

## Formulation and characterization of liposomes containing amphotericin B for topical delivery by freeze drying method

S. Dadras Moghadam<sup>1,\*</sup>, M. Jaafari<sup>2</sup>

<sup>1</sup>*School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran*

<sup>2</sup>*Pharmaceutical Research Center, Mashhad University of Medical Sciences, Mashhad, Iran*

**Background and Aims:** Cutaneous leishmaniasis (CL), due to different species of leishmania, produces a skin ulcer that heals spontaneously in most cases, leaving an unsightly scar. The topical dosage form of amphotericin B will probably have fewer side effects. Liposomes in proper formulation and sizes are able to penetrate through the stratum corneum of the skin and reach to the sublayer of epidermis and dermis in which leishmania parasites are growing inside the macrophages.

**Methods:** The objective of this study was to prepare and characterize different topical liposomal formulations containing amphotericin B. Different multilamellar (MLV) liposomes containing Fungizone were prepared by freeze drying method. All liposomal formulations were characterised for encapsulation capacity (EC), Stability, particle size and morphology, using UV-spectroscopy, light scattering and transmission electron microscopy techniques, respectively.

**Results:** The EC of liposomes in formulation 1 containing egg lecithin (EL), cholesterol (Chol) and glucose (GL), (F 1), was  $75.91 \pm 2.64$ , for F 2: phosphatidyl cholin (PC), Chol and GL, was  $79.21 \pm 3.03$ , for F 3: EL, Chol, GL and Oleic acid (OA), was  $81.40 \pm 3.12$ , for F 4: PC, Chol, Gl and OA, was  $83.75 \pm 2.25$ , for F 5: EL, Chol, GL and OA that sonicated by probe sonicator, was  $80.56 \pm 3.20$  and for F 6: PC, Chol, GL and OA that sonicated by probe sonicator was  $81.26 \pm 2.82$ . The leaking percentage of liposomes 3 months after preparation was:  $5.74$ , for F 1,  $5.53$ , for F 2,  $10.11$ , for F 3,  $9.83$ , for F 4,  $11.45$ , for F 5, and  $10.64$ , for F 6. The average particle sizes of F5 and F6 which have measured by electron microscopy were 68 and 53 nanometer, respectively.

**Conclusions:** This study showed that prepared liposomes containing amphotericin B are stable and have suitable characteristics to test in animal models for the treatment of cutaneous leishmaniasis.

**Keywords:** Cutaneous leishmaniasis; Liposome; Amphotericin B; Freeze drying; Topical preparation