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Preparation of *Ganoderma lucidum* polysaccharide loaded sodium alginate particles with nanoscaled surface morphology for controlled release

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Ganoderma lucidum polysaccharide (GLP) is a functional food source deployed in preventative medicine. However, applications utilizing GLP are limited due to oxidative and acidic environmental damage. Advances in preserving GLP structure (and therefore function), *in situ*, will diversify their applications within biomedical fields (drug and antibacterial active delivery via the enteral route). In this study, GLP loaded Sodium Alginate (NaAlg) micro-particles (size range 225-355 μm) were generated using the Electrospray (ES) process. The loading capacity and encapsulation efficiency of GLP for composite particles (collected at different temperatures) were ~23% and 71%, respectively. The collection substrate ($CaCl_2$, 1-20 w/v %) concentration was explored and preliminary findings indicated a 10 w/v % solution to be optimal. The process was further modified by manipulating the collection environment temperature (~25 to 50 °C). Based on this, NaAlg/GLP micro-particles were engineered with variable surface morphologies (porous and crinkled), without effecting the chemical composition of either material (GLP and NaAlg). *In vitro* release studies demonstrated pH responsive release rates. Modest release of GLP from micro-particles in simulated gastric fluid (pH~1.7) was observed, while rapid release was exhibited under simulated intestinal conditions (pH~7.4). Release of GLP from NaAlg beads was the greatest from samples prepared at elevated environmental temperatures. These findings demonstrate a facile route to fabricate GLP-NaAlg loaded microparticles with various shapes, surface topographies and release characteristics via a one-step ES process.

Biography

Ming-Wei Chang focuses mainly on multi-functional micro/nanoscaled drug delivery systems and their preparation combining traditional and advanced manufacturing approaches. His most recent research includes development of 3D micro/nanoscaled stacked fibers with accurate patterning and spatial arrangement which has led to improved functionality, production rate and safety for greater personalized healthcare applications.

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