

Accepted Manuscript

Hydrophobin-nanofibrillated cellulose stabilized emulsions for encapsulation and release of BCS class II drugs

Heli Paukkonen, Anni Ukkonen, Geza Szilvay, Marjo Yliperttula, Timo Laaksonen



PII: S0928-0987(17)30053-2
DOI: doi: [10.1016/j.ejps.2017.01.029](https://doi.org/10.1016/j.ejps.2017.01.029)
Reference: PHASCI 3889

To appear in: *European Journal of Pharmaceutical Sciences*

Received date: 16 September 2016
Revised date: 19 January 2017
Accepted date: 23 January 2017

Please cite this article as: Heli Paukkonen, Anni Ukkonen, Geza Szilvay, Marjo Yliperttula, Timo Laaksonen, Hydrophobin-nanofibrillated cellulose stabilized emulsions for encapsulation and release of BCS class II drugs. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Phasci(2017), doi: [10.1016/j.ejps.2017.01.029](https://doi.org/10.1016/j.ejps.2017.01.029)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Hydrophobin-nanofibrillated cellulose stabilized emulsions for encapsulation and release of BCS class II drugs

Heli Paukkonen ^a, Anni Ukkonen ^a, Geza Szilvay ^b, Marjo Yliperttula ^{a,c}, Timo Laaksonen ^{a,d}

^a Division of Pharmaceutical Biosciences, Faculty of Pharmacy, University of Helsinki, P.O. Box 56, FI-00014 Helsinki, Finland

^b VTT Technical Research Centre of Finland, P.O. Box 1000, FI-02044 VTT Espoo, Finland

^c Department of Pharmaceutical and Pharmacological Sciences, via Marzalo 5, University of Padova, Padova, Italy

^d Department of Chemistry and Bioengineering, Tampere University of Technology, P.O. Box 541, FI-33101 Tampere, Finland

ABSTRACT

The purpose of this study was to construct biopolymer-based oil-in-water emulsion formulations for encapsulation and release of poorly water soluble model compounds naproxen and ibuprofen. Class II hydrophobin protein HFBII from *Trichoderma reesei* was used as a surfactant to stabilize the oil/water interfaces of the emulsion droplets in the continuous aqueous phase. Nanofibrillated cellulose (NFC) was used as a viscosity modifier to further stabilize the emulsions and encapsulate protein coated oil droplets in NFC fiber network. The potential of both native and oxidized NFC were studied for this purpose. Various emulsion formulations were prepared and the abilities of different formulations to control the drug release rate of naproxen and ibuprofen, used as model compounds, were evaluated. The optimal formulation for sustained drug release consisted of 0.01% of drug, 0.1% HFBII, 0.15% oxidized NFC, 10% soybean oil and 90% water phase. By comparison, the use of native NFC in combination with HFBII resulted in an immediate drug release for both of the compounds. The results indicate that these NFC originated biopolymers are suitable for pharmaceutical emulsion formulations. The native and oxidized NFC grades can be used as emulsion stabilizers in sustained and immediate drug release applications. Furthermore, stabilization of the emulsions was achieved with low concentrations of both HFBII and NFC, which may be an advantage when compared to surfactant concentrations of conventional excipients traditionally used in pharmaceutical emulsion formulations.

Keywords

Nanofibrillated cellulose; Hydrophobin; Emulsions; Drug release; Ibuprofen; Naproxen

Download English Version:

<https://daneshyari.com/en/article/5547859>

Download Persian Version:

<https://daneshyari.com/article/5547859>

[Daneshyari.com](https://daneshyari.com)