

# Characterization and *In Vitro* Cytocompatibility of Hydroxyapatite Bioceramics

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## Abstract

Firstly, we must know about what is hydroxyapatite? Hydroxyapatite is a gift of a nature which is to apatite in which the main inorganic substance which constitute for tooth enamel and bone, although we can find it very rarely in rocks and sandstone.

**Keywords:** Biomaterial • Bioceramic • Bioactive ceramic • Calcium phosphate • Doped hydroxyapatite • Bone tissue engineering

## Introduction

As in chemistry inorganic we can say that also it is complex of phosphate of calcium that is  $\text{Ca}_5(\text{PO}_4)_3\text{OH}$  that occur as a mineral and it is chief structural element of vertebrate bone which we can directly found on humans' body at the part of vertebral bone.

The hydroxyapatite is the relation of bio ceramic that is a ceramic of hydroxyapatite is one of the special media for which it required bio molecular purification. It is a spherical ceramic from crystalline of hydroxyapatite and this was form and the crystalline allows it to be used in production of scale columns at the high flow while it's maintaining its unique separation of properties.

Some developments for suitable materials that act as an interface between the implanting of tissue in body system structurally mechanically and the function of bio it is very important for the success of tissue implementing. This was motivated materials of biologist to take out of suitable bioactive materials for the aforementioned.

The main characterization of hydroxyapatite it is the main inorganic component of the vertebral bone with formula  $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ . Hydroxyapatite can be used as substituted bone biomaterial because of biocompatible nontoxic and osteoconductive.

It is also used in manufacturing cosmetic and hygiene products as well as well as in bone-tissue for engineering and regenerative medicine by the help of hydroxyapatite. Hydroxyapatites it is used in biomedical applications were constantly growing due to their good mechanical properties which are enhanced efficiency of gene transfection in case of drug delivery.

The industry they can be manufactured by using many different methods, such like as hydrothermal synthesis, sol-gel synthesis, wet-chemical precipitation, and microwave processing etc.

The hydroxyapatite is a bioactive and biocompatible material possessing osteoconductive properties are used in widely on the biomedical sector. In the present study of synthesis of hydroxyapatite using a *Klebsiella pneumoniae* SM24 or we can say that phosphate solubilizing bacteria isolated from the slaughterhouse.

In natural hydroxyapatite from bio ceramic was extracted from the ostrich cortical bone by the process of thermal decomposition method. HAP was characterized by different analytical tools that such as thermo gravimetric analysis, Fourier-transform infrared spectroscopy, X-ray diffraction analysis, and scanning electron microscopy of human. And help to removal of organic impurities from the bone powder was confirmed by TGA analysis. FTIR spectra of HAP confirmed the presence of the major functional groups such as phosphate ( $\text{PO}_4^{3-}$ ), hydroxyl ( $\text{OH}^-$ ), and carbonate ( $\text{CO}_3^{2-}$ ) in the bio ceramic of hydroxyapatite.

The hydroxyapatite is Synthesis by hydrothermal method of Physico-chemical and microstructural properties of the hydroxyapatite were characterized by X-ray diffraction Fourier-transform infrared spectroscopy (FTIR), Brunner Emmett Teller (BET) analysis and Scanning Electron Microscope (SEM) and compared with standard sample of hydroxyapatite. For lead treatment in wastewater, adsorption of hydroxyapatite was tested by measuring concentration by the lead of the adsorption by in this process.

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## Declaration of Conflicting Interests

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