MS28-1-2 Probing the effect of non-/hydrostatic pressures on ofloxacin and levofloxacin
#MS28-1-2

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Abstract
Pharmaceutical tablets are the most widely used oral solid dosage (OSD) form worldwide. They have a convenient design that favours high patient compliance, display good stability to atmospheric conditions, and can be manufactured at a large scale with the correct formulation. [1] Currently, an iterative process is often needed to determine an OSD formulation with optimum mechanical properties for tablet compaction. Iterative processes require greater amounts of starting material, additional funding and prolonged research time. To make OSD formulation more efficient, a deeper understanding of the structural characteristics of pharmaceutically relevant materials and their behaviour under pressure is needed.
Ofloxacin and levofloxacin are the racemic mixture and L-enantiomer, respectively, of the effective antibiotic drug molecule 9-fluoro-3-methyl-10-(4-methylpiperazin-1-yl)-7-oxo-2,3-dihydro-7H-[1,4]oxazino[2,3,4-ij]quinoline-6-carboxylic acid. The chiral difference between the levo and dextro isomers causes not only a significant variation in antibacterial activity [2], but also differing solid state landscapes for ofloxacin and levofloxacin. [3][4]
In our study, we perform high-pressure X-ray diffraction on ofloxacin, levofloxacin hemihydrate and levofloxacin anhydrous γ-form to determine the impact of chirality, hydration and slip planes on their structural behaviour under pressure. Pressure is applied using hydrostatic and non-hydrostatic pressure transmitting media (PTM) to compare and model the differences in behaviour under these different pressure regimes. Additional Raman spectroscopic studies are carried out to complement the observations reported *via* X-ray diffraction. The materials are compressed up to 5 GPa to study their compressibility and phase behaviour above the tableting pressure range.

References
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