

Green Synthesis of Nano Liposomes Containing Berberine Chloride against *Leishmania major*

Authors : Ali Fattahi Bafghi, Abolghasem Siyadatpanah, Farzaneh Mirzaei, Fahimeh Pournasir, Roghayeh Norouzi, Maria De Lourdes Pereira

Abstract : Leishmaniasis caused by *Leishmania major* is one of the main infectious diseases that affect populations in developing countries around the world. We assessed the effectiveness of berberine chloride nano-liposome (BcNLs) against *L. major* promastigotes in vitro. Nano-liposomal berberine chloride was prepared using the thin-film hydration method and characterized based on encapsulation efficiency, size, and zeta potential. Anti-*Leishmania* effect of different concentrations (0.05-60 µg/ml) of BcNLs as studied in *L. major* [MRHO/IR/75/ER] at 24, 48, and 72 h using the hemocytometer technique. Berberine chloride was successfully loaded into nano-liposomes with an encapsulation efficiency of 85.54%. The surface charge of nanoparticles is neutral, and the morphology of nano-liposomal berberine chloride is spherical without any agglomeration. Cell viability assay was performed on the HFF cell line to show the biocompatibility of liposome nanoparticles. IC50 of BcNPs at 24, 48, and 72 h against *L. major* were found to be 7.6, 5.96, and 3.19 µg/ml, respectively. BcNLs showed a significant anti-*Leishmania* effect and induced a better and more tangible effect on the survival of *L. major* promastigotes and could be suitable candidates for further investigation. The results showed that the BcNLs agent is effective against *L. major* promastigotes and may be a promising alternative to current treatments.

Keywords : *Leishmania major*, berberine chloride, nano-liposomes, cutaneous leishmaniasis

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