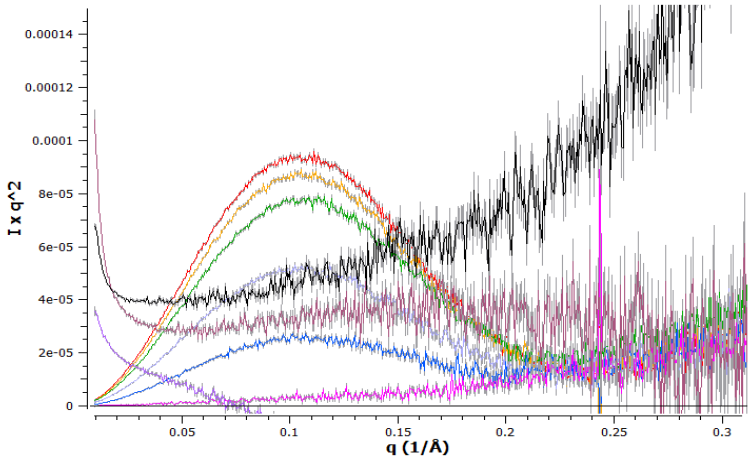

***Figure S1ab**. Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (green), 1:10 (light blue), 5:1 (dark blue), 1:1 (pink), 5:1 (purple), 10: (dark purple) EOAN : water mol ratio and pure EOAN (black)*

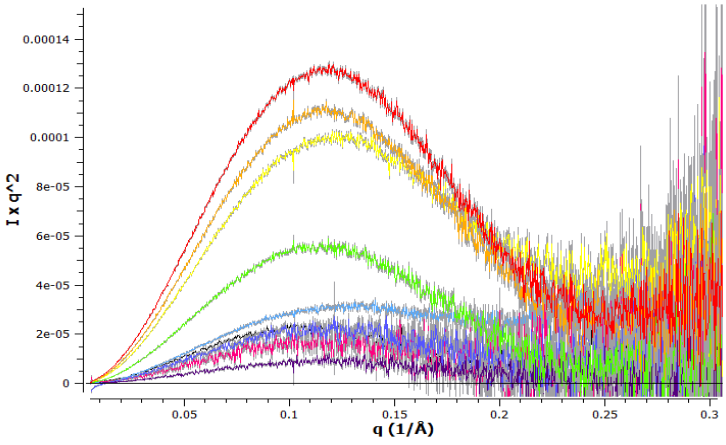

***Figure S1ac**. Kratky plot of lysozyme in 1:25 (red), 1:20 (orange), 1:15 (yellow) , 1:10 (green), 5:1 (blue), 1:1 (dark blue), 5:1 (pink), 10: (purple) EOAF : water mol ratio and pure EOAF (black)*

***Table S1**. Frequency of Amide I peak in molecular solvents*

Solvent	Frequency corresponding to Amide I peak (cm^{-1})					
	1:25	**1:20**	**1:15**	**1:10**	**1:5**	**1:1**
Triethanolamine	1630	1650	1646	1649	1657	1657
3-amino-1,2-propanediol	1656	1654	1657	1640	1654	1655
2-amino-1,3-propanediol	*	1648	1655	1632	1654	1643
2-amino-1-pentanol	*	1650	1628	1622	1628	1648

