Comparison of different cocrystal screening methods

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Cocrystals provide new opportunities to enhance the psychochemical properties, such as the melting point, hygroscopicity, mechanical properties, and solubility of the compounds [1]. Also, the study of the cocrystal interactions has a relevant importance to the crystal engineering, to further study on the cocrystal formation. Is important to notice that the most of reported cocrystals studies is regarding hydrogen bonds, and the focus of this study is the p-p interactions, which are more unusual, showing the importance of study this kind of cocrystal [2]. This work aims the synthesis of different compounds and its use in a cocrystal screening, in an attempt to form new cocrystal. Different isoxazoles and borodiazoles were synthesized and a cocrystal screening was carried out. Different methods of crystallization were carried out in liquid and solid state. The separated compounds and mixtures characterization were performed using X-ray powder diffraction (XRPD), TGA, DSC and NMR. The DSC analysis provided data to observe, in some cases, interactions between the compounds of the mixtures. In others, this technique was not effective, when the melting temperatures of pure components differ insignificantly. In those cases, a cocrystal peak can be overlap by the melting peak of the eutectic mixture. A further investigation using NMR, to obtain the association constant (Ka), must be accomplished to identify the formation or absence of co-crystal in a certain system, and evaluate if the Ka has an influence in the cocrystal growth. The use of XRPD before and after the crystallization method, can be a viable tool to assist in the cocrystal identification by the comparison of its diffraction patterns.

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References:
