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Development, optimization and evaluation of exemestane loaded solid lipid nanoparticles and *In vitro* cytotoxicity studies against human breast cancer cell line MCF-7

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Breast cancer is abnormal growth in the tissues of breast usually ducts and lobules. It is the most frequently diagnosed cancer and ranks second as a cause of cancer death in females worldwide. The objective of this study was to develop Exemestane (EXE) loaded Solid Lipid Nanoparticles (EXE-SLN) to enhance the solubility of anticancer drug in order to provide more effective and targeted therapy to breast cancer. Solid lipid nanoparticles were prepared by high shear homogenization process followed by ultrasonication method. 23 full factorial design was used to optimize the formulation by using Design Expert[®] Version 9 software. The prepared SLNs were evaluated for various characteristics like particle size, zeta potential, entrapment efficiency and drug loading. The *in vitro* release study showed sustained release after an initial burst effect. From the Regression coefficient (R²) values for various models, it was observed that the formulations followed Higuchi model of release kinetics. The stability study under accelerated conditions did not show any significant changes in particle size and zeta potential of prepared SLNs. *In vitro* cytotoxic efficacy study against Human Breast Cancer MCF-7 Cell lines showed that EXE-SLN have better activity as compared to pure drug which is attributed to increased cellular uptake and EPR effect due to its smaller size. This study, thus, demonstrated that prepared EXE-SLN provided sustained release of drug with improved bioavailability and therefore could produce improved therapeutic efficacy with safety for better management of breast cancer.

Biography

Ujjawal Bairagi is pursuing her Post-Graduation in Pharmaceutics at Department of Pharmaceutics, Indian Institute of Technology, BHU, Varanasi. She has excellent academic record at UG level. She has qualified GATE 2015. Currently, she is doing her research work on development of nanopaticulate drug delivery system under guidance of Professor B Mishra. She is receiving financial assistance, from MHRD, Government of India for her Post-Graduation research work.

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