**data not available*

FTIR spectra

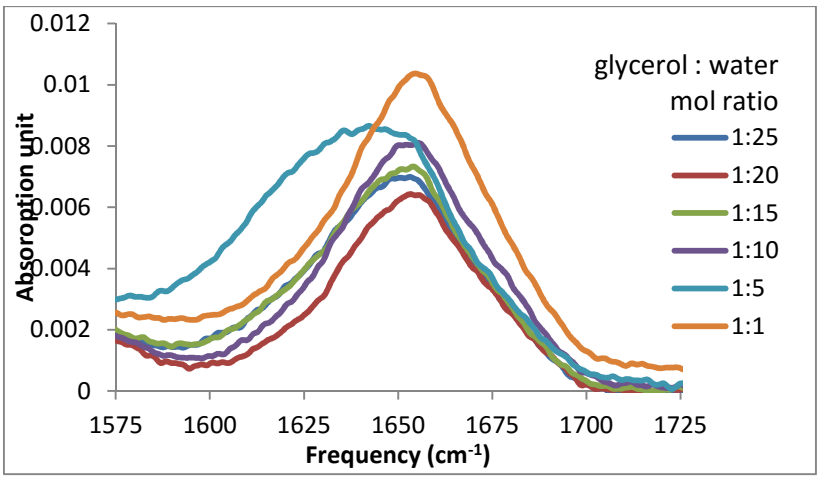

***Figure S2a.** FTIR spectra of Amide I band of lysozyme in increasing concentration of glycerol*

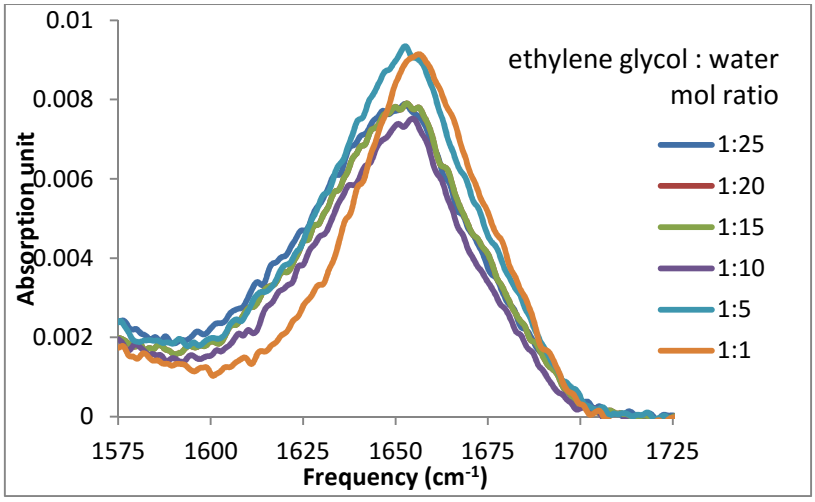

Figure S2b. *FTIR spectra of Amide I band of lysozyme in increasing concentration of ethylene glycol*

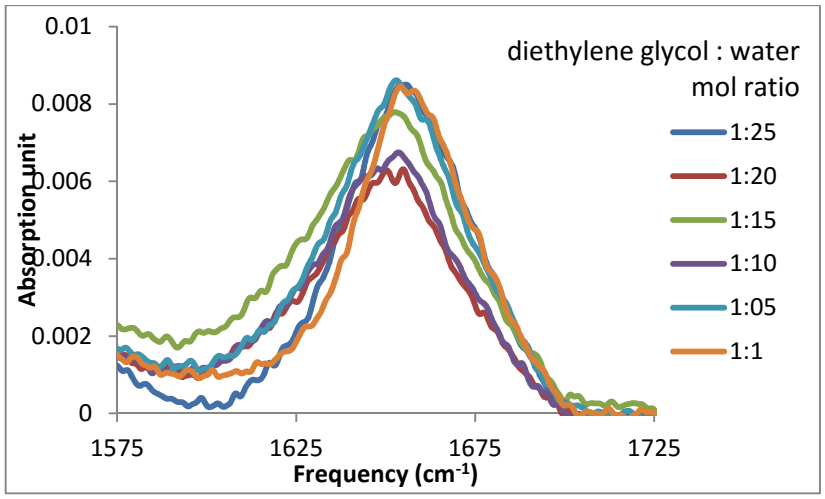

Figure S2c*. FTIR spectra of Amide I band of lysozyme in increasing concentration of diethylene glycol*

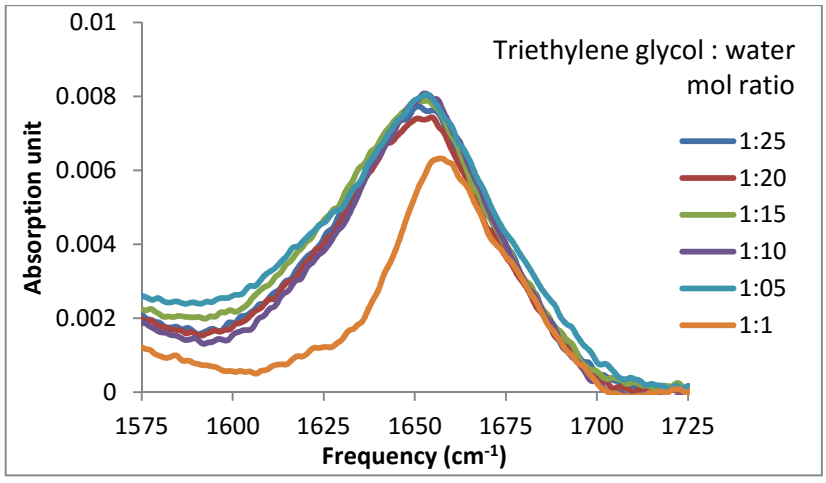

Figure S2d. *FTIR spectra of Amide I band of lysozyme in increasing concentration of triethylene glycol*

