Supplementary Materials

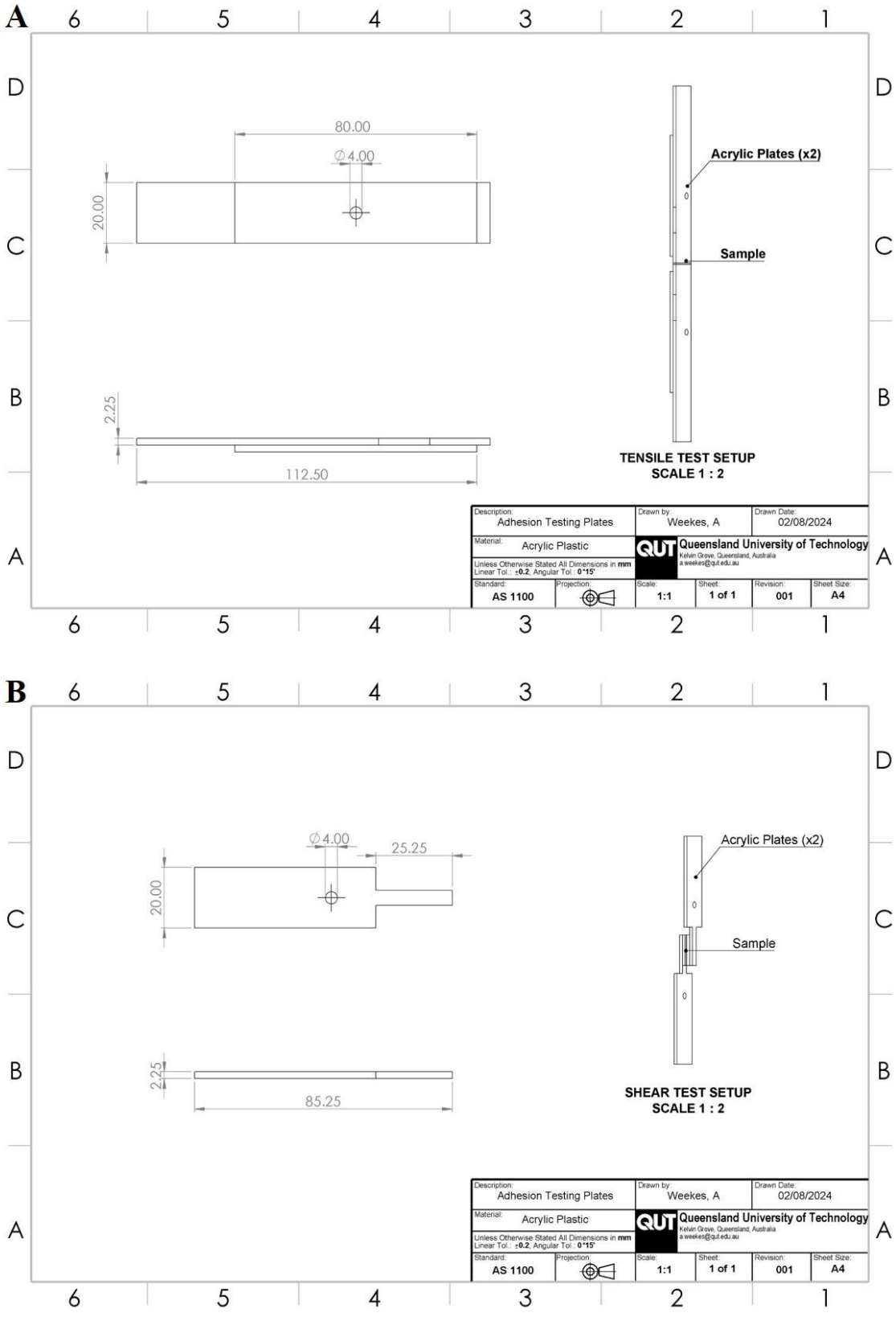

Figure S1. Technical drawing and dimensions for the custom-made acrylic plastic for tensile (**A**) and lap shear (**B**) test on caprine skin.

