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## Curcumin-Docetaxel co loaded nanosuspension for enhanced anticancer therapy

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Drug resistance has been a major hurdle in cancer chemotherapy. It has been observed that combination drug delivery can be successful in combating these emergences. Hence the present study has been aimed at drug delivery of Docetaxel along with curcumin which serves as a anticancer agent as well as a potent p-GP inhibitor responsible for drug resistance. Moreover both the drug has poor oral bioavailability which furthers limits there therapeutic effect. Hence docetaxel-curcumin co loaded nanosuspensions have formulated to enhance their solubility as well as their anticancer activity.

Nanosuspensions have been prepared by precipitation technique using Poloxamer as stabilizer. The particle size, zeta potential, SEM, TEM, saturation solubility, release and drug compatibility have been studied by DSC and FTIR. The biodistribution of the formulation have been studied in mice by radiolabelling method using Technetium. Cytotoxic assays were evaluated in breast carcinoma (MCF-7) cells by MTT analysis. The anticancer activities have been further studied in treated mice by histopathology, weight and tumor volume measurement.

From the study homogenous nanosuspension were formed with the particle size  $60 \pm 20$ nm and PDI was 0.19. Drug-excipient compatibility study by FT-IR and DSC confirms that there is no physical interaction of drug and stabilizer in their physical mixtures and shows amorphosisation of drug on formulation. These along with the reduced particle size resulted in substantial increase in drug release as up to 68-98.6% in 4 hours.

MTT study revealed substantial activity of 71 and 67 % inhibition in concentration of 0.5 to 1.0  $\mu$ g/ml respectively. 70 % tumour inhibition rate in mice treated with curcumin-docetaxel nanosuspension whereas curcumin and docetaxel nanosuspensions treated groups showed 34% and 15% inhibition respectively. Histopathological results showed a large numbers of mitotic results in control groups which substantially got decreased in the individual nanosuspensions of curcumin as well as docetaxel. The results were better when docetaxel was co-loaded with P-gp inhibitor (Curcumin). Apoptotic activity was also higher with combined drug treated group and reduced level of angiogenesis was observed.

It can be concluded that nanosuspension of Curcumin as well as Curcumin co-loaded with Docetaxel have increased solubility and bioavailability and good anti-breast cancer potentials in mice with

### Biography

Bhanu P Sahu has completed his PhD at the age of 33 years from Dibrugarh University. He is presently working as Assistant Professor in GIPS, Guwahati University. He has published more than 15 papers in reputed journals and has been serving as reviewer in some reputed journals. The major area of interest is in Novel drug delivery systems particularly in nanoparticulate drug delivery, nanobiotechnology, mucoadhesive drug delivery and targeted drug delivery for anticancer activity. He has worked on nanosuspensions for anticancer and antihypertensive drugs. Presently he is involved in nanoparticulate drug delivery in combination therapy of anticancer drug with use of p-gp inhibitors.

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