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Solubility of ranitidine in binary and ternary mixtures of PEGs 200 and 400, ethanol and propylene glycol at 25 °C

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Background and Aims: Solubility of drugs is the most important parameter in the drug formulation design. There are some methods for adjustment of drugs solubility and the cosolvensy method is the feasible method in practice. Beside the experimental determination of the solubility drugs in mixed solvents, there are some methods to predict the solubility and the Jouyban-Acree model is the most accurate one among similar models. To extend the available solubility database, solubility of ranitidine in binary and ternary mixtures of PEGs 200 and 400, ethanol and propylene glycol at 25ºC.
Methods: To reach the equilibrium condition, excess amount of ranitidine added to the prepared solvent mixtures. The solutions were saturated in an incubator equipped with a temperature-controlling system maintained constant at 25 (±0.2) ºC using a shaker. The solutions were saturated after 72 h. The saturated solutions were filtered and diluted by water. The absorbance of preparated solutions were determined at 325 nm. The obtained data were fitted to the Jouyban-Acree model to get model constant values and the trained model was used for predictions of binary and ternary mixtures of PEGs 200 and 400,ethanol and propylene glycol at 25oC.
Results: The results showed that the solubility of ranitidine in ethanol+PEG 400, 200, PG mixtures was increased with addition of PEG400, 200 and PG at 25 oC. The maximum dissolved concentration of ranitidine at ethanol+PEG400, ethanol+PEG200 and ethanol+PG were observed in 0.3, 0.2 and 1.0 (ethanol mass fraction), respectively. The results were correlated and predicted by the Jouyban-Acree model and the prediction error was less than 10%.
Conclusions: The trained model can provide more accurate results for prediction of the solubility of RH in binary and ternary solvent mixtures. As a result of this model, the number of required experimental data is reduced.

Keywords: Ranitidine; Solubility prediction; Jouyban-Acree; Cosolvensy