

Synthesis and Characterisation of Phase Pure Hydroxyapatite from Bovine Bones

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Abstract

Most bone fractures can heal spontaneously because of the regenerative nature of bone tissue. However, if the defect size exceeds a ‘critical size’, the bone is no longer able to heal naturally. Bone grafts are used to assist in the healing process. Several methods exist for obtaining bone grafts however, due to the drawbacks associated with the mainstream techniques, alternative sources of bone graft-substitute materials are being widely investigated. Hydroxyapatite (HA) obtained from bovine bone has been found to be easier to produce and more cost-effective. The current research focuses on the synthesis of phase pure HA from bovine cancellous bones using a range of techniques that completely removes the organic component and characterisation to investigate that the properties of produced material are similar or better to those currently available. Analysis of the samples with FTIR and XRD showed that the material exhibits properties of highly crystalline HA with its characteristic functional groups similar to bone graft materials currently being used. This is the first report of bovine-derived bone graft material produced in Sri Lanka. The material produced has the potential to be used as a novel low cost bone graft material, provided that necessary regulatory approvals are taken. It is expected that being a third-world country Sri Lanka will greatly benefit from the availability of a low-cost bone graft material.

Keywords: *Bone graft material, Bone fractures, Hydroxyapatite*