

## عنوان مقاله:

Theobroma Cocoa Dry Bean Extract as a Potential Green Inhibitor for Mild Steel in Acidic Medium

## محل انتشار:

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## خلاصه مقاله:

Theobroma cocoa dry bean extract (CDBE) was prepared by Soxhlet extraction method and was characterized for its chemical constituents using Fourier Transform-Infrared Spectroscopy (FT-IR), Gas chromatography-Mass spectroscopy (GC-MS) and also by Thermogravimetric Analysis-Differential Scanning Calorimetry (TGA-DSC) techniques. FT-IR analysis gave information about the mostly like to be present functional groups in the extract. GC-MS analysis of the extract revealed the presence of important 07 chemical constituents with cis-13-octadecanoic acid as the major component. TGA-DSC study gave the idea about different stages of thermal decomposition of the chemical constituents present in the extract. CDBE was then tested for its ability to inhibit the corrosion rate of mild steel in 1.0M HCl solution medium by means of weight loss, Potentiodynamic polarization, and Electrochemical impedance spectroscopy (EIS) techniques. The weight loss experiments revealed the anticorrosive property of it on mild steel, which was found to increase with increase in the concentration of the inhibitor CDBE and decrease with an increase in temperature of corrosive medium. EIS results showed the adsorption of organic constituents present in the extract at the metal-solution interface. Potentiodynamic polarization studies revealed that CDBE functioned as a mixed type inhibitor. The surface morphological studies of mild steel surface were carried out by Scanning electron microscopy (SEM). The inhibition efficiency values obtained by electrochemical measurements were consistent with those from weight loss measurements and hence it can be proposed that CDBE as a potent inhibitor towards corrosion of mild steel under acidic conditions.

## کلمات کلیدی:

Electrochemical impedance, Mild steel, polarization, Theobroma Cocoa, weight loss

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