P 28

Salt dissolution, supersaturation, and precipitation kinetics: A comparison between the USP II and the µDISS Profiler™

Laurin Zöller[1], Sara Carlert[2], Eva Karlsson[3], Anders Borde[3], Christoph Saal[4], Jennifer Dressman[1,*]

[1]Fraunhofer ITMP
*[2]Advanced Drug Delivery, Pharmaceutical Sciences, Bio Pharmaceuticals R&D, AstraZeneca, Gothenburg, Sweden; *corresponding author*
[3]Oral Product Development, Pharmaceutical Technology & Development, Operations, AstraZeneca, Gothenburg, Sweden; 3Boehringer Ingelheim Pharma GmbH & Co. KG Drug Discovery Sciences, Ingelheim, Germany

When dealing with poorly soluble drugs, salt formation is a popular technique to increase dissolution and subsequently absorption. However, a critical question arises: "Does the pharmaceutical salt induce supersaturation, and if so, is this maintained or does precipitation occur?" During early drug development, the µDISS Profiler™ is a popular tool for evaluating this behavior due to its small sample size requirement and ability to perform relatively high throughput measurements. Information gathered in these studies helps to guide decisions about further steps in pharmaceutical development. Larger devices like the USP II apparatus are typically used during later stages of development for testing final formulations. The aim of this study was to explore differences between the two set-ups with respect to the dissolution, supersaturation, and precipitation behavior of pharmaceutical salts using ibuprofen and its sodium and lysine salts as the model compounds. Differences were observed during dissolution/supersaturation/precipitation in the two apparatus. Under the same conditions with respect to the ratio between the amount of drug and the volume of medium used, the dissolution was faster in the µDISS Profiler, but led to earlier precipitation. The dissimilarities between set-ups can be attributed to differences in hydrodynamics due to differences in stirring devices, the volume-to-agitation speed ratio, and the volume-to-surface area ratio. In order to bridge the gap between the outcome in early and late preclinical dissolution tests of salts, it would be beneficial to establish a correlation between the µDISS Profiler™ and the USP II apparatus as well as improving simulation of GI hydrodynamics.

Acknowledgement: This project has received funding from the European Union´s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 955756.