# Electronic Supplementary Information (ESI)

**From Micron to Nano-Curcumin by sophorolipid co-processing: Highly enhanced bioavailability, fluorescence, and anti-cancer efficacy**

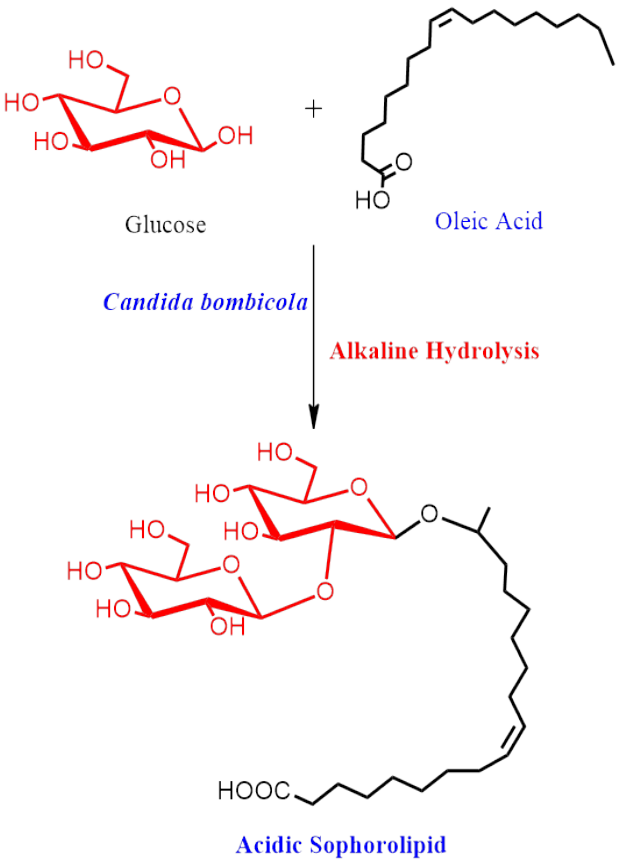
*Pradeep Kumar Singh[a,b], Kirtee Wani[c], Ruchika Kaul-Ghanekar[c], Asmita Prabhune[b,*] and Satishchandra Ogale[a,*]*

a) Physical and Materials Chemistry Division, National Chemical Laboratory (NCL), Council of Scientific and Industrial Research (CSIR), Dr. Homi Bhabha Road, Pashan, Pune 411008, India
E-mail: sb.ogale@ncl.res.in,

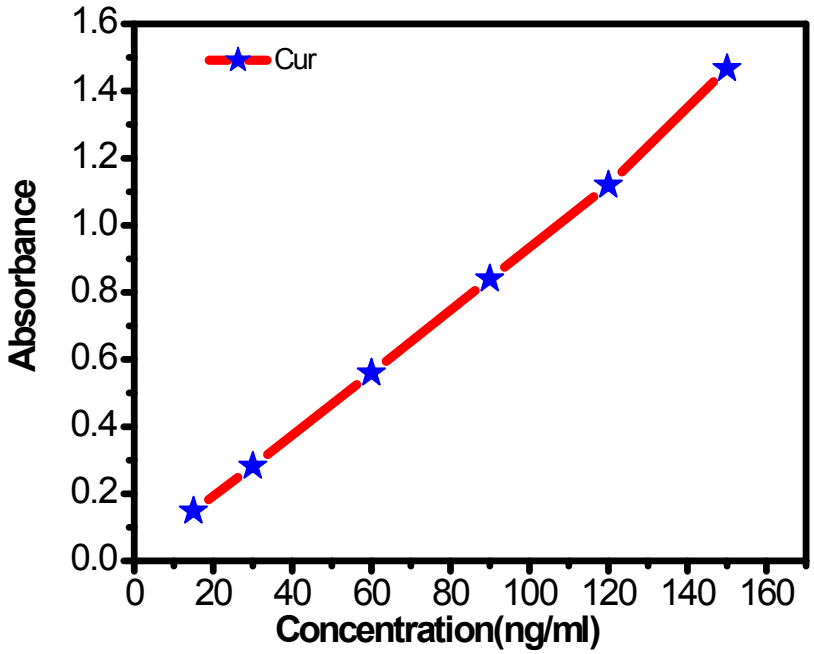
b) Biochemical Sciences Division, National Chemical Laboratory (NCL), Council of Scientific and Industrial Research (CSIR), Dr. Homi Bhabha Road, Pashan, Pune 411008, India
E-mail: aa.prabhune@ncl.res.in

c) Cell and Translational Research Lab, Interactive Research School for Health Affairs (IRSHA), Bharati Vidyapeeth Deemed University, Pune

