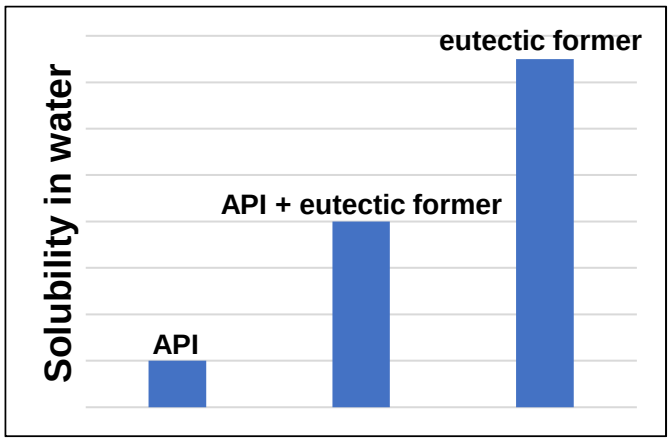
Biothermodynamics
Prof. Dr.-Ing. habil. Mirjana Minceva

Master's Thesis

Solubility Enhancement of an Active Pharmaceutical Ingredient through Eutectic Mixtures Formation

The solubility of active pharmaceutical ingredients (APIs) significantly influences critical factors such as bioavailability and therapeutic efficacy. In the pharmaceutical industry, around 40% of approved drugs and 90% of compounds in development demonstrate limited solubility in water. Therefore, there is a great need for strategies to enhance the solubility of APIs in water. One promising approach is the formation of eutectic mixtures. In this thesis, three different eutectic formers will be selected to enhance the solubility of a specific API in water. Experiments will be conducted to measure the solubility of both the API and the chosen eutectic formers in water using a temperature variant method. Additionally, the melting behavior of the eutectic formations will be assessed using thermal analysis. The experimental data will be analyzed and modeled using the non-random two-liquid (NRTL) model. The results will facilitate the prediction and understanding of the phase behavior and solubility enhancement mechanisms of the eutectic systems studied in this thesis. The findings from this thesis are expected to contribute to the development of novel pharmaceutical formulations with improved solubility in water.



Methods and devices:

- Temperature Variation Method (Crystal16)
- Differential Scanning Calorimeter (DSC)
- Data Analysis Using MATLAB

Requirements:
The student should be highly motivated, organized, and able to work independently. Prior experience in Crystal16, DSC, Matlab, is not required.

Start: Immediately.

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