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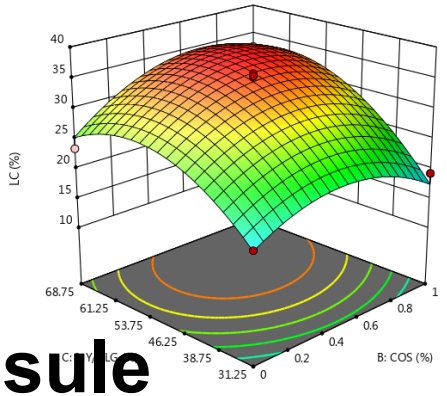
Microencapsulation of immunoglobulin Y: optimization with response surface morphology and controlled release during simulated gastrointestinal digestion

Key words: Immunoglobulin Y, Microencapsulation, Chitooligosaccharide, Response surface methodology, Controlled release, Simulated gastrointestinal digestion

Research Summary

The objective of this work was to prepare, optimize, characterize and evaluate *in vitro*, the immunoglobulin Y (IgY)-containing alginate (ALG) microcapsules coated with chitooligosaccharide (COS).



- **Optimization of microcapsule formulation with response surface morphology (RSM)**
- **The controlled release of microencapsulated IgY using a simulated GI digestion (SGID) system**

Innovation points

- **Preparation of IgY-containing microcapsules using a two-step methods with COS as the coating material.**

- **Comprehensive optimization of the formulation of microcapsules with RSM.**

$$EE = -1050.37 + 1289.22A + 3.23C - 392.88A^2 - 2.42B^2 - 0.04C^2$$

$$LC = -36.72 + 14.15B + 2.30C - 0.17AC + 0.22BC + 2.12A^2 - 21.55B^2 - 0.02C^2$$

$$APS = 551.03 + 41.50B - 3.43BC + 163.02B^2 + 0.02C^2$$

- **Systematic evaluation *in vitro* of the controlled release and immune-activity preservation of the microencapculated IgY.**

$$R(t) = k_0 t \qquad [R_T - R(t)]^{1/3} = R_T^{1/3} - k_{HC} t$$

$$R(t) = k_H t^{1/2} \qquad R(t) = R_{\lim}(1 - e^{-k_1 t})$$