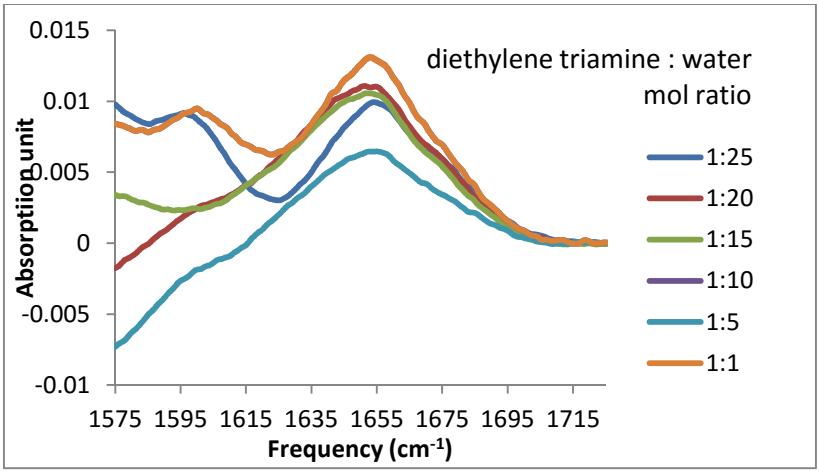

***Figure S2e**. FTIR spectra of Amide I band of lysozyme in increasing concentration of diethylene triamine*

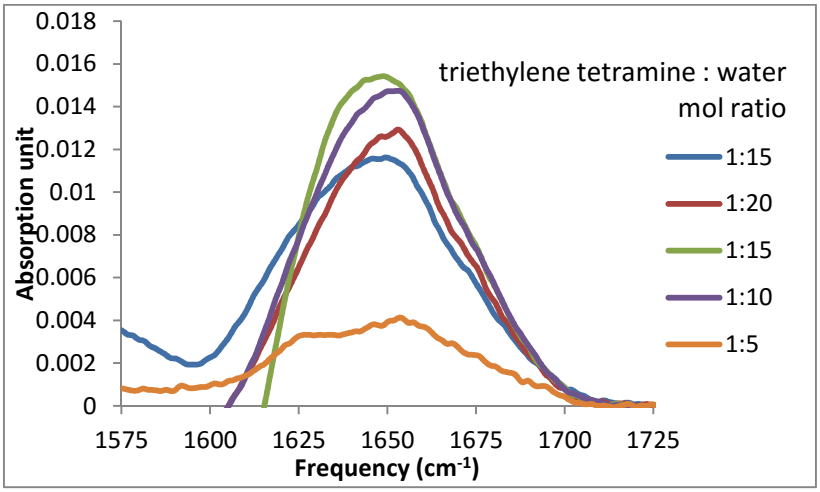

***Figure S2f**. FTIR spectra of Amide I band of lysozyme in increasing concentration of triethylene tetramine*

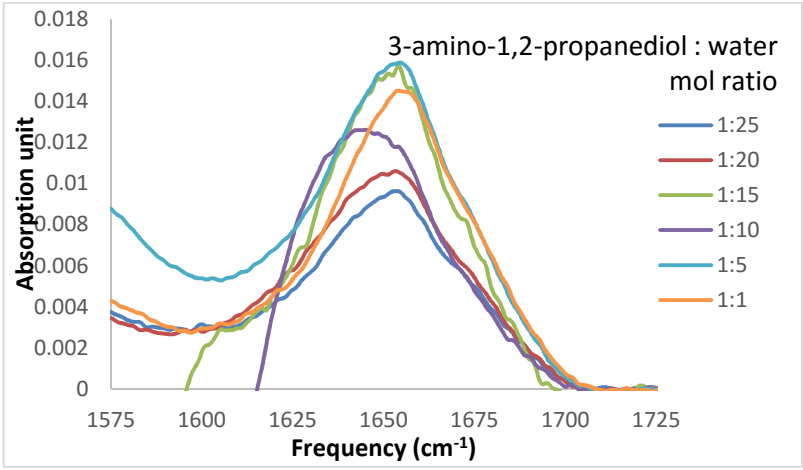

***Figure S2g**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 3-amino-1,2-propanediol*

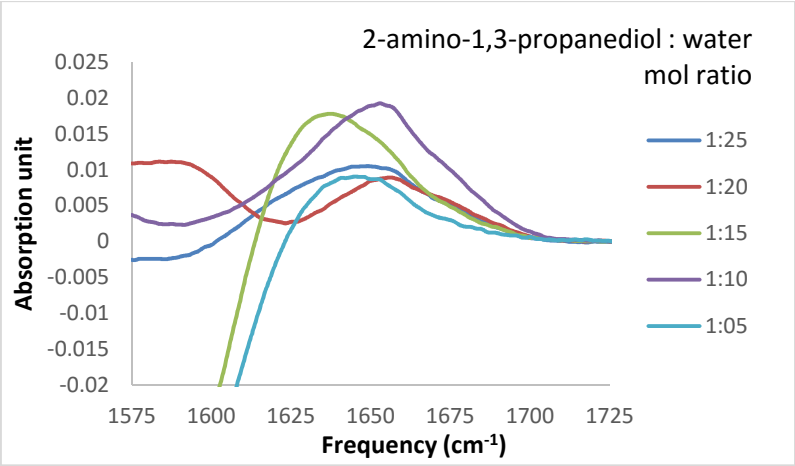

***Figure S2h**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 2-amino-1,3-propanediol*

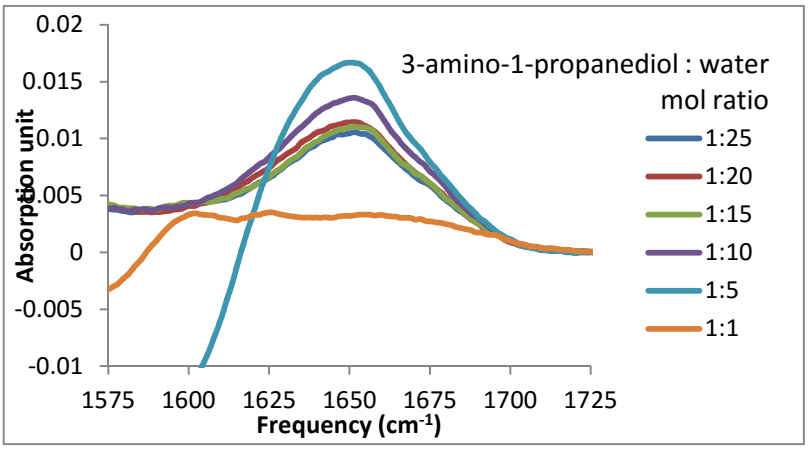

