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Topic of Research:*Chemical Functionalization of Natural based Polymers through Organic Reactions.*

Findings

This thesis describes the formulation of different functionalized natural polymer based hydrogels for drug delivery applications. These natural polymeric hydrogels were synthesised through covalent crosslinking using oxidised gum arabic (OGA), gum arabic multialdehyde (GAMA), multi-aldehyde Guar gum (MAGG) and carboxyl gum arabic (CGA) as crosslinking agents. The hydrogels were formulated via Schiff base, amide, and acetallinkages. The influence of crosslinking density predominantly affects the various properties of hydrogels like their swelling behaviour, mechanical strength, biodegradability, and drug release properties. The prepared functionalized natural polymer based hydrogels systems displayed sustained release behaviour of some important therapeutic agents. The nontoxic and biocompatible nature of these functionalized natural based hydrogels evaluated against Human embryonic kidney cell line showed excellent biocompatibility of these hydrogels. Moreover, the drug loaded hydrogels proved to be significantly effective in the killing of cancer cells when they were tests against human breast cancer cell line (MCF-7).

Based on the above mentioned findings, these functionalized natural polymeric hydrogels may find promising application as biomaterial in drug delivery particularly in anti-cancer drug delivery.