Supporting informations

Concentrated O/W Emulsion Stability of Non-Ionic Chitosan Oligomer Surfactants Modified by Epoxidized Fatty Chains at pH7: Influence of Emulsification Conditions

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Characterizations of synthesized molecules

Characterization of COS-oxime

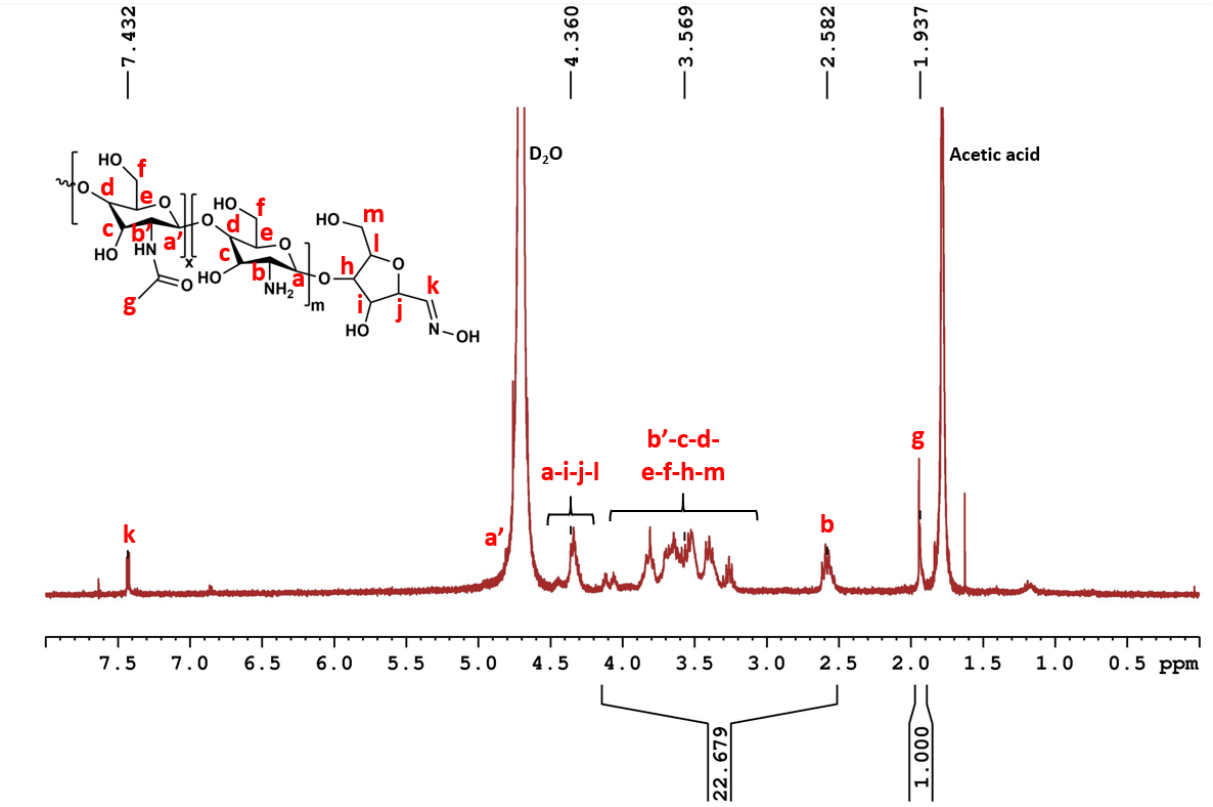

Figure S1. ^{1}H NMR (400 MHz, D_2O) spectrum, and proton assignments for DP10-oxime.

