

Title: Development and Characterization of Biocomposite Materials for Functional Artificial Organs

Abstract:

This research aims to develop novel biocomposite materials combining natural fibers and biodegradable polymers for use as scaffolds in artificial organs. The project addresses the critical need for biocompatible, sustainable materials that enhance the mechanical performance and integration of artificial organs while reducing immune rejection. The methodology involves synthesizing biocomposites using fibers like cellulose with polymers such as poly(lactic acid), followed by comprehensive characterization of their mechanical and biological properties. Prototype scaffolds incorporating vascular channels will be fabricated using 3D bioprinting and tested for cell viability and functionality in vitro. The expected outcome is a functional biocomposite scaffold demonstrating biocompatibility and mechanical resilience, advancing the potential for clinically viable artificial organs. This work holds significant implications for regenerative medicine by offering sustainable solutions to organ shortages and transplant complications.