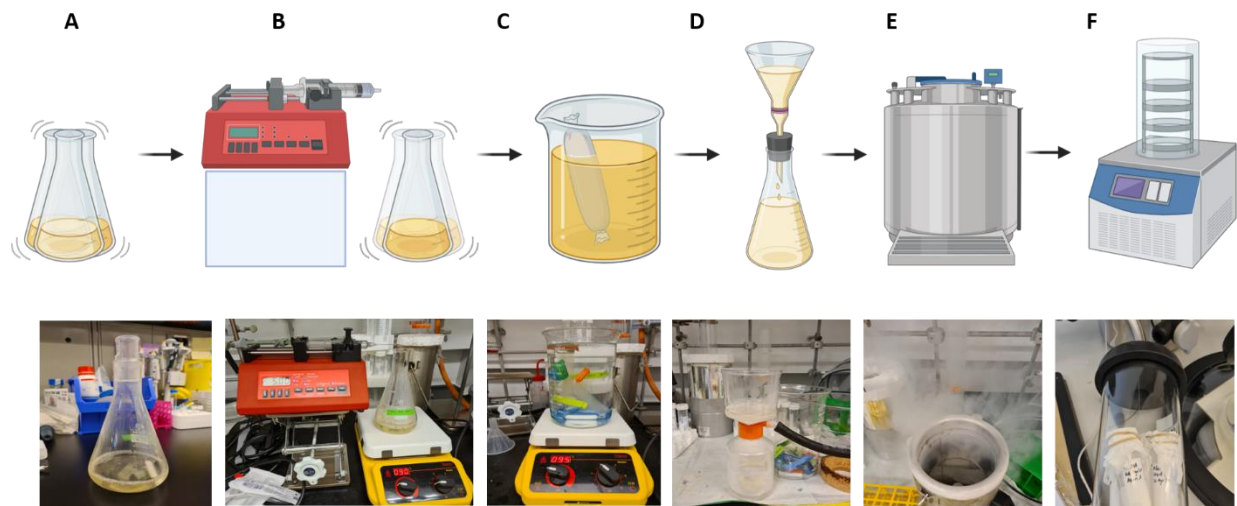
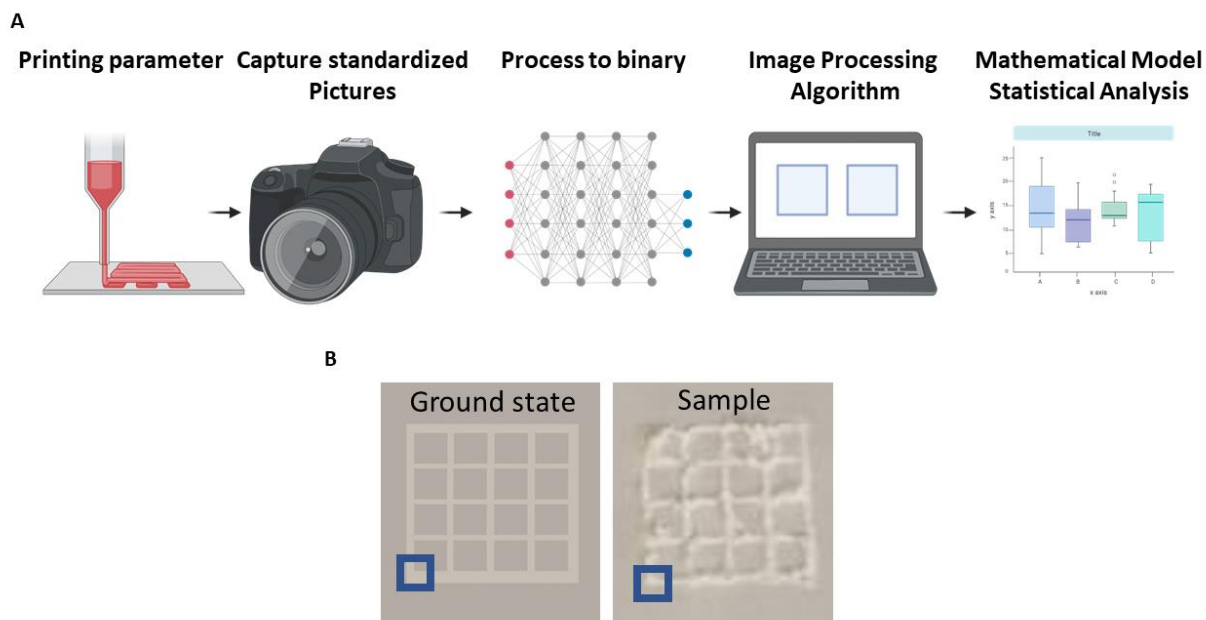












## Supplementary file



**Figure S1.** (A) Dissolving gelatin in PBS. (B) Dropwise methacrylation. (C) Dialysis of the sample. (D) Filtrations. (E) Freezing with liquid nitrogen. (F) Freeze-drying to get the final product.

