

Bio-technically vibrant chitosan based electrospun nanofibrous membrane for potential water filtration

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In this study, a chitosan based non-woven nanofibrous membrane was fabricated by electrospinning technique. Chitosan being a natural polymer offers environmentally benign, nontoxic and antibacterial properties, which are rather favourable for a water filtration membrane. Three types of chitosan material combinations were utilized e.g. i) untreated chitosan, ii) chitosan-polypropylene hybrid blend and iii) hydrolysed chitosan to fabricate a set of nanofibrous membranes. The morphological characteristic of the fabricated membranes was analysed using scanning electron microscope (SEM), which revealed that the process parameters affected the membrane's uniformity and integrity. The mechanical property and antibacterial activity were also investigated through tensile and microbial tests, respectively. All three types of chitosan based materials showed promise to be processed into non-woven nanofibrous membrane. However, the chitosan-polypropylene hybrid membrane was observed to be the optimum amongst the three, in terms of fabrication process and necessary characteristics like, mechanical strength and antibacterial activity. The preliminary test results suggest that the chitosan based electrospun nanofibrous membrane holds high potential for advanced water filtration.

Keywords: Chitosan, Electrospinning, Nanofibrous, Membrane, Filtration

Biography:

Dr. Md Enamul Hoque is an Associate Professor in the Department of Biomedical Engineering. He received his PhD in Mechanical Engineering (major in Bioengineering) from NUS, Singapore in 2007. So far, he has authored 3 books, edited 3 books and co-authored 12 book chapters. He has also published about 140 technical papers in high impact referred journals and international conference proceedings. He serves as an editor for 5 journals, as member of editorial board for 8 journals, and technical reviewer for about 25 journals. He is a Chartered Engineer and Fellow of Higher Education Academy, UK. Besides, He is a member of several professional scientific bodies including Tissue Engineering and Regenerative Medicine International Society (TERMIS), USA; Institute of Mechanical Engineer (IMechE), UK; Institute of Materials, Minerals and Mining (IOM3), UK; Institute of Materials Malaysia (IMM), Malaysia; and Tissue Engineering Society Malaysia (TESMA), Malaysia. His research interests include the areas of Biomaterials, Biocomposites, Tissue Engineering, Stem Cells, Rapid Prototyping Technology, Nanotechnology, Nanomaterials, Bioenergy & Food Technology.