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Development of Eudragit RSPO nanoparticle and preliminary *in vitro* release studies of suppositories with lopinavir loaded nanoparticles

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Lopinavir (LPV) with poor bioavailability suffers from low aqueous solubility (0.01 mg/mL) which leads to a limited oral absorption and low bioavailability was the first line anti HIV drugs used for paediatric treatment in South Africa. However, oral administration poses challenges such as bitter taste and gastric enzyme degradation of drug, hence rectal delivery is proposed as an alternative treatment. The aim of this study is to design LPV nanoparticles loaded suppositories which will improve the bioavailability and decrease the toxicity. LPV nanoparticles were prepared based on nanoprecitation and freeze-drying method. They were then evaluated for entrapment efficiency (EE), drug loading (DL), particle size analysis (PS), zeta potential (ZP) and polydispersity index (PDI). The following results were obtained: scanning electron microscopy (SEM) showed the spherical morphology of the nanoparticles with the size range of 135.91–365.9±2.21 nm, (PDI) 0.224±0.01, (ZP) 25.87±0.41–27 mV, (DL) 32±0.3 and (EE) 79±0.5 and *in vitro* drug release. Lopinavir loaded nanoparticles suppositories were prepared by fusion method and were evaluated physicochemically by analyzing their weight variation, disintegration test, stability studies, mechanical strength and content uniformity and *in vitro* release studies. FTIR results revealed the presence of O-H at 3373.70 cm^{-1}, C-H bond at 2954.06 cm-1, C=O at 1731.84 cm-1, C-N amine at 1252.72 cm-1 and confirmed that there is no interaction between drug and polymer. XRD illustrated that the drug loaded nanoparticles are in an amorphous phase; thermogravimetric analysis indicated the thermal stability of the NPs and the in-vitro studies showed a good release from PEG formulated suppositories. The results of the study offer an alternative in the near future for the pediatric treatment of HIV in South Africa.

Biography

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