IN VITRO ANTI-CANCER EFFECT OF LAYERED DOUBLE HYDROXIDE-CHLOROGENIC ACID NANOPARTICLES AS DRUG DELIVERY SYSTEM

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Layered double hydroxides (LDHs) have obtained significant attention as nano-sized carriers for therapeutic and bio-active molecules. LDH nanoparticles are competent for drug delivery purposes due to their numerous advantageous properties such as unique structure, high anionic exchangeability and solubility in acidic media which give rise to the controlled release of intercalated molecules. Hence, the aim of this study is to investigate the properties of newly constructed drug delivery system consisting a natural compound, chlorogenic acid (CA) intercalated into Zn/Al-LDH interlayers for the formation of the nanocomposite. Structural and physical properties of chlorogenic acid intercalated into Zn/Al-LDH (CA-Zn/Al-LDH) were determined by X-ray diffraction, field emission scanning and transmission electron microscope. Loading efficiency of CA in between the interlayers of Zn/Al-LDH was investigated using a UV-Vis spectrophotometer. Subsequently for *in vitro* work, the anti-cancer properties of CA-Zn/Al-LDH nanocomposite on various cancer and normal cell lines were carried out using 3-(4,5-dimethylthiazol 2-yl)-2,5-diphenyl bromide (MTT) reduction assay. Half-maximal inhibitory concentrations of CA-Zn/Al-LDH in all the cell lines was found to be ranged from 0-50 μg/L, determined after 24, 48 and 72 h. To justify their efficacy, apoptosis induction and clonogenic inhibition of chlorogenic acid-LDH nanocomposite were observed and analyzed microscopically. The preliminary result of this study may offer valuable primary information towards the development of potential nanodrugs for cancer therapy.