Supporting Information

Andrographolide-loaded silk fibroin nanoparticles

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Figure S1 general production of RSF nanoparticles

Table S1 infrared spectroscopy data of different silk fibroin status

<table>
<thead>
<tr>
<th>Entry</th>
<th>Amides I (cm⁻¹)</th>
<th>Amides II (cm⁻¹)</th>
<th>Amides III (cm⁻¹)</th>
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<td>1515-1525</td>
<td>1265</td>
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<td>α-helices</td>
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<td>1545</td>
<td>1240</td>
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<td>Random coil</td>
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<td>1535-1545</td>
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<table>
<thead>
<tr>
<th>Entry</th>
<th>RSF concen</th>
<th>AP concen</th>
<th>mPEGN H₂(g%)</th>
<th>ethanol : RSF vol</th>
<th>freezing time (h)</th>
<th>volume-mean diameter (nm)</th>
<th>variance (P.I.)</th>
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<td>1</td>
<td>0.5</td>
<td>2</td>
<td>5%</td>
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<td>5</td>
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<td>10</td>
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<td>/</td>
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<tr>
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<tr>
<td>14</td>
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<td>24</td>
<td>495.7</td>
<td>0.479</td>
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<td>15</td>
<td>3</td>
<td>6</td>
<td>10%</td>
<td>0.5</td>
<td>5</td>
<td>&gt;1000</td>
<td>/</td>
</tr>
<tr>
<td>16</td>
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<td>7</td>
<td>5%</td>
<td>0.4</td>
<td>10</td>
<td>372.0</td>
<td>0.172</td>
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</tbody>
</table>
**VOLUME-Weighted GAUSSIAN DISTRIBUTION Analysis (Solid Particle)**

**GAUSSIAN SUMMARY:**
- Mean Diameter: 528.2 nm
- Std. Deviation: 173.8 nm (32.9%)
- Norm. Std. Dev.: 0.329
- Variance (P.I.): 0.108
- Chi Squared: 2.556
- Baseline Adj.: 0.000%
- Z-Avg. Diff. Coeff.: 9.78E-009 cm²/s

**Figure S2.** AP-loaded RSF nanoparticles sizing distribution of No.1

**Run_Sample**

**Cumulative Result:**
- 25% of distribution < 400.6 nm
- 50% of distribution < 500.1 nm
- 75% of distribution < 624.4 nm
- 90% of distribution < 762.4 nm
- 99% of distribution < 1075.1 nm
- 60% of distribution < 659.7 nm
Figure S3. AP-loaded RSF nanoparticles sizing distribution of No.2
**VOLUME-Weighted GAUSSIAN DISTRIBUTION Analysis (Solid Particle)**

**GAUSSIAN SUMMARY:**
- Mean Diameter = 332.0 nm
- Std. Deviation = 108.5 nm (32.7%)
- Norm. Std. Dev. = 0.327 (Coeff. of Var’n)
- Variance (P.I.) = 0.107
- Chi Squared = 4.371
- Baseline Adj. = 0.918 %
- Z-Avg. Diff. Coeff. = 1.46E-008 cm²/s

![Volume-Weighted Gaussian Distribution](image)

**Cumulative Result:**
- 25 % of distribution < 252.3 nm
- 50 % of distribution < 314.5 nm
- 75 % of distribution < 392.1 nm
- 90 % of distribution < 478.2 nm
- 99 % of distribution < 673.0 nm
- 80 % of distribution < 414.1 nm

**Figure S4.** AP-loaded RSF nanoparticles sizing distribution of No.3
Figure S5.  AP-loaded RSF nanoparticles sizing distribution of No.4
**VOLUME-Weighted GAUSSIAN DISTRIBUTION Analysis (Solid Particle)**

**GAUSSIAN SUMMARY:**
- Mean Diameter = 322.8 nm
- Stnd. Deviation = 100.4 nm (31.1%)
- Norm. Stnd. Dev. = 0.311
- Variance (P.I.) = 0.097
- Chi Squared = 64.604
- Baseline Adj. = 1.099 %
- Z-Avg. Diff. Coeff. = 1.51E-008 cm2/s

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**Cumulative Result:**
- 25% of distribution < 249.2 nm
- 50% of distribution < 307.3 nm
- 75% of distribution < 379.1 nm
- 90% of distribution < 457.8 nm
- 99% of distribution < 633.6 nm
- 80% of distribution < 399.3 nm

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Figure S6. AP-loaded RSF nanoparticles sizing distribution of No.5
Figure S7. AP-loaded RSF nanoparticles sizing distribution of No.6
**Figure S8.** AP-loaded RSF nanoparticles sizing distribution of No.7
**Gaussian Summary:**