Characterization of COS-C9

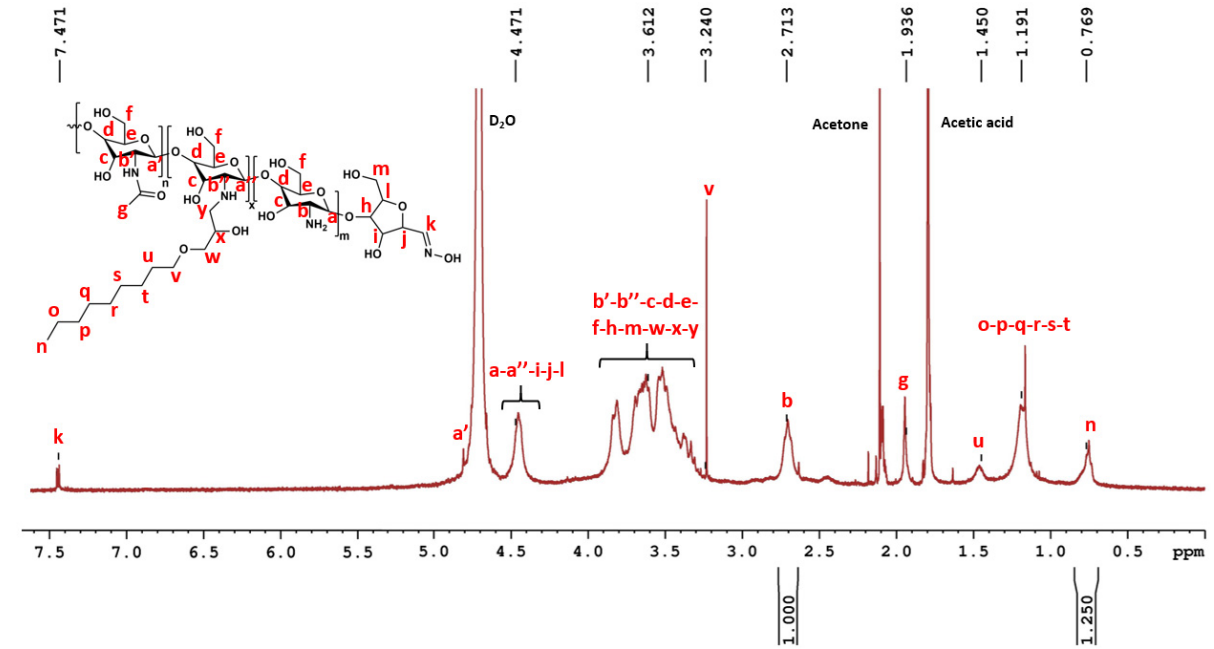

Figure S2. ^{1}H NMR (400 MHz, D_2O) spectrum, and proton assignments for DP10-C9.

Characterization of COS-C16

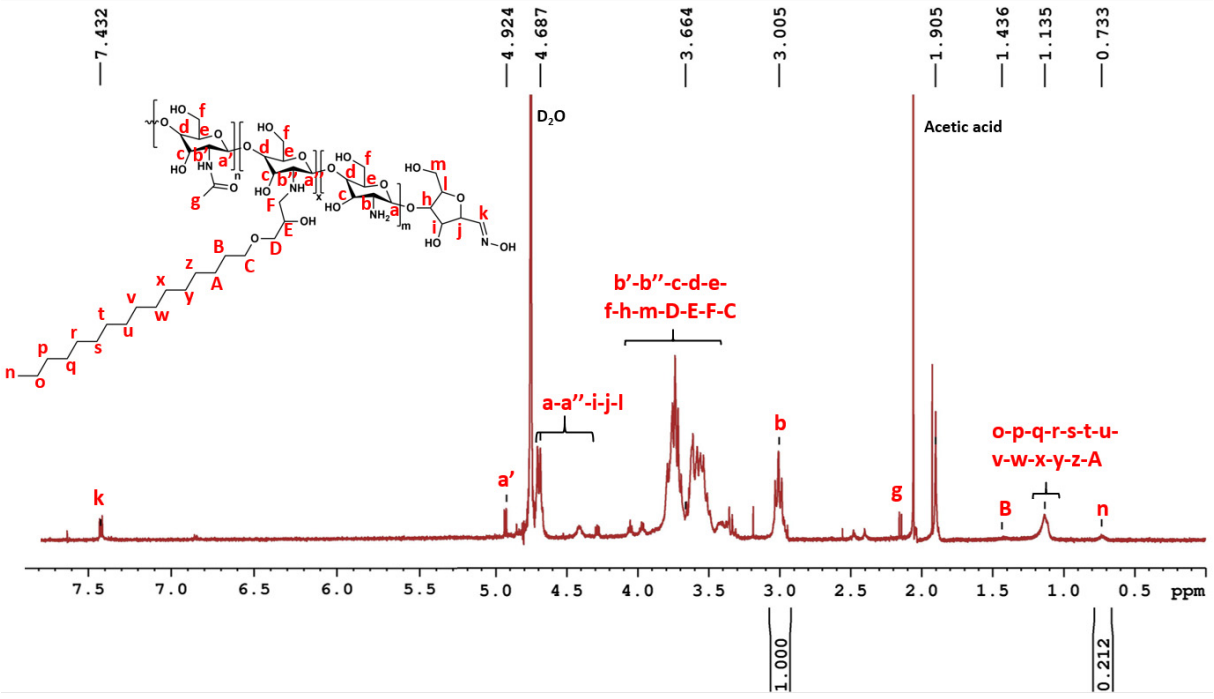

Figure S3. ^{1}H NMR (400 MHz, D_2O) spectrum, and proton assignments for DP10-C16.

