MS32-P12 Can ionic liquids be the key for pharmaceutical polymorphic control? Gabapentin as a case study

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For pharmaceutical industry, the delivery of an active pharmaceutical ingredient (API) as crystalline solid form occurs predominantly due to solubility, bioavailability and thermal stability considerations.[1] However, solids are often strongly affected by polymorphic conversions, which impacts the bioavailability and thus the drug efficacy, imposing great financial and patenting issues.[1] Having this in mind, it is extremely important to control this solid state phenomenom, or even avoid it, recurring to new alternatives (Figure 1). In the past years, ionic liquids (ILs) have been used, not only as green solvents for the synthesis and crystallization of organic compounds, but also as possible drug delivers, giving rise to the third generation of ILs, called API-ILs.[2] Gagabentin (Gaba) is an amino acid-based drug used to treat neurodegenerative diseases, such as epilepsy. This API is known to exhibit three polymorphs (Forms II, III and IV), which are easily interconverted,[3] making Gaba susceptible to adopt different physicochemical behaviors. In order to explore the role of ionic liquids as possible green and challenging alternative for polymorphic control, we studied the influence of selected ionic liquids in crystallization control process of Gaba and also prepared some API-ILs, through the combination with biocompatible counter-ions. We will present here some of the latest results from the crystallization process. The room temperature API-ILs obtained allowed to avoid polymorphism, transforming the solid API into a liquid. All the compounds were characterized by NMR, DSC and MS.

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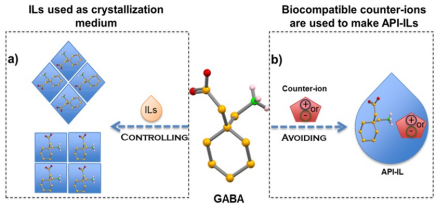

Figure 1. Schematic representation for polymorphic control (a)) and avoidance (b)) of Gaba.

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