

# Paracetamol solubility in cosolvents

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Why is the relationship between paracetamol solubility and the concentration of the co-solvent alcohol (in an aqueous system) not linear?

One of the factors influencing the solubility in water is the presence of co-solvents besides the impact of temperature, salinity, pH, and dissolved organic matter (DOM). It is found that different co-solvents behave differently depending on certain characteristics especially polarity and miscibility with water in an aqueous setting. Generally, the addition of co-solvent is capable of increasing the solubility of hydrophobic substances such as the paracetamol drug according to recent studies. Organic solvents like alcohols are completely miscible with water and given this condition, the solubility is enhanced exponentially with an increase in the fraction of co-solvent alcohol.

Based on the experimental results, the molarity of paracetamol varies with percent alcohol in an exponential rate unlike the nearly linear relationships established by the same solute with propylene and glycerol. Such is an evidence of decrease in polarity aside from the findings that for homologous n-alcohols, increase in the length of carbon chain and complexity in molecular structure, which is also true for ketones, contribute to the lowering of solubility. Thus, since alcohols like methanol, ethanol, and propanol possess full miscibility with water and consist of polar molecules at the same time, greater extent of drug solubility can be expected for a paracetamol in an aqueous system with alcohol as the co-solvent. Due to this high level of solubility, the relationship between the concentrations of paracetamol and of alcohol becomes graphically non-linear whereas co-solvents other than alcohols bearing insignificant effect on solubility make a more linear

variation with less steep slope upon dissolution of the drug solute.

#### Reference

Roger A. Granberg, and ke C. Rasmuson. Solubility of Paracetamol in Pure Solvents. 2009. [ONLINE] Available at: . [Accessed 17 August 2012].