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Effect of Temperature on The Corrosion Inhibition of Mild Steel by Mango Peel Extract in the Presence of Iodide Ions

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EFFECT OF TEMPERATURE ON THE CORROSION INHIBITION OF MILD STEEL BY MANGO PEEL EXTRACT IN THE PRESENCE OF IODIDE IONS

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ABSTRACT

Effect of Temperature on The Corrosion Inhibition of Mild Steel by Mango Peel Extract in the Presence of Iodide Ions

Mild steel is highly prone to corrosion in acidic conditions, which causes significant industrial losses. To overcome corrosion, natural extracts have become widely used as environmentally friendly solutions to reduce metal corrosion. This research assessed the corrosion inhibition efficiency of mango peel extract (MPE) in combination with potassium iodide (KI) on mild steel at different temperatures in acidic environment. Weight loss method was used to determine inhibition efficiency and the potentiodynamic polarization test was performed to assess electrochemical behavior. Optical and electron microscopy was carried out to examine surface morphology. The result showed that the combination of MPE and KI has the capacity to inhibit corrosion with a maximum efficiency of 99.83%. Potentiodynamic polarization exhibited that the inhibitor was effective as a mixed type, lowering both anodic and cathodic reactions. Optical microscopy and FESEM analysis verified the production of protective layers on the mild steel surface. Although the calculated synergy value between MPE and KI was low, the combination of MPE and KI system showed improved corrosion inhibition efficiency compared to MPE when applied individually. In general, the combination of MPE and KI is a very effective and eco-friendly way to inhibit corrosion. These results suggest the possibility of practical uses in industrial settings in which mild steel is capable of being protected with green and organic inhibitors although susceptible to corrosive environment.

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