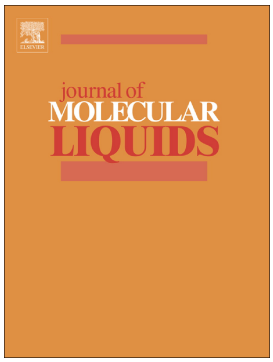

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Application of Zizyphus Lotuse - pulp of Jujube extract as green and promising corrosion inhibitor for copper in acidic medium

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Abstract

The study of the inhibitory power of the Pulp of Jujube (PJ) extract of the plant *Zizyphus Lotus* with respect to the corrosion of copper in 1M hydrochloric medium has been realized. This study was conducted by stationary and transients electrochemical measurements, weight loss and atomic absorption spectroscopy techniques. Scanning electron microscopy (SEM), energy dispersive X-ray spectrometry (EDS), Fourier transform infrared (FT-IR) and atomic force microscopy (AFM) studies were used to characterize the surface of uninhibited and inhibited copper specimens. The results showed that the inhibition increases with PJ extract concentration reaching a maximum of 93% at a concentration of 1 g L^{-1}. The obtained results indicate that PJ extract can act as a good green corrosion inhibitor for copper in 1M HCl. The effect of temperature was also investigated and thermodynamic parameters were determined and discussed.

Keywords: Corrosion; Inhibition; Copper; Zizyphus Lotus; jujuba pulp; Hydrochloric acid.

1. Introduction

Many metallic materials are used in various human activities **[1-6]**. Copper and its alloys are the most concerned due to their emerging importance. The choice of this metal is justified by its high mechanical, electrical and thermal properties **[6]**. Studies on copper corrosion phenomena have become indispensable **[7]**. This is due to the growing applications of acid solutions **[8-10]**. Recently, corrosion inhibitors are means of protecting against corrosion of copper, especially in acidic media **[6, 11-16]**. These are considered as one of the most effective and cost-effective methods. Among the most widely known inhibitors are the derivatives of azoles, which are considered as the most effective inhibitors against the corrosion of copper in the acid medium by virtue of the functional groups (containing N, S and O atoms). These groups are responsible for the adsorption of these molecules on the metal surface preventing the attack of acidic solutions **[1, 12, 17-21]**. However, these azoles are toxic and are classified as environmental pollutants **[22, 23]**, so it is necessary to develop new inhibitors that could satisfy our needs. For this reason, biomaterials coming from original