Supplementary Data

Further experimentation was conducted to determine if the 'printability window' ($0.25 < \tan\delta < 0.45$) found for gelatin-alginate formulations could be applied to other bioinks. Rheology, extrusion uniformity (Figure S1), and structural integrity (Figure S2) experiments were conducted on Pluronic F127, hyaluronic acid (HA), and a fibrinogen composite bioink using the same methodology as the gelatin-alginate formulations. Pluronic F127 was tested at 270 mg/mL and 400 mg/mL, HA at 30 mg/mL, and the fibrinogen composite bioink contained 20 mg/mL fibrinogen, 35 mg/mL gelatin, 3 mg/mL HA, and 10%(v/v) glycerol.

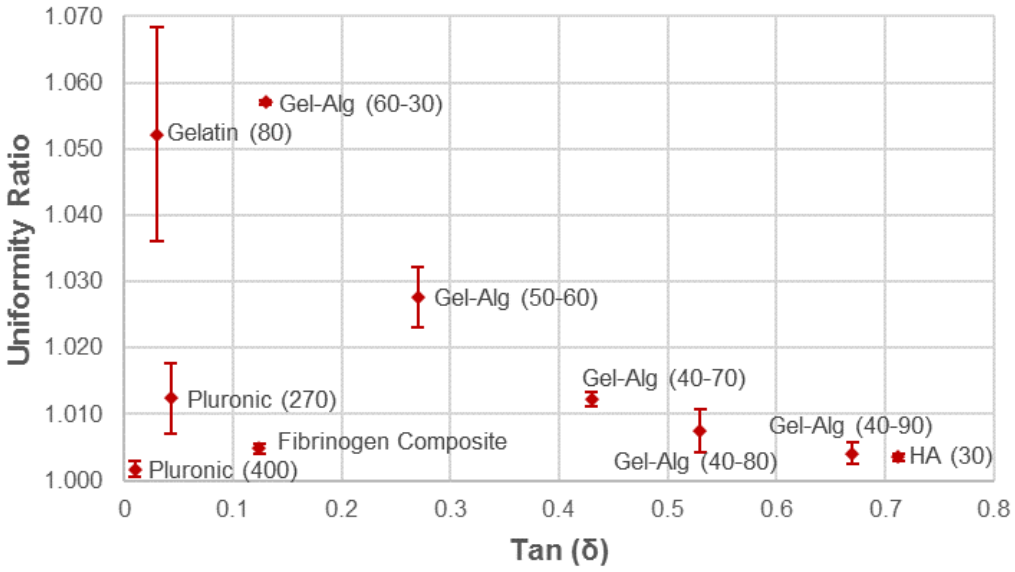

Figure S1. Extrusion uniformity vs. loss tangent of various hydrogels.

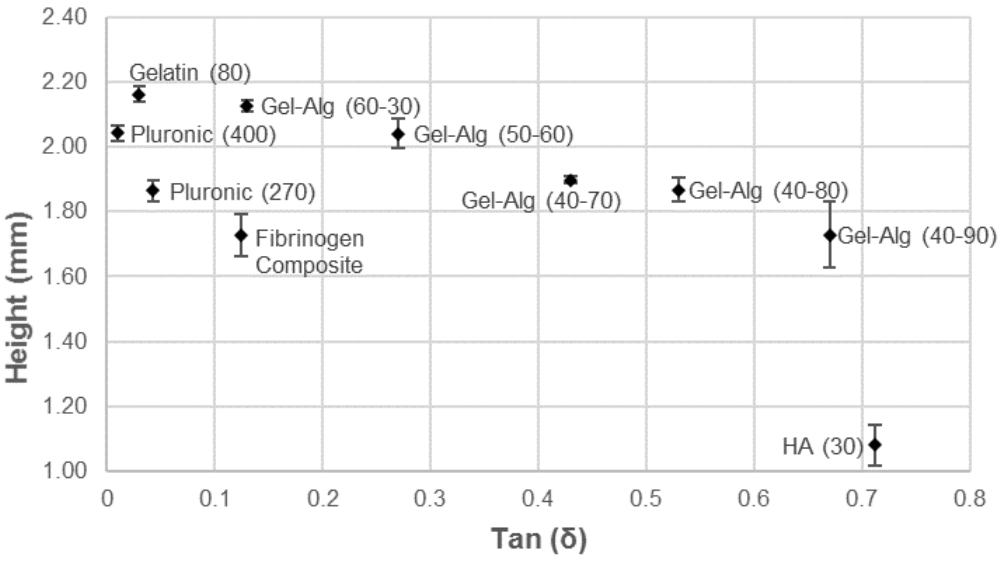

Figure S2. Structural integrity vs. loss tangent of various hydrogels.

3% HA followed similar trends to the gelatin-alginate formulations. Its high loss tangent resulted in poor structural integrity and high extrusion uniformity. However, the fibrinogen composite bioink also showed poor structural integrity and high extrusion uniformity despite a loss tangent similar to the 80 mg/mL gelatin (0.12). Lastly, 400 mg/mL Pluronic F127 was highly printable (excellent structural integrity and extrusion uniformity) despite a loss tangent that fell well outside of the printable window for gelatin-alginate formulations. This data likely suggests that the desirable loss tangent for any given bioink will be hydrogel-dependent.