

***In vitro* degradation studies of synthetic polymer scaffolds (PLGA) with simulated body fluids**

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The synthetic scaffolds considered for implants are usually tested by in vivo and by in vitro (in media simulating the body fluid) for their biocompatibility. The tests are focused on their physical, chemical and mechanical properties and thus provide the basic information allowing the suitability of a material for implanting into the human organism to be assessed. In our case study we have studied the degradation efficiency of hybrid synthetic polymer scaffolds (PLA: PGA at 80:20, 75:25 and 70:30) with four different simulated biological fluids (SBF1, SBF2, SBF3 and SBF4) as per ASTM F1635-04a. The composition of simulated body fluids we used for in vitro studies almost resembles that of blood plasma except varying concentrations of Cl⁻ and HCO₃⁻, which influence the hydroxyapatite (HA) deposition over scaffolds. X-ray diffraction (XRD) results confirmed the variation in thickness and crystallinity of the polymer scaffolds after 14 days of incubation in these four biological fluids. Out of four SBF types, SBF1 has shown moderate HA deposition over all three polymer scaffolds whose carbonate content and phosphate contents are near the human blood plasma compared to other SBF solutions. Polymer scaffolds with PLA: PGA (70:30) have shown more uniform HA deposition over scaffold surface. In case of polymer degradation studies, SBF1 shown better biodegradability (12% /21 days) compared with other body fluids and its optimum buffering capacity (7.0 to 7.6) made this body fluid combination a perfect match for in vitro degradation studies of polymer scaffolds.

Biography

M. Naveen Kumar is pursuing his PhD from National Institute of Technology, Warangal, India. He has completed his M.Tech in "Biotechnology" from Vellore Institute of Technology, Vellore, India. His current area of interest is "synthesis of 3D synthetic polymer scaffolds for bone tissue engineering applications". He has published 4 International papers in reputed journals.

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