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PREPARATION AND CHARACTERIZATION OF LIPOSOMAL VESICLES LOADED WITH NEW ANTITUBERCULAR DRUG

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Abstract. Tuberculosis (TB) still remains one of the primary factors of mortality for millions of people around the world. About one-third of the world's population is estimated to have been exposed to TB bacteria and potentially affected. Liposomes are receiving growing attention in the treatment of pulmonary diseases because of their distinctive structural characteristics, physiological features, and biological properties. The primary treatment of pulmonary infections requires the use of antituberculosis drugs by oral/parenteral route of administration. As a result, higher amount of oral or parenteral drugs is required to reach the lungs for curing infection. Consequently, part of the drug molecules can stay in the body causing severe side effects. In order to improve the clinical outcome, new antitubercular (anti-TB) drugs as well as a drug delivery system that would target directly to diseased cells specifically with little or no interaction with nontarget tissue has become of utmost importance and necessity. Deol and Khuller developed lung-specific modified liposomes for more effective chemotherapy against TB [1]. Another study suggested pyrazinamide incorporated proliposomes as a potential candidate for TB therapy through inhalation [2]. Pyrazinamide proliposomes were less toxic to kidney, liver, and respiratory-associated cells.

Our work is focusing on the development of liposomal vesicles loaded with new synthesized antitubercular drug. The antitubercular agent is a composition of imidazo-tetrazine derivative under the IUBAC name 3- (3,5-dimethylpyrazole-1-yl) -6-(isopropylthio) imidazo [1,2-b] [1,2,4,5] tetrazine. The free compound showed antimycobacterial activity on both mycobacterium tuberculosis H37Rv and mycobacterium smegmatis mc2 155, with in a concentration as low as 1 μg/ml [3]. The liposomes were prepared by thin film hydration method using phosphatidylcholine and cholesterol. Several factors such the concentration of drug to lipid components, the volume of organic solvent were investigated to optimize the preparation conditions. The encapsulation efficiency was ranged from 12.4 to 48% by using different types and volumes of the organic solvents. The prepared liposomes are characterized by dynamic light scattering, zeta potential, polydispersity index (PDI) and in vitro release studies.

References

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