Abstract No: 131 ***Physical Sciences***

ZINC-DOPED HYDROXYAPATITE/CHITOSAN BIODEGRADABLE POLYMER COMPOSITE FOR BONE GRAFTING APPLICATIONS

R. T. Mohotti[1*], A. Manipura[1], S. Jagoda[2] and N. Adassooriya[1]

[1]Department of Chemical and Process Engineering, Faculty of Engineering, University of Peradeniya, Peradeniya, Sri Lanka
[2]Department of Veterinary Pathobiology, Faculty of Veterinary Medicine and Animal Science, University of Peradeniya, Peradeniya, Sri Lanka
[*]rashmimohotti@yahoo.com

The occurrence of bacterial infections during and after bone graft surgeries are rising to the point of concern, despite the use of antibiotics and controlled hygienic practices. Better methods of preventing bacterial infections are needed, and the fabrication of materials with antibacterial properties within the material itself can be of added advantage. Hence, an investigation into the possibility of synthesizing a bone graft material with antibacterial properties was conducted. Suitable materials for the composite were reviewed and selected. These materials had the added advantage of biocompatibility and degradation. Thus, a polymer composite for bone grafting applications was prepared using chitosan, hydroxyapatite, and zinc. Four composites with varying zinc (doped at 0.2, 0.4 and 2% of Zn) and chitosan ratios were synthesized, and scaffolds were prepared by a compression pelletizing process with 10 kN force. The composites were characterized through Fourier Transform Infrared (FTIR), Powdered X-Ray Diffraction (PXRD), and Thermogravimetric analysis (TGA) techniques. The composites were thermally stable till around 300 °C proving suitable use in the specific application. Water absorption, stability in fluids, compressive strength and antibacterial properties of the composites were tested. The compressive strength of the scaffolds obtained ranged from 4-11 MPa, which is satisfactory for cancellous bone applications. The composites displayed effective inhibition against *Escherichia coli* and *Staphylococcus aureus* after 18 and 30 h of incubation. Stability in fluids had to be further enhanced, though satisfactory water absorption levels were observed.

Keywords: Antibacterial, Bone graft, Chitosan, Hydroxyapatite, Polymer composite