

Final Abstract for WCP2026 Submission

Title:

Green Solvent-Based Enhancement of Sulfasalazine Solubility: A Novel Approach Using Choline Chloride Eutectic Systems

Abstract:

Poor aqueous solubility remains a critical limitation in the bioavailability of many therapeutic agents, including sulfasalazine, a widely used anti-inflammatory drug. In this study, we explored the use of deep eutectic solvents (DESs) based on choline chloride in combination with glycerol and ethylene glycol as a green, biocompatible strategy to enhance sulfasalazine solubility. A series of eutectic mixtures were formulated and characterized for pH, viscosity, and solubilization capacity. UV-Vis spectrophotometry was employed to quantify solubility changes, and FTIR analysis confirmed the molecular interactions between sulfasalazine and DES components.

The results revealed a significant increase in solubility in the choline chloride-glycerol system, outperforming traditional solvents. This suggests that hydrogen bonding and polarity shifts induced by the eutectic environment play a critical role in drug dissolution. Importantly, all solvents used in the study were non-toxic, biodegradable, and aligned with sustainable pharmaceutical practices.

Our findings support the integration of DES-based solubilization strategies in pre-formulation and drug delivery systems, especially for poorly soluble APIs. This study provides a cost-effective and environmentally friendly platform for enhancing drug bioavailability without the use of harmful organic solvents.