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Monodisperse dendrimeric phytoglycogen nanoparticles in water act as hard sphere colloidal dispersions JOHN DUTCHER, ERZSI PAPP-SZABO, CARLEY MIKI, 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. We have used cone-and-plate and concentric cylinder rheometry to measure the dependence of the zero shear viscosity of aqueous dispersions of phytoglycogen on the phytoglycogen concentration. We find that the nanoparticles behave like hard spheres in water, with the viscosity diverging for volume fractions very close to that corresponding to randomly packed hard spheres. This simple system provides an ideal platform for detailed testing of theories of colloidal glasses and jamming.

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