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Investigation of Monodisperse Dendrimeric Polysaccharide Nanoparticle Dispersions Using Small Angle Neutron Scattering JOHN ATKINSON, University of Guelph, JONATHAN NICKELS, Oak Ridge National Laboratory, ERZSI PAPP-SZABO, University of Guelph, JOHN KATSARAS, Oak Ridge National Laboratory, JOHN DUTCHER, University of Guelph — Phytoglycogen is a highly branched polysaccharide that is very similar to the energy storage molecule glycogen. We have isolated monodisperse phytoglycogen nanoparticles from corn and these particles are attractive for applications in the cosmetic, food and beverage, and biomedical industries. Many of these promising applications are due to the special interaction between the nanoparticles and water, which results in: (1) high solubility; (2) low viscosity and high stability in aqueous dispersions; and (3) a remarkable capacity to sequester and retain water. Our rheology measurements indicate that the nanoparticles behave like hard spheres in water, with the viscosity diverging for concentrations >25% (w/w). Because of this, aqueous suspensions of phytoglycogen provide an ideal platform for detailed testing of theories of colloidal glasses and jamming. To further explore the interaction of the phytoglycogen particles and water, we have performed small angle neutron scattering (SANS) measurements on the Extended Q-Range SANS (EQ-SANS) diffractometer at the Spallation Neutron Source at Oak Ridge National Laboratory. Measurements performed on phytoglycogen dispersions in mixtures of hydrogenated and deuterated water have allowed us to determine the particle size and average particle spacing as a function of the phytoglycogen concentration in the limits of dilute and concentrated dispersions.

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