

ORIGINAL RESEARCH ARTICLES

SYNTHESIS AND PHYSICO-CHEMICAL CHARACTERIZATION OF IONIC LIQUID SYSTEMS OF POSACONAZOLE

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ABSTRACT

Aspergillosis, caused by *Aspergillus niger*, is difficult to manage due to the poor solubility of antifungal agents like posaconazole. To enhance its delivery, an ionic liquid (IL) of posaconazole was prepared in 1:4 and 1:5 molar ratios via employing solvent evaporation method. Structural characterization using Fourier transform infrared spectroscopy (FTIR) revealed red shifts in O–H and N–H bands, confirming hydrogen bonding and drug-carrier interaction. X-ray powder diffractometry (XRPD) and differential scanning calorimetry (DSC) analysis indicated reduced crystallinity. Saturation solubility and partition coefficient studies demonstrated improved aqueous solubility and reduced lipophilicity of IL formulations. *In vitro* dissolution showed significantly enhanced release profiles compared to the pure drug. Antifungal evaluation revealed increased activity against *A. niger* and retained activity against *Candida albicans*. These findings suggest that IL based systems can improve solubility, permeability and antifungal efficacy of posaconazole, offering a promising strategy for the treatment of aspergillosis.