

MOF-199 IN CONTROLLED RELEASE OF DRUGS

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MOFs (Metal organic frameworks) are porous materials still under investigation as controlled drug delivery systems. MOF-199/HKUST-1 consisting of Cu(II) nodes and trimesate linkers is a widely exploited MOF in the areas of catalysis and gas storage. In this study, its ability was tested to perform as a controlled drug delivery system. Aspirin and nicotinamide were encapsulated to the MOF-199 structure via direct adsorption using water and 95% ethanol as solvents and drug release studies were conducted under pH 5, 7 and 8 at 37 °C. However, the powder X-ray diffraction analysis of MOF samples placed in water revealed that MOF-199 was unstable in water. Hence, 95% ethanol was selected as the better solvent for encapsulation. Good loading capacities were observed for nicotinamide and aspirin with comparison to the reported results for MOF-199 with other drugs. The average drug encapsulations were 44.84 mg g⁻¹, 51.28 mg g⁻¹ and 62.88 mg g⁻¹ for nicotinamide encapsulated in water, nicotinamide encapsulated in ethanol and aspirin encapsulated in ethanol, respectively. The highest drug release, after 24 h, for nicotinamide was observed at pH 8, while it was pH 5 for aspirin. Overall, the results show that MOF-199 can be developed as a controlled drug delivery system for nicotinamide and aspirin.

Keywords: Aspirin, Controlled drug release, MOF-199, Nicotinamide