



EVALUATION OF ANTIMICROBIAL ACTIVITY OF MORITA-BAYLIS-HILLMAN ADDUCT DERIVATIVES OF ISATIN

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ABSTRACT

Microbial infections are still one of the leading causes of death worldwide, even with the presence of several drugs for these diseases on the market. This is due to several reasons, including the increase in microbial resistance to drugs, which is accentuated by the irresponsible and indiscriminate use of these drugs by the population. Thus, the search for new drug candidate compounds with antimicrobial activity continues to be of great importance. In this sense, the Morita-Baylis Hillman adducts and their derivatives stand out for demonstrating a wide range of biological activity. This work shows the synthesis of a series of Morita-Baylis Hillman adducts from isatin derivatives via an efficient green approach involving the use of a new catalyst system, a mixture of copper-manganese iminodiacetate 1D coordination polymer (Cu/Mn-IDA) and choline chloride-urea deep eutectic solvent (ChCl/Urea 1:2). The adducts 2a-2i were obtained in good to excellent yields (59-97%) with shorter reaction times. The results demonstrate for the first time the synergistic catalytic effect of the combination of Deep Eutectic Solvent and coordination polymer on Morita-Baylis-Hillman reactions. The catalyst recyclability was investigated, and it was found that Cu/Mn-IDA maintains consistent performance for at least 4 catalytic cycles. The synthesized compounds were evaluated for their in vitro antimicrobial activity against four bacteria and eight fungi species. Among all, 2a, 2b, 2d, 2e, and 2g showed antifungal and antibacterial activities in 70-83% of the strains tested. The adduct 2e exhibited significant antifungal activity with a MIC value of 128 $\mu\text{g}\cdot\text{mL}^{-1}$ compared to the standard drug fluconazole (MIC 256 $\mu\text{g}\cdot\text{mL}^{-1}$), being considered as bacteriostatic/bactericidal and fungistatic/fungicidal.