

“Novel Metal N-Heterocyclic Carbene Complexes embedded in Polymer Matrix as potential Antimicrobial Agents”

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Current drug research has been focusing on silver N-heterocyclic carbene (NHC) complex. Its metal-ligand bonds are stabilized by the strong-electron donor nature of NHC, slowing down the release of silver ions from NHC complex to the target site, ultimately increasing its antimicrobial properties. However, sustainable release of metal ions is still a major concern since its antibacterial effect faded over time, rendering reinfections at wounds. This research project aims to synthesize and characterize silver and copper-NHC complexes with different NHC side chains in terms of alkyl chain length and mono/biscarbene properties, followed by evaluation of their antibacterial activities respectively. Electrospinning method is used to fabricate metal-NHC complexes which are subjected to assessment of their potential in antimicrobial properties. A series of Ag-NHC complexes have been successfully synthesized, characterized, and evaluated for their potential antimicrobial activities, which depend on the nature of ligands and complexes. Although the mechanism is not well developed, it was proved that the Ag-NHC complexes possess promising activities with long aliphatic alkyl N-1/N-3 side chains and bisimidazolium ligands in general. Also, the encapsulation of metal complexes in nanofibers is expected to slow down the release of metal ions to the target site. Thus, enabling it to sustain over a more extended period than aqueous metal-NHC complexes with a smaller amount of complexes, making drug delivery more efficient and sustainable.

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