

AP-004

## DEVELOPMENT OF 3D INJECTABLE BIODEGRADABLE HYDROGEL FOR THE TREATMENT OF PERIODONTAL DISEASE

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### ABSTRACT

Periodontitis is an inflammatory disease resulting in the destruction and loss of tooth-supporting structures (periodontal ligament and alveolar bone) and if left untreated, it can lead to the loss of teeth. In this study, an injectable composition of silanized hydroxypropyl methyl cellulose/titrated extract of *Centella asiatica* (Si-HPMC/TECA) is formulated for the treatment of periodontal disease. We tested TECA efficacy for bone formation and collagen fibres regeneration. TECA 3% w/w enhanced the proliferation and osteogenic (alkaline phosphatase) activity of the periodontal ligament fibroblasts in-vitro. The experiments showed that the self-reticulating 3D hydrogels containing 4% w/w of hydroxypropyl methyl cellulose (HPMC) have potential controlled release properties. The self-reticulating Si-HPMC hydrogel also enhanced matrix cohesion and can be used as an exclusion barrier. The 3D polymer network is acting as an extracellular synthetic matrix mimicking the in-vivo extracellular matrix and can be adapted to provide the best environment for specific cell functions. In addition, this biomaterial is easy to use, simplifies the process of filling periodontal lesions and may improve the clinical results.

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