Supporting Information

Effect of Vitamin E and a Long Chain Alcohol n-Octanol on the Carbohydrate based Non-ionic Amphiphile Sucrose Monolaurate – Formulation of Newly Developed Niosomes and Application in Cell Imaging

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1. Solution Preparation.

To prepare sucrose monolaurate-vitamin E/octanol niosome solutions of varying vitamin E and octanol content, first appropriate amounts of sucrose monolaurate was taken in separate glass bottles so that the final concentration of sucrose monolaurate in aqueous solution becomes 10 mM which is well above their critical micelle concentration (CMC) values. Afterwards, different amounts of vitamin E or octanol were added into each glass bottle in order to vary their content in terms of R values (R = vitamin E or octanol /sucrose monolaurate molar ratio = (Conc. of vitamin E or octanol)/(Conc.of sucrose monolaurate)) from 0 to 1. Finally, the resulting mixtures were sonicated using a bath sonicator (Oscar Ultrasonic) for 5 min and vortexed for 2 min at 298K to obtain the niosome solutions.Then, the solutions are half diluted and stored in a fridge at 8-10^{0}C. Finally, this half-diluted solution was used for all experiments.

2. Instrumentations.

2.1. Turbidity Measurement.

The turbidity measurement was done by determining the transmittance of the solution using a Shimadzu (model no. UV-2405) spectrophotometer. The turbidity of sucrose monolaurate-vitamin E/octanol niosome solutions as a function of increasing vitamin E and octanol content (R) were measured.The wavelength for the measurement of optical density was selected to be 600 nm where there is no absorption of the individual components.

2.2. Malvern Nano ZS instrument.

In Malvern Nano ZS instrument, a 4 mW He−Ne laser (λ = 632.8 nm) is used. In this instrument detector is poisoned at 173º angle. The hydrodynamic diameter (d_h) of micelles or

niosomal aggregates was calculated by using the scattering intensity according to following equation:

$$d_h = \frac{k_B T}{3\pi\eta D} \qquad (1)$$

Where, k_B, T, D and η denotes Boltzmann constant, Temperature, diffusion coefficient and viscosity respectively.

Zeta potential was also measured using this instrument.

2.3. Transmission Electron Microscopy Measurements.

For transmission electron microscopy (TEM) measurements, the JEOL model JEM 2100 transmission electron microscope is used. The operating voltage of the instrument is 200 kV to obtain the morphology of various niosome aggregates.

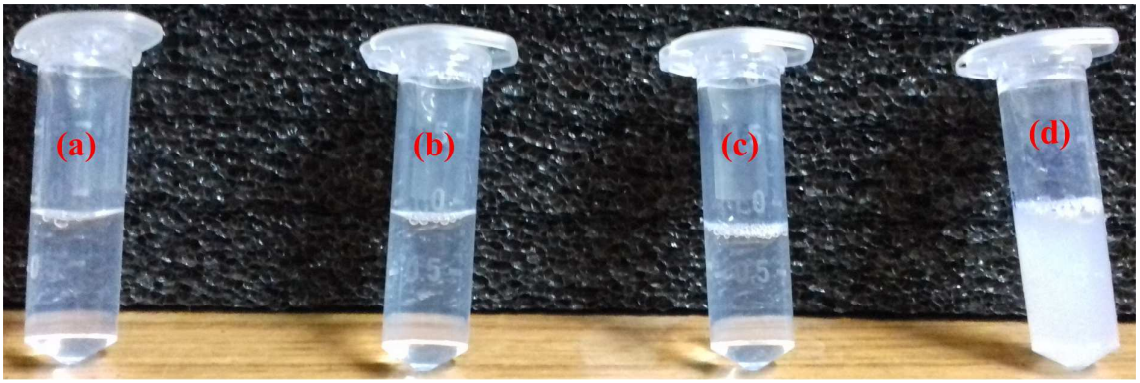

Figure S1. Optical micrographs of (a) sucrose monolaurate micelle, (b) sucrose monolaurate-n-pentanol, (c) sucrose monolaurate-n-hexanol and (d) sucrose monolaurate-n-octanol solutions at R=1. The turbidity of sucrose monolaurate- n-octanol solution indicates niosome formation occurs only in presence of n-octanol and the lower order analogues do not produce niosomal dispersion.

