

Effects of environmental stresses and in vitro digestion on the release of tocotrienols encapsulated within chitosan-alginate microcapsules

ABSTRACT

Considering the health benefits of tocotrienols, continuous works have been done on the encapsulation and delivery of these compounds. In this study, we encapsulated tocotrienols in chitosan-alginate microcapsules and evaluated their release profile. Generally, these tocotrienols microcapsules (TM) displayed high thermal stability. When subjected to pH adjustments (pH 1–9), we observed that the release of tocotrienols was the highest ($33.78 \pm 0.18\%$) under basic conditions. The TM were also unstable against the effect of ionic strength, with a high release ($70.73 \pm 0.04\%$) of tocotrienols even at a low sodium chloride concentration (50 mM). As for the individual isomers, δ -tocotrienol was the most sensitive to pH and ionic strength. In contrast, β -/ γ -tocotrienols were the most ionic-stable isomers but more responsive toward thermal treatment. Simulated gastrointestinal model showed that the chitosan-alginate-based TM could be used to retain tocotrienols in the gastric and subsequently release them in the intestines for possible absorption.

Keyword: Alginate; Chitosan; Gelation; Microencapsulation; Release profile; Self-assembled