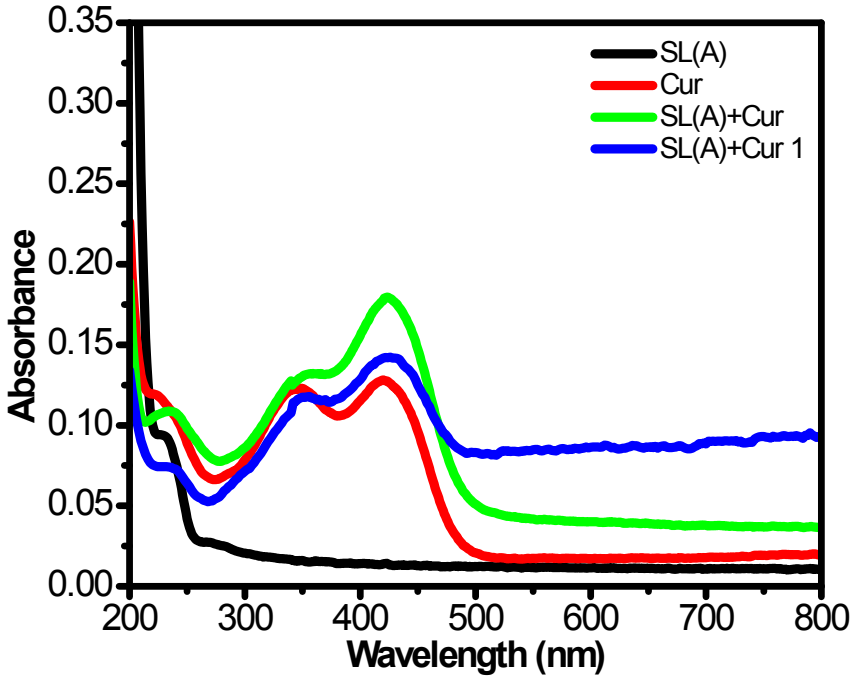
## 1. Sophorolipid (SL(A)) synthesis



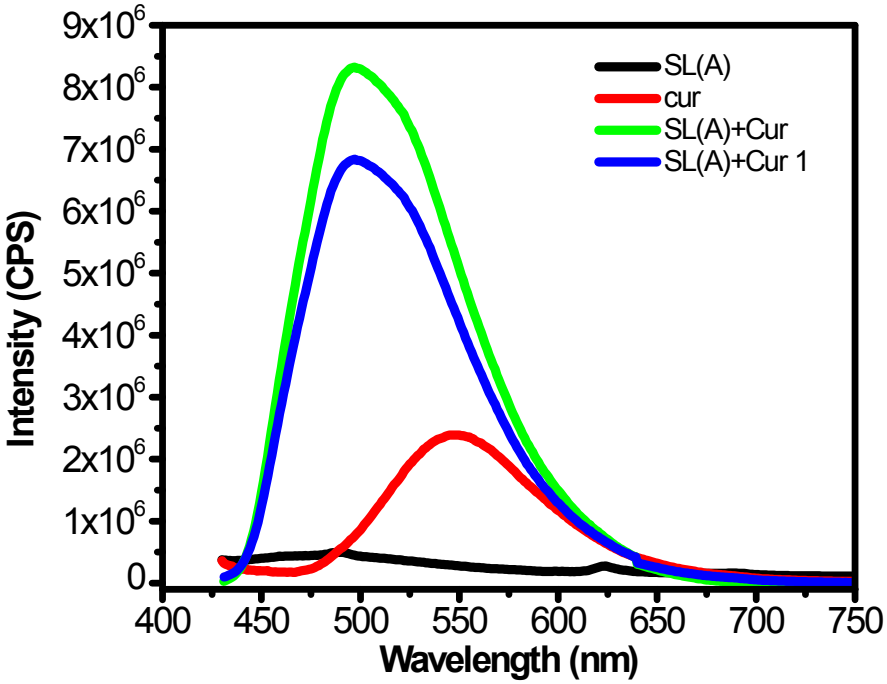

**ESI Fig. S1** Basic structure of SL produced by yeast C. bombicola after purification process



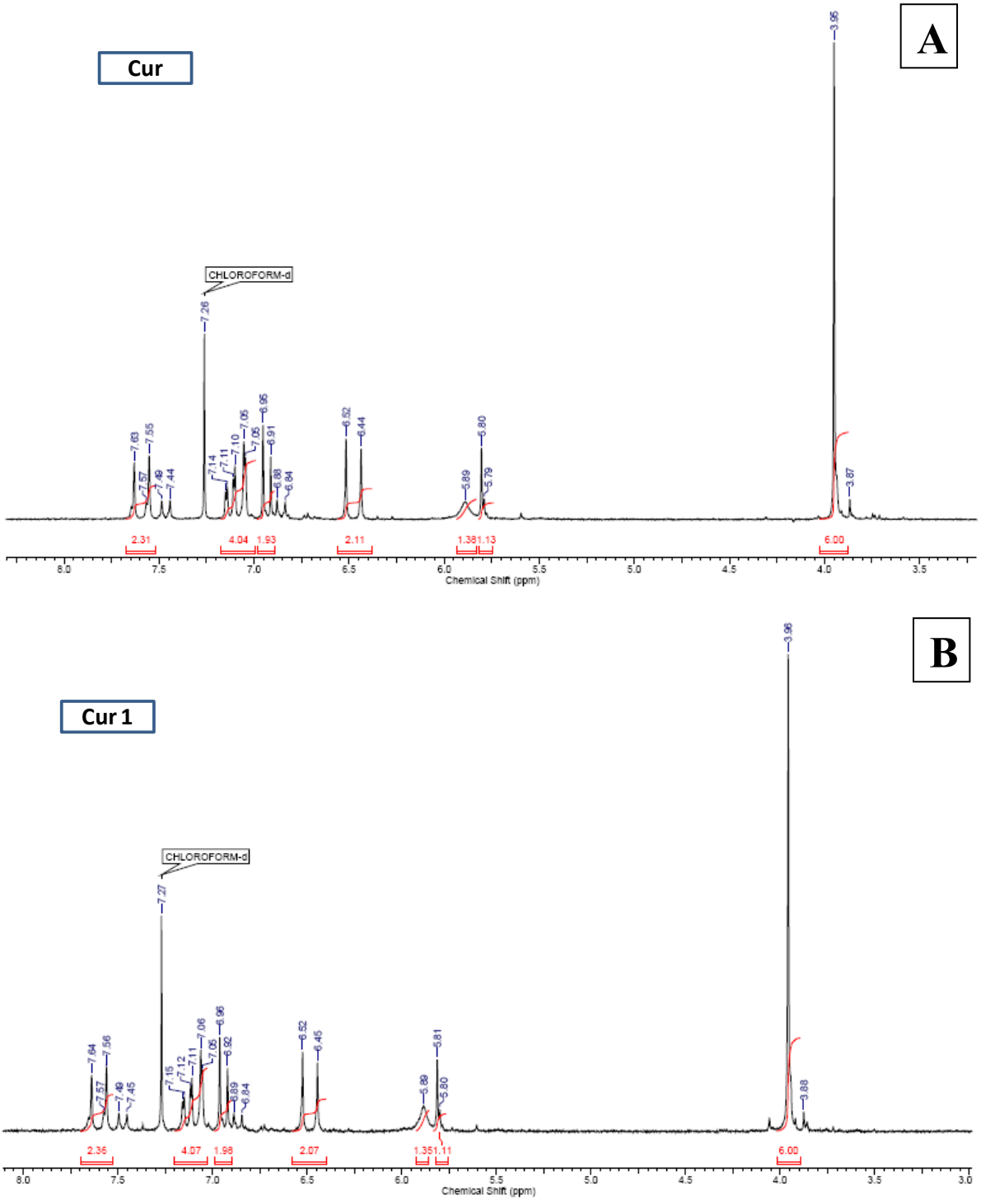

**ESI Fig. S2** The curcumin concentration calculated using standard solutions with different amounts of pristine curcumin dissolved in ethanol. Curcumin was dissolved in ethanol and measured for absorbance at 420 nm using a UV-Vis spectrophotometer to determine its concentration in the SL(A)+Cur nano-complex.




**ESI Fig. S3** UV-Visible spectra of SL (A), Curcumin and SL(A)+ Cur solutions. SL(A) solution shows absorbance at λ=234 nm and Curcumin solution at λ=344 and 420 nm while SL(A) + Cur showing increase absorption at one peak at 420 nm. Blue line shows the stability of nano complex after four months.




**ESI Fig. S4** Photoluminescence study of SL(A), Curcumin and SL(A)+ Cur solutions. The SL(A) solution shows no PL. Curcumin solution shows PL at 550 nm while SL(A) + Cur showing very strong Photoluminescence at 500 nm; Blue line shows the stability of nano complex after four months.




**ESI Fig. S5** NMR study of **(A)** Curcumin and **(B)** curcumin in SL(A)+ Cur solutions after four month stability.

**Sample preparation for NMR**

Chloroform was added in SL(A)+Cur aqueous solution to extract curcumin from nano-complex. The sample was rotator evaporator and vacuum dried for 60 min to remove chloroform. Curcumin crystals, as a control, were dissolved in chloroform and vacuum-dried

as above the encapsulated curcumin. The obtained curcumin powders were dissolved in deuterated chloroform for 1H NMR study.