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Delivery of Doxorubicin from nano gel calcium alginate beads

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The objective of this study was to develop a sustained release dosage form Doxorubicin (Dox) using a natural polymeric carrier prepared in a completely aqueous environment. Dox was entrapped in calcium alginate beads prepared with sodium alginate by the ionotropic nanogel method using calcium chloride as a crosslinking agent. The drug was incorporated either into preformed calcium alginate gel beads. Fourier Transform Infrared (FTIR), Thermal Analysis (TG/DTA), Scanning Electron Microscope (SEM) studies on this system are discussed. The controlled release of Dox from calcium alginate beads in buffer solution has been performed and monitored by UV-visible spectroscopy. The surface morphology of drug-loaded beads obtained from various percentages of polymer, CaCl2 and drug were studied by using a scanning electron microscope (model JEOL JSM-6360, Japan). The beads were mounted on an appropriate stub and then coated with carbon and gold (100 and 50 Å thickness respectively) sputter module in a vacuum evaporator in an argon atmosphere. The coated samples were then observed under a scanning electron microscope operated at 15 KV. The products were characterized by Fourier Transform Infrared Spectroscopy (FTIR), Thermal analysis (TG/DTA) and Scanning Electron Microscope (SEM). The controlled release of Dox from nan gel-calcium alginate beads in buffer solution was studied by changing pH, temperature, initial concentration of Dox and the bead composition. The release of Dox was monitored by UV-visible spectroscopy. The results show that the *in vitro* release of Dox can be substantially affected by temperature and nana gel content. Incorporation of nan gel into the beads could also control the rate of drug release. The release rate of Dox from the beads can be simply regulated by changing the neon gel content. It can be concluded that the modified calcium alginate beads are suitable for delivery of Dox.

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