Betal Leaf-Mediated Zinc Oxide Nanoparticle-Coated Silk Fibres: A Sustainable Approach for Biomedical Applications

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Table S1: X-ray diffraction (XRD) pattern of BZnONPs compared with the standard JCPDS card no. 36-1451. The diffraction peaks correspond to the hexagonal wurtzite structure of ZnO, confirming the crystalline nature. The peak positions and intensities are consistent with the standard ZnO pattern, indicating successful doping without altering the primary crystal phase.

JCPDS no. 36-1451 ZnO wurtzite structure		**BZnONP**		
Standard ZnO Peak	Miller Indices (hkl)	2θ (°)	Absolute Intensity (a.u.)	Relative Intensity (%)
31.77	100	32.09055	9000	56.30%
36.25	101	36.56776	16000	100%
47.54	102	47.84721	2500	15.60%
56.6	110	56.89522	4000	25.00%
62.86	103	63.14653	3600	22.50%
66.38	200	66.76783	3000	18.80%
69.1	112	69.34768	1900	11.90%
72.55		72.83301	1600	10.00%
74.1		74.5057	1500	9.40%

Table S2: Quantitative elemental composition (net content and weight %) of BZnONPs, uncoated silk and BZnONPs-coated silk fibers obtained from EDS analysis. The data confirm the presence and surface distribution of key elements—zinc (Zn), oxygen (O), and carbon (C)—supporting the successful and uniform coating of ZnO nanoparticles on the silk matrix.

Element	Net content	Weight %	Material
C	207	4.17	BZnONPs
O	1278	20.43	
Zn	5236	75.41	
C	34411	50.06	Uncoated Silk
O	10167	49.94	
Zn	0.00	0.00	
C	4178	29.55	BZnONP-coated Silk
O	3135	32.15	
Zn	4426	38.30	

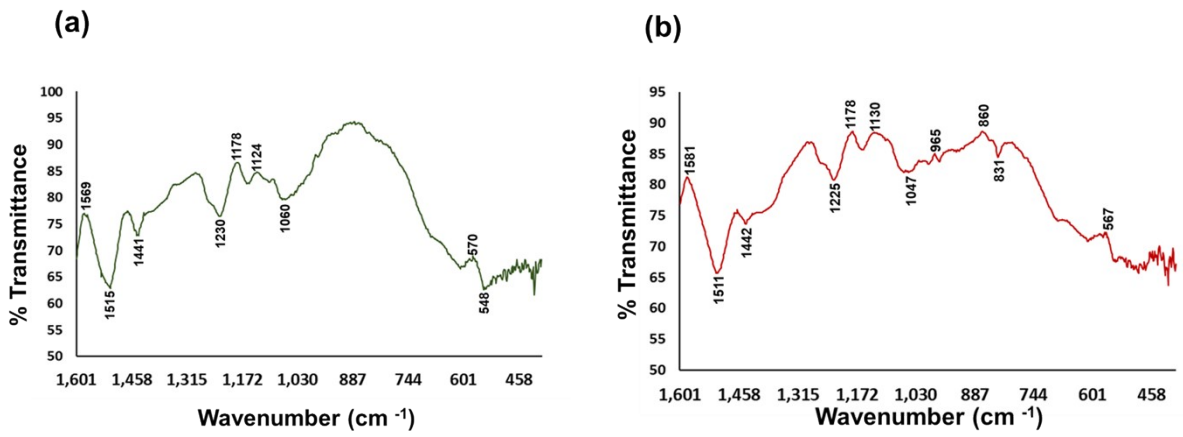

Figure S1. FTIR spectral analysis in the spectral regions of 1600–400 cm^{-1} showing the characteristic functional groups in (a) degummed silk fibres, and (b) BZnONP-coated silk fibres, confirming successful synthesis, surface interactions, and coating efficiency.