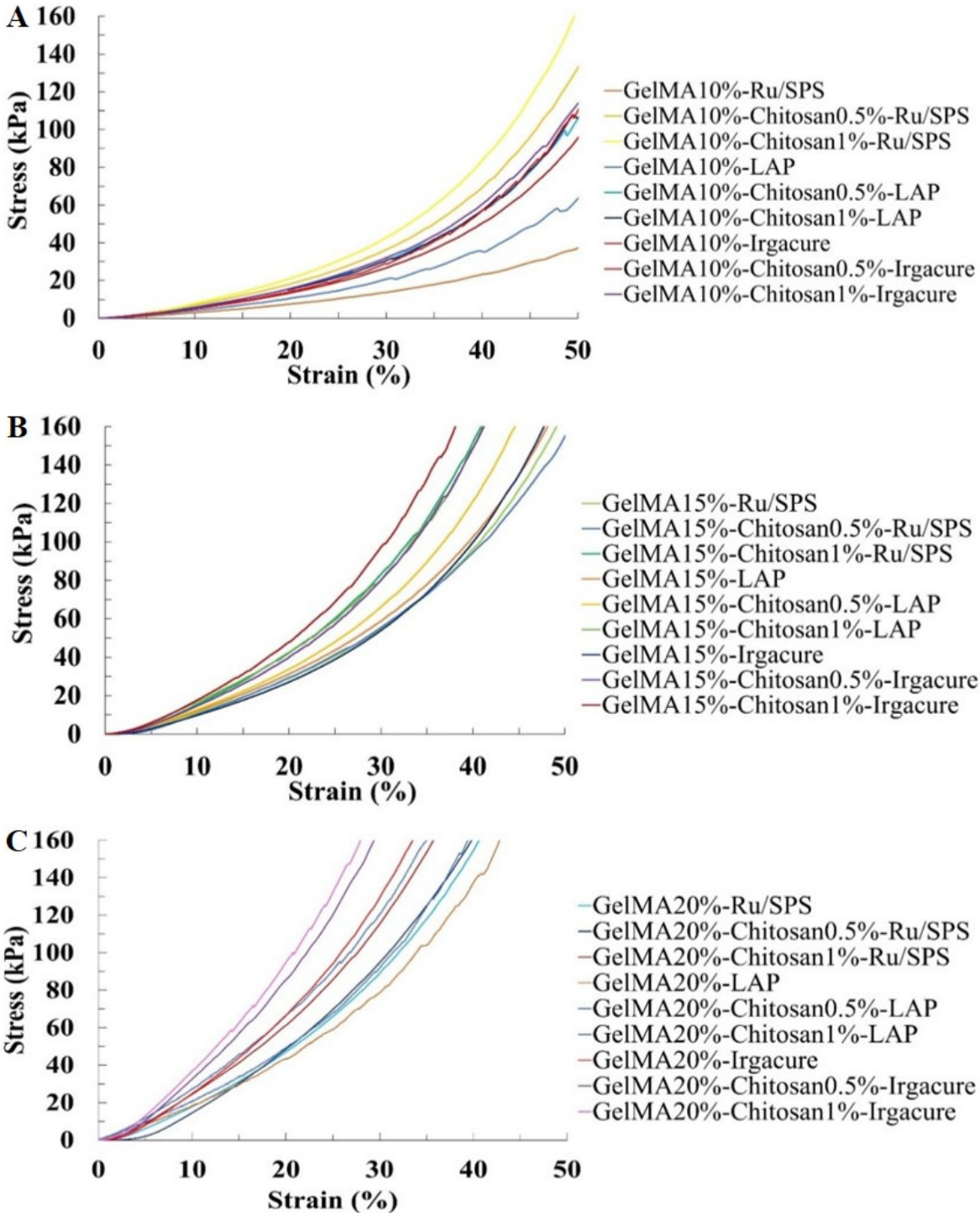

Figure S2. Effects of chitosan on compressive modulus of GelMA and GelMA-chitosan hydrogels: stress vs. strain curve. 10%, 15% and 20% (*w*/*v*) GelMA alone or blended with 0.5% and 1% (*w*/*v*) chitosan hydrogels were cross-linked with Ru/SPS, LAP and Irgacure photo-initiators. (**A**–**C**) compression graphs of hydrogels were measured 24 hours after polymerization using an Instron 5567 tester with a nonporous indenter and a 5 N load cell. GelMA 10%, 15% and 20% (*w*/*v*) hydrogels were considered as control in each group (n = 6 for each group).