***Figure S2i**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 3-amino-1-propanol*

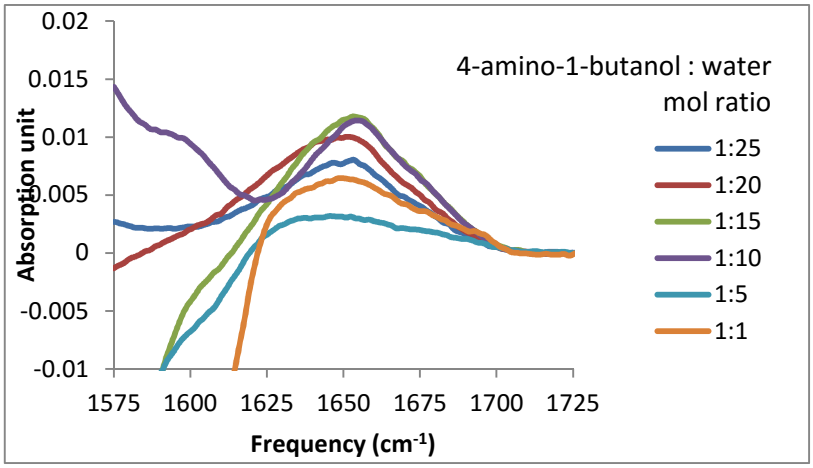

***Figure S2j**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 4-amino-1-butanol*

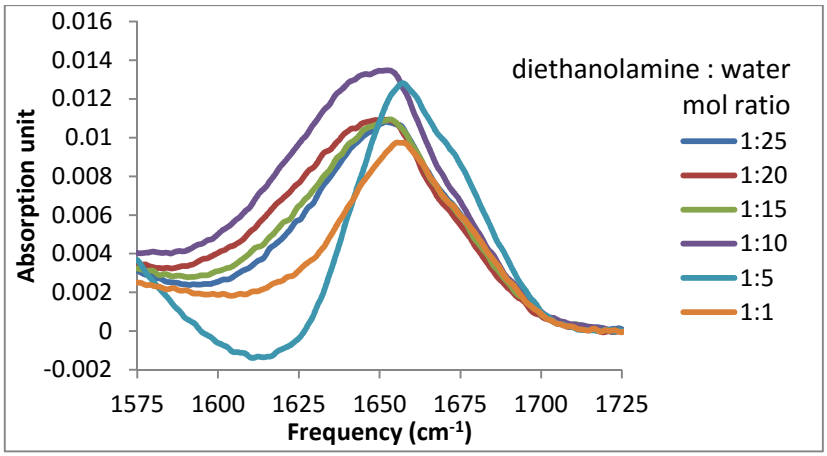

***Figure S2k**. FTIR spectra of Amide I band of lysozyme in increasing concentration of diethanolamine*

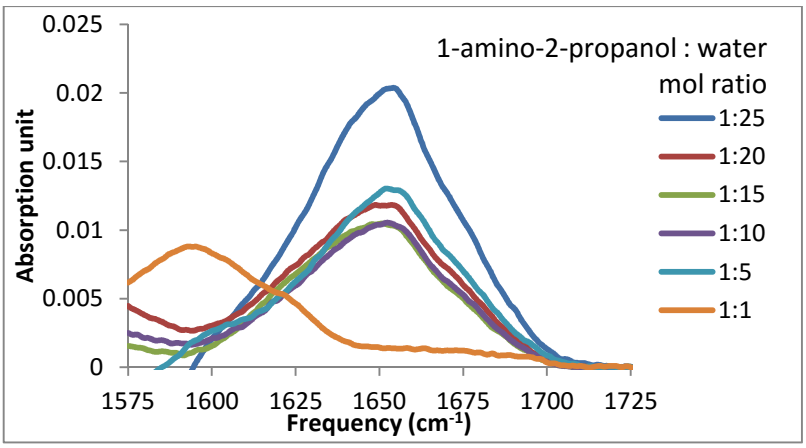

***Figure S2l**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 1-amino-2-propanol*

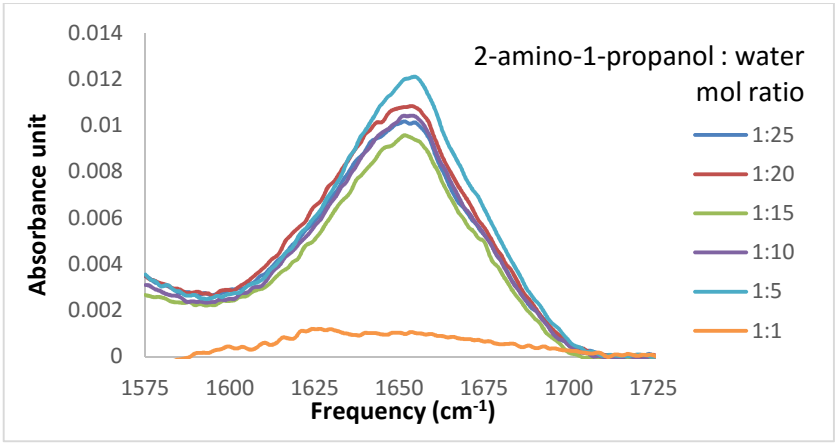

