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Insights into molecular architecture of terpenes using small angle neutron scattering[1] DURGESH K. RAI, Massachusetts Institute of Technology, APARNA ANNAMRAJU, SAI VENKATESH PINGALI, HUGH M. ONEILL, RITESH MEWALAL, LEE E. GUNTER, GERALD A. TUSKAN, Oak Ridge National Laboratory — Understanding macromolecular architectures is vital to engineering prospective terpene candidates for advanced biofuels. Eucalyptus plants store terpenes in specialized cavity-like structures in the leaves called oil glands, which comprises of volatile (VTs) and non-volatile (NVTs) terpenes. Using small-angle neutron scattering, we have investigated the structure and phase behavior of the supramolecular assembly formed by Geranyl beta-D-glucoside (GDG), a NVT and compare the results with that of beta-octyl glucoside (BOG). The formation of micellar structures was observed in the concentration range of 0.5-5 v/v% in water using small angle neutron scattering (SANS) where Schultz sphere model was used in quantifying structural parameters of micelles. SANS studies determine that GDG and BOG behave like amphiphiles forming micellar structures in aqueous solution. The micelles swell upon addition of alpha-Pinene (AP) indicating partition to the core region of the micelles. The general behavior of the micellar growth after partitioning of AP to form thermodynamically stable sizes varies with the NVT concentration. Our studies reveal that the presence of steric hindrance in the GDG via the unsaturated bonds could help stabilize VTs inside the oil glands.

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