

Studying the influence of formulation and process variables on Vancomycin-loaded polymeric nanoparticles as potential carrier for enhanced ophthalmic delivery.

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Abstract

Ocular topically applied Vancomycin (VCM) suffers poor bioavailability due to its high molecular weight and hydrophilicity. In the present investigation, VCM-loaded polymeric nanoparticles (PNPs) were developed aiming to enhance its ocular bioavailability through prolonging its release pattern and ophthalmic residence. PNPs were prepared utilizing double emulsion (W/O/O), solvent evaporation based gel. In-vivo evaluation of the optimized formulae was performed via Draize test followed by microbiological susceptibility testing on albino rabbits. Results revealed successful formulation of VCM-loaded PNPs was achieved with particle sizes reaching 155 nm and up to 88% encapsulation. Draize test confirmed the optimized formulae as non-irritating and safe for ophthalmic administration. Microbiological susceptibility testing confirmed prolonged residence, higher Cmax. with more than two folds increment in the AUC(0.25646+) of VCM-PNPs over control groups. Thus, VCM-loaded PNPs represent promising carriers with superior achievements for enhanced Vancomycin ophthalmic delivery over the traditional use of commercially available VCM parenteral powder after constitution into a solution by the ophthalmologists.

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