

Guar-Based Injectable Hydrogel for Drug Delivery and In Vitro Bone Cell Growth

Humendra Poudel ¹, Ambar B. RanguMagar ², Pooja Singh ³, Adeolu Oluremi ³, Nawab Ali ³, Fumiya Watanabe ⁴, Joseph Batta-Mpouma ⁵, Jin Woo Kim ⁵, Ahona Ghosh ¹ and Anindya Ghosh ^{1,*}

¹ Department of Chemistry, University of Arkansas at Little Rock, 2801 South University Avenue, Little Rock, AR 72204, USA; hxpoudel@ualr.edu (H.P.); ahonag7@gmail.com (A.G.)

² Department of Chemistry, Philander Smith University, 900 W Daisy L Gatson Bates Dr, Little Rock, AR 72202, USA; arangumagar@philander.edu

³ Department of Biology, University of Arkansas at Little Rock, 2801 South University Avenue, Little Rock, AR 72204, USA; pxsingh1@ualr.edu (P.S.); asoluremi@ualr.edu (A.O.); nali@ualr.edu (N.A.)

⁴ Center for Integrative Nanotechnology Sciences, University of Arkansas at Little Rock, 2801 South University Avenue, Little Rock, AR 72204, USA; fxwatanabe@ualr.edu

⁵ Department of Biological and Agricultural Engineering, Bell Engineering Center, University of Arkansas, 4183 Fayetteville, Little Rock, AR 72701, USA; jnbattam@uark.edu (J.B.-M.); jwkim@uark.edu (J.W.K.)

* Correspondence: axghosh@ualr.edu; Tel.: +501-916-5197; Fax: +501-569-8838

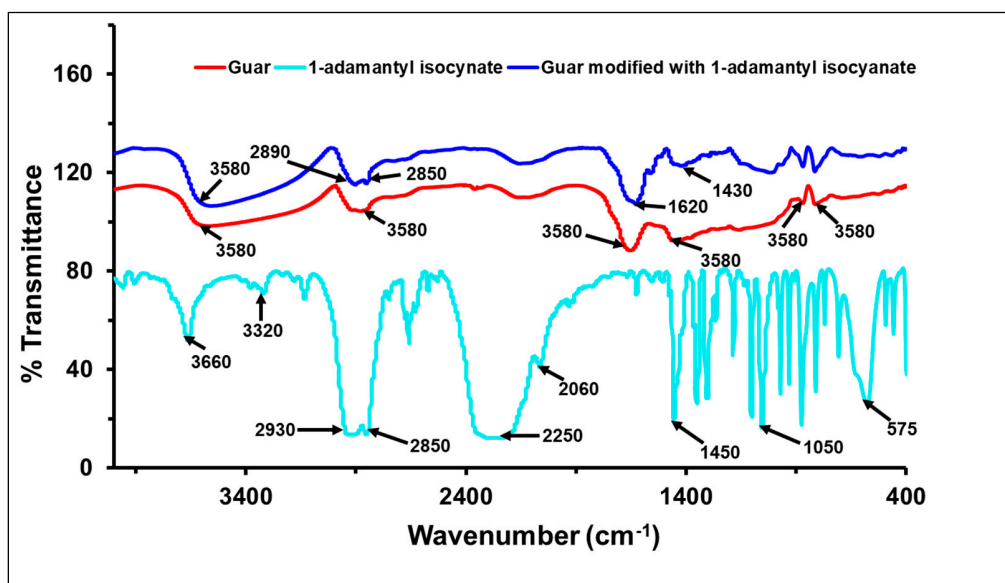


Figure S1. Fourier Transform Infrared (FTIR) spectroscopy of guar, 1-Adamantyl isocyanate (ADI), and Guar-ADI.

