

Corrosion inhibition studies of cashew nut (*Anacardium occidentale*) on carbon steel in 1.0 M hydrochloric acid environment

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 $-17.374 \text{ kJ mol}^{-1}$ indicating that the process was exothermic and physisorption.

Keyword: *Anacardium occidentale*; Carbon steel; Corrosion inhibitor; Adsorption isotherm; Acid solution