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Solvent Impact on Polymorphism in Sulfonamide Compounds

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Polymorphism, the ability of a compound to crystallize in more than one solid form, has a significant impact on the properties of that compound (e.g. melting point, solubility, colour, morphology). Thus, although consisting of the same molecular unit, different polymorphs should be regarded as different materials. The control of polymorphism requires a good understanding of the crystallization conditions (e.g. solvent, solution concentration, cooling or evaporation profiles) and pathways favouring the formation of specific crystal forms. Very little fundamental knowledge still exists, however, on the mechanisms involved in the formation of crystals from solution, in particularly at early stages. For this reason, trial and error approaches still play a significant role in the set-up of crystallization processes.

In this work, a sulfonamide family of compounds was used as model (Figure 1) to study the solvent effect on their crystallization from solution. This was the first family discovered with antibacterial properties. These compounds were selected because they are prone to polymorphism, the reproducible preparation of specific crystal forms was never achieved, and conflicting results regarding their crystallization are often found in the literature.[1-3]

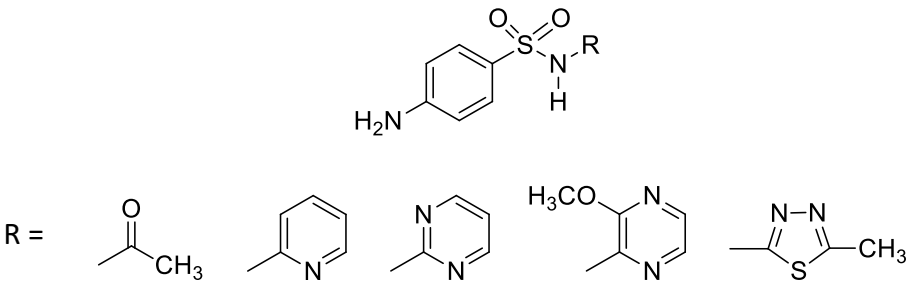

Figure 2. Molecular structure of the sulfonamides studied in this work.

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