α-Eprosartan (EPR) is a weakly basic drug which belongs to BCS class II and its mesylate salt has only 15% bioavailability. Pharmaceutical adducts of α-eprorsartan (EPR) with nicotinamide (NIC) and p-hydroxy benzoic acid (PHBA) was prepared by a liquid assisted grinding method. Before conducting this study, the crystal structure of EPR was determined. The main objective of this study was to prepare the pharmaceutical adducts such as cocrystal/eutectics to improve the aqueous solubility and dissolution rate and therefore oral bioavailability of EPR. Differential scanning calorimetry (DSC) and powder X-ray diffractometry (PXRD) were used as a solid state characterization tool to confirm the formation of cocrystals and eutectics. The eutectic mixture of EPR with PHBA in a 1:3 stoichiometry ratio showed better solubility and dissolution rate in all aqueous buffers (covering gastrointestinal pH range) as compared to EPR-NIC cocrystals and EPR. The EPR-NIC cocrystal in a 1:1 stoichiometry ratio showed better dissolution rate as compared to pure EPR but was converted to EPR within 30 min in pH 1.2 and 6.8 aqueous buffers as it was unable to sustain the “Parachute effect”. Dynamic vapor sorption profile of EPR cocrystal and eutectic are reversible which suggests that there is no solid state transformation under the conditions of experimentations. Which revealed that the generated formulation were quite stable at different humidity and temperature conditions. A significant increase in oral bioavailability in Sprague-Dawley rats, 2.4 fold and 6.1 fold was achieved with the cocrystal and eutectics respectively, even when cocrystals transformation is suspected based on in vitro studies. This study postulate that generation of pharmaceutical adduct like cocrystal and eutectic can be better formulation strategies to improve the biopharmaceutical performance of drug like Eprosartan.


Keywords: Cocrystals, Eutectics, Bioavailability