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INHIBITION EFFECT OF ADMIXED CITRUS PARADISE AND CYMBOPOGON OIL DISTILLATES ON THE CORROSION RESISTANCE MILD STEEL IN DILUTE ACID ELECTROLYTES

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Abstract

Corrosion suppression effect of the combination of citrus paradise and cymbopogon oil distillates on mild steel (MS) in 0.5M H₂SO₄ and HCl solution was studied by potentiodynamic polarization, open circuit potential measurement, optical microscopy characterization, and ATF-FTIR spectroscopy. The distillates performed adequately in both acids at all concentrations considered with average inhibition efficiency above 90%.

Corrosion rate of the non-inhibited steel at 7.690 and 2.819mm/y from both acids were substantially reduced to values between 0.465 and 0.466mm/y in H₂SO₄ while the values in HCl are 0.081 and 0.034mm/y. The distillates exhibit mixed type inhibition performance in both acids. However, polarization plots displayed cathodic passivation effect at higher distillate concentration in H₂SO₄ while cathodic-anodic passivation plots were observed at all distillate concentrations in HCl solution. Corrosion potential plots from open circuit measurement at specific distillate concentrations were significantly electropositive compared to the non-inhibited steel which was electronegative. Inhibition effect of the distillates occurred through chemisorption adsorption mechanism with Gibbs free energy values greater than -40KJ/Mol , in agreement with Langmuir isotherm model. Optical images of the non-inhibited steel displayed a severely degraded exterior which significantly contrast the protected exterior of the inhibited steel.

Keywords:

- [Corrosion](#)
- [adsorption](#)
- [carbon steel](#)
- [inhibitor](#)
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