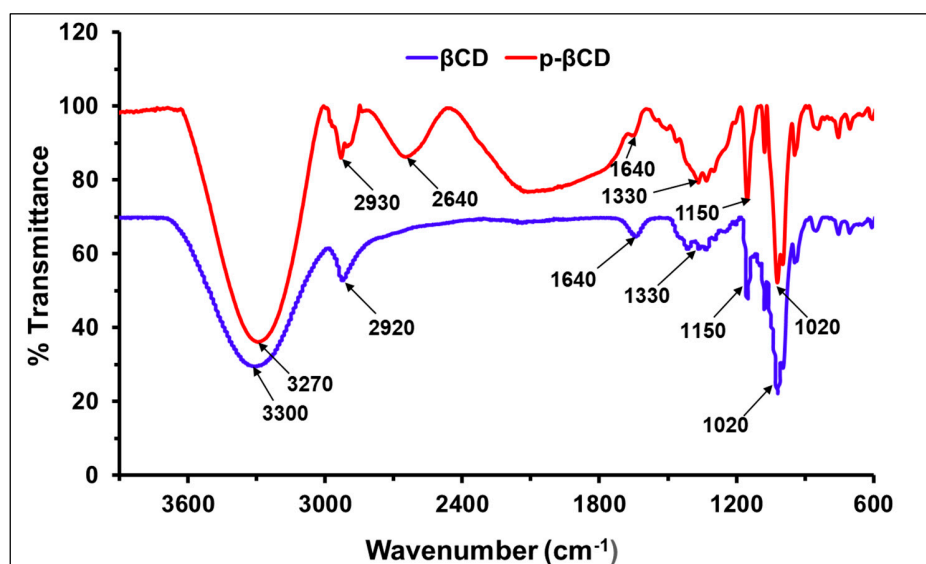


Figure S2. Fourier Transform Infrared (FTIR) spectroscopy of β -cyclodextrin (β -CD), and poly- β -cyclodextrin (p- β -CD).

