Surfactant Free Microemulsions as Fluid Scaffolds for Thermal Stabilization of Lysozyme

Manvir Kaur,[a] Manpreet Singh[a], Rajwinder Kaur[a], Navdeep Kaur[b], Pratap. K. Pati and Tejwant S. Kang[a]*

[a]Department of Chemistry, University Grants Commission (UGC) Centre for Advanced Studies-II, Guru Nanak Dev University, Amritsar-143005, Punjab, India.
[b]Department of Biotechnology, Guru Nanak Dev University, Amritsar-143005, Punjab, India

Electronic Supplementary Information

**To whom correspondence should be addressed:*

*e-mail: tejwantsinghkang@gmail.com; tejwant.chem@gndu.ac.in Tel: +91-183-2258802-Ext-3291

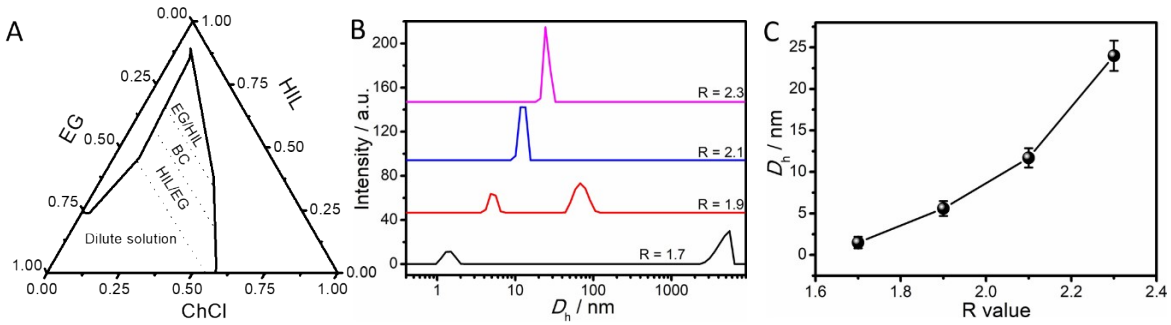

Figure S1: (A) Phase diagram of the investigated system at 28 °C showing different regions of SFME. (B) Intensity weighted size distribution and (C) the variation in the hydrodynamic diameter (D_h) of micro-droplets as a function of R value.

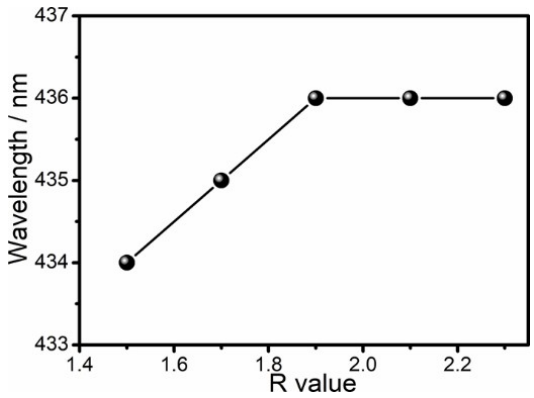

Figure S2: The variation of λ_{max} of MO as a function of R value.

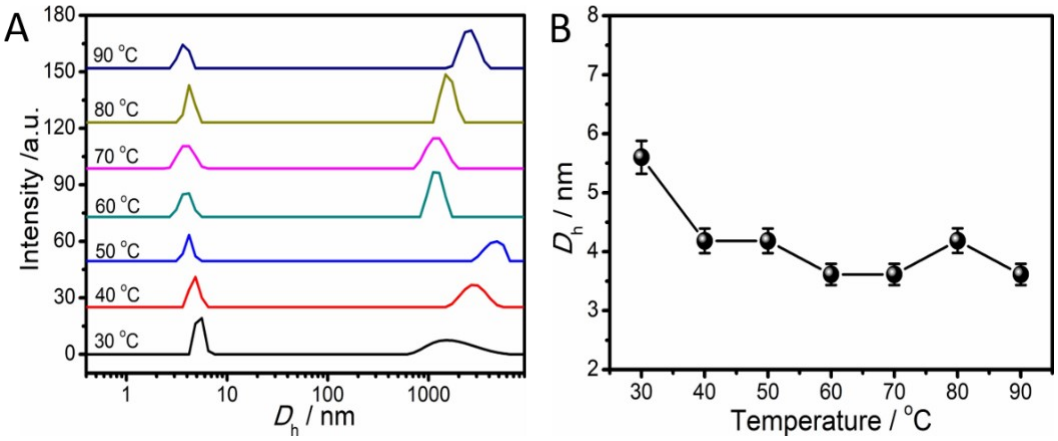

Figure S3: (A) Intensity weighted size distribution and (B) the variation in the hydrodynamic diameter (D_h) of micro-droplets in SFME (R = 1.9) as a function of temperature.

