

Figure S1: Calibration data obtained on varying wt% of glycerol in water. Data obtained with the microrheology technique matched data obtained on a TA-AR2000 bulk rheometer and was verified with literature data.

Validation of Microrheology Technique

The accuracy of viscosity measurements using our microrheology technique was verified by comparing our results with experimentally obtained viscosity measurements of solutions with varying fractions of glycerol in water (included in supporting information), obtained using a TA Instruments AR-2000 rheometer. Data obtained on the bulk rheometer and with the microrheology technique were in close agreement with literature values. Next, the same viscosity

measurements were taken using KITO1 solutions over a range of concentrations from 2.5 to 300 mg/mL KITO1 (included in supporting information). Viscosity data obtained with bulk rheometer matched that obtained with the microrheology technique demonstrating the capability of the system to accurately measure solution viscosity of chitosan solutions. There was a small discrepancy observed at very low KITO1 concentrations. The slightly higher values of viscosity obtained using the microrheology technique can be explained by the temporal resolution limit on the CCD camera used in the microrheology technique. At the lowest concentrations of KITO1, the images generated by the camera showed the full rotation of the nanorods occurring in as little as two frames and sometimes the entire turn would occur in one frame which renders the data essentially useless. The frame rate of the camera can be modified but comes at the expense of spatial resolution. Despite this discrepancy, it is easy to conclude that the microrheology system performs very well in estimating the viscosity of KITO1 solutions.

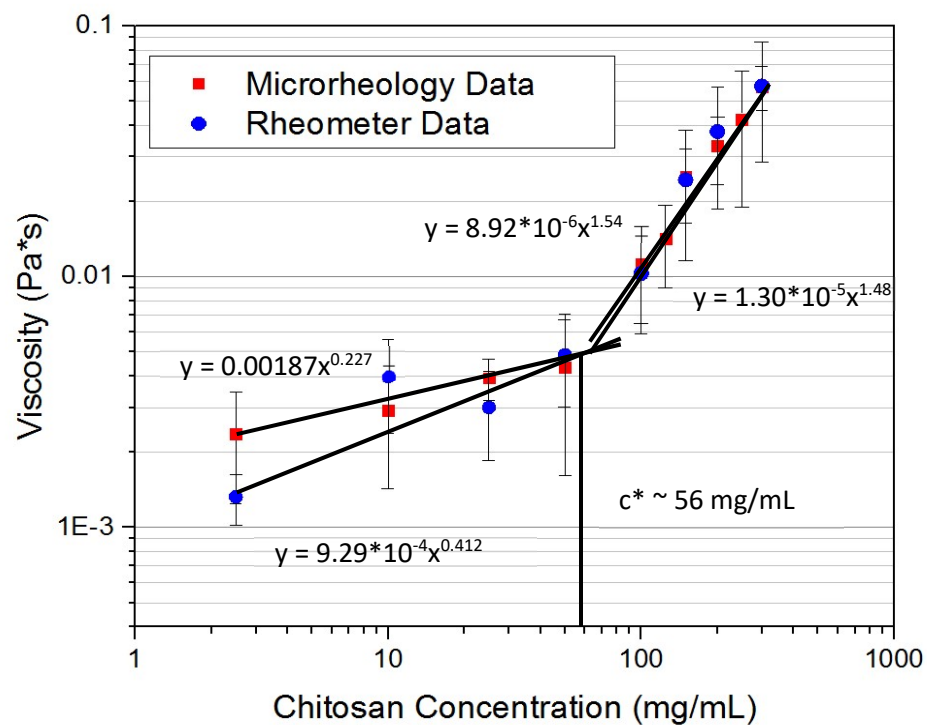


Figure S2: Calibration data for microrheology device using KITO1 chitosan. The microrheology setup obtained very similar data in the entangled region of KITO1. More discrepancy was seen at lower KITO1 concentrations and is likely due to the framerate limitations of the camera. Data was obtained at 23 ± 1 °C.

