Poster

Characterization of Apremilast – halogen benzoic acids cocrystals

Y. Naumkina[1,2], J. Čejka[1], E. I. Korotkova[2]

[1]University of Chemistry and Technology, Prague, Czech Republic, [2]National Research Tomsk Polytechnic University – Tomsk (Russia)

naumkiny@vscht.cz

Apremilast is a medication that is prescribed to patients who have psoriatic arthritis, atopic dermatitis, and rheumatoid arthritis. It is classified as a class IV drug, which means that it has low solubility and permeability. The optimization of these properties can be achieved through the modification of pharmaceutical substances. However, a study of the pattern of changes in a series of solid multicomponent forms of Apremilast with co-formers of the same class has not yet been presented. We aimed to investigate the influence of the substituent position in the coformer on the crystal lattice of the obtained solid forms of Apremilast. New multicomponent forms of Apremilast with halogen benzoic acids with halogen substituent at different positions in the benzene ring (*o*- chlorobenzoic acid, *m*-chlorobenzoic acid, *p*-chlorobenzoic acid) were synthesised. Crystal structures of Apremilast with halogen-benzoic acids were characterised by the single crystal X-ray diffraction method. Aromatic-aromatic interactions in the obtained cocrystals preferentially hold the Apremilast molecule and the molecule of halogen benzoic acid together. Also, our results indicate that the steric condition of the para-chlorobenzoic acid as coformer played a crucial role in the crystallization of Apremilast cocrystals. This resulted in the formation of an entirely different form crystallizing in orthorhombic space group $P\,2_12_12$, as compared to the Apremilast cocrystals with *o*- and *p*-chlorobenzoic acid, which crystallized in the tetragonal space group $P\,4_12_12$. This research was supported by the Czech Science Foundation grant No. 21-05926X.