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The adjunctive use of locally delivered metformin as mucoadhesive slow releasing multiple layer film in the management of chronic periodontitis

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Periodontal disease broadly defines group of conditions in which the supportive structure of the tooth (periodontium) is destroyed. Recent studies suggested that the anti-diabetic drug metformin hydrochloride (MF) has an osteogenic effect and is beneficial for the management of periodontitis. The objective was development of strong mucoadhesive multiple layer film loading a small dose of MF for intra-pocket application. Triple layer film was developed by double casting and compression methods. Either 6% Carboxy methyl cellulose sodium (CMC) or sodium alginate (ALG) was used as the inner drug (0.6%) loaded layer. Thiolated sodium alginate (TSA; 2 or 4%) constituted the outer drug free layers to achieve a controlled drug release and enhanced mucoadhesion. Optimized formulation was assessed clinically on 10 subjects. Films were uniform, thin and hard for easy insertion into periodontal pockets. Based on water uptake and in vitro drug release, CMC based films with 4% TSA as outer layers was the optimized formulation with enhanced mucoadhesion property and controlled drug release. SEM showed the effective fabrication of the triple layer film in which connective lines between the layers could be observed. FTIR examination confirmed absence of chemical interaction. DSC revealed the presence of MF mainly in the amorphous form. Clinical results indicated improvement of all clinical parameters 3 and 6 months post treatment. Also, radiographs indicated an improvement an increase in density and alveolar bone level. The results suggested that local application of the mucoadhesive triple layer films loaded with metformin hydrochloride was able to manage moderate and chronic periodontitis.

Biography

Ragwa M. Farid has completed her (2010) from Faculty of Pharmacy, Alexandria University, Egypt. Now, she is an Assistant Professor in Department of Pharmaceutics, Faculty of Pharmacy & Drug Manufacturing, Pharos University in Alexandria, Egypt. She has published about 10 papers in reputed journals and two books. She participated in many international pharmaceutical conferences and was awarded the best Industrial Pharmacy Poster Prize 2010 entitled: "Salbutamol Sulfate In-Situ Nasal Gelling Systems: Formulation and Evaluation" in 70th FIP World Congress of Pharmacy/Pharmaceutical Science 28 August - 2 September 2010 -Lisbon 2010, Portugal. She served as a reviewer in reputed journals. Field of interest and ongoing research projects in nanocarriers' drug delivery systems for variable routes.

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