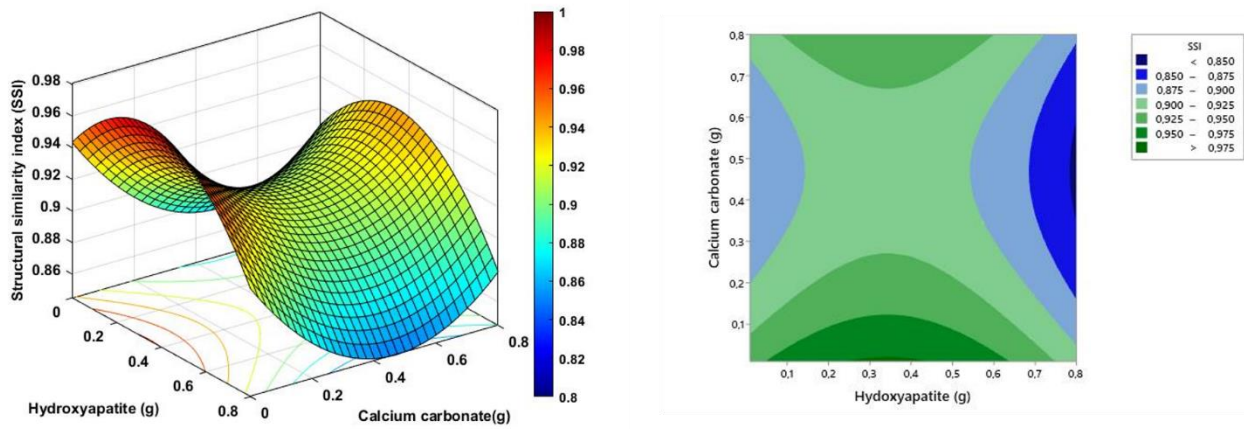


**Figure S2.** Methodology of image processing to assess the printing fidelity of a sample. (A) Schematics from printing the sample, capturing, and processing the pictures in silico, and its analysis. (B) An example of how the technique is comparing the similarity of pixels.

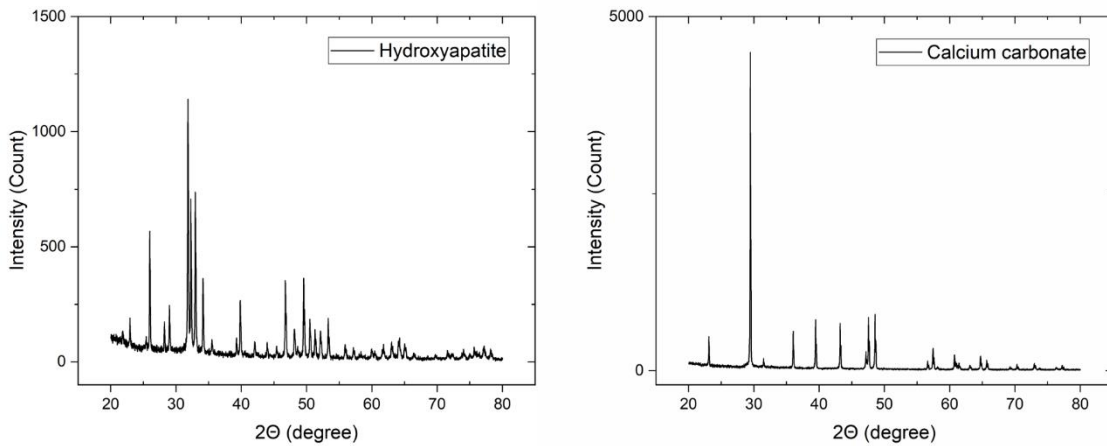
Sample		Hydroxyapatite / mL of Hydrogel Base	Calcium Carbonate / mL of Hydrogel Base	Printing Fidelity (SSIM)	Height 10 layers dried	
1		0.80g	0.0 g	0.91034	2.1 mm	
2		0.60g	0.20g	0.91375	1.9 mm	
3		0.40g	0.40g	0.91321	1.8mm	
4		0.20g	0.60g	0.9116	1.4mm	
5		0.00g	0.80g	0.9111	2mm	



