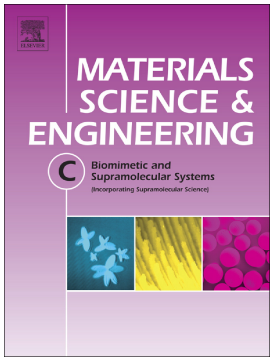


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G. Prabha, V. Raj

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# Sodium alginate–Polyvinyl alcohol–Bovinserumalbumin coated $Fe_3O_4$ nanoparticles as anticancer drug delivery vehicle: Doxorubicin loading and in vitro release study and cytotoxicity toHepG2 and L02 cells

G. Prabha and V. Raj *

Advanced Materials Research Laboratory, Department of Chemistry,

Periyar University, Salem – 11, Tamil Nadu, India

* Corresponding author E-mail address: gprabhagovinn@gmail.com, alaguraj2@rediffmail.com,

Tel: +919790694972, +919789703632

## Abstract

The challenging part of this work was to research the potential aspects of sodium alginate (SA)–polyvinyl alcohol (PVA)–bovin serum albumin (BSA) coated $Fe_3O_4$ nanoparticles ($Fe_3O_4$-SA-PVA-BSA) as a drug delivery system for doxorubicin (DOX). The anticancer drug doxorubicin was selected as a model drug which is powerful for numerous cancer treatments. Superparamagnetic $Fe_3O_4$ nanoparticles were prepared by co-precipitation method. The mixture solution of $Fe_3O_4$-sodium alginate (SA) - doxorubicin (DOX) was crosslinked with $Ca^{2+}$ to form ($Fe_3O_4$-SA-DOX) nanoparticles and addition of PVA and BSA with ($Fe_3O_4$-SA-DOX) nanoparticles were prepared by coating procedure. Doxorubicin drug loaded NPs were prepared by a simple crosslinking method by calcium chloride solution.The prepared polymer coated magnetic nanoparticles ($Fe_3O_4$-SA-PVA-BSA) were characterized by using SEM, AFM, FT-IR, XRD and VSM. The mean sizes of the obtained drug loaded nanoparticles ($Fe_3O_4$-SA-DOX, $Fe_3O_4$-SA-DOX-PVA and $Fe_3O_4$-SA-DOX-PVA-BSA) were between 240± 8.3 and 460± 8.7 nm and zeta potential of the particles also was evaluated using Malvern Zetasizer which ranged between -48.1 ± 2.3 and -22.4 ± 4.1mV. The encapsulation efficiency, was between 36.2 ± 0.01