

Supplementary Information

Structural and Functional Stabilization of Sericin from *Bombyx mori* Cocoons in a Biopolysaccharide Film: Bioorigami for Skin Regeneration

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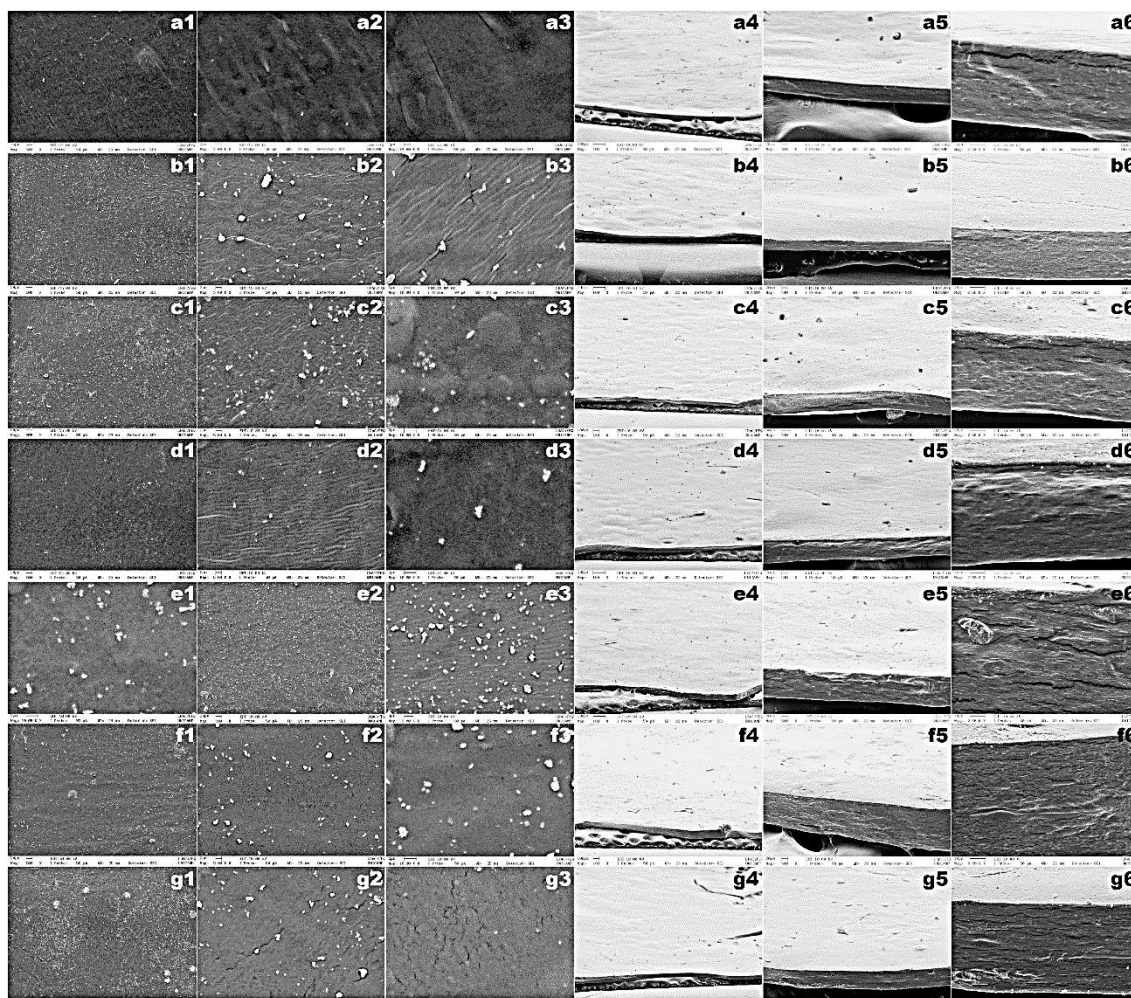


