ABSTRACT

THE POTENTIAL OF HUMAN HAIR EXTRACT (HRE), A BIODEGRADABLE BIOWASTE EXTRACT, TO PROTECT COPPER SURFACE AND INHIBIT METALLIC CORROSION IN 1 M HCL WAS INVESTIGATED USING ELECTROCHEMICAL AND WEIGHT LOSS TECHNIQUES. THE RESULTS REVEALED THAT HRE EXHIBITS AN EFFICIENT CORROSION-MITIGATING EFFECT VIA ADSORPTION ONTO THE METAL SURFACE FOLLOWING A LANGMUIR ISOTHERM. A MAXIMUM INHIBITION EFFICIENCY (IE %) OF 92.47 % WAS ACHIEVED USING 100 PPM OF THE HRE INHIBITOR. TAFEL PLOT RESULTS REVEALED THE MIXED-MODE [CORROSION PROTECTION](https://www.sciencedirect.com/topics/materials-science/corrosion-protection) BEHAVIOR OF HRE. SURFACE ANALYSIS USING SCANNING ELECTRON MICROSCOPY (SEM), ENERGY DISPERSIVE X-RAY SPECTROSCOPY (EDS), AND ATOMIC FORCE MICROSCOPY (AFM) PROVIDED EVIDENCE FOR THE PRECIPITATION OF A PROTECTIVE HRE FILM ON THE METAL SURFACE. THE INTERACTION OF HRE WITH COPPER WAS INVESTIGATED USING FOURIER TRANSFORM INFRARED SPECTROSCOPY (FT-IR) AND X-RAY DIFFRACTION (XRD) SPECTROSCOPY; THEY CONFIRMED THE ABOVE CONCLUSIONS.