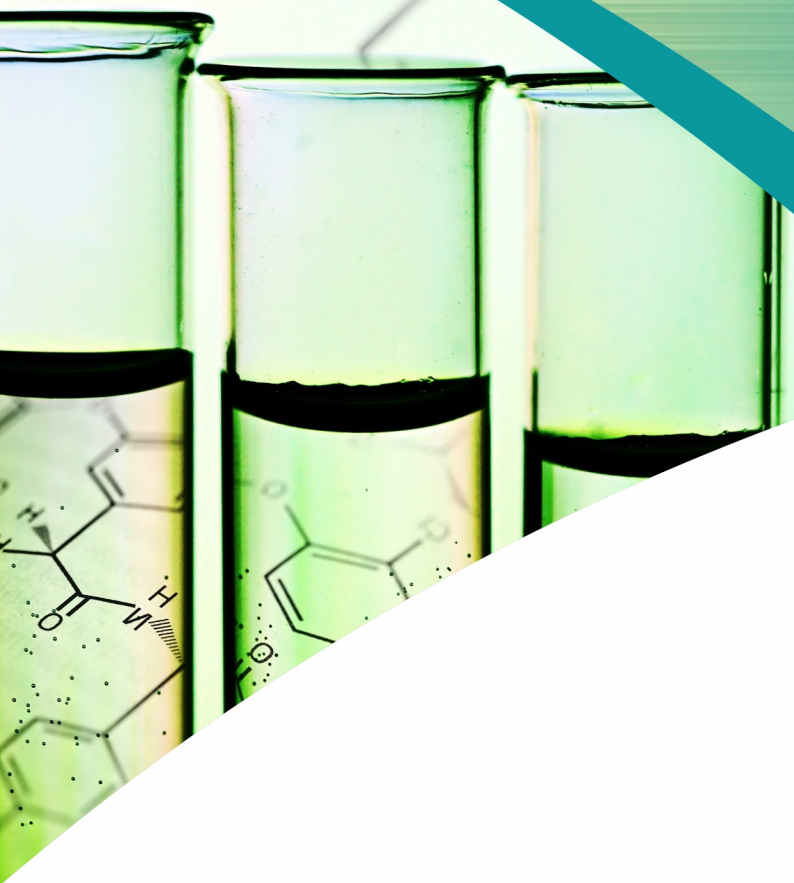


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Development and Optimization Naringenin Nanoparticle for Effective Therapy in Pancreatic Cancer

Md. Habban Akhter

Faculty of Pharmacy, DIT University Dehradun 248009, India

ABSTRACT

Background and Aim: Despite nanomedicines, advances in cancer therapy, pancreatic cancer continues to be the life threatening disease in United States and other countries. The new cases of pancreatic cancer diagnosed in 2018 stand at 460,000. The aim of the study was optimization, *in vitro* characterization, cytotoxic assessment and stability of naringenin loaded nanoparticles (NPs).

Methods: The sonication tailored Naringenin (NARG)-loaded polymeric NPs were fabricated by emulsion diffusion evaporation technique. Box Behnken experimental design based on 3-level and 3-factors was applied for optimization of fabrication parameters. The effect of independent variables such as surfactant concentration (X1), polymer conc. (X2), and sonication time (X3) were studied on responses particle size (Y1), and drug release % (Y2). NPs were characterized for particles size and size distribution, polydispersity index (PDI), zeta potential, transmission electron microscope (TEM), scanning electron microscope (SEM), Fourier transform infrared spectroscopy (FT-IR), Differential scanning calorimeter (DSC), and X-ray diffraction (XRD) studies. Drug release kinetics and cytotoxicity assays were also carried out.

Results: The nanosized particles were spherical, uniform with an average size of 160 ± 23 nm, PDI value 0.210 ± 0.032 , zeta potential 25 ± 5.76 mV, and cumulative percentage release $82.21 \pm 9.31\%$. In vitro release of NARG from nanoparticle evaluated initially showed burst effect followed by sustained release behavior. The formulation followed Higuchian model to drug release from NARG NPs. The MTT assay revealed that NARG NPs showed higher cytotoxic effect over free NARG ($p=0.045$). The stability study of optimized formulation revealed no significant physicochemical changes during 3 months of study.

Conclusion: NARG-loaded NPs have more potential in ameliorating cancer over NARG suspension.



Aims & Scope

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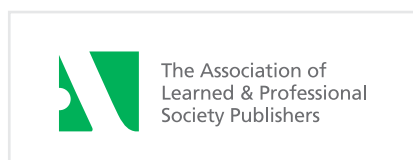
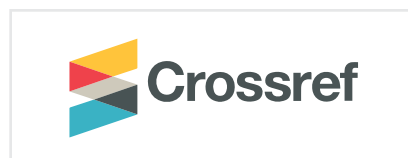
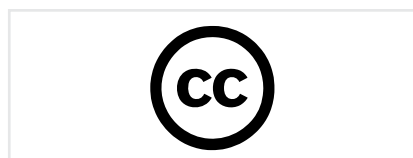
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