

**Supplementary Materials:** The following are available online at [www.mdpi.com/1422-0067/222/21/2267/s1](http://www.mdpi.com/1422-0067/222/21/2267/s1).

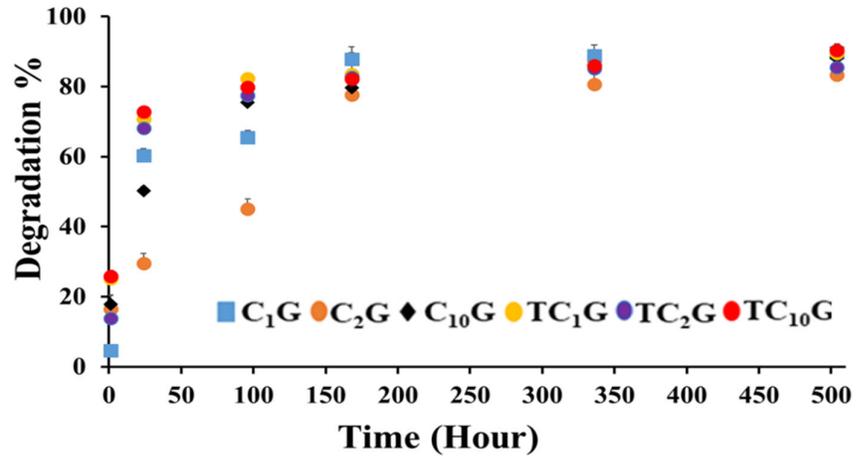


Figure S1: Degradation percentages for the different types of hydrogels after 504 hours showing the slowest degradation rate in C<sub>2</sub>G and TC<sub>2</sub>G.

## Antibacterial effects of hydrogels

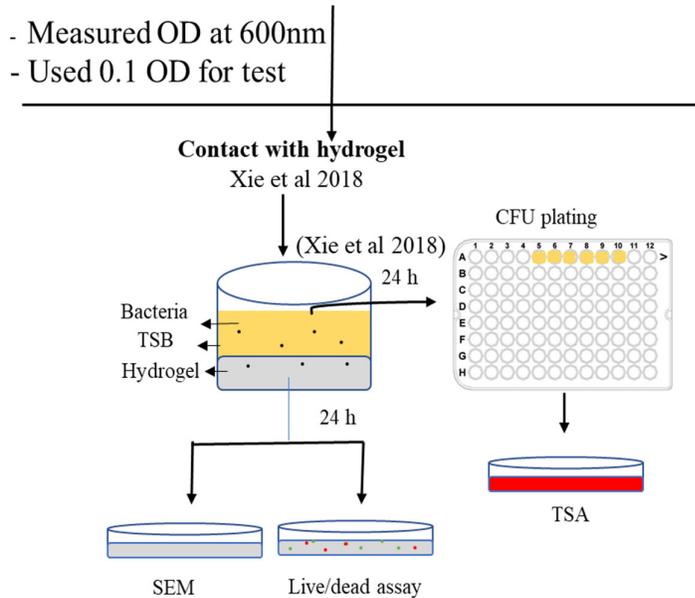


Figure S2: Schematic showing the assays used to evaluate the antibacterial activity of hydrogels. CFU: colony-forming unite, TSB: Tryptic soy broth, TSA: tryptone soya agar, SEM: scanning electron microscope.

**Table S1.** Silica release from the different types of hydrogels at 0.5, 1, 7, 24, 96, 168, 336, 504 hours. Significant differences were identified through one-way ANOVAs and post-hoc Tukey comparisons ( $p < 0.05$ ). Lower case letters represent the post-hoc Tukey comparisons at each time (across the rows) where the significantly highest to lowest release is represented in ascending alphabetical order.

Hydrogels Time (hour)	C2G BPS	C2G E	TC2G PBS	TC2G E
0.5	0.88±0.1 <sup>bc</sup>	3.04±0.39 <sup>a</sup>	0.77±0.17 <sup>c</sup>	0.97±0.18 <sup>b</sup>
1	0.869±0.09 <sup>b</sup>	1.29±0.54 <sup>a</sup>	0.55±0.13 <sup>c</sup>	0.76±0.08 <sup>b</sup>
7	5.0±0.26 <sup>b</sup>	7.84±0.2 <sup>a</sup>	2.83±0.35 <sup>d</sup>	1.94±0.24 <sup>c</sup>
24	3.05±0.37 <sup>a</sup>	1.11±0.17 <sup>c</sup>	2.46±0.62 <sup>b</sup>	2.69±0.26 <sup>b</sup>
96	0.79±0.05 <sup>d</sup>	1.55±0.08 <sup>c</sup>	2.04±0.08 <sup>a</sup>	1.87±0.06 <sup>b</sup>
168	1.11±0.9 <sup>d</sup>	1.31±0.21 <sup>b</sup>	1.28±0.013 <sup>c</sup>	1.41±0.1 <sup>a</sup>
336	1.42±0.1 <sup>d</sup>	1.96±0.1 <sup>b</sup>	1.67±0.01 <sup>c</sup>	2.08±0.12 <sup>a</sup>
504	0.95±0.10 <sup>d</sup>	1.58±0.25 <sup>b</sup>	1.18±0.06 <sup>c</sup>	1.70±0.14 <sup>a</sup>

**Table S2:** Glycerol release from the different types of hydrogels at 0.5, 1, 7, 24, 96, 168, 336, 360, 504 hours. Significant differences were identified through one-way ANOVAs and post-hoc Tukey comparisons ( $p < 0.05$ ). Lower case letters represent the post-hoc Tukey comparisons at each time (across the rows) where the significantly highest to lowest release is represented in ascending alphabetical order.

