

Formulation of saudi propolis into biodegradable chitosan chips for vital pulpotomy

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Abstract:

Background: Propolis has been widely used to treat oral cavity disorders, such as endodontal and periodontal diseases and microbial infections. Objective: The study aimed at the formulation of commercial Saudi propolis into biodegradable chitosan chips and evaluation of its effectiveness as a pulpotomy agent. Methods: The standardization of 80% ethanolic propolis extract was performed regarding its total phenolic content, total flavonoid content, quantitative estimation of main polyphenolic constituents and antioxidant activity. Chitosan chips containing propolis extract were prepared by the solvent/casting method. The investigated variables were % of chitosan polymer (2, 2.5 and 3%), % of plasticizer (1, 5 and 10%) and incorporation of different concentrations of hydroxypropyl methylcellulose (5, 10 and 20% of polymer weight). The chips were characterized for weight and thickness uniformity, content uniformity, pH, percentage moisture loss, swelling index, tensile strength and in vitro propolis release. The optimal propolis chip formulation was further investigated in dogs regarding the short term response of primary dental pulp to propolis chips compared with the most commonly used formocresol preparation. Results: The prepared films were flexible and demonstrated satisfactory physicochemical characteristics. The optimal formulation showed an initial release of about 41.7% of the loaded propolis followed by a sustained release extended up to 7 days. The kinetics study demonstrated that propolis release was controlled by Fick's diffusion. The optimal propolis chip formulation resulted in less pulpal inflammation compared to formocresol, and produced hard tissue formation in all specimens. Conclusion: Formulation of commercial Saudi propolis as a biodegradable chitosan chip is an effective alternative to the commercially available chemical agents for the treatment of vital pulpotomy. © 2018 Bentham Science Publishers.

Reference:

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