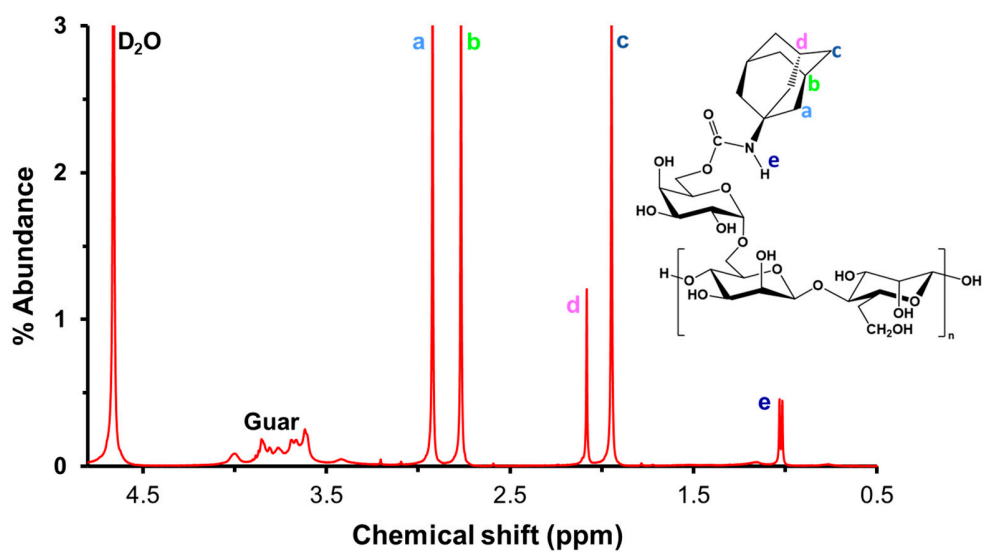


Figure S3. Proton Nuclear Magnetic Resonance (^1H -NMR) spectroscopy of Guar-ADI

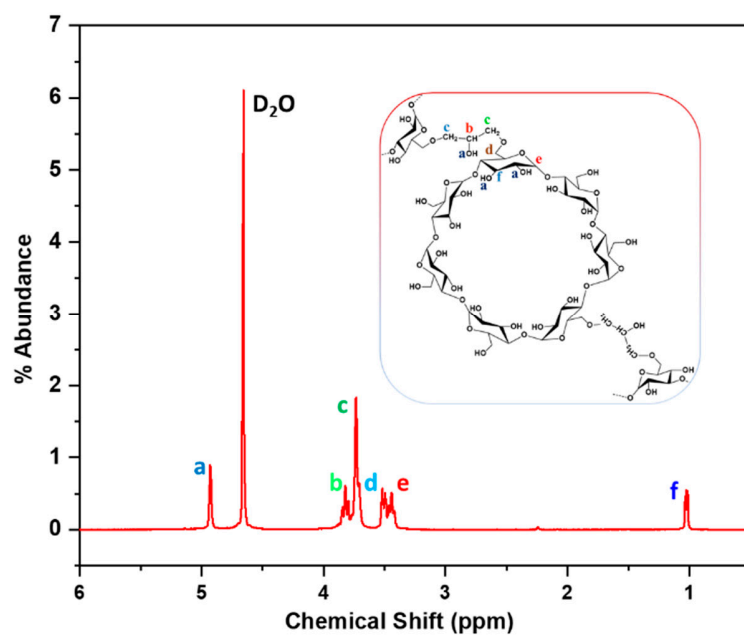


Figure S4. Proton Nuclear Magnetic Resonance (^1H -NMR) spectroscopy of p- β -CD

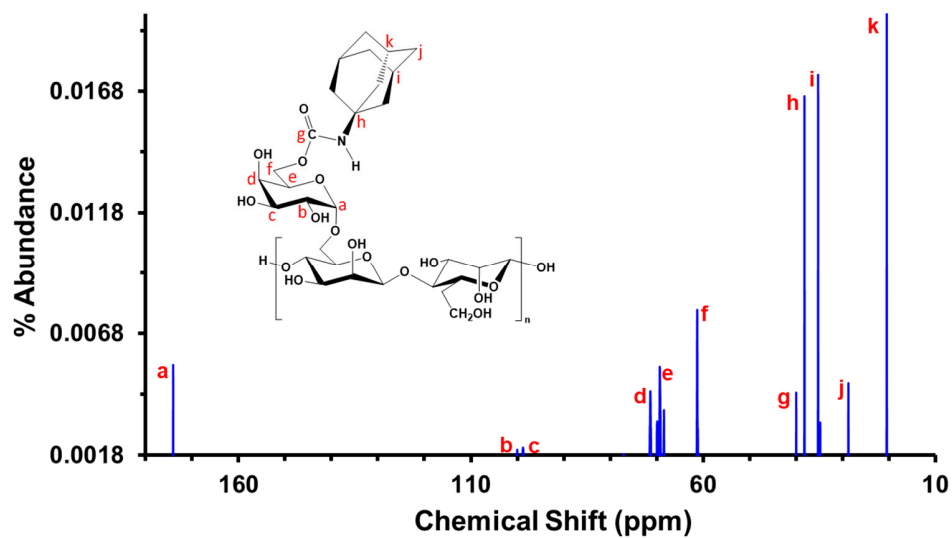


Figure S5. Carbon Nuclear Magnetic Resonance (^{13}C -NMR) spectroscopy of Guar-ADI

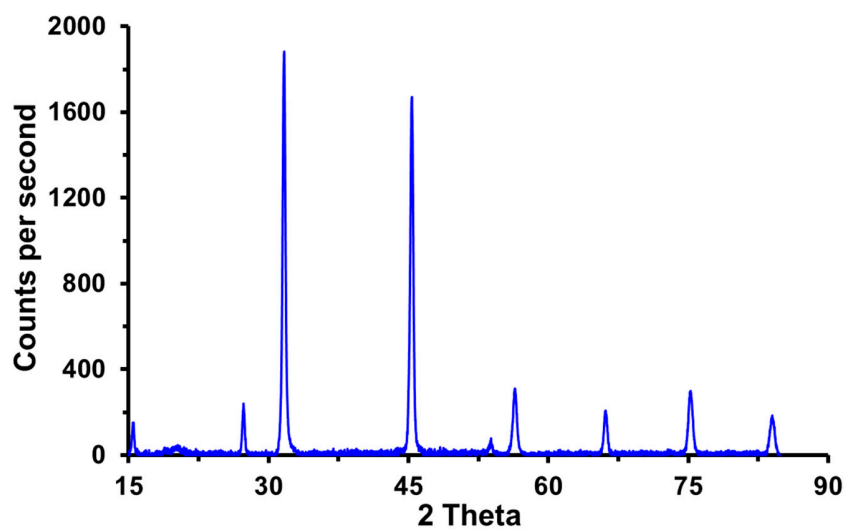


Figure S6. X-ray Diffraction (XRD) of 5% hydrogel

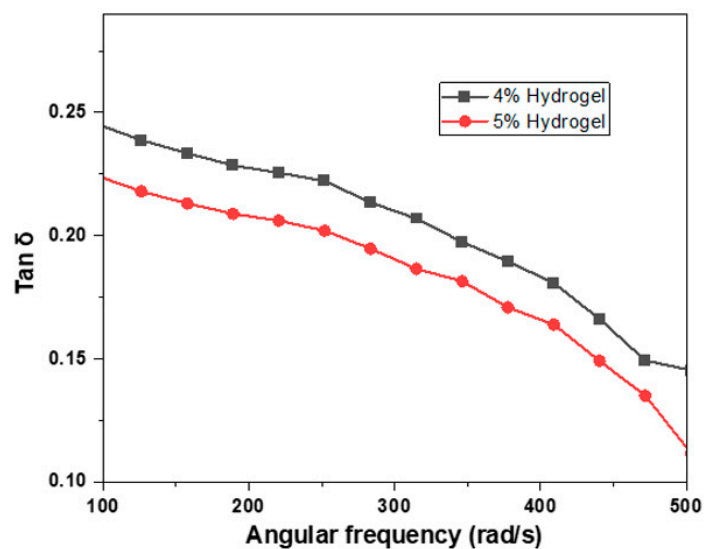


Figure S7. $\tan \delta$ vs. angular frequency of 4%, and 5% hydrogels at room temperature

