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Smart Dental Implant Coating: Chitosan–Gelatin Film with Curcumin, Clove, and pH-Sensing Antimicrobial Action

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Peri-implantitis is a common but significant problem that leads to the failure of a dental implant. This study focuses on the development of a biopolymer coating for titanium implants that contains natural agents, such as curcumin and clove extract, to inhibit bacterial growth and colonization. The coating incorporates a chitosan–gelatin matrix, with acceptable biocompatibility and pH-responsive functionality that can change colour to indicate infection. Initial studies deal with the selection and optimization of materials with the theoretical determination of the coating's antimicrobial power and pH-sensing abilities. The primary objective of this work is to develop a non-invasive method for enhancing the longevity of implants, utilizing real-time visual feedback to monitor peri- implantitis health, thereby laying the groundwork for future research.

Keywords: Chitosan–gelatin coating, Curcumin, Clove extract, Titanium dental implant, Peri-implantitis

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