



A Comparative Investigation of *Terminalia* genus Extracts as a Green Corrosion Inhibitor for Mild Steel in 1N HCl acid Media

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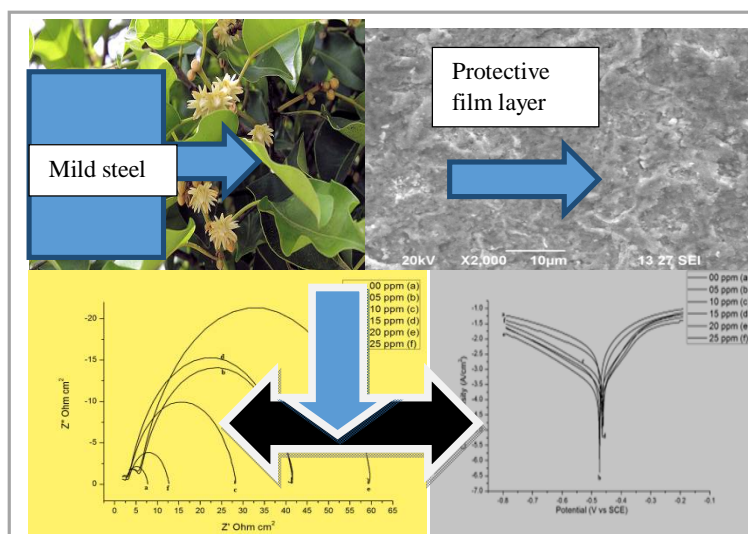
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ABSTRACT

Using the weight-loss method, potentiodynamic polarization, and electrochemical impedance spectroscopy techniques, the inhibitory impact of various components of the plant *Terminalia* genus (TG) extract (leaves, fruits, stems, seeds) on mild steel corrosion in 1 N HCl medium was examined. The plant extract acts as a mixed-type inhibitor, according to polarization experiments. The inhibitory efficiency of *Terminalia* genus extracts increases in a concentration-dependent way, according to the weight-loss method, which was also corroborated by the findings of electrochemical methods. In comparison, *Terminalia* genus leaf extracts had the highest inhibitory efficacy, with 98.50 percent at 20 ppm concentration. The remarkable performance of the plant extract's inhibitive activity was validated by the SEM morphology of the adsorbed protective coating on the mild steel surface. Surface coverage levels were graphed to see if they were acceptable for adsorption. Temperature experiments found that when the temperature rises, the inhibitory efficacy decreases, implying a physisorption process.

Graphical Abstract



Keywords: Mild steel, Corrosion test, EIS, SEM.