- **Mean Diameter**: 623.0 nm
- **Variance (P.I.)**: 0.477
- **Std. Deviation**: 430.5 nm (69.1%)
- **Chi Squared**: 52.596
- **Norm. Std. Dev.**: 0.691
- **Baseline Adj.**: 0.000 %
- **(Coeff. of Var’n)**: Z-Avg. Diff. Coeff. = 9.60E-009 cm²/s

**Run_Sample**

**Cumulative Result:**
- 25% of distribution < 308.1 nm
- 50% of distribution < 490.6 nm
- 75% of distribution < 781.4 nm
- 90% of distribution < 1167.5 nm
- 99% of distribution < 2419.7 nm
- 80% of distribution < 876.9 nm

*Figure S9. AP-loaded RSF nanoparticles sizing distribution of No.8*
### VOLUME-Weighted GAUSSIAN DISTRIBUTION Analysis (Solid Particle)

**GAUSSIAN SUMMARY:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Mean Diameter</td>
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<tr>
<td>Std. Deviation</td>
<td>7589.4 nm (87.3%)</td>
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<tr>
<td>Norm. Std. Dev. (Coef. of Var’n)</td>
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<tr>
<td>Variance (P.I.)</td>
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<tr>
<td>Chi Squared</td>
<td>17254.455</td>
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<tr>
<td>Baseline Adj.</td>
<td>0.000 %</td>
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<tr>
<td>Z-Avg. Diff. Coeff.</td>
<td>1.07E-009 cm²/s</td>
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**Run_Sample**

**Cumulative Result:**

- 25% of distribution < 3284.3 nm
- 50% of distribution < 5877.6 nm
- 75% of distribution < 10467.6 nm
- 90% of distribution < 17322.9 nm
- 99% of distribution < 34935.6 nm
- 99.9% of distribution < 12052.8 nm

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Figure S10. AP-loaded RSF nanoparticles sizing distribution of No.9
**VOLUME-Weighted GAUSSIAN DISTRIBUTION Analysis (Solid Particle)**

**GAUSSIAN SUMMARY:**
- Mean Diameter = 238.9 nm
- Variance (P.I.) = 0.312
- Std. Deviation = 133.5 nm (55.9%)
- Chi Squared = 2006.459
- Norm. Std. Dev. = 0.559
- Baseline Adj. = 0.058 %
- Z-Avg. Diff. Coeff. = 1.62E-009 cm2/s

![Volume-weighted Gaussian Distribution](image)

Cumulative Result:
- 25% of distribution < 140.2 nm
- 50% of distribution < 204.3 nm
- 75% of distribution < 297.8 nm
- 90% of distribution < 418.1 nm
- 99% of distribution < 749.7 nm
- 80% of distribution < 327.0 nm

Figure S11. AP-loaded RSF nanoparticles sizing distribution of No.10
Figure S12.  AP-loaded RSF nanoparticles sizing distribution of No.11
Figure S13. AP-loaded RSF nanoparticles sizing distribution of No.12
Figure S14. AP-loaded RSF nanoparticles sizing distribution of No.13
Figure S15. AP-loaded RSF nanoparticles sizing distribution of No.14
**VOLUME-Weighted GAUSSIAN DISTRIBUTION Analysis (Solid Particle)**

**GAUSSIAN SUMMARY:**

- Mean Diameter = 372.0 nm
- Variance (P.I.) = 0.172
- Std. Deviation = 154.4 nm (41.5%)
- Chi Squared = 76.511
- Norm. Std. Dev. = 0.415
- Baseline Adj. = 1.084 %
- (Coeff. of Var'n)
- Z-Avg. Diff. Coeff. = 1.36E-008 cm$^2$/s

**Cumulative Result:**

- 25 % of distribution < 257.8 nm
- 50 % of distribution < 341.1 nm
- 75 % of distribution < 451.2 nm
- 90 % of distribution < 580.5 nm
- 99 % of distribution < 895.6 nm
- 99.5 % of distribution < 483.7 nm

**Figure S16.** AP-loaded RSF nanoparticles sizing distribution of No.16
Figure S17 Standard curve of AP by HPLC
Figure S18 HPLC of AP-loaded RSF nanoparticle
Figure S19 FT-IR spectra of RSFNPs1

Figure S20 FT-IR spectra of RSFNPs2
Figure S21  FT-IR spectra of RSFNPs3

Figure S22  FT-IR spectra of RSFNPs4
Figure S23  FT-IR spectra of RSFNP5

Figure S24  FT-IR spectra of RSFNP6
Figure S25  FT-IR spectra of RSF

Figure S26  FT-IR spectra of mPEGNH$_2$
Figure S27  FT-IR spectra of AP

Figure S28  FT-IR spectra of physical mixture of AP, PEG and RSFNPs