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Furosemide-silver complex nanosuspension: Preparation and evaluation of antibacterial activity

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In the current scenario, there is a slow rate of development of novel antibiotic scaffolds and there is increasing possibility of development of resistance by bacteria to clinically used antibiotics. Therefore, efforts are being made on enhancing the activity and potency of currently existing antimicrobial and other non-antibacterial drugs by chemically transforming them into complexes of silver, a well-known broad spectrum antibacterial metal, and developing their nano formulations for sustained and targeted release. Recently, researchers have synthesized a silver complex of furosemide, a diuretic and antihypertensive drug, and evaluated it for antimicrobial activity. The studies revealed that furosemide silver complex (Ag-FSE) could be a good antibacterial drug for future use in medicine. However, the synthesized Ag-FSE is insoluble in water and most of the organic solvents. This poor solubility of Ag-FSE could hamper its introduction into clinics as an effective antibacterial drug. One of the most promising approaches to enhance the solubility of poorly water-soluble drugs is nanosuspension approach. A nanosuspension is a submicron colloidal dispersion of nanosized drug particles stabilized by surfactants. Due to increase in solubility, dissolution rate of a drug increase and subsequently the plasma level is reached faster. Nanosuspension approach is useful for molecules with poor solubility, poor permeability, or both, which poses a significant challenge for the formulators. Therefore, in this study we have developed a nanosuspension of Ag-FSE with particle size <200nm for its solubility and antibacterial activity enhancement. This study is an effort to pave the way towards introduction of Ag-FSE into clinical trials.

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