# 以幾丁聚醣奈米粒包覆水溶性維生素之探討

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## 大綱

一、前言

二、包覆維生素 B 之幾丁聚醣-海藻酸鈉奈米粒特性

三、包覆維生素 C 之幾丁聚醣-三聚磷酸鹽奈米粒特性

四、包覆水溶性維生素之三甲基幾丁聚醣-三聚磷酸鹽奈米粒特性

五、結論

## 摘要

水溶性維生素會因為以下因素導致其在環境中不穩定，如：溫度、氧氣、光及水氣等等，使用奈米粒包覆可讓維生素穩定，選擇適當的包覆方法可使奈米粒具有理想的性能及功能。幾丁聚醣有良好的生物相容性、生物降解性與可被化學修飾的特性，因此被選用作為食品級奈米粒殼材。本報告利用幾丁聚醣分別和三聚磷酸鹽 (Tripolyphosphate, TPP) 及海藻酸鈉製作成奈米粒包覆水溶性維生素，改善水溶性維生素易受環境破壞的特性，增加保存期限，並探討樣品之奈米顆粒產率、粒徑、Zeta 電位、PDI (Polydispersity Index)、體外及體內釋放速率。海藻酸鈉/幾丁聚醣奈米粒包覆維生素 B2 後奈米粒於溫度 32$^{o}$C 時釋放速率快，存放 5 個月後奈米粒粒徑變化較小及 PDI 較低表示具有良好穩定性。幾丁聚醣-TPP/維生素 C 奈米粒中，幾丁聚醣分子量在 110 kDa 時和 TPP 交聯形成之奈米粒維生素 C 包覆率高，在體外環境及胃腸道環境中酸性條件下穩定，鹼性條件下釋放，而幾丁聚醣具有黏附特性可使維生素 C 滯留時間增加且增強鱒魚之免疫力。水溶性衍生物三甲基幾丁聚醣 (N,N,N- trimethyl chitosan, TMC) 和 TPP 交聯形成奈米粒，低濃度 TMC / TPP 可製成粒徑最小的奈米粒，利用 $^{13}$C NMR 做出的圖譜，可看出 TMC、TPP 及維生素間彼此相互鍵結。幾丁聚醣奈米粒包覆水溶性維生素具有良好的包覆效果。

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