

## Utilisation of biowaste to bioceramic hydroxyapatite for bone tissue engineering

Avian eggshell is a significant form of biowaste, with millions of tonnes a year generated worldwide. Sometimes eggshell biowaste is used as fertiliser, but a significant amount is wasted. Eggshells contain high calcium carbonate and can be converted into synthetic hydroxyapatite – a key natural mineral in native tissues such as bone. The natural calcium and magnesium content of eggshell is similar to that of the apatite mineral of human bone, and increases the bioactivity of the synthesised hydroxyapatite. Conversion of eggshell biowaste into synthetic hydroxyapatite can be achieved via an inexpensive and energy efficient household microwave irradiation method. This simple technique is quick and processing parameters can be easily controlled to significantly increase the synthesis reaction rate and achieve rapid production. The hydroxyapatite bioceramics produced by this technique can be used for wide ranging orthopaedic tissue engineering applications such as void fillers, bioscaffolds, synthetic biocomposite bone screws and apatite coatings for hip and knee implants.

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