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Controlled protein release from defatted pine pollen

Arun Kumar Prabhakar
Nanyang Technological University, Singapore

Pine pollen with its two air sacs and a sporoplasmic central cavity is naturally capable of molecular loading owing to the void sac space. Pollen-defatting has been shown to remove lipid content and thus increase the pore size and volume favoring enhanced loading. Here natural pine pollen was defatted using diethyl ether and was physically and chemically characterized comparatively. Vacuum loading was employed and increase in bovine serum albumin (BSA) loading efficiency was observed upon defatting. Rapid release was observed with powdered formulation while tableting helped slow it down. Controlled release was achieved by using a binder (Xanthan Gum) for tableting and coating the tablets using sodium alginate separately, where minimal release was observed in SGF (simulated gastric fluid). As proof of concept, natural pine pollen was also shown to encapsulate other hydrophilic and hydrophobic molecules through both passive and vacuum loading separately and dually, opening exciting prospects for microencapsulation using natural particles.

Biography

Arun Kumar Prabhakar has completed his Master's (Biomedical Eng.) from IIT, Bombay (India) and Bachelor's (Biotechnology) from Anna University, Chennai (India). His area of interest is drug delivery and he has worked with both nanoparticles (polymerosomes, graphene quantum dots) and microparticles (pine pollen) for the same. He is currently working with pine pollen for protein delivery for his PhD thesis under Cho Nam Joon (Assoc. Prof. MSE dept., NTU). He has published a paper for his work on pine pollen capsules (A K Prabhakar, et al., Chemical processing strategies to obtain sporopollenin exine capsules from multicompartmental pine pollen. J. Ind. Eng. Chem. (2017)).

arun0028@e.ntu.edu.sg

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