Characterization of COS-card

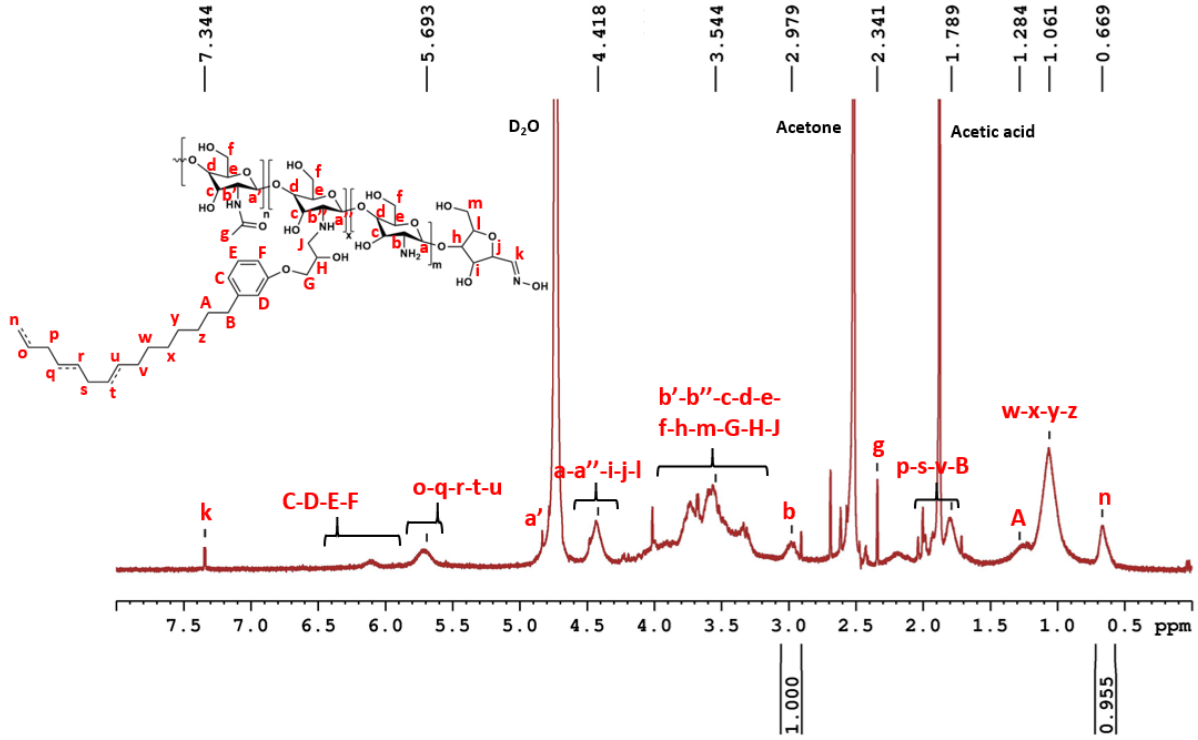

Figure S4. ^{1}H NMR (400 MHz, D_2O) spectrum, and proton assignments for DP10-card.

Characterizations of emulsions

Comparison of average droplet size using two different methods

Method used	1 minute	2 minutes	3 minutes	4 minutes
Light scattering	14.9	14.2	13.9	13.9
Image J	14.8	13.9	13.7	13.8

Figure S5. Comparison of average droplet size (in μm) determination by light scattering and Image J (microcopy images) for the experiment as a function of stirring time. For the Image J results, average droplet size was calculated by averaging 200 droplets for each sample.

