

Application of nanotechnology to enhance Bio-efficacy of pharmacologically active natural molecules: Catechin and Curcumin



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Abstract

In the present study, curcumin and catechin rich extract nanoparticles were prepared by emulsion solvent evaporation technique using Eudragit L 100 polymer with a major focus on enhancing the bioefficacy of these molecules. FTIR studies suggested that both extracts were stable and compatible with polymer. Nanoformulations were evaluated for % yield and drug encapsulation efficiency, the encapsulation efficiency was 45 and 30 % in case of curcumin and catechin (Compound to polymer ratio 1:1), respectively. Nanoparticles were further characterized by Dynamic Light Scattering and Scanning Electron Microscopy, which indicated that the particles are in nanometre range (100 nm to 200 nm). Gas Chromatography analysis indicated that the nanofomulations had residual methanol content within the permitted limits. Results of MTT assay suggested that both CRE and Curcumin possess can inhibit cell proliferation of liver cancer (HepG2) cells, with increased in efficacy upon encapsulation. Fluorescent imaging with acridine orange and propidium iodide and also DNA fragmentation suggest involvement of apoptosis as major cytotoxic mechanism. *In vitro* absorption studies indicated maximum uptake of compounds by Caco-2 cells in case of 1:1 nanoformulations (Nanocurcumin 1.6 fold and NanoCRE 2.1 fold increase in absorption). Induction of apoptosis was higher in case of nanoformulations when compared to extracts and the activity was more significant in case of 1:1 nanoformulations. Thus, particle size reduction and nanofrmulation with eudragit-L100 polymer enhances the efficacy of active compounds. Considering the results, it is worthwhile to undertake further studies to scale up nanoformulation and *in vivo* studies of the formulations.