

Biopolymeric Hydrogels for the Co-Encapsulation of Phycocyanin and Albumin-bound Curcumin

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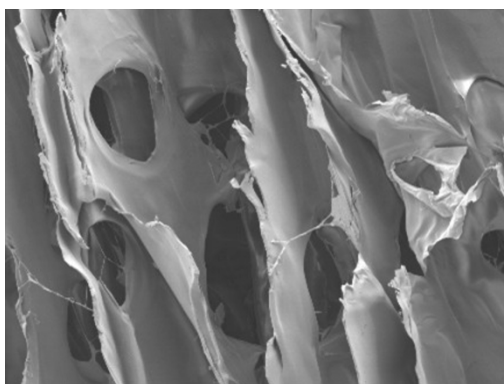
A significant challenge across various scientific and industrial fields remains the co-encapsulation of hydrophilic and hydrophobic compounds within a single delivery system. Towards this direction, the current study proposes an encapsulation strategy, according to which the simultaneous incorporation of both hydrophilic and hydrophobic biomolecules within a hydrogel matrix is enabled.

For this reason, in the present study, a hydrophilic hydrogel matrix is prepared to serve as the network on which the two compounds are co-encapsulated. Namely, the hydrophilic compound chosen is the cyanobacterial protein phycocyanin, extracted and purified by dry *Arthrospira maxima* biomass. The hydrophobic compound chosen is curcumin which has been previously bound to bovine serum albumin (BSA). This approach facilitates the indirect entrapment of hydrophobic molecules within the hydrophilic hydrogel network.

The structural and physicochemical properties of the resulting hydrogels are characterized using optical analysis, scanning electron microscopy (SEM) and confocal laser scanning microscopy (CLSM). Additionally, the antioxidant potential of the encapsulated biomolecules is evaluated to assess their functionality after the encapsulation. Furthermore, a cell viability assay confirmed the hydrogel's biocompatibility and lack of toxicity, demonstrating its suitability as a multifunctional biomaterial for biomedical and pharmaceutical applications.

Keywords:

antioxidants, biopolymers, hydrogels, structure, morphology



SEM image of the freeze-dried hydrogel containing both, phycocyanin and albumin-bound curcumin

References:

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