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## Biodegradable Nanogels as Potential Drug Delivery Carriers for Development of Target Specific Chemotherapeutic Agents

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Novel nanoparticulate delivery system encapsulating gallic acid into the nanogels has been developed through aqueous inverse miniemulsion ATRP and encapsulation of the gallic acid was carried out at three drug loading percentages i.e., 10, 20 and 30 wt% of the nanogels to study its *in vitro* kinetics in order to ensure its effective delivery in a controlled fashion. Nanogels synthesized through this technique have uniformly crosslinked network and degrade in reducing environment to individual polymer chain with a very narrow molecular weight distribution ( $M_w/M_n=1.6$ ). The nanogels have been shown to degrade in the presence of glutathione, which is a natural reducing agent present in the body, to individual water soluble chains and are non-toxic to the cells and biocompatible. Size distribution of the nanogel was determined with and without drug loading by Dynamic Light Scattering. Release profile of the gallic acid was studied in PBS (pH-7.4), and various mathematical models i.e., Zero order, First order, Higuchi, Hixson-Crowell and Korsmeyer-Peppas equations were applied for initial 60% drug release. Further the antioxidant activity of the as released gallic acid i.e., at 6, 12, 24, 48 h, was determined using FRAP assay and compared with free Gallic acid. Gallic acid was successfully encapsulated into the nanogels and size of the nanogels was increased on drug loading. It can be concluded from the *in vitro* release study that the release of gallic acid is slow and in a controlled fashion from the nanogels, exhibiting release mechanisms explained by more than one mathematical model. Release of the gallic acid from nanogels in PBS (pH-7.4) was following anomalous behavior indicating more than one release mechanism involved.