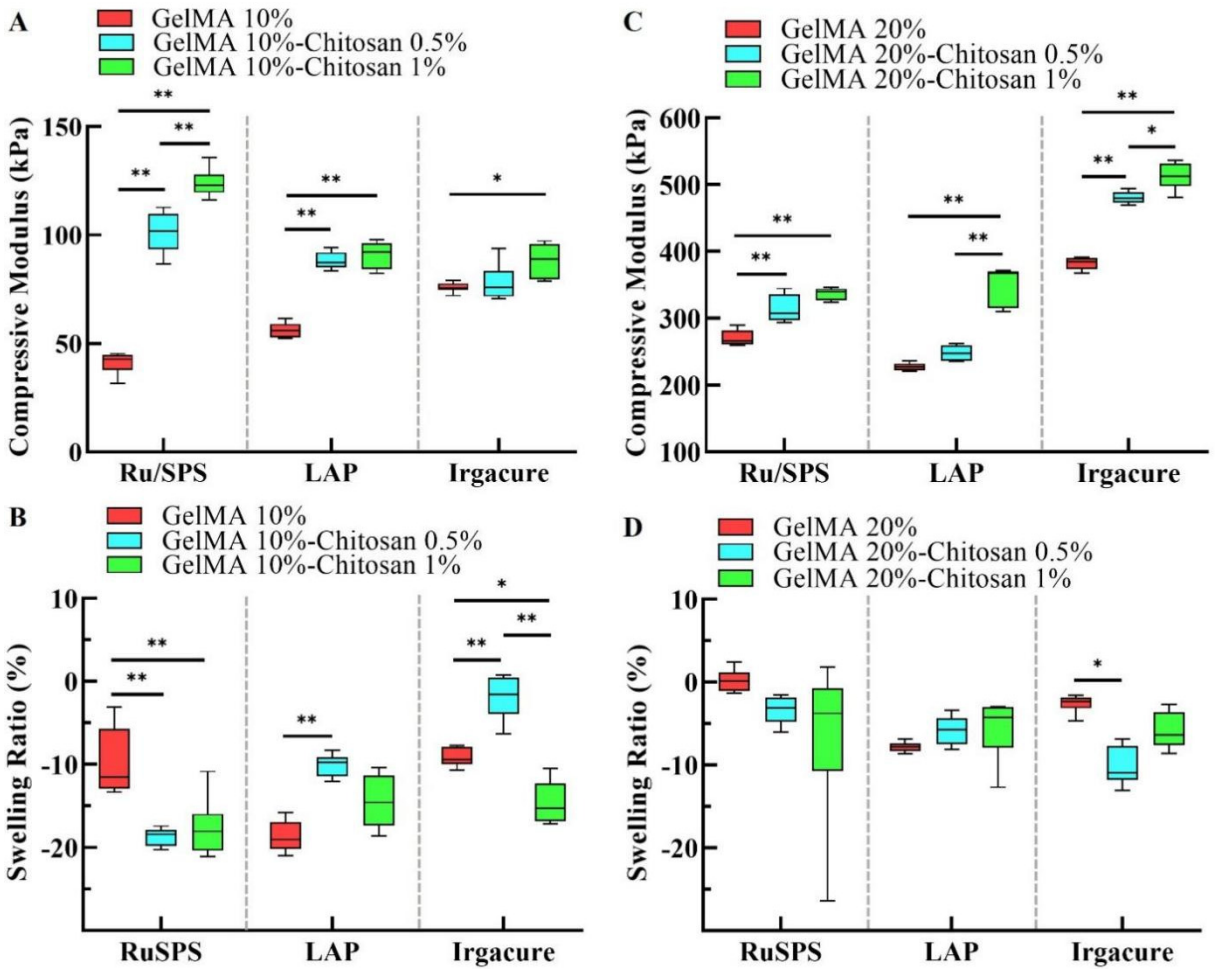

Figure S3. Effects of chitosan on compressive modulus and swelling ratio of GelMA and GelMA-chitosan hydrogels. 10% and 20% (*w*/*v*) GelMA alone or blended with 0.5% and 1% (*w*/*v*) chitosan hydrogels were cross-linked with Ru/SPS, LAP and Irgacure photo-initiators. (**A**,**C**) compressive modulus of hydrogels was measured 24 hours after polymerization using an Instron 5567 tester with a nonporous indenter and a 5 N load cell. (**B**,**D**) the swelling ratio was determined by weighing hydrogels directly after polymerization and after 24 h of incubation in PBS (pH = 7.4). GelMA 10% and 20% (*w*/*v*) hydrogels were considered as control in each group. Significant differences are indicated by asterisks * ($p < 0.05$) and ** ($p < 0.01$) between groups (n = 6 for each group).

