

# Sustainable use of biogenic resources for developing calcium phosphates bioceramics and microcomposites with tunable bulk and surface characteristics

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**Keywords:** biogenic resources, bovine bone, sea shell, marble, calcium phosphates, hydroxyapatite microcomposites

## **Abstract.**

Utilization of biogenic precursors for producing calcium phosphates for bone reconstruction aims to contribute to a more sustainable use of natural resources. Different carbonate or phosphate-based materials, available on land or in marine environments, could be processed into high-value biomaterials which closely resemble the mineral component of bone tissue. Current challenges in this field include the development of reproducible synthesis methods based on chemical and thermal routes which are adequate for processing raw materials with large compositional variability.

This presentation provides a comparative analysis of synthesis and processing methods used for obtaining biocompatible calcium phosphates from bovine bone, sea shells and marble. A solely thermal route is discussed for extracting hydroxyapatite from bovine bones, while a chemical route developed for pure calcium carbonate is adapted for sea shells and marble. The methods are further linked with adequate thermal treatment and sintering programmes for developing bioceramics and microcomposites with suitable properties for bone reconstruction. Each of these stages is evaluated by means of bulk and surface characterization techniques. A comparative evaluation of in vitro behaviour after thermal treatment of the materials is also provided.

## **References**

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**Acknowledgement:** This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-III-P2-2.1-PED-2016-0892.