Time (hour)	Hydrogels			
	C2G BPS	C2G E	TC2G PBS	TC2G E
0.5	217.45±37 <sup>b</sup>	248.53±30 <sup>a</sup>	169.78±31 <sup>c</sup>	172.53±32 <sup>c</sup>
1	166.4±28 <sup>b</sup>	169.35±39 <sup>a</sup>	162.15±29 <sup>c</sup>	162.65±25 <sup>c</sup>
7	136.25±31 <sup>a</sup>	136.83±10 <sup>a</sup>	100.15±16 <sup>c</sup>	121.5±21 <sup>b</sup>
24	80.33±19 <sup>a</sup>	80.7±17 <sup>a</sup>	79.33±9 <sup>a</sup>	79.55±11 <sup>a</sup>
96	227.03±40 <sup>a</sup>	228.68±44 <sup>a</sup>	221.4±45 <sup>d</sup>	225.05±45 <sup>b</sup>
168	197.48±20 <sup>b</sup>	198.53±31 <sup>a</sup>	193.08±23 <sup>d</sup>	195.75±41
336	140.4±35 <sup>b</sup>	146.9±29 <sup>a</sup>	124.95±36 <sup>d</sup>	134.73±23 <sup>c</sup>
360	4.38±1 <sup>b</sup>	4.975±0.5 <sup>a</sup>	2.875±0.4 <sup>d</sup>	3.975±0.8 <sup>c</sup>
504	0	0	0	0

**Table S3:** Chitosan monomers release from the different types of hydrogels at 0.5, 1, 7, 24, 96, 168, 504 hours. Significant differences were identified through one-way ANOVAs and post-hoc Tukey comparisons ( $p < 0.05$ ). Lower case letters represent the post-hoc Tukey comparisons at each time (across the rows) where the significantly highest to lowest release is represented in ascending alphabetical order.

Hydrogels Time (HOUR)	C2G BPS	C2G E	TC2G PBS	TC2G E
0.5	2.62±0.43 <sup>b</sup>	3±0.2 <sup>a</sup>	1.83±0.1 <sup>d</sup>	1.97±0.37 <sup>c</sup>
1	1.20±0.1 <sup>b</sup>	1.31±0.13 <sup>a</sup>	0.78±0.14 <sup>d</sup>	1.04±0.12 <sup>c</sup>
7	0.66±0.13 <sup>ab</sup>	0.69±0.13 <sup>a</sup>	0.62±0.06 <sup>c</sup>	0.63±0.03 <sup>bc</sup>
24	0.57±0.14 <sup>a</sup>	0.58±0.13 <sup>a</sup>	0.46±0.41 <sup>b</sup>	0.49±0.01 <sup>b</sup>
96	1.14±0.12 <sup>ab</sup>	1.17±0.24 <sup>a</sup>	1.03±0.7 <sup>b</sup>	1.12±0.17 <sup>ab</sup>
168	0.64±0.13 <sup>ab</sup>	0.65±0.13 <sup>a</sup>	0.6±0.09 <sup>b</sup>	0.61±0.01 <sup>bc</sup>
336	1.09±0.13 <sup>a</sup>	1.19±0.12 <sup>a</sup>	1.06±0.11 <sup>a</sup>	1.12±0.15 <sup>a</sup>
504	0.81±0.1 <sup>ab</sup>	0.86±0.11 <sup>a</sup>	0.77±0.07 <sup>b</sup>	0.79±0.03 <sup>b</sup>

**Table S4:** Effect of the different hydrogels on metabolic activity of osteoblasts at 24, 48, 72 and 168 hours. Significant differences were identified through one-way ANOVAs and post-hoc Tukey comparisons ( $p < 0.05$ ). Lower case letters represent the post-hoc Tukey comparisons at each time (across the rows) where the significantly highest to lowest release is represented in ascending alphabetical order.

Hydrogels Time (HOUR)	C <sub>1</sub> G	C <sub>2</sub> G	C <sub>10</sub> G	TC <sub>1</sub> G	TC <sub>2</sub> G	TC <sub>10</sub> G
24	49.01±2.9 <sup>a</sup>	48.09±1.8 <sup>a</sup>	49.15±9.5 <sup>a</sup>	51.33±5.9 <sup>a</sup>	51.89±4.06 <sup>a</sup>	51.58±3.5 <sup>a</sup>
48	42.10±7.0 <sup>b</sup>	59.58±6.1 <sup>ab</sup>	59.68±10.4 <sup>ab</sup>	66.41±12.3 <sup>ab</sup>	63.48±10.3 <sup>ab</sup>	68.88±5.6 <sup>a</sup>
72	57.35±3.1 <sup>ab</sup>	68.01±1.8 <sup>a</sup>	52.41±11.4 <sup>b</sup>	69.54±7.5 <sup>a</sup>	64.09±6.4 <sup>ab</sup>	71.49±3.7 <sup>a</sup>
168	61.69±3.3 <sup>b</sup>	71.93±8.3 <sup>ab</sup>	65.37±10.8 <sup>ab</sup>	79.43±8.9 <sup>a</sup>	79.59±2.8 <sup>ab</sup>	77.18±8 <sup>ab</sup>