***Figure S2m**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 2-amino-1-propanol*

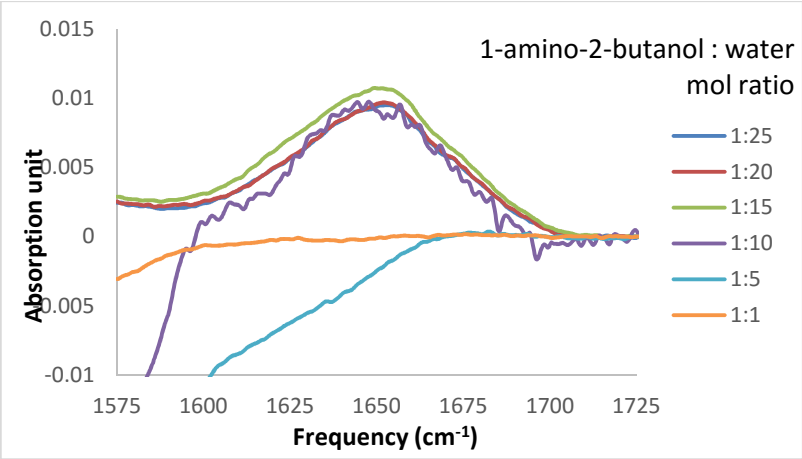

***Figure S2n**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 1-amino-2-butanol*

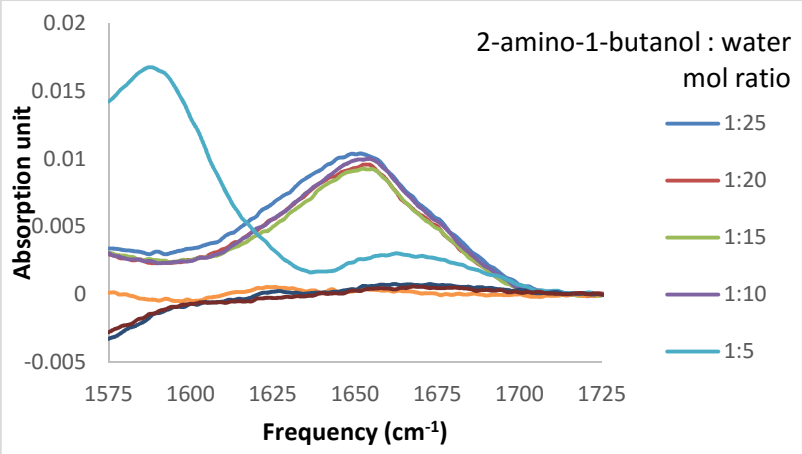

***Figure S2o**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 2-amino-1-butanol*

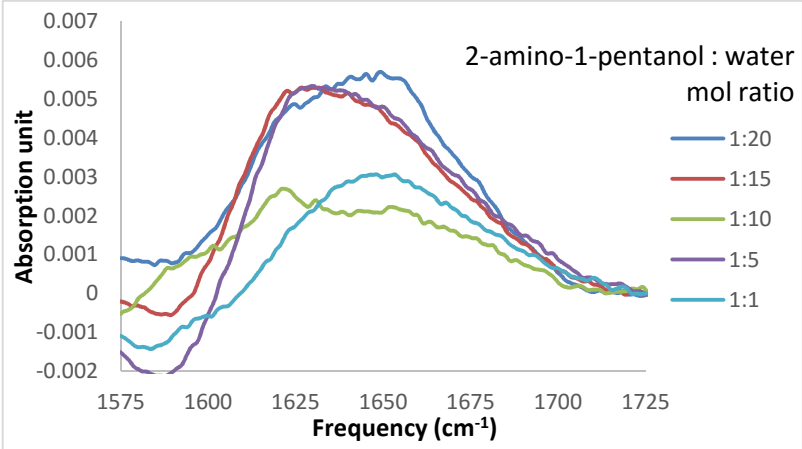

***Figure S2p**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 2-amino-1-pentanol*

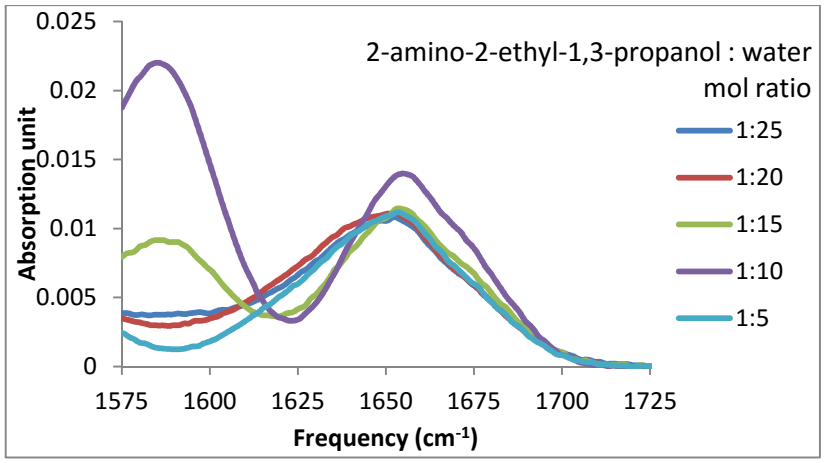

***Figure S2q**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 2-amino-2-ethyl-1,3-propanediol*

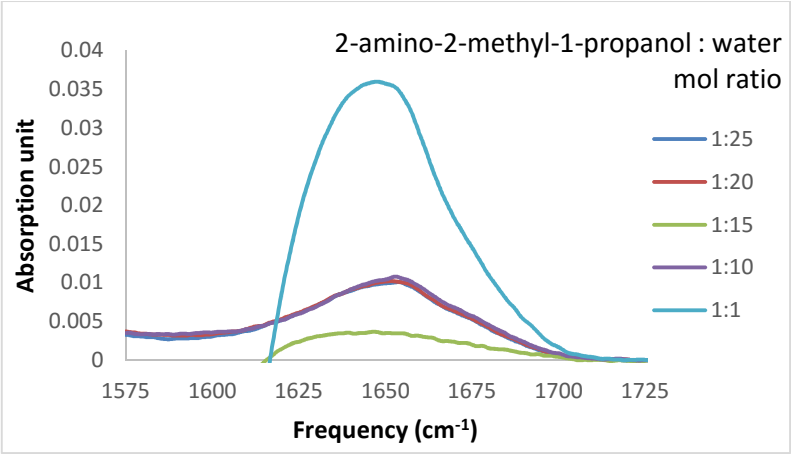

