Cocrystal screening of ibuprofen with oxalic acid and citric acid via grinding method

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ABSTRACT
Ibuprofen is a Class II Biological Safety Class (BSC) drugs used for relief of arthritis, as an analgesic and possesses the effect of antiplatelet. The major problem involves in ibuprofen is it has a low solubility and high permeability thus causes an unsatisfactory therapeutic effect to humans. Thus, in this work, alteration of ibuprofen's physicochemical properties is conducted by means of cocrystallization technique. Co-crystallizations of ibuprofen were prepared with selected coformers using dry grinding and liquid assisted grinding (LAG) techniques in different molar ratios while ethanol and propanol were used as a solvent. The new crystalline forms were identified and characterized by differential scanning calorimetry (DSC), powder X-ray diffraction (PXRD) and fourier transform infrared spectroscopy (FTIR). Analysis for Ibuprofen-Citric acid (IBP-CA) system, co-crystal was successfully formed in 1:2, 1:3, 2:1 and 3:1 molar ratios for neat grinding method although the co-crystal produced is unstable. Meanwhile, for Ibuprofen-Oxalic acid (IBP-OA) system, the co-crystal formation was identified only in 1:1, 1:2 and 1:3 molar ratios for the neat grinding method. LAG method shows that co-crystal formation was unsuccessful in both solvents for IBP-CA, while IBP-OA co-crystal was formed in the molar ratio 1:1, 2:1 and 3:1 in ethanol, and 2:1 and 3:1 in propanol.

KEYWORDS:
Citric acid; Differential scanning calorimetry; Drug products; Ethanol; Fourier transform infrared spectroscopy