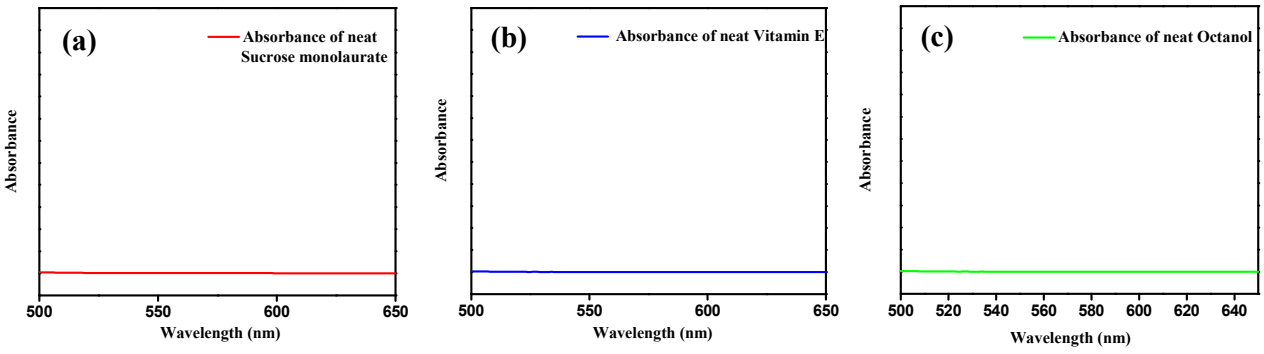

Figure S2. Absorption spectra of neat (a) sucrose monolaurate, (b) vitamin E and (c) octanol.

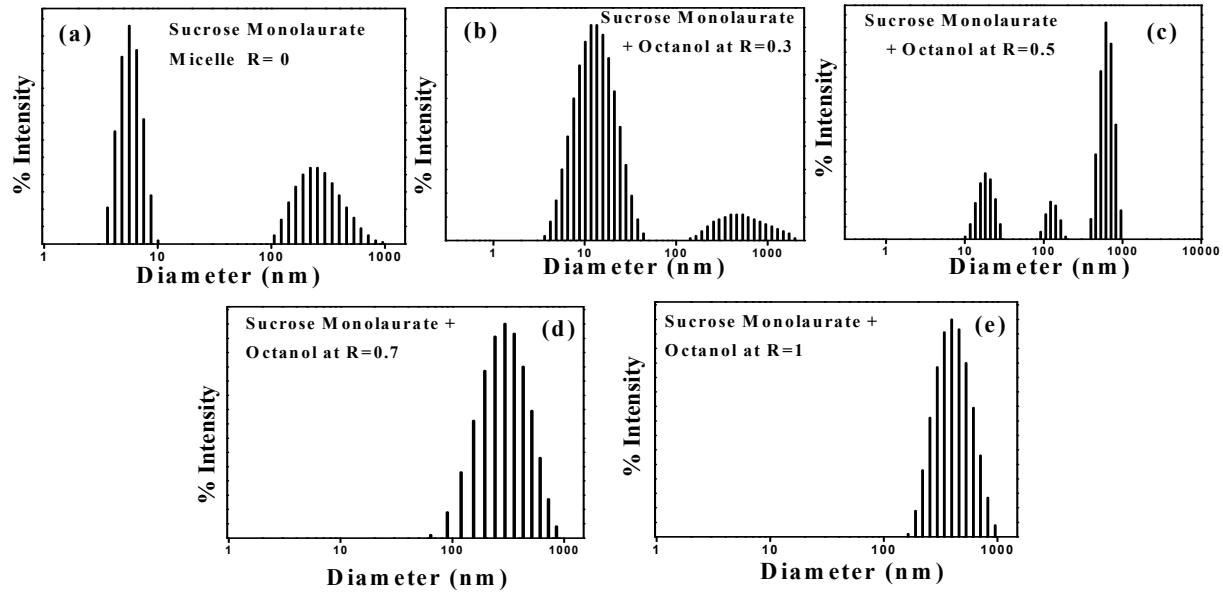

Figure S3. DLS intensity-size distribution of sucrose monolaurate-octanol containing niosomes at (a) R=0, (b) R=0.3, (c) R=0.5, (d) R=0.7 and (e) R=1.

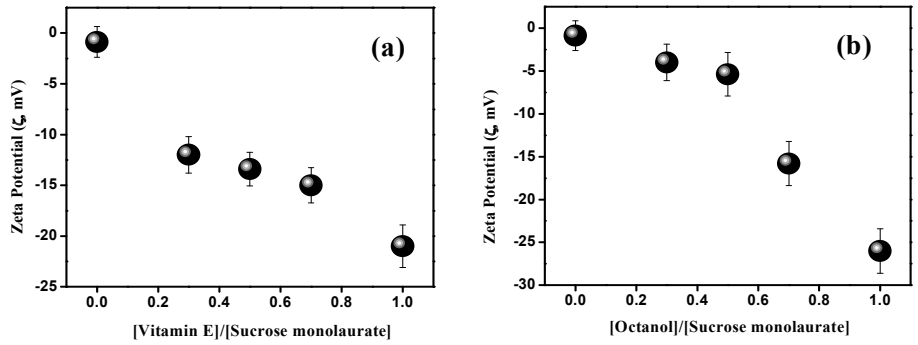

Figure S4. Variation of zeta potential (ζ) of (a) sucrose monolaurate-vitamin E and (b) sucrose monolaurate-octanol containing niosomes at various concentrations of vitamin E and octanol respectively.

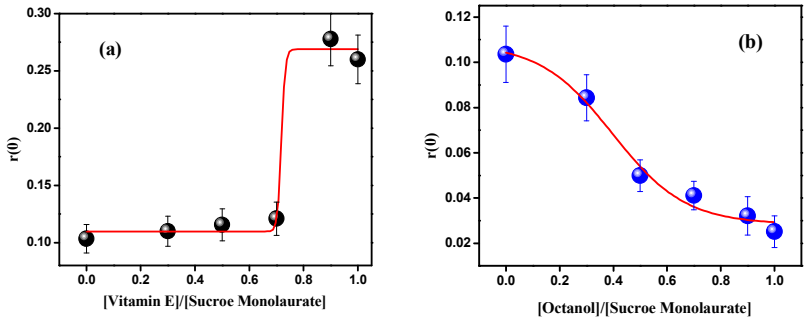

Figure S5. Variation of steady-state anisotropy of DPH in the (a) sucrose monolaurate-vitamin E and (b) sucrose monolaurate-octanol self-assembled solutions with increasing R values.

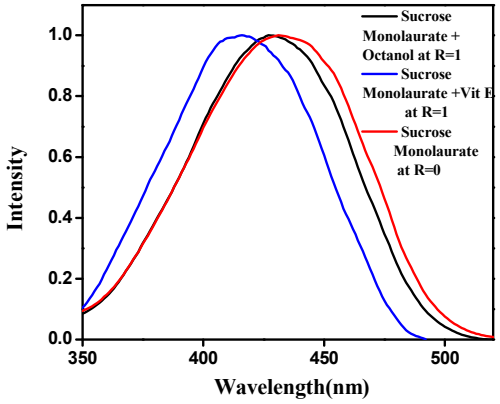

Figure S6. Variation in excitation spectra of C153 in sucrose monolaurate micelle, sucrose monolaurate-vitamin E and sucrose monolaurate-octanol containing niosomes at R=1.