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DEVELOPMENT AND COMPARISON OF HYDROPHOBIC DRUG LOADED NLC, SLN AND LDC NANOPARTICLE FOR TREATMENT OF PULMONARY TUBERCULOSIS

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ABSTRACT

Tuberculosis is a chronic recurrent infectious disease caused by the Mycobacterium tuberculosis most commonly found in lungs. Rifampicin is a hydrophobic drug, neither freely soluble in water nor in oils. The aim of the present study is to develop an anti-tubercular nano-lipid formulation containing this hydrophobic drug Rifampicin for lungs targeted delivery over a prolonged period of time. For the purpose, Nano Liquid Carrier, Solid Lipid Nanoparticle and Lipid Drug Complex of Rifampicin was developed and compared for its *in vitro* characteristics. LDC of Rifampicin was prepared by dissolution method, where as SLN and LDC nanoparticles were developed by emulsion solvent diffusion technique and NLC was prepared by hot melt homogenization method. Formulations were characterized by particle size, zeta potential, drug entrapment and loading, and finally drug release & kinetic profile. LDC nanoparticle showed the highest drug entrapment efficiency 47.72% with optimum drug release in 12 hours following Korsmeyer Peppas release kinetic model. Upon successful development and characterization of all the three forms of nanoparticle, it could be concluded that LDC loaded nanoparticle was most suitable for loading hydrophobic drugs like Rifampicin and further lung targeting.

KEYWORDS: *Solid Lipid Nanoparticle, Nano Liquid Structure, Lipid Drug Complex, Rifampicin, Tuberculosis.*