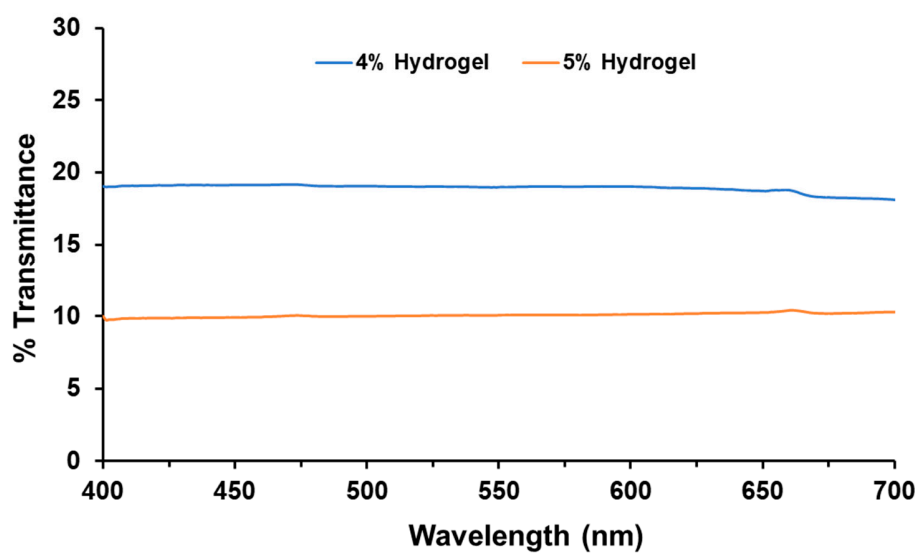


Figure S8: UV-Visible spectroscopy of 4% and 5% hydrogel

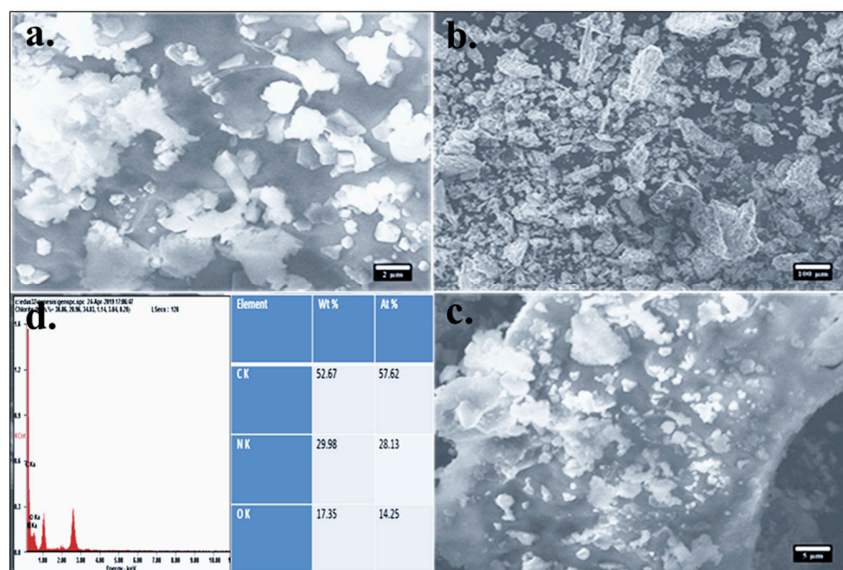


Figure S9. Scanning Electron Microscopy (SEM) (**a.** x 5000, **b.** x 100, and **c.** x 2000 magnifications) and **d.** Energy Dispersive Spectroscopy (EDS) of dried 5% hydrogel.

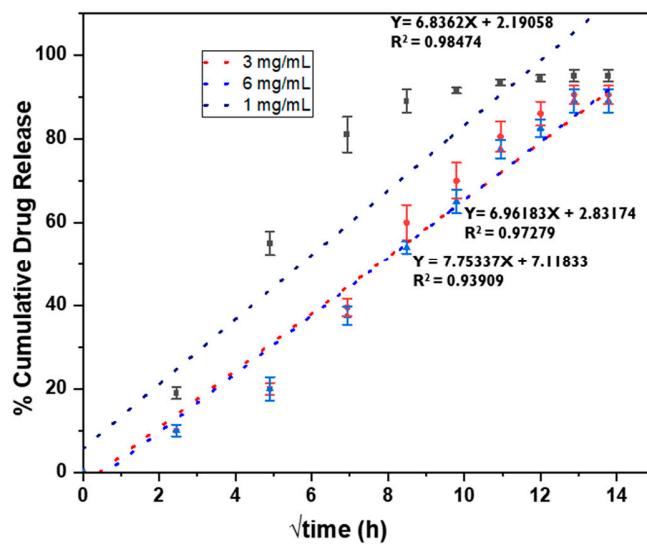


Figure S10: Higuchi Model showing percentage (%) cumulative drug release vs. square root of time for BSA release study from 5% hydrogel having 1, 3, and 6 mg/mL BSA at 37°C in PBS (7.4).