

Adsorption and Inhibitive Properties of *Ruta chalepensis* L. Oil as a Green Inhibitor of Steel in 1 M Hydrochloric Acid Medium

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Inhibition of steel corrosion by *Ruta chalepensis* L. oil has been investigated in aqueous 1 M hydrochloric acid solution using weight loss method, potentiodynamic polarization, electrochemical and impedance spectroscopy (EIS). The inhibition efficiency of *R. chalepensis* L. oil was calculated and compared. We note good agreement between these methods. The results obtained revealed that the inhibitor tested reduce differently the kinetics of corrosion process of steel. Its efficiency increases with the concentration and attained 77% at 2.5 ml/L. Effect of temperature on the corrosion behavior of steel in 1M HCl was also studied in the range 308 K and 338 K. The thermodynamic data of activation are determined. The analysis of *R. chalepensis* L. oil, obtained by steam distillation, using Gas Chromatography (GC) and Gas Chromatography/Mass Spectroscopy (GC/MS) showed that the major components were 2-Undecanone (67 %), 2-Decanone (9 %), 6-(3',5'-Benzodioxyl)-2-hexanone (6.3 %) and 2-Dodecanone (4 %).

Keywords: Corrosion; Green Inhibitor; *Ruta chalepensis* L. essential oils; Adsorption

1. INTRODUCTION

The study of steel corrosion phenomena has become an industrial and academic topic in recent years. Particularly in acidic media, because of the increased industrial applications of acid solutions; Such as, the acid pickling, industrial cleaning, acid descaling, oil well acid in oil recovery and the petrochemical processes [1,2]. Among the acid solutions, hydrochloric acid is one of the most widely used agents.