

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Sucralose Destabilization of Protein Structure¹ INHA CHO, LEE CHEN, NIMESH SHUKLA, CHRISTINA OTHON², Wesleyan Univ — Sucralose is a commonly employed artificial sweetener. Sucralose behaves very differently than its natural disaccharide counterpart, sucrose, in terms of its interaction with biomolecules. The presence of sucralose in solution is found to destabilize the native structure of the globular protein Bovine Serum Albumin (BSA). The melting temperature decreases as a linear function of sucralose concentration. We correlate this destabilization with the increased polarity of the sucralose molecule as compared to sucrose. The strongly polar nature is observed as a large dielectric friction exerted on the excited state rotational diffusion of tryptophan using time-resolved fluorescence anisotropy. Tryptophan exhibits rotational diffusion proportional to the measured bulk viscosity for sucrose solutions over a wide range of concentrations, consistent with a Stokes-Einstein diffusional model. For sucralose solutions however, the diffusion is linearly dependent with the concentration, strongly diverging from the viscosity predictions. The polar nature of sucralose causes a dramatically different interaction with biomolecules than natural disaccharide molecules.

¹Connecticut Space Grant Consortium

²Corresponding Author

Inha Cho
Wesleyan Univ

Date submitted: 14 Nov 2014

Electronic form version 1.4