Rheological measurements to highlight the anti-thixotropic behavior

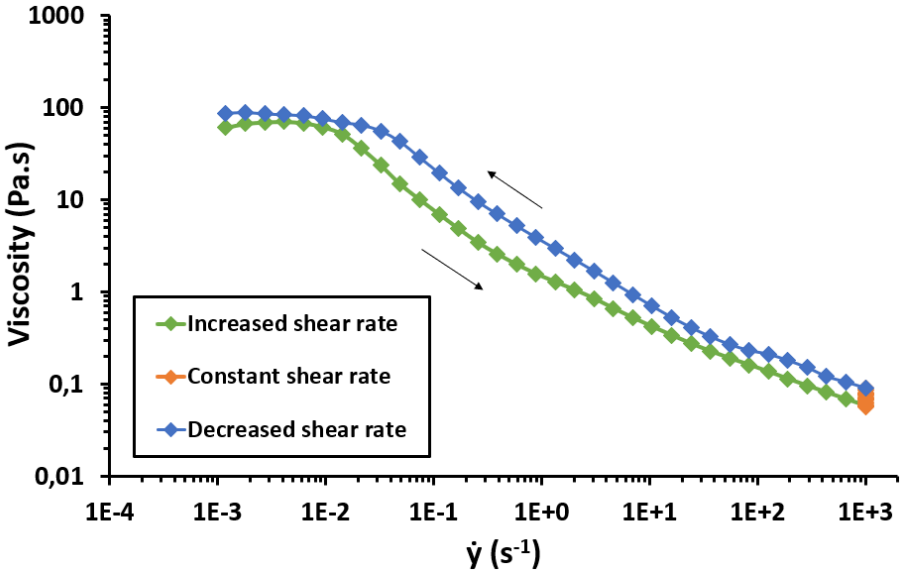

Figure S6. Viscosity profile of the emulsion with D10-card surfactant (stirring speed of 16500 rpm and stirring time of 4 minutes). An increase and then a decrease in shear rate were used to highlight the anti-thixotropic behavior.

Size distribution of emulsions as a function of stirring time

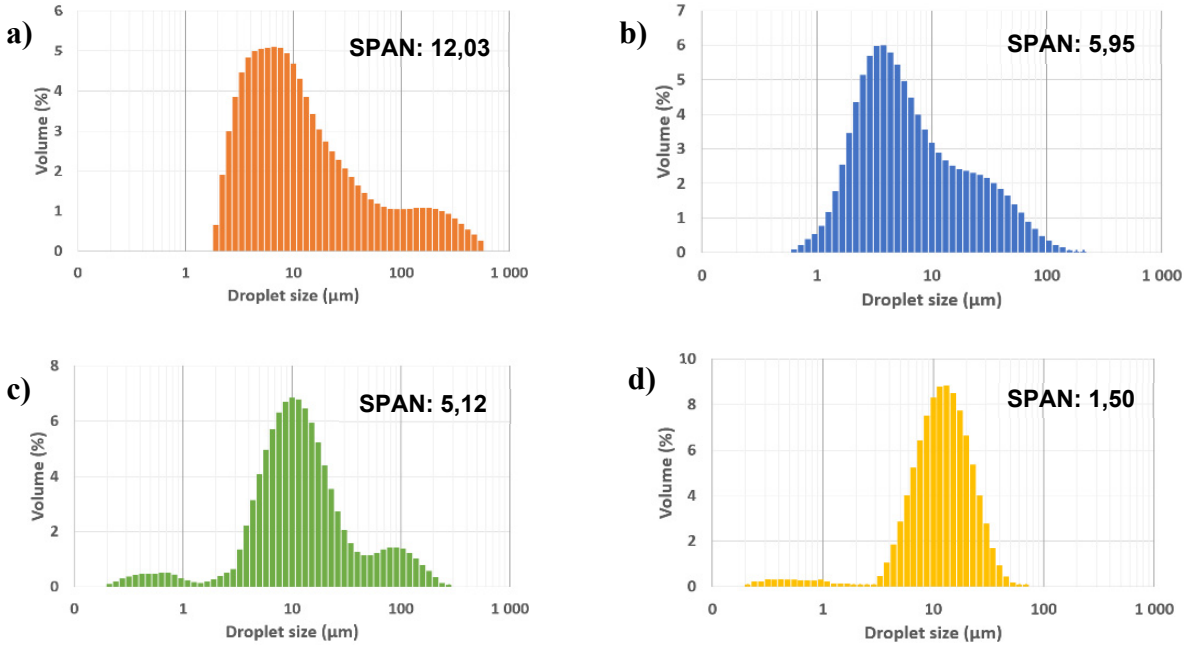

Figure S7. Size distribution of emulsion with DP10-card surfactant at a) 1 minute of stirring; b) 2 minutes of stirring; c) 3 minutes of stirring; d) 4 minutes of stirring.