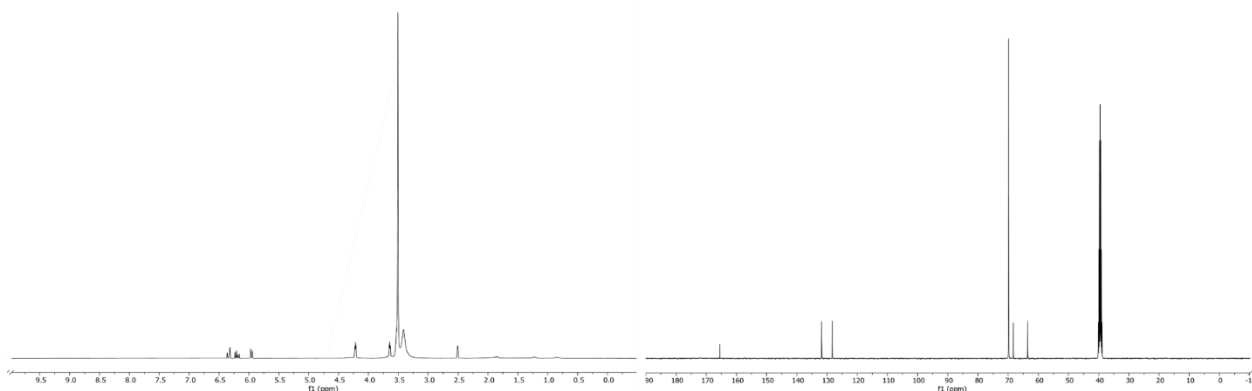
**Figure S3.** Data obtained from the image processing analysis to find the best ratio of bioceramics that are imbued in the biopolymer-base. Also, an example of how the MATLAB code is working, where two images are compared, and we get a convergence of both pictures that gives us a mathematical value to process in a statistical model.



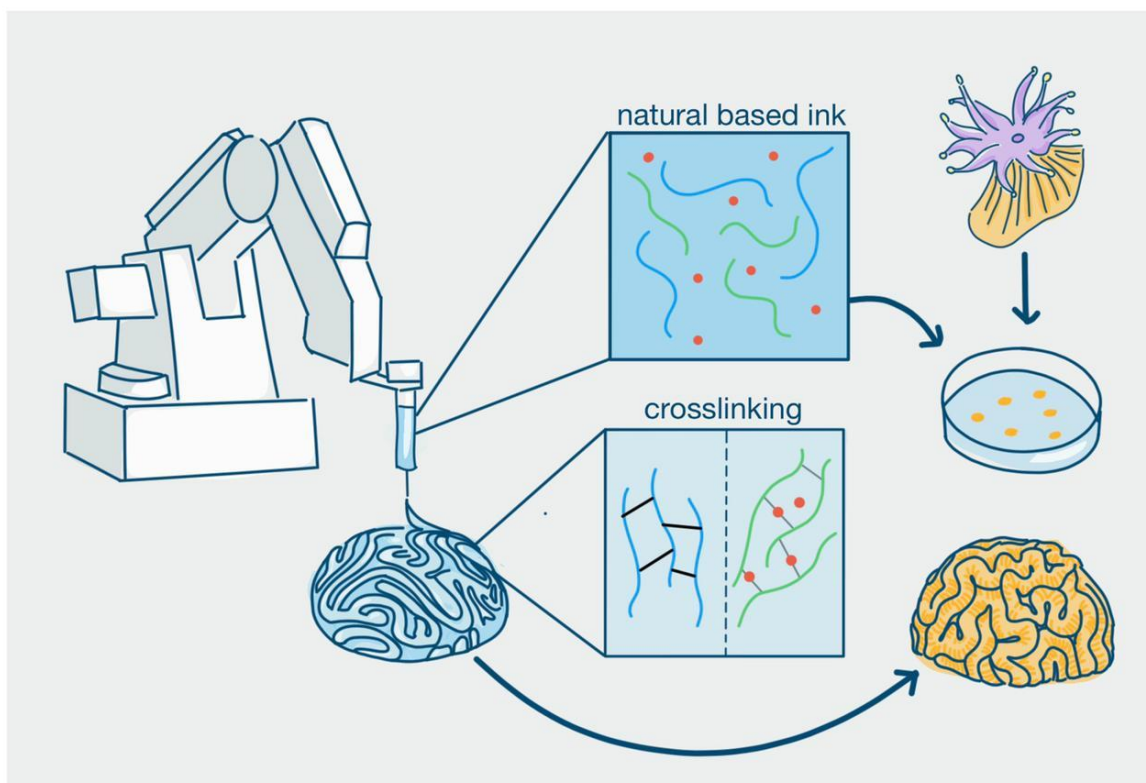
**Figure S4.** 3D response surface plot representing the effect of adding hydroxyapatite and calcium carbonate to the developed ink over the structural definition of the printed structure. The model presented an adjustment >98% and contour plot representation of the effect in adding hydroxyapatite and calcium carbonate to the developed ink over the structural definition of the printed structure.



**Figure S5.** XRD diagrams from sole hydroxyapatite and calcium carbonate as the source of the bioceramics reinforcement from the ink formulation.



**Figure S6.** (A)  $^1\text{H}$  NMR (solution-state) spectrum of biopolymer-base. (B)  $^{13}\text{C}$  NMR (solution-state) spectrum of biopolymer-base.



**Figure S7.** Schematic overview of the project.