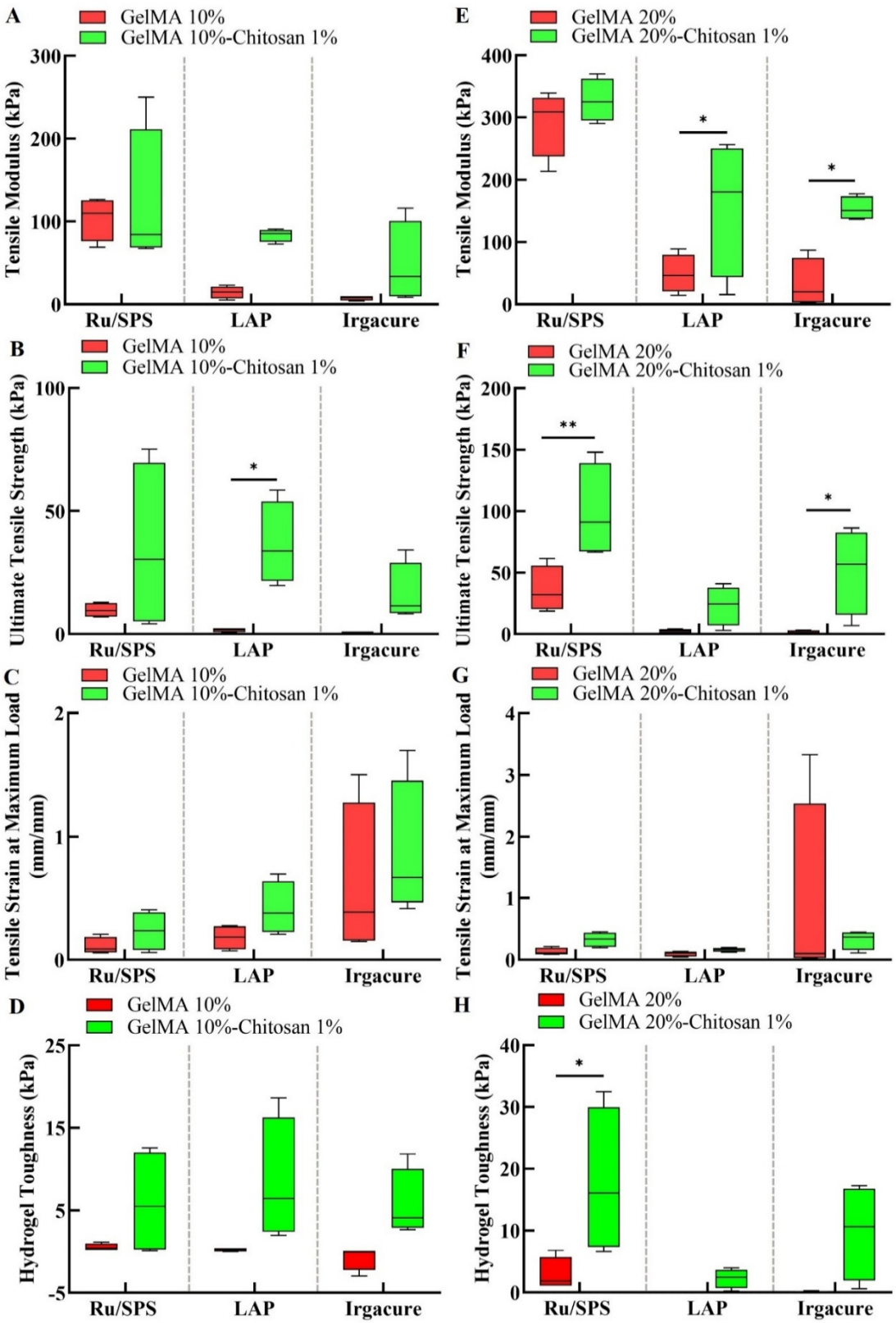

Figure S4. Effects of chitosan on cartilage adhesive properties of GelMA and GelMA-chitosan hydrogels. 10% and 20% (*w*/*v*) GelMA alone or blended with 1% (*w*/*v*) chitosan hydrogels were cross-linked with Ru/SPS, LAP and Irgacure photo-initiators. (**A**–**C**) tensile modulus, ultimate tensile strength, tensile strength at maximum load were measured after polymerization and after 1 hour incubation with PBS (pH = 7.4) using an Instron 5567 tester with a custom made clamp and a 500 N load cell. GelMA 10% and 20% (*w*/*v*) hydrogels are considered as control in each group. Significant differences are indicated by asterisks * ($p < 0.05$) and ** ($p < 0.01$) between groups (n = 4 for each group).

