

Targeted drug delivery potential of hydrogel biocomposites containing partially and thermally reduced graphene oxide and natural polymers prepared via green process

B. A. Aderibigbe & S. J. Owonubi & J. Jayaramudu &
E. R. Sadiku & S. S. Ray

Abstract

Hydrogel biocomposites containing a combination of partially and thermally reduced graphene oxide (rGO) and natural polymer were prepared by free radical polymerization. The effect of rGO and the natural polymer on the morphology of the hydrogel composites was studied. The 0.007 g of rGO was used for uniform dispersion within the hydrogel composite matrix. The swelling kinetic and swelling ratios of the composites were evaluated at pH 1.2 and 7.4. Drug release studies were performed at pH values of 1.2 and 7.4 simulating gastric juice and intestinal fluid pH, respectively. The hydrogel biocomposites were able to bypass the acidity of the simulated gastric juice without liberating substantial amounts of the loaded drug, suggesting that rGO containing hydrogels are potential targeted drug delivery systems. The hydrogel biocomposites were further characterized by Fourier transform spectroscopy, X-ray diffraction, scanning electron microscopy, transmission electron microscopy, and differential scanning calorimetry.