Size distribution of emulsions as a function of stirring speed

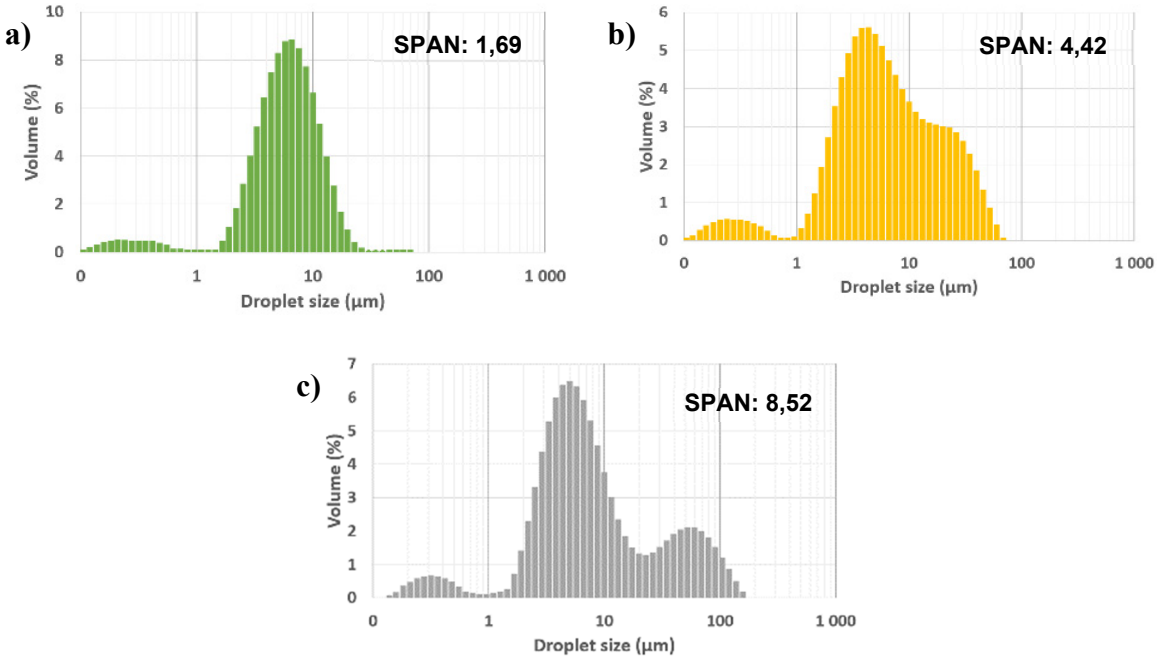

Figure S8. Size distribution of emulsion with DP10-card surfactant at a) 16500 rpm; b) 20500 rpm; c) 24500 rpm.

Highlighting the appearance of internal droplets by optical microscopy image

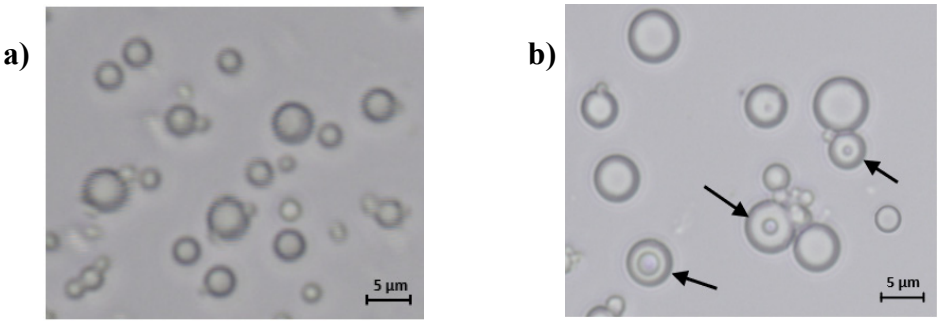

Figure S9. Optical microscopy images of a) an emulsion at a stirring speed of 16500 rpm; b) an emulsion at a stirring speed of 24500 rpm. Internal droplets are shown with arrows.