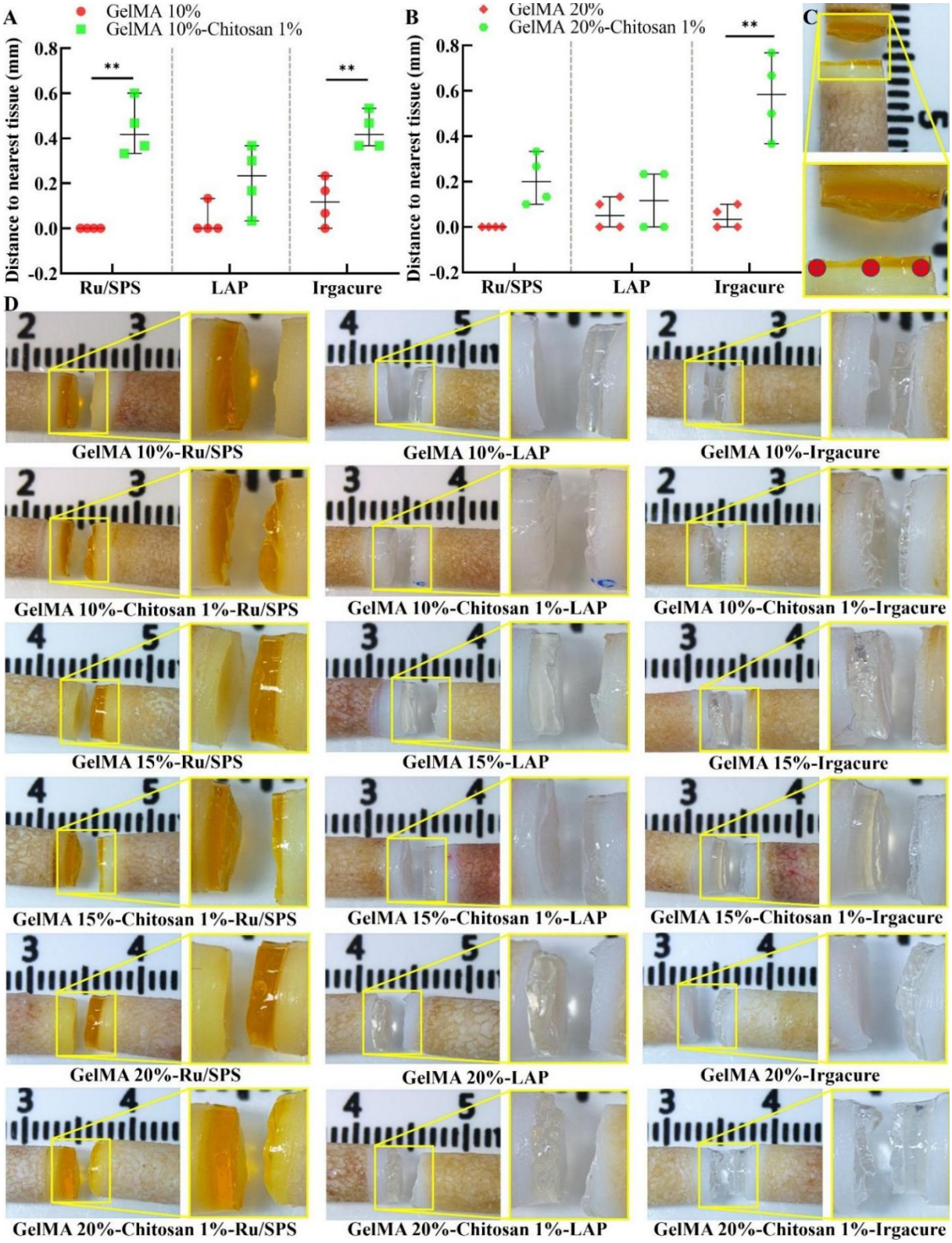

Figure S5. Effects of chitosan on adherent hydrogels length from nearest cartilage tissue. 10% and 20% (*w*/*v*) GelMA alone or blended with 1% (*w*/*v*) chitosan hydrogels were cross-linked with Ru/SPS, LAP and Irgacure photo-initiators. (**A**,**B**) distance of 10% and 20% (*w*/*v*) GelMA alone or blended with 1% (*w*/*v*) chitosan hydrogels to nearest cartilage tissue were measured after adhesion test. Significant differences are indicated by asterisks ** ($p < 0.01$) between groups (n = 4 for each group). (**C**) adherent hydrogels length measurement sites are marked as red cercle (inset). (**D**) hydrogels failure images after adhesion test; area of interest is marked in the inset. GelMA hydrogels only are considered as control in each photo-initiators group.

