

Supplementary Materials: Composite Nanocellulose Fiber-Based Hydrogels Loading Clindamycin HCl with Ca^{2+} and Citric Acid as Crosslinking Agents for Pharmaceutical Applications

Pichapar O-chongpian ¹, Mingkwan Na Takuathung ², Chuda Chittasupho ^{1,3}, Warintorn Ruksiriwanich ^{1,3}, Tanpong Chaiwarit ¹, Phornsawat Baipaywad ⁴ and Pensak Jantrawut ^{1,3,*}

¹ Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University, Chiang Mai 50200, Thailand; pichaparo@gmail.com (P.O.-c.); chuda.c@cmu.ac.th (C.C.); yammy109@gmail.com (W.R.); tanpong.c@gmail.com (T.C.)

² Department of Pharmacology, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand; mingkwan.n@cmu.ac.th

³ Cluster of Research and Development of Pharmaceutical and Natural Products Innovation for Human or Animal, Chiang Mai University, Chiang Mai 50200, Thailand

⁴ Biomedical Engineering Institute, Chiang Mai University, Chiang Mai 50200, Thailand; phornsawat.b@cmu.ac.th

* Correspondence: pensak.amuamu@gmail.com or pensak.j@cmu.ac.th; Tel.: +66-53944309

Citation: O-chongpian, P.; Na Takuathung, M.; Chittasupho, C.; Ruksiriwanich, W.; Chaiwarit, T.; Baipaywad, P.; Jantrawut, P. Composite Nanocellulose Fibers-Based Hydrogels Loading Clindamycin HCl with Ca^{2+} and Citric Acid as Crosslinking Agents for Pharmaceutical Applications. *Polymers* **2021**, *13*, 4423. <https://doi.org/10.3390/polym13244423>

Academic Editor: Luis García-Fernández

Received: 15 November 2021

Accepted: 14 December 2021

Published: 16 December 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

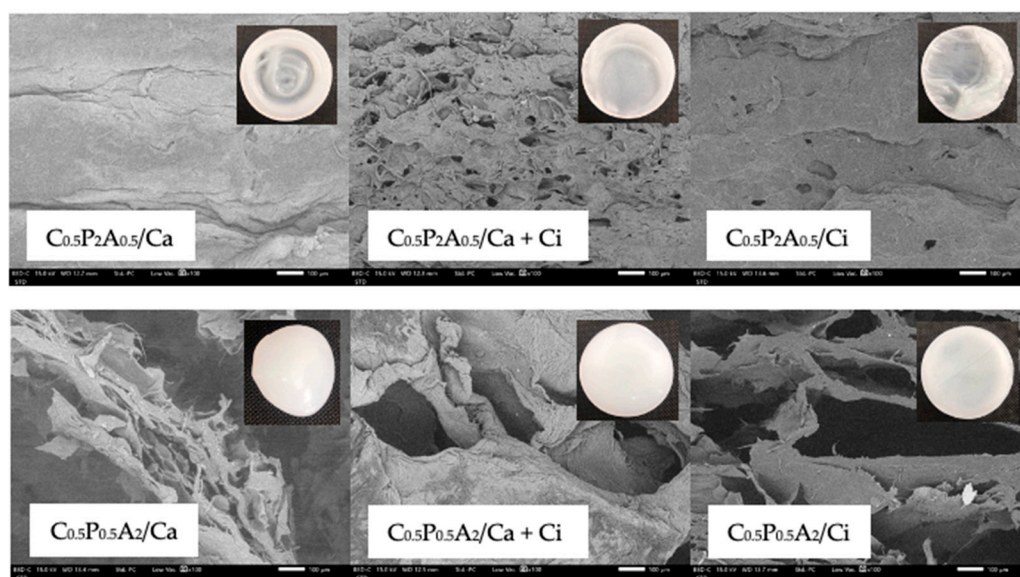


Figure S1. Gross appearance and SEM images of cross-section at 100× of CNFs-based hydrogels that composed of C:P:A with mass ratio 0.5:2:0.5 and 0.5:0.5:2.

Table S1. Thickness of CNFs-based hydrogels that composed of C:P:A with mass ratio 0.5:2:0.5 and 0.5:0.5:2 formulations.

Formulations	Thickness (mm)	Puncture strength (N/mm ²)	Young's modulus (N/mm ²)
C _{0.5} P ₂ A _{0.5} /Ca	3.990 ± 2.199	NA	NA
C _{0.5} P ₂ A _{0.5} /Ca+Ci	3.742 ± 2.151	NA	NA
C _{0.5} P ₂ A _{0.5} /Ci	3.541 ± 2.146	NA	NA
C _{0.5} P _{0.5} A ₂ /Ca	11.740 ± 5.453	NA	NA
C _{0.5} P _{0.5} A ₂ /Ca+Ci	5.558 ± 2.453	NA	NA
C _{0.5} P _{0.5} A ₂ /Ci	3.916 ± 2.674	NA	NA

NA (Not applicable): A large standard deviation of the thickness of CNFs-based hydrogels that composed of C:P:A with mass ratio 0.5:2:0.5 and 0.5:0.5:2 indicates that these formulations were not suitable for mechanical testing.