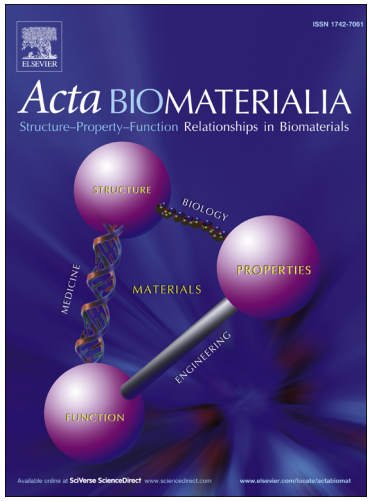

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Chlorhexidine loaded biodegradable cellulosic device for periodontal pockets treatment

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Abstract

Absorbent points widely used in endodontic therapy were transformed into bioresorbable chlorhexidine delivery systems for the treatment of the periodontal pocket by preventing its recolonization by the subgingival microflora. These paper points (PP) were firstly oxidized to promote their resorption, and then grafted with β-cyclodextrin (CD) or maltodextrin (MD) in order to involve the sustained delivery of chlorhexidine. We investigated the oxidation step parameters through the time of reaction and the nitric and phosphoric acids ratios in the oxidizing mixture, and then the dextrins grafting step parameters through the time and temperature of reaction. A first selection of the appropriate functionalization parameters was operated in relation with the degradation profile kinetics of the oxidized (PPO) and oxidized-grafted samples (PPO-CD and PPO-MD). Samples were then loaded with chlorhexidine digluconate (digCHX), a widely used antiseptic agent in the periodontal therapy. The release kinetics of digCHX from PPO-CD and PPO-MD samples were compared to PP, PPO and to PerioChip® (a commercial digCHX containing gelatine chip) in phosphate buffer saline (PBS, pH = 7.4) by UV spectrophotometry. The cytocompatibility of the oxidized-grafted PP was demonstrated by cell proliferation assays. Finally, the disk diffusion test from digCHX loaded PPO-MD samples immersed in human plasma was developed on pre-inoculated agar plates with four common