

Abstract

Introduction

Many of the drugs that are taken orally must first dissolve in bodily fluids to become effective. The potency of these drugs depends on their solubility in body fluids, and the more soluble they are, the more potent they will be.

Approximately 40% of drugs face solubility challenges. Therefore, efforts to predict solubility levels in research are of great importance, as solubility can impact not only the formulation of pharmaceuticals but also processes like crystallization in purification and the development of pharmaceutical analyses. Various methods have been devised to enhance the solubility of poorly soluble drug molecules, with Cosolvency being one of the simplest and oldest of these methods.

Aim

In the present study, the solubility of the drug mesalazine in a mixture of eutectic solvents consisting of choline chloride and ethylene glycol has been investigated within the temperature range of 293.2 to 313.2 Kelvin. Additionally, the correlation of the measured data with various solubility models has been examined.

Method

In the current research, the solubility of the drug mesalazine is measured using the shake-flask method. This involves adding an excess amount of the solute to 11 different fractions containing varying ratios of the eutectic solvents choline chloride + ethylene glycol and water. After reaching equilibrium in an incubator over 48 hours, the mixture is centrifuged, and if necessary, it is diluted. The absorption of these samples is then measured at the drug's maximum wavelength, which is 299 nanometers, using a UV-Vis spectrophotometer. Concentrations of the samples are determined based on a previously validated calibration curve. This process is repeated for 5 different temperatures, and all the data is fitted to several cosolvency models.

Conclusion

Based on the obtained data, solubility increases with an increase in the mass fraction of eutectic solvents choline chloride + ethylene glycol and temperature. The highest solubility is associated with the mass fraction of 1.0 of the eutectic solvents choline chloride + ethylene glycol at a temperature of 313.2 Kelvin, while the lowest solubility is related to pure water at a temperature of 293.2 Kelvin.

Keywords: Solubility- models- mesalazine- cosolvency- cholinechloride- ethylene glycol