

## **Abstract:**

Among the various contaminants that pollute water resources, persistent pharmaceuticals, mainly antibiotics, pose serious environmental hazards due to their recalcitrance to degradation and removal through conventional treatment processes. The frequent detection of the antibiotic amoxicillin in wastewater highlights its potential environmental impact and bioremediation necessity. The study reports the synthesis of a pyridine-based bimetallic Fe/Cu metal-organic framework (MOF), which was used as a photo-catalyst for the amoxicillin degradation under UV illumination. For the photocatalytic degradation of amoxicillin, the efficiency was measured for interval periods which was then analyzed through UV-Visible spectroscopy. The study reports considerable degradation of amoxicillin, which demonstrated the amoxicillin degradation potential of the photo-catalyst. The structure and functional characteristics of the photo-catalyst were evaluated through FT-IR spectroscopy and XRD, which confirmed the incorporation of the 4,4'-bipyridine ligand and essential functional groups, and the formation of a highly crystalline framework. The photocatalytic degradation studies demonstrated the potential of the bimetallic Fe/Cu MOF in the removal of antibiotic contaminants from effluents; its enhanced photocatalytic activity opens avenues for the use of the MOF in the treatment of antibiotic contaminated waters.