Journal of Pharmaceutical Sciences
Volume 103, Issue 12, December 2014, Pages 3914-3923

Pharmaceutics, Drug Delivery and Pharmaceutical Technology

Mucoadhesive System Formed by Liquid Crystals for Buccal Administration of Poly(Hexamethylene Biguanide) Hydrochloride

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https://doi.org/10.1002/jps.24198

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ABSTRACT:

Antimicrobial approaches are valuable in controlling the development of buccal diseases, but some antibacterial agents have a short duration of activity. Therefore, the development of prolonged delivery systems would be advantageous. Liquid crystalline systems comprising monoolein (GMO)/water have been considered to be a potential vehicle to deliver drugs to the buccal mucosa because of the phase properties that allow for controlled drug release as well as its mucoadhesive properties. Therefore, the aim of this study was to develop a GMO/water system for the slow release of poly(hexamethylene biguanide) hydrochloride (PHMB) on the buccal mucosa and test the properties of this system with regard to swelling, release profile, antimicrobial activity, and strength of mucoadhesion, with the overall goal of treating buccal infections. The tested systems were capable of modulating drug release, which is controlled by diffusion of the drug throughout the system. Furthermore, PHMB appeared to improve the mucoadhesive properties of the system and may synergistically act with the drug to promote antimicrobial activity against *S. mutas* and *C. albicans*, indicating that liquid crystals may be suitable for the administration of PHMB on the buccal mucosa. Therefore, this system could be proposed as a novel system for mucoadhesive drug delivery. © 2014 Wiley Periodicals, Inc. and the American Pharmacists Association.

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Keywords

mucosal drug delivery; controlled release; biomaterials; lipids; surfactants; liquid crystal; monoolein; antimicrobial activity; PHMB; mucoadhesion

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> ...According to polarized light microscopy and SAXS analysis, MB addition at 0.1% to F6:4, F7:3 and F8:2 did not induce phase transition, preclude the formation of the liquid crystalline phases or change the lattice parameter of F6:4 hexagonal and F7:3 lamellar phases; however, it induced a reduction in the lattice parameter of F8:2. A similar effect has also been reported by Borgheti-Cardoso et al. (2016) and Souza et al. (2014), and attributed to dehydration of the aqueous domain of liquid crystalline system, as the hydrophilic molecules competes for water. SAXS studies also demonstrated that addition of MB at 0.2% in F6:4 induced phase transition, leading to formation of the lamellar phase....

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