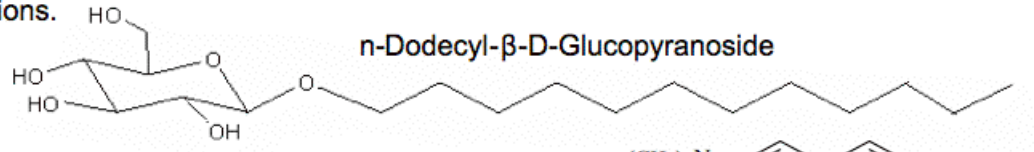
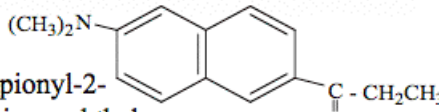
Determining the Binary Phase Diagram of *n*-Dodecyl-β-D-Glucopyranoside in Water

Chiara H.C. Giammanco and Kerry K. Karukstis, Harvey Mudd College

n-dodecyl-β-D-Glucoside (C12G1) is an environmentally safe, biologically relevant nonionic surfactant. In water it forms lyotropic liquid crystals, specifically micellar, hexagonal, and lamellar phases. Fluorescence spectroscopy with a PRODAN probe offers a highly sensitive means for determining the phases in liquid crystal systems. This is a simple method which allows the determination of phase diagrams by a single process, with accurate detection of two phase regions.



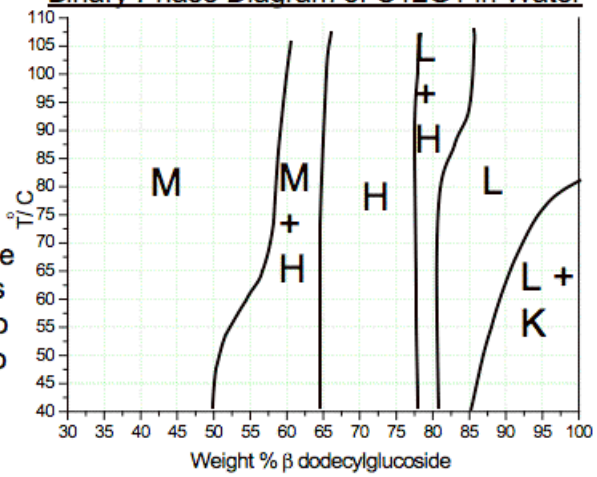
n-Dodecyl-β-D-Glucopyranoside



6-propionyl-2-dimethylaminonaphthalene (PRODAN)

A fluorescence spectrophotometer is used to excite the various weight percent samples with 340 nm light and then to record the emission spectra. Each aggregate that forms gives a gaussian curve with a characteristic peak wavelength. By peak fitting that data, the component gaussians of a spectrum can be obtained. Micellar shows up at 489 nm, Hexagonal at 481 nm, and Lamellar at 470 nm. Small peaks at 422 nm and 417 nm indicate PRODAN incorporated in the core of the Micelles and between the nonpolar tails of the lamellar region, respectively. Two phase regions show up as a sum of two gaussians and so were readily distinguishable.

Binary Phase Diagram of C12G1 in Water



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