

Ph.D. APPLICATION 2024

ONE PAGE WRITE UP

TENTATIVE TITLE: Experimental Investigation of Bio nanocomposite for Biomedical Applications

The Bio-nanotechnology research has the important role in medicinal application during the past two decades. Biomaterials are used widely for the treatment of body fatal disease. With the advent of nanotechnology, the use of nanocomposites has become almost inevitable in the field of biomaterials. The versatile properties of nanocomposites, such as improved durability and biocompatibility, make them an ideal choice for various biomedical applications.

The desire to search for new materials that could be successfully implanted into the human body which it provide synergy to the system of man and is not exposing it to unwanted side effects by means of nanotechnology or composite materials with controlled properties. There are looking for synthetic-biology and materials with special properties. Biological method has been explored for the synthesis of nanoparticles. Comparing to other synthesis, the green synthesis are more efficient. But they are scaratly reported in the literature hence in the work an attempt is to be made to develop bionanocomposite for medical applications.

To enhance the mechanical properties and biological properties of the bio nanocomposite, the green synthesis nanofiller are used. This study investigates the effect of green synthesis nano filler at different concentrations on the properties of bionanocomposites from species. Synthetic Nanoparticles are to be characterized using FTIR, UV visible spectrometer, XRD, SEM, EDAX.

INFERENCE FROM LITERATURE REVIEW

The following observations are made from the detailed literature reviews,

- Recent advances in material science offer new polymers and metal with improved properties are calcification-resistance efficacy, and surface properties, Whole blood clotting time, plasma recalcification, Factor XII activation, platelet adhesion and activation, hemolytic index and complement activation, biodegradability, cytotoxicity, and antibacterial properties, Mechanical , Biocompatibility, rheological and thermal properties, potentially suitable for synthetic leaflets heart valves manufacturing and bone implant.
- Metal nanoparticles Green synthesised, characterised and evaluated UV-Visible spectrophotometer, X-Ray diffraction (XRD), Fourier transform infrared (FTIR), Energy dispersive spectroscopy (EDAX) and Transmission electron microscopy (TEM), scanning electron microscopy (SEM) and antibacterial activity of metal nanoparticles by using plant.

RESEARCH GAP

From the detailed literature review,

- Development of medicine significantly associated with the progression of chemical sciences and materials science. Progress in these disciplines cause the desire to search for new materials that could be successfully implanted into the human body.
- These new materials are called smart materials can provide synergy to the system of man and is not exposing it to unwanted side effects.
- To find use here in conducting polymers, materials produced by means of nanotechnology or composite materials with controlled properties.
- There are looking for synthetic-biology and materials with special properties. Increasingly, also biological structures arise in vitro, which contributes to the development of tissue engineering (Heart valve).

- Prepare green synthesis of nanoparticles by using plant which is used to prepare bionanocomposites.

SCOPE

The aim of this study is, to produce bio nanocomposite as the green synthesis nanofiller in order to enhance the mechanical properties and biological properties of the bio nanocomposite produced.

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OBJECTIVE OF THE WORK

The main objective of this project is,

- To prepare green synthesis of nanoparticles by medicinal plant.
- To characterise and evaluation the green synthesised nanoparticles for UV-Vis Spectroscopy, Scanning Electron Microscope(SEM) with EDAX and Fourier Transform Infra-Red Spectroscopy (FTIR) and Antibacterial activity.
- To develop bio nanocomposites for application of heart valve.
- To characterise the synthesised bio nanocomposites for mechanical properties and biological properties.
- To study the effect of nano fillers on the properties of bio nanocomposites.