Development Of Marine Species-Derived Hydroxyapatite-Based Scaffold Using Robocasting For Bone Regeneration And Targeted Drug Delivery For Orthopaedic-Related Surgical Site Infections

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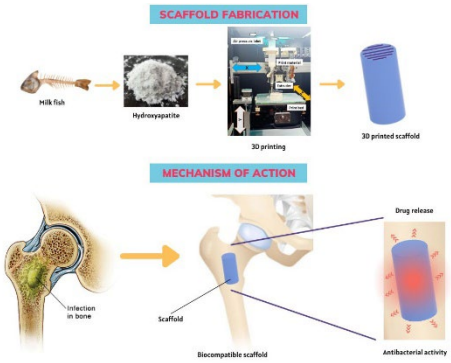
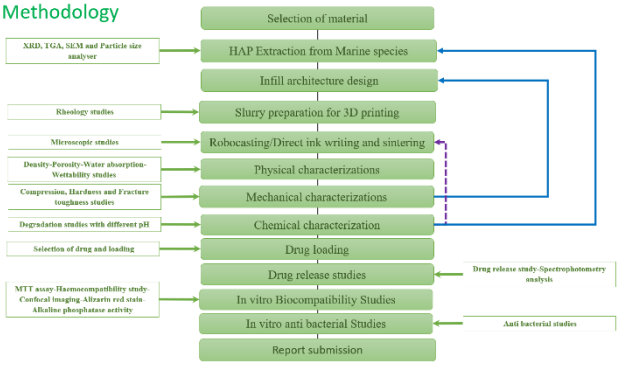
3

Graphical Abstract/ Layout





Project Description

Surgical site infections (SSIs) pose a significant risk to patients undergoing orthopedic surgeries. Studies have shown that SSI rates in India are comparable to those in developed countries, emphasizing the need for preventive measures. To address this issue, we propose developing a low-cost scaffold for orthopedic implants that incorporates anti-inflammatory and antibacterial properties. The scaffold will be fabricated using hydroxyapatite (HAP) extracted from Chanos chanos, a readily available fish bone in the Philippines. HAP will be processed using ball milling and robocasting techniques, followed by sintering. The scaffold's design will be optimized using finite element analysis to ensure optimal performance. Celecoxib (anti-inflammatory) and Levofloxacin (antibacterial) drugs will be incorporated into the scaffold to enhance healing and combat infection. In vitro studies will assess the biocompatibility and antibacterial efficacy of the developed scaffold. This research aims to provide a cost-effective and innovative solution to mitigate SSIs in orthopedic surgeries.

Products/ Instruments/ Results/ Outreach Activities