Environment friendly corrosion inhibitor from star fruit: Gravimetric, electrochemical and morphological investigation

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In the present work inhibitive effect of Star fruit juice extract (SFJE) on the corrosion of mild steel in aqueous solution of hydrochloric acid medium was investigated. Gravimetric measurement, electrochemical impedance spectroscopy and potentiodynamic polarization were used to study the corrosion behaviour of mild steel in absence and presence of SFJE. The inhibition efficiencies of the extract obtained from all these studies are in good agreement and were found to increase with increasing concentration of SFJE. Morphological results obtained from SEM and AFM studies showed that adsorption of plant extract molecules on mild steel surface is responsible for corrosion inhibition properties. Adsorption isotherm studies revealed that the molecules followed the Langmuir adsorption isotherm as a result of both physical and chemical adsorption. Effect of temperature on the corrosion inhibition behaviour has also been carried out which showed that inhibition efficiency increased with increasing temperature within the temperature range 293K to 323K. The molecules in the extracted material have been characterized by FT-IR spectroscopy, NMR spectroscopy and gas chromatographic method.

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