

Title: Aggregation of Unsaturated Long-Chain Fatty Alcohols in Nonaqueous Systems

Author(s): R.O. Dunn and M.O. Bagby

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Summary:

Aggregation and related phenomena in nonaqueous binary and ternary solutions contain unsaturated long-chain fatty alcohol amphiphiles have been studied. Six C18 fatty alcohols were studied - oleyl alcohol (9Z-octadecen-1-ol), elaidyl alcohol (9E-octadecen-1-ol), linoleyl alcohol (9Z, 12Z-octadecadien-1-ol), elaidolinoleyl alcohol (9E, 12E-octadecadien-1-ol), linolenyl alcohol (9Z, 12Z, 15Z-octadecatrien-1-ol) and elaidolinolenyl alcohol (9E, 12E, 15-E-octadecatrien-1-ol). Equivalent conductivity and photon correlation spectroscopy confirmed that unsaturated long-chain fatty alcohols form large and polydisperse aggregates in methanol. Critical micelle concentration (CMC) results showed that the degree of unsaturation and configuration of the double bonds in the fatty alcohol significantly influences aggregation. Aggregation of oleul alcohol in a series of straight and branched medium-chainlength (C3-C8) alkanol solvents was studied. For shorter-chained alkanols (C1-C4), decreasing solvent dielectric constant decreases the CMC; however, for longer-chained alkanols (C4-C8), no significant effects occurred on the CMC. The effect of solubilized soybean oil on the viscosity of long-chain fatty alcohol/methanol solutions was also analyzed. Relative viscosity results were consistent with those expected for microemulsions. Although preliminary in nature, these results generally support the notion that soybean oil is solubilized by incorporation into large soybean oil-in-fatty alcohol aggregates in methanol solvent, resembling a nonaqueous detergentless microemulsion.

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Market Segment: General Interest

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