Incorporation of the grapheme oxide nano-plates in to sterculia gum hydrogels to improve mechanical and drug release properties

Baljit Singh1 and Baldev Singh2

Department of Chemistry, Himachal Pradesh University, Shimla -171005, India.

1Email: baljitsinghhpu@yahoo.com, Ph. +(91)1772830944,

2Email: sbaldev561@yahoo.in , Ph. 9459848799

Abstract

In order to improve the mechanical and drug release property of hydrogels, in the present studies, incorporation of the grapheme oxide nano-plates in to sterculia gum hydrogels was carried out. Radiation method was used for graft-copolymerization of carbopol and graphene oxide (GO) onto sterculia gum polysaccharides. These polymers were characterized by Cryo-SEMs, AFM,  13C NMR solid state, swelling studies. Some biomedical properties of hydrogels like thrombogenicity, haemolytic potential, antioxidant activity, mucoadhesion and gel strength were determined along with the drug delivery studies. The release profile of anti-cancer drug ‘gemcitabine’ followed non-Fickian diffusion mechanism and release profile was best fitted in Korsmeyer-Peppas kinetic model of drug release. The hydrogels were found to be non-thrombogenic, non-haemolytic, mucoadhesive and antioxidant in nature. Incorporation of the GO nano-sheets in the composite hydrogel matrix has improved its mechanical and drug delivery properties and also exerted strong influence on the network density and mesh size of the hydrogels.

Thrust area : Polymer Chemistry

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