MS14-O5 BioMOFs: are we getting alternative carriers for improved drug storage and release?

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We are engaged in a challenging project that proposes to synthesize new "bio-inspired" metal organic frameworks, BioMOFs, using safe metals and having active pharmaceutical ingredients (API) as linkers and/or guests. This is a new approach that has been proposed as a way to tackle the common drawbacks, such as low drug-storage capacity, too rapid delivery and high toxicity, presented in the traditional systems, used for controlled release of drugs, such as mesoporous silicas [1-4]. This type of compounds is traditionally synthesized by solvothermal methods, but in this project we are deeply engaged in using "green" techniques such as mechanochemistry.

In this work we will present results obtained with azelaic acid, a well-known API commonly used to treat skin disorders and flufenamic acid, a non-steroidal anti-inflammatory drug when using these as linkers in the network. The novel compounds are being characterized and we are strongly dependent on powder diffraction data (collected at the ESRF) for structure solution.

Muconic acid, a rigid and GRAS spacer, is one of the ligands that we are using to synthesize new BioMOFs having the API as guest.New compounds were successfully synthesized and characterized and we are now exploring the addition of a second GRAS ligand.

This is an on-going work using different synthetic and characterization approaches. However preliminary results are encouraging and may lead to very promising applications in the pharmaceutical field.

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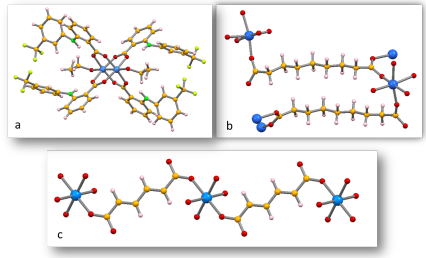

Figure 1. Molecular structure view of some new compounds obtained with: a) Flufenamic acid and Cu; b) Azelaic acid and Mg and c) Muconic acid and Mg

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