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Porous deproteinized natural rubber for drug delivery system under applied electric field

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Abstract

Deproteinized natural rubber latex (DPNR) was fabricated from natural rubber latex (NRL) in order to remove the proteins causing the skin allergy. The porous DPNR films were formed via the internal formation of surfactant micelles to generate porous structures. The pore size of porous DPNR films increased with increasing DPNR: SDS volume ratio. To study the drug release and drug release-permeation, naproxen and indomethacin were used as the model drugs with the modified Franz diffusion cells. The drug release experiment was investigated under the effects of surfactant amount, electrical potential, and drug size. For the porous DPNR films, the drug release mechanism was mainly driven by concentration gradient. The matrix with a larger pore size provided the higher drug release. The release rate was enhanced under applied electrical potential owing to the electro-repulsive force between the negatively charged anionic drugs and the cathode electrode. Furthermore, the molecular size of drug affected the drug released amount and release rate. The drug release-permeation through the pig skin was also determined, two release- permeation periods were governed by the combination of concentration gradient and swelling in the first period, and the mechanism changed to the matrix erosion in the second period. In addition, when electrical potential was applied, the higher amount of drug release-permeation and higher diffusion coefficient were obtained in a shorter period of time. Hence, the herein porous DPNR films has a potential to be used as a transdermal patch.

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Biography

Paradee N completed her B.Sc. with First Class Honour in Industrial Chemistry from King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand in 2008. She graduated Ph.D. with Polymer Science from The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand in 2016. Presently, she is a lecturer at Department of Chemistry, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangkok, Thailand. Her research interest consists of conductive polymer, drug delivery system, transderrnal patch, biomaterial, polymer chemistry, polymer synthesis, material science, electrochromic material, and nanomaterial.

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