***Figure S2r**. FTIR spectra of Amide I band of lysozyme in increasing concentration of 2-amino-2-methyl-1-propanol*

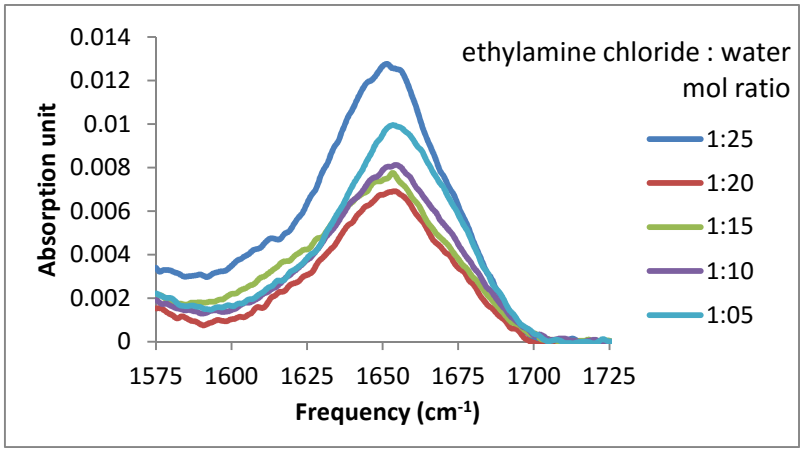

Figure S2s. *FTIR spectra of Amide I band of lysozyme in increasing concentration of ethylamine chloride*

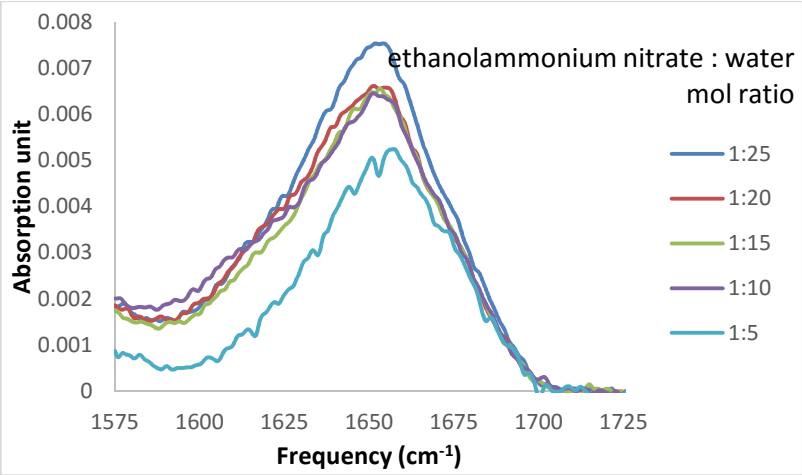

Figure S2t*. FTIR spectra of Amide I band of lysozyme in increasing concentration of ethylammonium chloride*

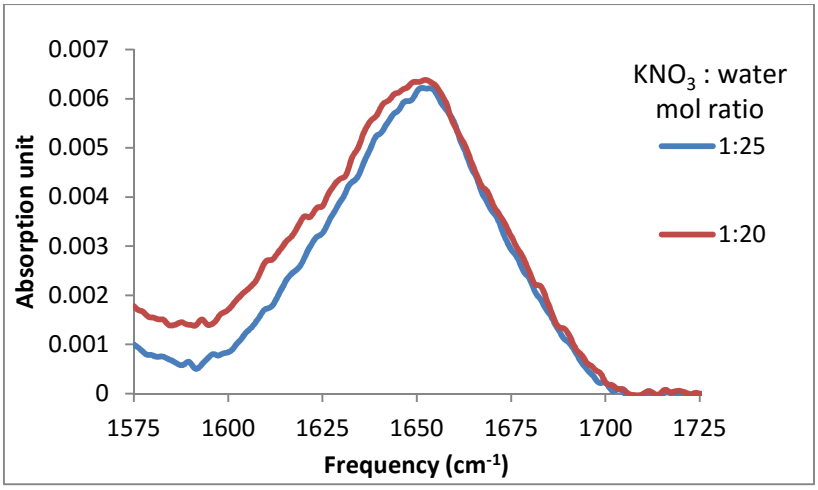

Figure S2u*. FTIR spectra of Amide I band of lysozyme in increasing concentration of potassium nitrate*