Highlighting the appearance of flocs by optical microscopy image

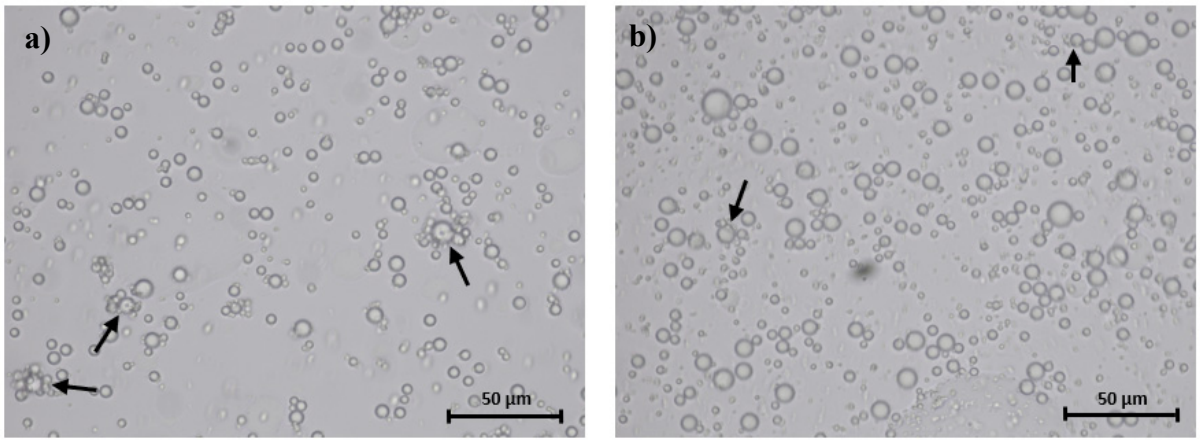

Figure S10. Optical microscopy images of diluted emulsions (x200) at t0 with a) DP10-card surfactant; b) DP20-C9 surfactant. Flocs are shown with arrows.

%BS and %T evolution over time

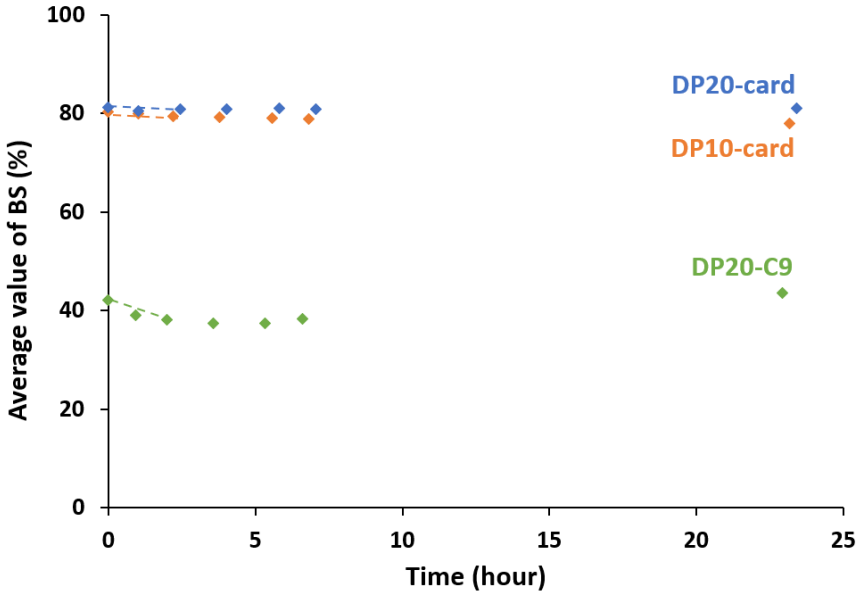

Figure S11. Backscattering percentage values over time for DP10-card, DP20-card and DP20-C9. Kinetics of flocculation/coalescence were measured during the first 4 hours of storage.

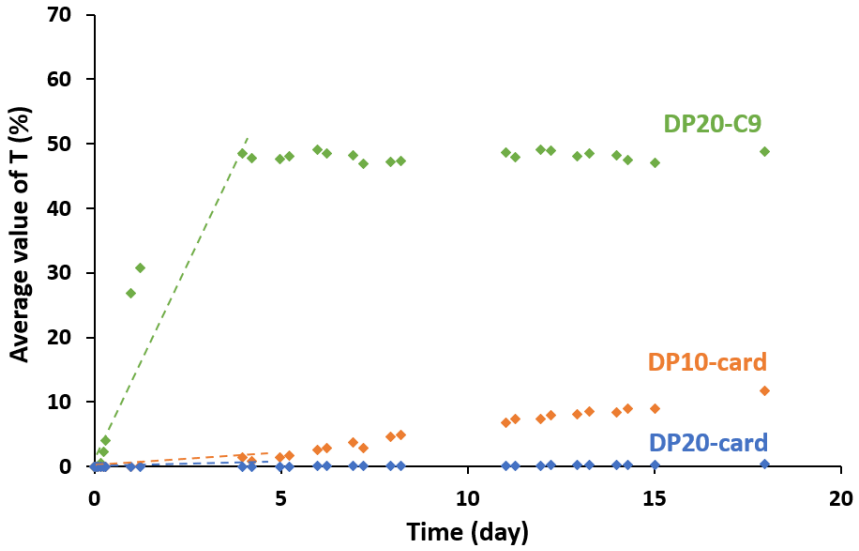

Figure S12. Transmission percentage values over time for DP10-card, DP20-card and DP20-C9. Kinetics of aqueous phase formation were measured during the first 5 days of storage using the slope at the origin.