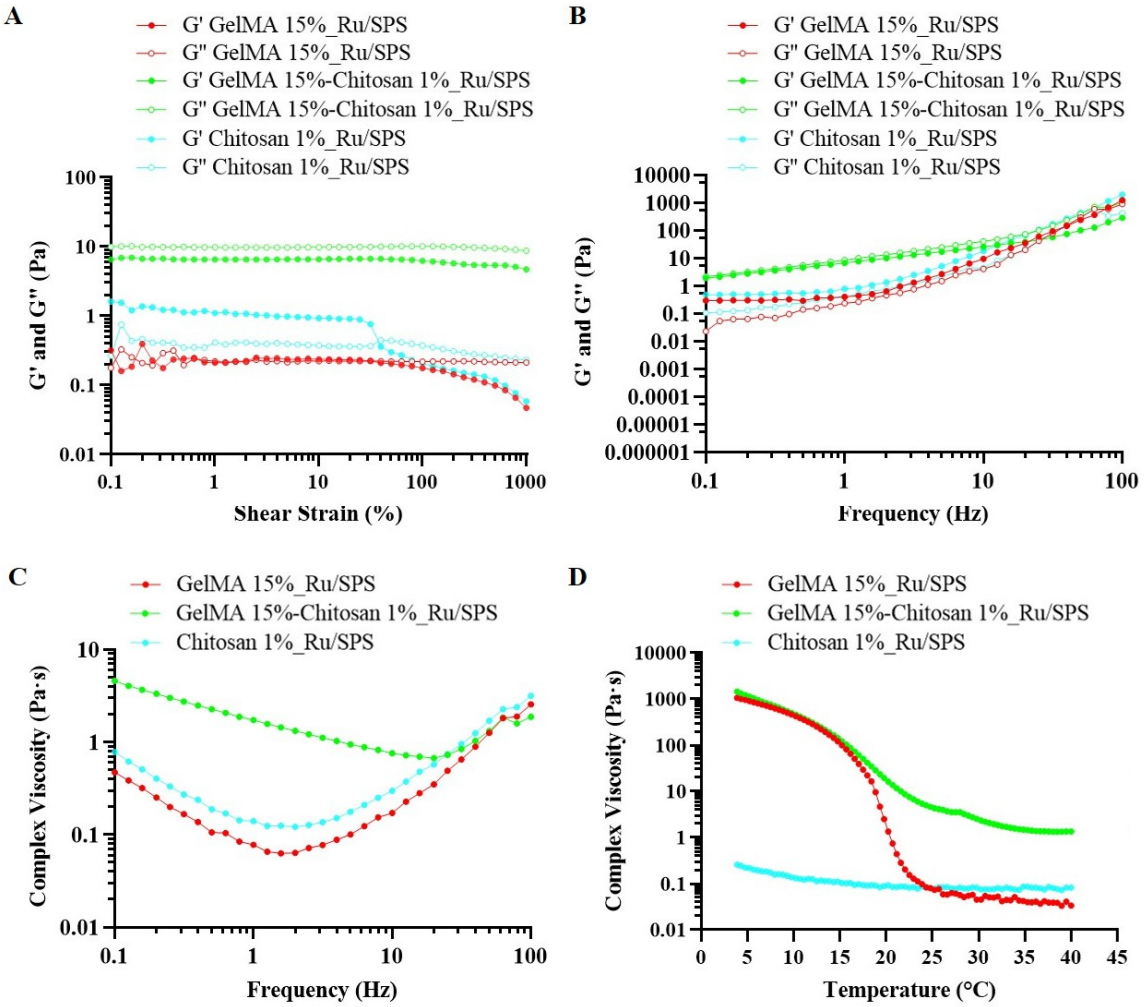

Figure S6. Oscillatory amplitude sweeps, frequency sweeps and complex viscosities of Ru/SPS containing GelMA (15%, *w/v*), chitosan (1%, *w/v*) and GelMA-chitosan (GelMA 15% and chitosan 1%, *w/v*) polymer blends. (**A**) Oscillatory amplitude sweeps at a constant frequency of oscillation of 1 Hz at 37 °C. Frequency sweeps (0.1–100 Hz) (**B**), and complex viscosity (0.1–100 Hz) (**C**) measurements in a linear viscoelastic range at the deformation of 1% at 37 °C. Complex viscosity (**D**) from 40–4 °C at 1% strain and 1 Hz frequency with a decrease rate of 1 °C/min.