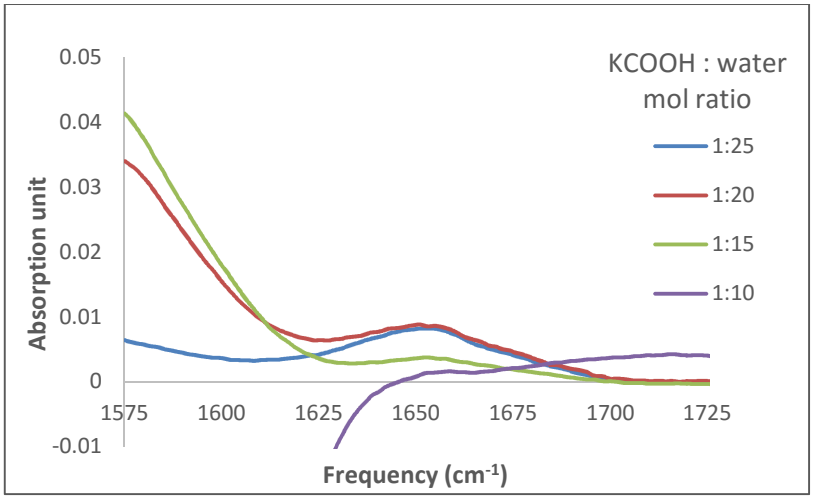

***Figure S2v**. FTIR spectra of Amide I band of lysozyme in increasing concentration of potassium formate*

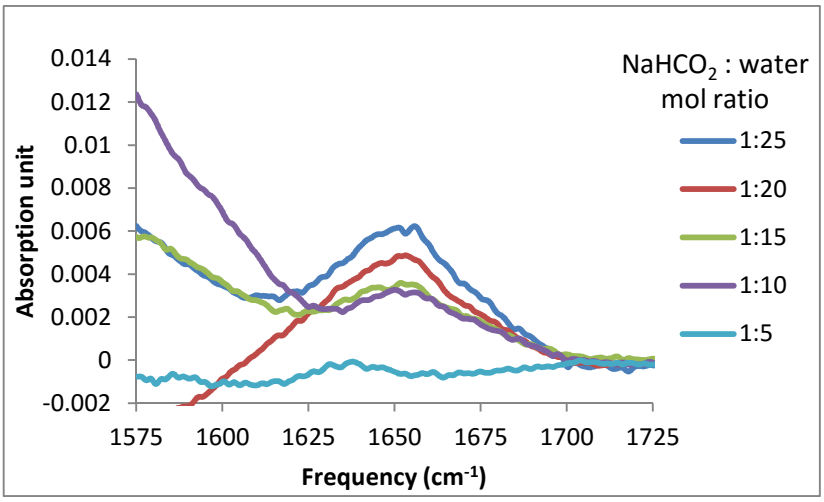

***Figure S2w.** FTIR spectra of Amide I band of lysozyme in increasing concentration of sodium formate*

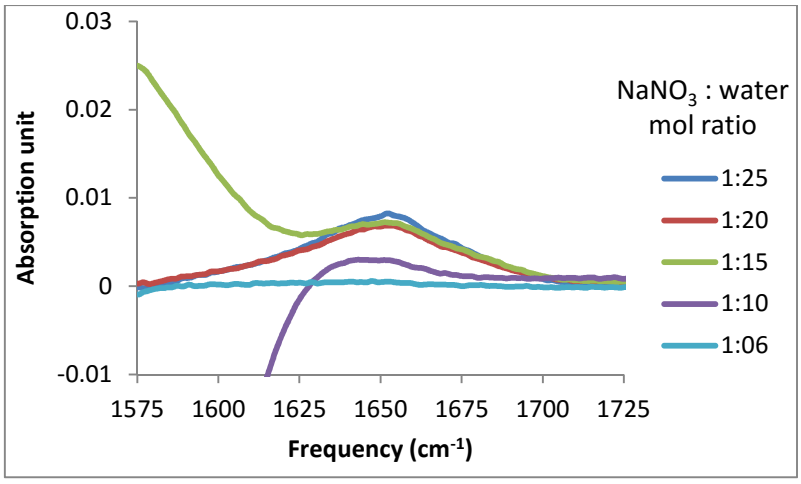

***Figure S2x**. FTIR spectra of Amide I band of lysozyme in increasing concentration of sodium nitrate*

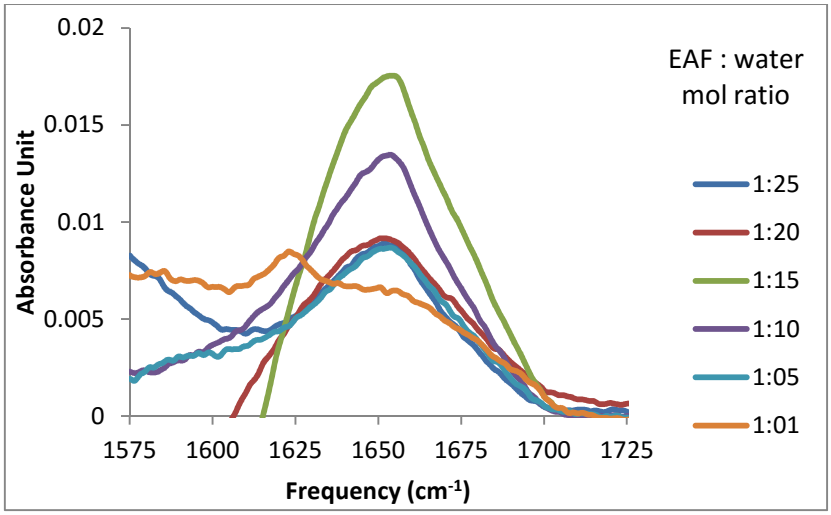