Profiles evolution of Turbiscan

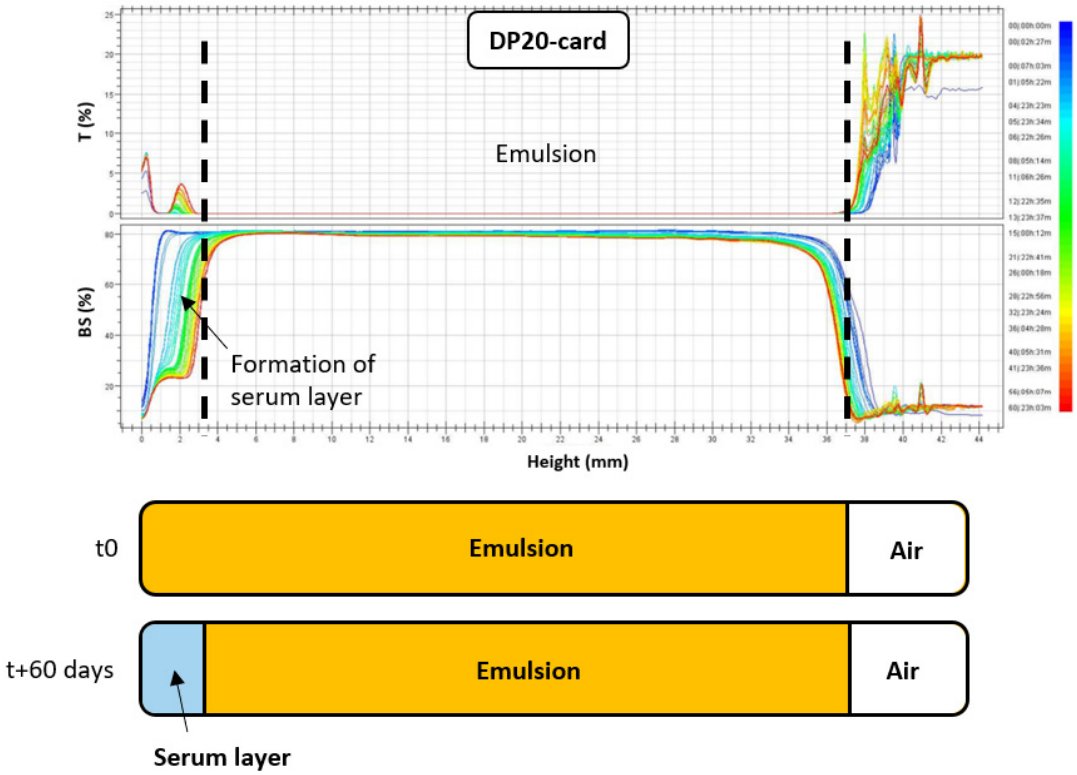

Figure S13. Transmission and backscattering profiles evolution as a function of time for the emulsion with DP20-card during 60 days. Horizontal representation of emulsion column at t0 and after 60 days.

