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Preparation and characterization of three-dimensional scaffolds based on hydroxypropyl chitosan-graft-graphene oxide

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Abstract

Hydroxypropyl chitosan (HPCH), a water soluble derivative of chitosan, is widely considered for tissue engineering and wound healing applications due to its biocompatibility and biodegradability. Graphene oxide (GO) is a carbon-based nanomaterial which is capable of imparting desired properties to the scaffolds. Hence, the integration of GO into HPCH could allow for the production of HPCH-based scaffolds with improved swelling character, mechanical strength, and stability aimed at being used in tissue engineering. In this study, hydroxypropyl chitosan-graft-graphene oxide (HPCH-g-GO) with varying GO content (0.5, 1, 3 and 4 wt. %) was prepared using HPCH and GO as a tissue engineering scaffold material. The formation of HPCH-g-GO was confirmed by FTIR and XRD analysis. Using the HPCH-g-GO as a matrix material and glutaraldehyde as a crosslinking agent, the three dimensional (3D) porous scaffolds were fabricated by the freeze-drying method. The HPCH-g-GO scaffolds exhibited uniform

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