Coffee Husk as Corrosion Inhibitor for Mild Steel in HCl Media

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The corrosion inhibition of mild steel by coffee husk aqueous extract (1) and its high molecular weight fraction (2) was investigated in 1 mol L⁻¹ HCl medium. Gravimetric tests showed that for both inhibitors, inhibition efficiency (*IE*) increased with time and extract concentration, reaching a *IE* of 89.2% and 90.3% for 800 mg L⁻¹ of inhibitors (1) and (2), respectively, in 24 h of immersion. Gravimetric tests varying temperature showed the activation energy (*E_a*) barely varied for Inhibitor 1. For Inhibitor 2 a decrease in *E_a* was noted, a hint it is attached on the metal surface by chemisorption. Polarization curves indicated that both extracts act as mixed type inhibitors. Impedance results showed a decrease in double layer capacitance (*C_{dl}*) and an increase in charge transfer resistance (*R_{ct}*), with a better performance for inhibitor (2). Both extracts presented a good linearity with respect to Langmuir isotherm, an evidence of a monolayer formation. Our results suggest inhibitor 1 acts by purely blocking the metal surface, and in case of inhibitor 2, it screens the metal surface and reduces the activation energy.

Keywords: Mild steel, corrosion inhibitor, coffee husk, waste, natural products.

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