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Corrosion Inhibition Studies of Cashew Nut (*Anacardium occidentale*) on Carbon Steel in 1.0 M Hydrochloric Acid Environment

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Abstract

The corrosion inhibitive characteristics of the cashew nut (*Anacardium occidentale*) were studied as an eco-friendly green corrosion inhibitor at ambient temperature of 25°C using weight loss analysis and adsorption isotherms. The effect of inhibitor concentration (4-12_g/l) at immersion time of 3-12_days was evaluated. The inhibitive ability of cashew nut shows a significant inhibition efficiency of 86% at 12 g/l concentration for 3-days and 72.9% at 12-days, which are undoubtedly as a result of the absorption of the inhibitor molecules on the metal surface which serve as a barrier against corrosion of carbon steel in acidic medium. The adsorption mechanism was found to fit Tempkin isotherms. The average optimum free energy of absorption was calculated to be $-17.374 \text{ kJmol}^{-1}$ indicating that the process was exothermic and physisorption.

Keywords: *Anacardium Occidentale*; Carbon steel; Corrosion inhibitor; Absorption isotherm; Acid solution.

1.0 Introduction

Recently, corrosion phenomena, regimentation and prevention have become major scientific issues that must be considered in expectation or prior to increasing demands or usage of metallic materials in all angles of technological development (Loto *et al.*, 2011). Thus, engineers fundamentally consider corrosion when dealing with metallic materials. Corrosion process can affect all sorts of materials, for example, rubber, ceramics, plastics and materials alike. Rusting of steel and iron is the most common example of corrosion (Ahmad, 2008). Acidic processes play a major role in the industries, in terms of pickling solutions, cleaning of oil refinery

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