Figure S1. FESEM photomicrographs of the films loaded with variable amounts of sericin, at several magnifications [plain bioorigami film surface: (a1) $\times 500$, (a2) $\times 5000$, (a3) $\times 10000$; plain bioorigami fracture cross-section: (a4) $\times 100$, (a5) $\times 500$, (a6) $\times 2500$; bioorigami film surface loaded with $1 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$: (b1) $\times 500$, (b2) $\times 5000$, (b3) $\times 10000$; bioorigami film surface loaded with $1 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$ fracture cross-section: (b4) $\times 100$, (b5) $\times 500$, (b6) $\times 2500$; bioorigami film surface loaded with $2 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$: (c1) $\times 500$, (c2) $\times 5000$, (c3) $\times 10000$; bioorigami film surface loaded with $2 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$ fracture cross-section: (c4) $\times 100$, (c5) $\times 500$, (c6) $\times 2500$; bioorigami film surface loaded with $5 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$: (d1) $\times 500$, (d2) $\times 5000$, (d3) $\times 10000$; bioorigami film surface loaded with $5 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$ fracture cross-section: (d4) $\times 100$, (d5) $\times 500$, (d6) $\times 2500$; bioorigami film surface loaded with $10 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$: (e1) $\times 500$, (e2) $\times 5000$, (e3) $\times 10000$; bioorigami film surface loaded with $10 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$ fracture cross-section: (e4) $\times 100$, (e5) $\times 500$, (e6) $\times 2500$; bioorigami film surface loaded with $20 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$: (f1) $\times 500$, (f2) $\times 5000$, (f3) $\times 10000$; bioorigami film surface loaded with $20 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$ fracture cross-section: (f4) $\times 100$, (f5) $\times 500$, (f6) $\times 2500$; and bioorigami film surface loaded with $50 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$: (g1) $\times 500$, (g2) $\times 5000$, (g3) $\times 10000$; bioorigami film surface loaded with $50 \text{ mg}_{\text{sericin}} \text{ mL}_{\text{film}}^{-1}$ fracture cross-section: (g4) $\times 100$, (g5) $\times 500$, (g6) $\times 2500$], gathered using the electron back-scattered diffraction (EBSD) technique.

Table S1. Results obtained from the tomographic analyses via X-ray transmission performed to the bioorigami-films integrating variable amounts of sericin from *Bombyx mori* cocoons

| Parameter | Bioorigami film loaded with 10 mg _{sericin} mL _{film} ⁻¹ | |
|--|---|---|
| | Bi-dimensional (2D) morphological analysis | Three-dimensional (3D) morphological analysis |
| Number of layers | – | 101.000 |
| Pixel size / μm | – | 20.7991 |
| Total VOI (volume of interest) (TV) / mm^3 | 0.07810 | 0.07076 |
| Object volume (Obj.V) / mm^3 | 0.04102 | 0.03495 |
| Percentage of object volume (Obj.V/TV) / % | 52.5216 | 49.3932 |
| Total VOI surface (TS) / mm^2 | 5.54313 | 5.08429 |
| Object surface (Obj.S) / mm^2 | 4.02444 | 3.68457 |
| Intersection surface (i.S) / mm^2 | – | 1.42233 |
| Object surface/volume ratio (Obj.S/Obj.V) / mm^{-1} | 98.1101 | 105.426 |
| Cross-sectional thickness (Cs.Th) / mm | 0.02584 | – |
| Object surface density (Obj.S/TV) / mm^{-1} | – | 52.0735 |
| Degree of anisotropy (DA) | – | 4.07826 (0.75480) |
| Eigenvalue 1 | – | 0.02233 |
| Eigenvalue 2 | – | 0.06913 |
| Eigenvalue 3 | – | 0.09109 |
| Number of closed pores (Po.N(cl)) | – | 0.00000 |
| Volume of closed pores (Po.V(cl)) / mm^3 | – | 0.00000 |
| Surface of closed pores (Po.S(cl)) / mm^2 | – | 0.00000 |
| Closed porosity (Po(cl)) / % | 0.00000 | 0.00000 |
| Mean fragmentation index (Fr.I) / mm^{-1} | 11.9519 | 15.3358 |
| Mean fractal dimension (FD) | 0.78338 | 1.71086 |
| Volume of open pore space (Po.V(op)) / mm^3 | – | 0.03581 |
| Open porosity (Po(op)) / % | – | 50.6068 |
| Total volume of pore space (Po.V(tot)) / mm^3 | – | 0.035810 |
| Total porosity (Po(tot)) / % | – | 50.6068 |
| Euler number (Eu.N) | – | –54.0000 |
| Connectivity (Conn) | – | 151.000 |
| Connectivity density (Conn.Dn) / mm^{-3} | – | 2134.06 |

