

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

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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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