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## Formulation and solid-state characterisation of a novel benzanilide co-crystal of the anti-HIV drug Efavirenz

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HIV/AIDS has had a crippling socio-economic effect on developing countries in Africa. EFV (Efavirenz) is generally used to treat this pathology. However, its clinical efficacy is reduced by its limited water solubility. Our recent efforts were to discover new multicomponent molecular crystals of EFV to further enhance the solubility of EFV, which has led to the formulation of a novel BZA (benzanilide) CC (co-crystal). The molecular complex was characterized by X-ray Powder Diffraction (XRD) and FTIR (Fourier transform infrared) spectroscopy. FTIR data showed a shift in the N-H stretch of the amide group of EFV from 3,312.39 cm-1 to 3,299.71 cm-1 and the C = O frequency from 1,749.70 cm-1 to 1,739.87 cm-1 suggesting that the N-H and C = O functionalities of EFV are participating in hydrogen bonding with the N-H and C = O moieties of BZA in the EFV-BZA complex, indicative of improved water solubility. Both the XRD patterns of BZA and EFV show characteristic peaks, however, in the XRD pattern of EFV-BZA CC, one unique peak appeared which is absent in both EFV and BZA at 30.8005° (100% intensity) suggesting the formation of a new solid phase. The results from this study are significant in understanding the complexity of these scarce EFV based CCs and can be used to advance the development of new solid-state structures with improved physicochemical properties.