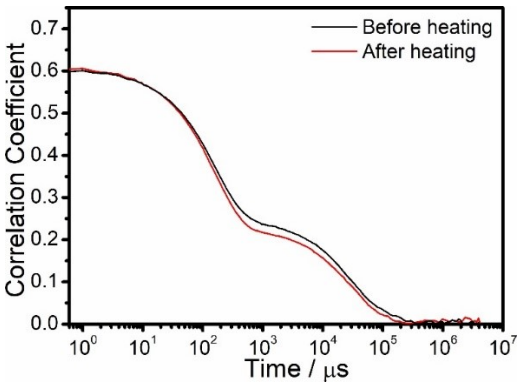

Figure S4: Correlation function of SFME before and after heat treatment.

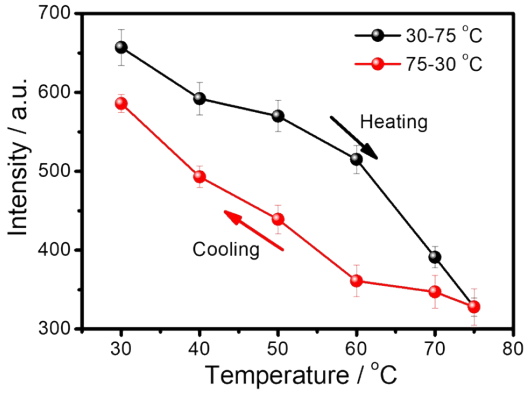

Figure S5: The variation in the intensity of fluorescence of LYZ as a function of temperature in SFME.

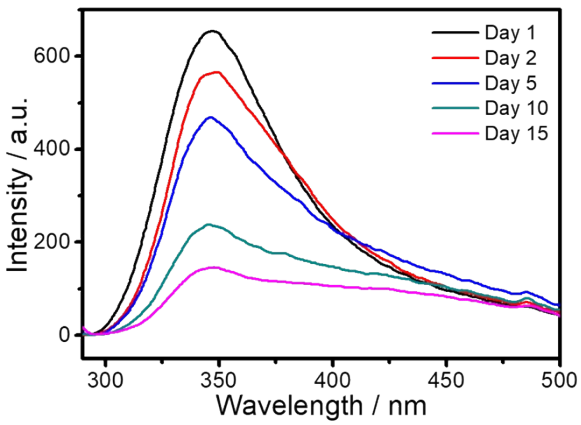

Figure S6: Intrinsic fluorescence spectra of LYZ in SFME when excited at 280 nm with time.

Table S1: Interactional energy between different components of SFME.

S. No.	Type of Energy	Energy at Hydrophobic Interface (HIL-ChCl)	Energy at Hydrophilic Interface (ChCl-EG)
1.	Electrostatic Energy	-14.73	-49.54
2.	Exchange Energy	-2.74	-22.54
3.	Repulsion Energy	19.55	75.45
4.	Polarization Energy	-9.79	-30.13
5.	Dispersion Energy	-6.44	-9.84
6.	Total Interaction Energy	-14.14	-36.59

Table S2: Second order perturbation theory analysis of the Fock matrix in the NBO basis for the intermolecular interactions between hydrophilic and hydrophobic interfaces.

Complex	Donor NBO (i)	Acceptor NBO (j)	E(2) (kcal mol^{-1})	E(j)-E(i) (a.u)	F (i,J) (a.u)
Hydrophilic Interface (ChCl-EG)	LP O 62	BD* O 7 – H 8	28.73	0.91	0.144
	LP Cl 19	BD* O 62 – H 63	19.57	0.66	0.102
	LP Cl 19	BD* O 60 – H 61	5.53	0.65	0.053
Hydrophobic Interface (HIL-ChCl)	LP O 45	BD* C 1 - H 2	1.76	2.76	0.058
	LP O 45	BD* C 14 - H 15	1.03	3.86	0.031
	LP O 45	BD* C 9 - H 66	2.31	2.73	0.072