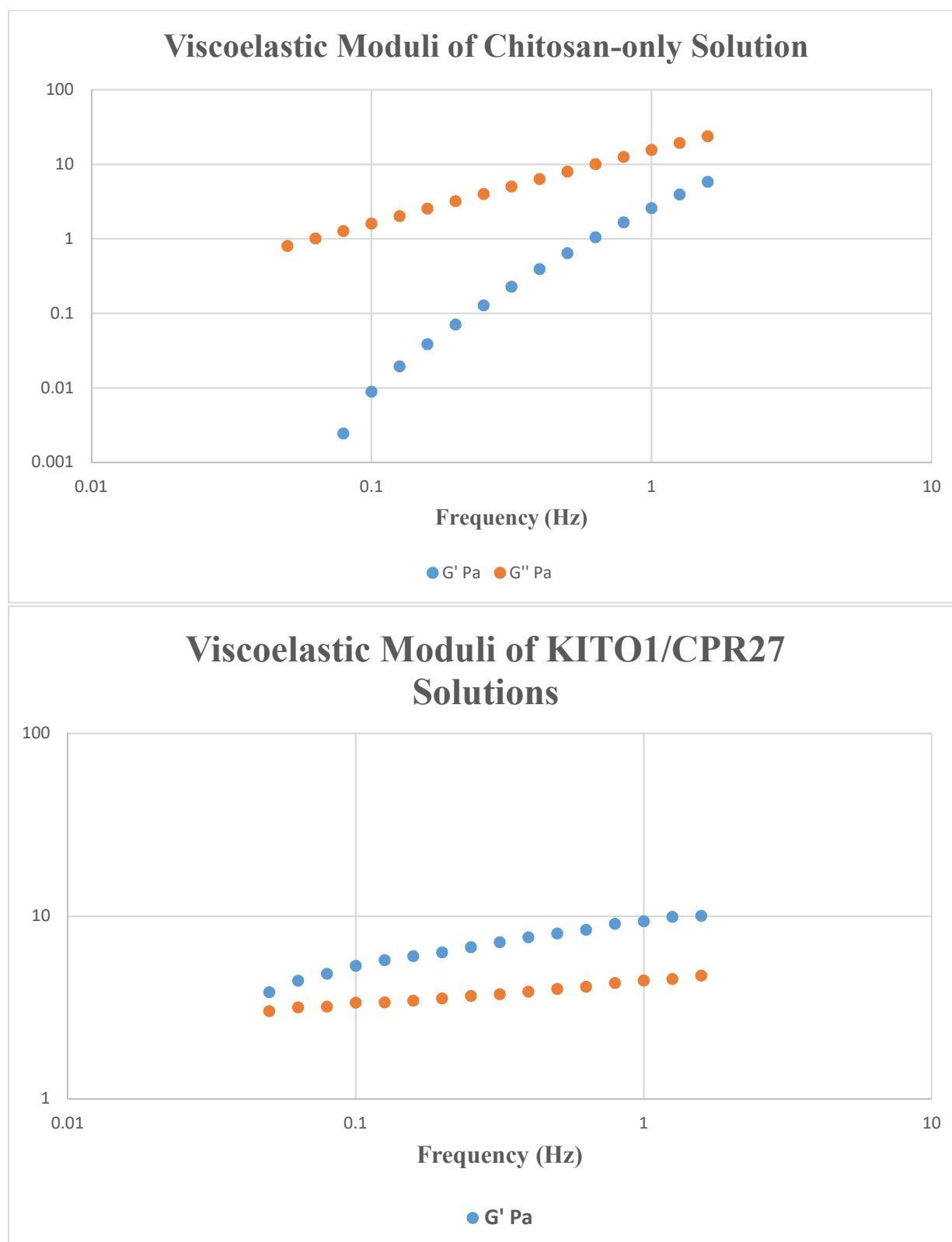


Figure S3: Oscillatory data obtained on TA-AR2000 bulk rheometer on chitosan and chitosan/CPR27 solutions. Addition of CPR27 caused a significant increase in the storage modulus of the solution.

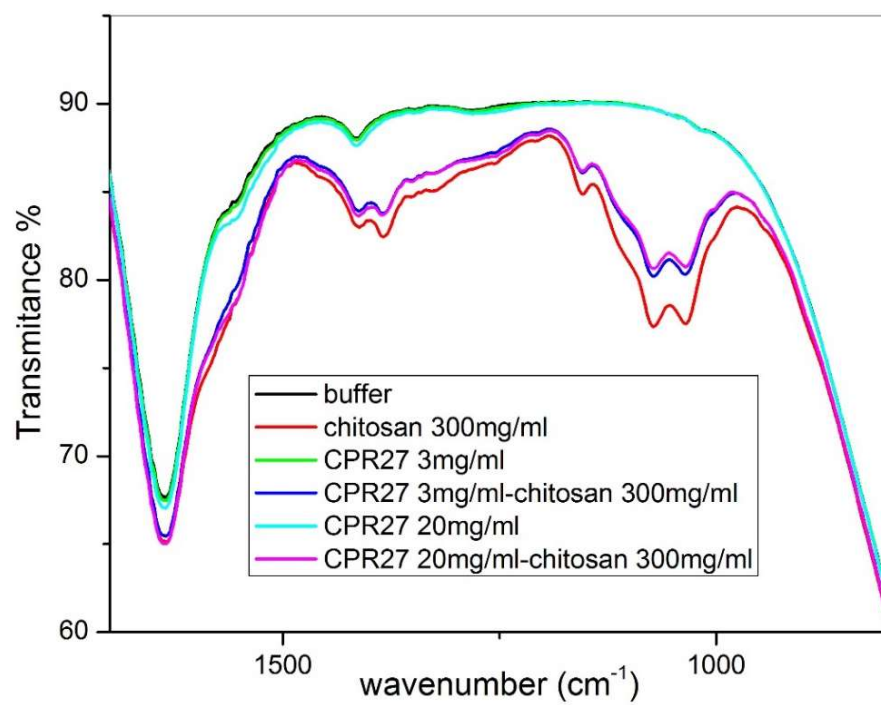


Figure S4: FTIR data of various combinations of KITO1 chitosan and CPR27 as well as sodium acetate/acetic acid buffer.