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The use of *Ruta chalepensi* as corrosion inhibitor for steel corrosion in 2M sulphuric acid solution

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ABSTRACT

*The effect of addition of Ruta Chalepensi (**RC**) extracts (aqueous extract and alcoholic extract) on steel corrosion in 2.0 M H_2SO_4 containing 10% ethyl alcohol (EtOH) by chemical methods (hydrogen evolution (HE) and mass loss(ML)) and electrochemical (potentiodynamic polarization (PDP) and impedance (EIS)) methods. SEM was applied for surface morphology to confirm the obtained results. The results showed that when the concentration of the extracts is increased the corrosion rate of steel sample is decreased, which indicates that the inhibition of the corrosion takes place. The polarization results showed that the extracts of RC plant acts as mixed type inhibitors, they retarded both cathodic and anodic corrosion reactions. The electrochemical parameters ($E_{corr.}$, $I_{corr.}$, b_c and b_a) and the inhibition percentages inh%. were calculated. Electrochemical impedance spectroscopy results showed that the corrosion and corrosion inhibition of steel occurred mainly by charge transfer. Also, the experimental results from chemical and electrochemical results agree with Langmuir isotherm. Values of equilibrium constant of adsorption $K_{ads.}$ and the standard free energy of adsorption $\Delta G°_{ads.}$, for the extracts were also calculated.*

Key words: Steel, acid solution, corrosion, inhibition and *Ruta chalepensi*.