

Preparation, Characterization and *in vitro* Release of Zein-pectin Capsules for Target Delivery

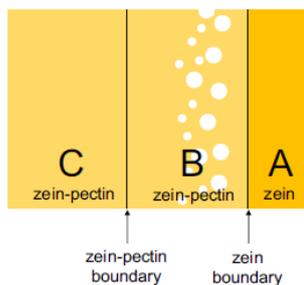
Drug
Delivery

Dr. Yi WANG

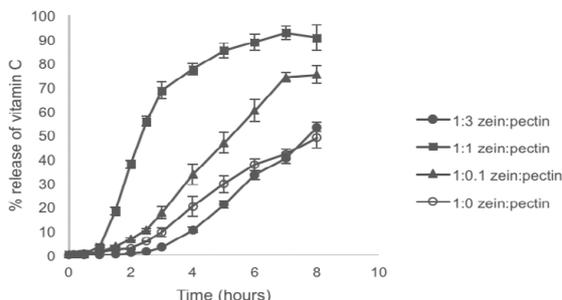
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. Capsule with Controlled Drug Release .

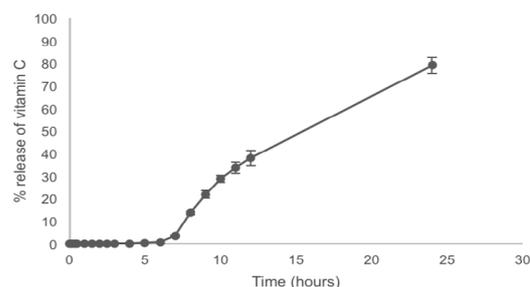
Targeted drug delivery has been the interest of many researchers to improve drug efficiency and reduce side effects. Because of the potential toxicity and contamination problems of the current gelatin capsules, plant derived materials are selected for the developments of capsules for drug delivery systems. The objective of this work is to develop a target drug delivery system using zein and pectin. Different ratios of zein and pectin were used to achieve target delivery in stomach and small intestine. Zein-pectin capsule for colon-specific delivery was also developed. *In vitro* performance of zein-pectin capsules was examined and their structural morphology was characterized using scanning electron microscopy (SEM). Chemical interactions between zein and pectin were analyzed using Fourier transform infrared spectroscopy equipped with attenuated total reflectance (FTIR-ATR). Zein and pectin formed complex by hydrogen bonding. The swelling behavior of pectin was suppressed by zein in the zein-pectin interacted complex. By adjusting the ratio of zein to pectin, the drug release from the capsule in simulated gastric solution for 2 hours can be controlled in the range of 0% to 38%. Zein-pectin capsule for colon-specific delivery had no release in gastric and intestinal solutions while gradual release from zein-pectin capsule was observed in colonic solution, finally reaching about 80% release. Zein-pectin capsule has a potential in developing targeted drug delivery system.



Three-layer structure of zein-pectin capsule for colon-specific drug delivery.



[Above] Controlled release of Vit. C in stomach and small intestine. The capsules were in simulated gastro solutions for the first two hours, while they were in simulated intestinal solutions for the next six hours.



[Left] Controlled release of Vit. C in colon. The capsules were in simulated gastro solutions for the first two hours, and moved to simulated intestinal solutions for the next four hours, and finally moved to simulated colon solution for the next 18 hours.

Representative Publications

W.-W. Tang, F. Dong, K.-H Wong, Y. Wang. Preparation, characterization and *in vitro* release of a zein-pectin capsule for target delivery. *Current Drug Delivery*. 2015, 12 (4), 397-405.



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