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J Pharm Drug Deliv Res 2018, Volume 7
DOI: 10.4172/2325-9604-C4-036

World Congress on
Drug Delivery, Formulation and Analytical Techniques
July 02-03, 2018 New Orleans, USA

Encapsulation of antibacterial Furosemide-silver complex into chitosan nanoparticles

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The rise of resistant bacteria has become a leading threat worldwide. Attempts are being made to introduce novel antibacterial systems to combat resistance. The goal of this study was to formulate Chitosan Nanoparticles (CSNPs) of recently reported silver complex of Furosemide (Ag-FSE) to enhance its solubility and antibacterial efficacy. Synthesis of Ag-FSE complex was performed using a literature reported method. CSNPs were formulated via ionotropic gelation and ultra-sonication techniques. Size, Polydispersity Index (PDI) and Zeta Potential (ZP) of Ag-FSE loaded CSNPs were determined using Dynamic Light Scattering (DLS) technique. Our primary goal was to obtain CSNPs with sizes <300 nm along with a low PDI and high ZP value to reduce risk of particulate aggregation. At 3 and 5 minutes sonication (30% amplitude) sizes obtained were above 300 nm. After increasing sonication time to 10 minutes the values were 261.3±12.23 nm, 0.195±0.023 and 42.8±1.31 mV, respectively. Further, Ag-FSE loaded CSNPs were investigated for size, PDI and ZP. Size, PDI and ZP were 257.5±5.132 nm, 0.185±0.014 and 30.7±5.48 mV, respectively at 5% loading whereas at 10% loading the values were 216.6±26.8 nm, 0.194±0.021 and 25.8±3.05 mV, respectively. We have successfully optimized Ag-FSE loaded CSNPs for size, PDI and ZP. Further studies such as physicochemical characterization and antibacterial activity are under way.

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