

*Supramolecular synthon hierarchy in bumetanide cocrystals*

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Active pharmaceutical ingredients (API) cocrystals are much important in pharmaceutical industry to fine tune the physicochemical properties such as solubility, dissolution, bioavailability and stability. to design of new cocrystals, basic understanding of the functional groups attached to the given molecules, complementary hydrogen bonds and molecular crystal packing of the API and coformer is essential. recently; we synthesized sulfonamide cocrystals with lactams, syn-amides and pyridine carboxamides from binary to ternary cocrystals. The new supramolecular synthon strategy was successfully developed for sulfonamide functional group and applied on acetazolamide drug. in continuation of our previous work to explore more about new supramolecular synthons, our focus moved towards diuretic sulfonamide drug 'Bumetanide (BUM)' with carboxamides are developed based on supramolecular synthons approach. Binary cocrystals of BUM with pyridine carboxamides, pyridones, and cytosine were obtained by solvent assist grinding followed by solution crystallization. All cocrystals are formed by proper insertion of coformers in the acid-acid homo dimer of BUM to achieve new supramolecular synthons. Pyridones are inserted acid-acid homo dimer of BUM as pyridone dimers. Pyridine amide coformers are always interacted with acid of BUM to form acid–amide dimer. Cocrystal polymorphs are obtained with Bumetanide–Isonicotinamide combination and show rare sulfonamide–pyridine, sulfonamide–acid synthon. By careful crystal packing analysis of single component BUM and nine new binary adducts gave an idea to design ternary cocrystals and finally four new ternary crystalline materials were synthesized. Single component crystals of BUM, all binary cocrystals were characterized PXRD, IR, DSC and finally all the binary adducts (except nicotinamide) confirmed by single crystal analysis.

References

- (1) Etter, M. C. Frankenbach, G. M. (1989), Chem. Mater. 1, 10–12.
- (2) Desiraju, G. R. (1995), Angew. Chem., Int. Ed. Engl. 34, 2311.
- (3) Allu, S. Bolla, G. Tothadi, S. Nangia A. (2017) (manuscript to be communicated).



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