DEVELOPMENT AND FABRICATION OF BARICITINIB-LOADED SOLID LIPID NANOPARTICLES FOR ENHANCED BIOAVAILABILITY

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ABSTRACT

The drug baricitinib exhibits poor bioavailability issues as a Janus kinase inhibitor, thus requiring specialized delivery methods to enhance its therapeutic performance. A 3^2 factorial design was used to develop solid lipid nanoparticles (SLNs) by varying coating agent Precirol® ATO5 and surfactant Tween® 80 concentrations. The particle size of developed SLNs ranged from 186.63–261.73 nm and the method achieved 71.43%–91.43% entrapment efficiency, while maintaining 93.66%–99.35% drug content. The compatibility assessment was confirmed by both FTIR and DSC analysis. The test of the stability analysis at 40 ± 2°C, and relative humidity of 75 ± 5% showed that the formulations were stable for a duration of approximately three months. The *in vitro* drug release data had controlled drug releasing mechanism. The research findings indicate that baricitinib bioavailability is subject to significant enhancement by the application of SLNs as an efficacious delivery structure for the low solubility of drug formulations.