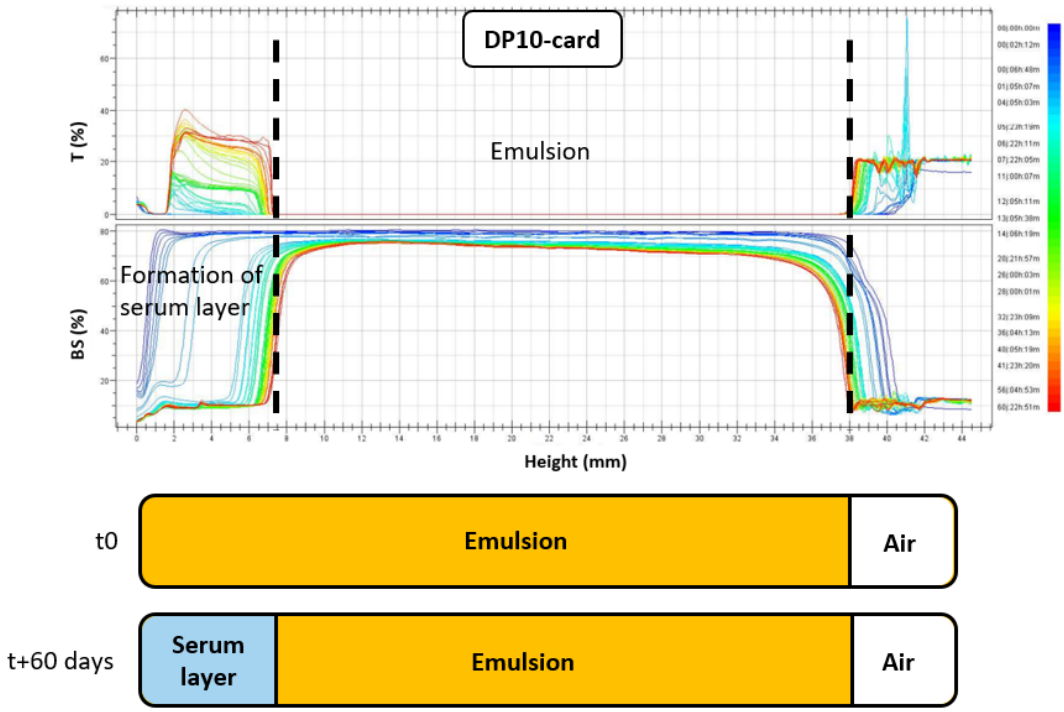

Figure S14. Transmission and backscattering profiles evolution as a function of time for the emulsion with DP10-card during 60 days. Horizontal representation of emulsion column at t0 and after 60 days.

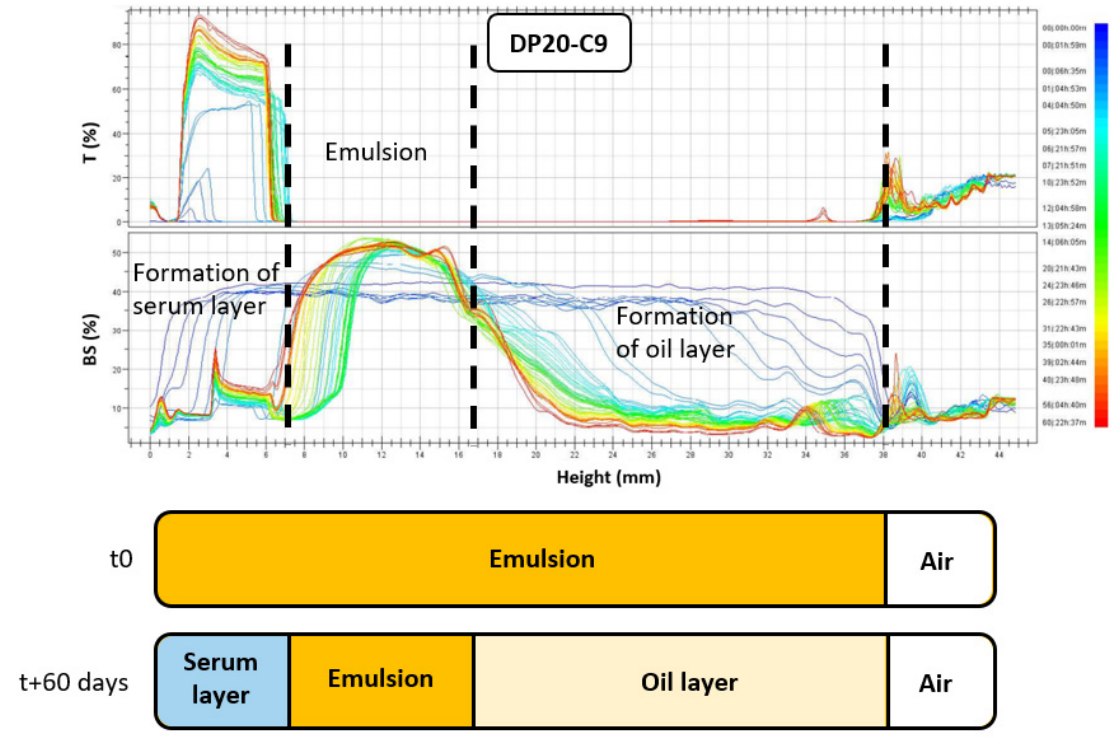

Figure S15. Transmission and backscattering profiles evolution as a function of time for the emulsion with DP20-C9 during 60 days. Horizontal representation of emulsion column at t0 and after 60 days.