OMICS International
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Aysu Arslan et al., J Tissue Sci Eng 2015, 6:2
http://dx.doi.org/10.4172/2157-7552.S1.021

Polybutyleneadipate-co-terephthalate (PBAT) scaffolds for tissue engineering applications

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Polybutyleneadipate-co-terephthalate (PBAT) is aliphatic-aromatic co-polyester based on the monomers 1, 4-butanediol, adipic acid and terephthalic acid. Recently, it has been considered as a promising biomaterial for tissue engineering applications due to its non-toxicity, desiredphysical properties and complete biodegradability under enzymatic conditions. However, existing studies are limited to cytotoxicity and basic cell proliferation assays with non-functional PBAT membranes which is not enough to understand PBAT's behavior as scaffolds for tissue regeneration. In this study, 2D and 3D porous PBAT scaffolds were fabricated via solvent casting, electro-spinning, solvent casting-particulate leaching and melt molding-particulate leaching methods. Fabricated scaffolds were characterized due to their morphologies, mechanical properties, water absorption capacities, wettabilities and pre-osteoblastic cell promotion in order to estimate its potential for tissue regeneration. PBAT scaffolds were successfully fabricated in various structural forms with up to 90% porosities. Attachment and proliferation of MC3T3-E1 pre-osteoblastson PBAT surfaces was observed with scanning electron microscope (SEM) on the 4th, 24th hours, 3rd and 11th day of cell culture. Results show that cells favored the neat PBAT surfaces in all fabricated structural forms. At the 11th day of the cell culture, PBAT surfaces were covered by cells and extracellular matrix secreted by the cells. As a result, it is easy process ability, good mechanical properties, biocompatibility and well-known biodegradability makes it a powerful candidate for tissue engineering applications. In further studies, tissue engineering potentials of neat and modified 3D electrospun PBAT scaffolds will be investigated.

Biography

Aysu Arslan has completed her BSc degree from Hacettepe University, Department of Chemical Engineering. Currently she is MSc student at the same department and she is a Member of Hacettepe University Cell and Tissue Engineering Research Group, being coordinated by Prof Dr Menemse Gumusderelioğlu. She has published 1 paper in a related journal.

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