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POLYCAPROLACTONE (PCL) BASED SYNTHETIC BIOPOLYMERS FOR MODERN SCAFFOLD-BASED TISSUE ENGINEERING

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With the progress of technological advancement, biopolymers have drawn great attention in the modern regenerative therapy. Scaffold-based tissue engineering approach is truly promising in repairing and/or regenerating diseased/damaged tissues/organs. Natural biopolymers mimic the properties of natural extracellular matrices (ECM) of tissues. However, the natural biopolymers inherit a number of limitations that include large batch-to-batch variation, limited resources, poor mechanical performance etc. Synthetic biopolymers overcome these limitations offering a range of benefits such as enormous availability, high processability, controllable biomechanical properties and so on. Because of favourable viscoelastic property and low melting temperature, PCL has been one of the most contributing biopolymers to the field of tissue engineering. In this study, a set of polycaprolactone (PCL)-based biopolymers were employed to develop a scaffold family to cater for various tissue engineering applications as per necessity. The scaffolds were fabricated using a customized desktop robot based rapid prototyping (DRBRP) technique. Morphological and mechano-chemical characterizations were performed using scanning electron microscope (SEM) and in vitro degradation test, respectively. The biocompatibilities of the fabricated scaffolds were also tested via cell culture study. The results demonstrated great potential of the PCL-based synthetic biopolymers for advanced scaffold-based tissue engineering therapy.

Biography

Md Enamul Hoque is a Professor in the Department of Biomedical Engineering at the Military Institute of Science and Technology (MIST), Dhaka, Bangladesh. Previously, he served a number of key positions in some other global universities prior to joining MIST including Head of Department, Biomedical Engineering at King Faisal University (KFU), Saudi Arabia and also Founding Head of Bioengineering Division, Department of Mechanical, Materials and Manufacturing Engineering at the University of Nottingham Malaysia Campus (UNMC). He received his PhD from the National University of Singapore (NUS), Singapore in 2007. He also obtained his PGCHE (Post Graduate Certificate in Higher Education) from the University of Nottingham, UK in 2015. He is a Chartered Engineer (C Eng) certified by the Engineering Council, UK and Fellow of Higher Education Academy (FHEA), UK. So far, he has authored three books, edited three books and co-authored 19 book chapters. He has also published around 160 technical papers in referred journals and international conference proceedings. His publications have attracted about 900 citations. His major research interests include the areas of biomaterials, bio-composites, tissue engineering, stem cells, rapid prototyping technology, nanotechnology, nanomaterials.

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