

Liquid-crystalline dispersed systems for controlled drug delivery

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Abstract

In this study, we propose the use of dispersions of liquid-crystals formed by phytantriol, an alcohol capable of forming reversed bicontinuous cubic phase in diluted regime under physiological temperature, into which a drug-model was incorporated for the study of its release.

Cubosomes, phytantriol, drug delivery.

Introduction

The drug delivery control of drugs incorporated into dispersed systems has a great importance because these systems respond to specific demands of the body, increasing the therapeutic efficacy and reducing side effects of treatment.⁽¹⁾ Therefore, in this study, we proposed the use nanoparticles formed by phytantriol and dioctyl sodium sulfosuccinate (AOT) stabilized by Pluronic F127, which were characterized by small-angle x-ray scattering (SAXS). In sequence, these nanoparticles were used to incorporate a drug-model, fluorescein sodium salt and free acid, and its released was monitored and quantified using dialysis method and UV-vis spectrophotometry

Results and Discussion

For study of the fluorescein sodium salt release we prepared two samples, varying the AOT concentration (sample A: 1% AOT, sample D: 22% AOT in relation to phytantriol), these samples were dispersed in a Pluronic F127 solution, and a third control sample, consisting an aqueous solution 14 µg/ml of the drug model.

SAXS measurements were made and indicate the presence of phase mixture, cubic (Pn3m) and hexagonal for sample A and loss of long-range order for sample D, probably indicating presence of micelles.

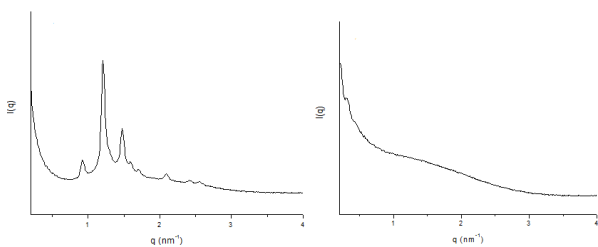


Image 1. SAXS curves for sample A (left) and sample D (right)

The three samples were subjected to a release study of the drug-model incorporated, using dialysis method, in which aliquots were taken at intervals of 1h for 24h, these aliquots were quantified using a UV-vis spectrophotometer, allowing to obtain the release profiles.

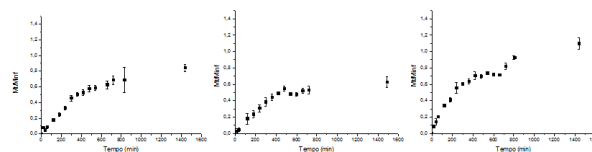


Image 2. Release profile to control sample (left), sample A (middle) and sample D (right)

Conclusions

Sample A released the drug in a controlled way while sample D displayed a faster release in relation to the control sample, contrary to the expected result of a slower release for both.

These results shown to be reproducible, reducing the chance of systematic errors associated with the experiments. In order to confirm the results, new studies using other drug-models will be conducted.

Acknowledgement

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¹ V.P. Torchilin, drug targeting. European Journal of Pharmaceutical Sciences. 11, S81- S91, 2000.