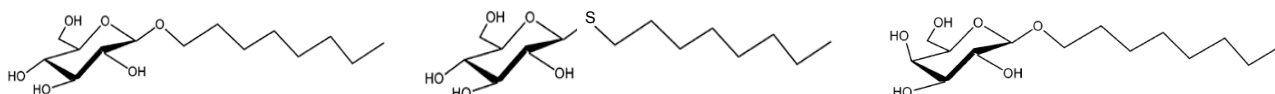


# Determination of Thermodynamic Properties of Green Surfactants Using Differential Scanning Calorimetry and Polarizing Microscopy

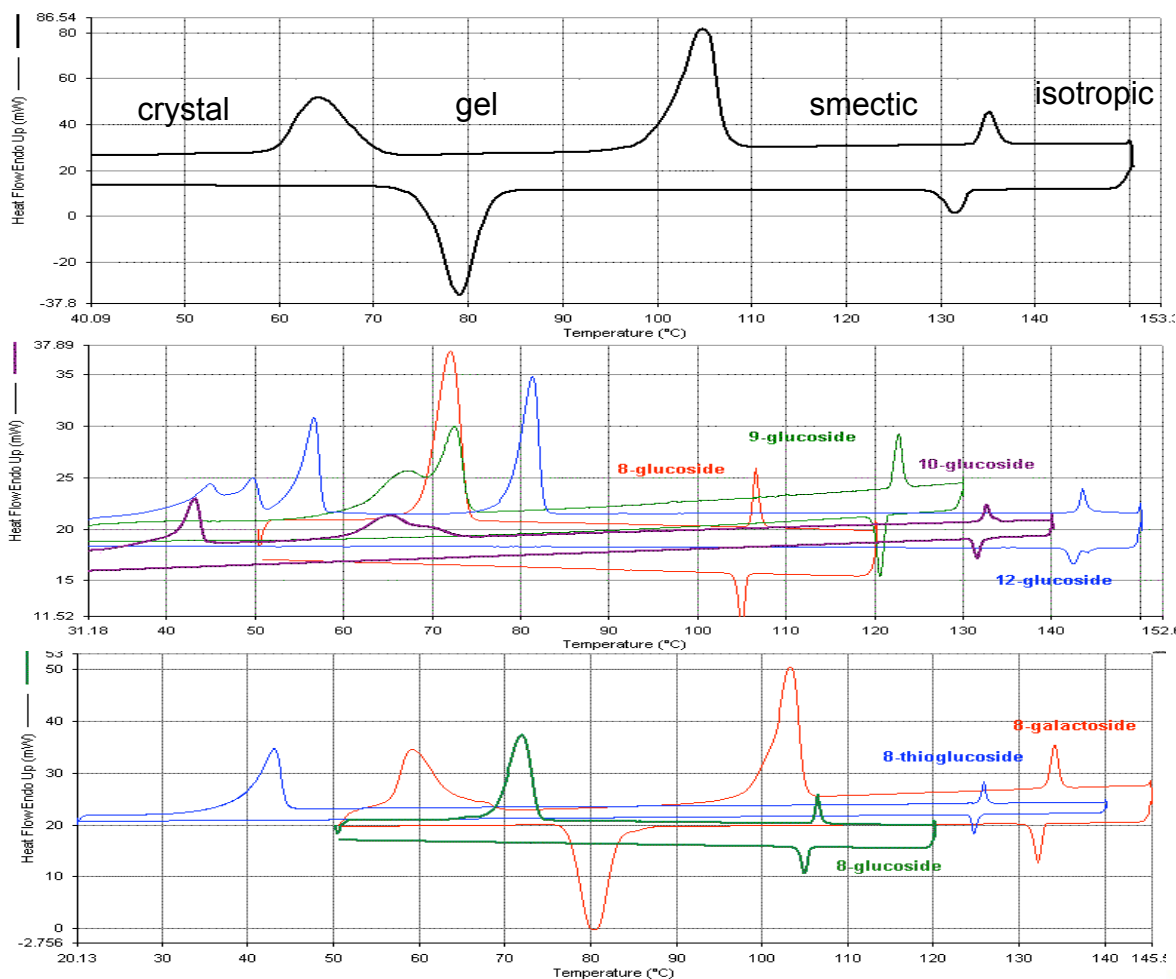
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**Background.** Differential Scanning Calorimetry (DSC) is used to measure the temperature and enthalpy of a phase transition. Often a complement to DSC, Polarizing Microscopy (PM) is used to see the different phases by capitalizing on a compound's birefringent properties.

**Motivation.** The Karukstis lab group develops phase diagrams of binary mixtures of green surfactants and water via fluorescence spectroscopy. However, it is difficult to gather data at high concentrations of the surfactant. With DSC, we can measure the temperatures of transitions for the pure material (the 100% composition on the x-axis) to complete the phase diagram.



**Research.** Glucosides, thioglucosides, and galactosides of various alkyl chain lengths were studied. These include n-β-D-glucosides (octyl-, nonyl-, decyl-, dodecyl-), n-β-D-thioglucosides (heptyl-, octyl-, nonyl-, decyl-), and n-octyl-β-D-galactoside. Three distinct and recurring phase transitions were observed: crystal to gel, gel to smectic, and smectic to isotropic.



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