Figure S2y. *FTIR spectra of Amide I band of lysozyme in increasing concentration of EAF*

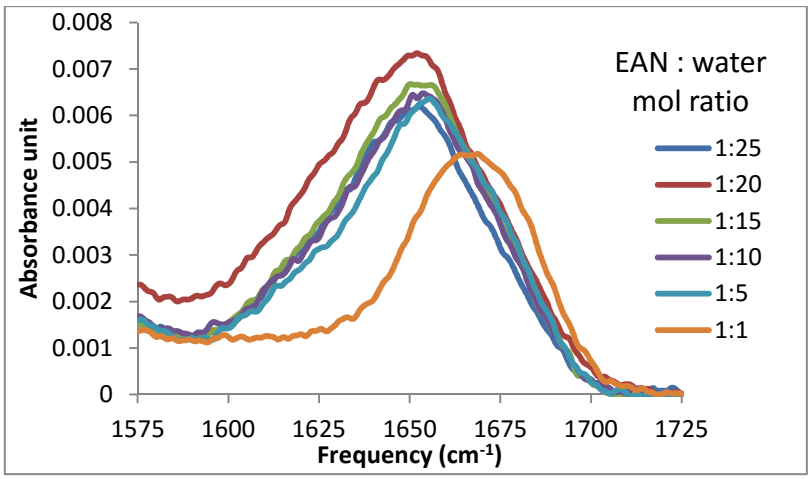

Figure S2z. *FTIR spectra of Amide I band of lysozyme in increasing concentration of EAN*

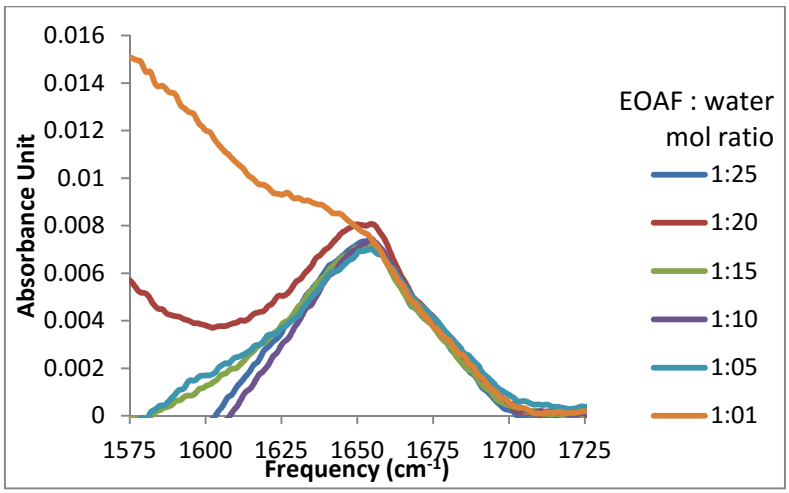

Figure S2aa. *FTIR spectra of Amide I band of lysozyme in increasing concentration of EOAF*

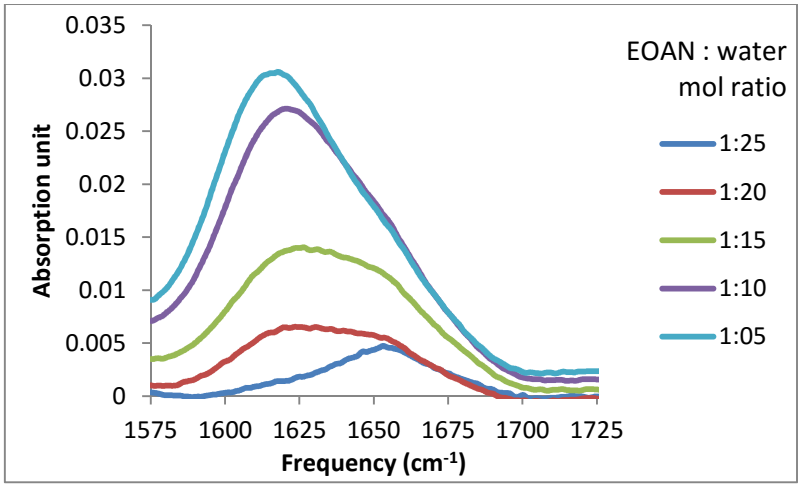

***Figure S2ab**. FTIR spectra of Amide I band of lysozyme in increasing concentration of EOAN*