

## One-step preparation of chitosan/sodium dodecyl sulfate-stabilized oil-in-water emulsion of *Zingiber cassumunar* Roxb. oil extract

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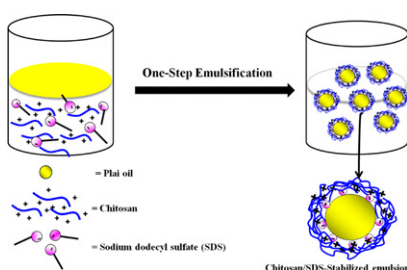
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### HIGHLIGHTS

- ▶ Chitosan-functionalized O/W emulsions can be prepared in a one-step emulsification.
- ▶ Chitosan/SDS complex can act as a colloidal stabilizer.
- ▶ The behaviors of the complex on emulsion fabrication and stability were analyzed.

### GRAPHICAL ABSTRACT



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### ABSTRACT

Chitosan/sodium dodecyl sulfate (CS/SDS)-stabilized emulsions of oil extract from *Zingiber cassumunar* Roxb. or plai oil were prepared in a one-step emulsification process. The effects of CS, SDS, and plai oil amounts on average droplet size, CS/SDS adsorption and colloidal stability of resulting emulsions were investigated using laser light scattering and zeta potential measurements, Fourier transform infrared (FTIR) spectroscopy, and transmission electron microscopy (TEM). Emulsion stability, loading capacity, and emulsification efficiency were also determined. This one-step approach of involving positively charged CS macromolecules associated with negatively charged surfactant molecules, SDS, as an emulsifying system for micron and submicron oil-in-water emulsions brought new scientific insights about interfacial adsorption of polymer/surfactant complexes and the interplay between bulk solution behavior and emulsion fabrication and stability.

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### 1. Introduction

Oil ingredients have numerous potential uses in food, beverage, pharmaceutical, agricultural, and cosmetic products. Generally, those ingredients are used in the form of emulsion after

dispersion into a continuous aqueous phase. However, these emulsions are thermodynamically unstable systems, leading to the increase in the droplet size, and, the susceptibility to chemical deterioration and physical evolution with time. Consequently, a loss of product quality and a shorter shelf-life would be resulted. Therefore, the formation of chemically and physically stable emulsions is a scientific challenge and would be a major benefit for the above mentioned products.

Designing formulated products consisting of emulsions generally requires satisfying several criteria regarding physico-chemical properties (like colloidal stability) as well as chemical stability of ingredients, end use properties, etc. Thus, the design of

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