- Research Article
- Published: 16 June 2020

Evaluation of the corrosion inhibition efficacy of *Cola acuminata* extract for low carbon steel in simulated acid pickling environment

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Environmental Science and Pollution Research **volume 27**, pages34270–34288 (2020)Cite this article

Abstract

In this study, Kola nut extract (KE) was evaluated for inhibiting ability towards low carbon steel corrosion in 1 M HCl solution using weight loss and electrochemical techniques. The surface of the corroded carbon steel was examined by Fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), and atomic force microscopy (AFM). Elemental composition of the corrosion products and/or adsorbed inhibitor film on the carbon steel surface was determined with the aid of an energy-dispersive X-ray spectroscopy (EDX). The ultraviolet-visible (UV-vis) experiments were also performed to get information about the interaction of KE with the carbon steel surface. It was found that KE exhibited good corrosion protection property. From weight loss technique, corrosion rate was reduced from 0.387 to 0.054 mm/year by 700 ppm of KE at room temperature after 24 h immersion and this corresponded to inhibition efficiency (IE) of 86%. The IE however

depreciated with rise in temperature. FTIR results reveal that KE interacted with the carbon steel surface through the O and N heteroatoms of its phytoconstituents. FTIR spectroscopy, UV-vis, SEM, AFM, and EDX data provided proof of KE adsorption on the steel surface as reason for the corrosion inhibition.

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Ethics declarations

Conflict interest

The authors declare that they have no conflict of interest.

Additional information

Responsible editor: Philippe Garrigues

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About this article

Cite this article

Mohammed, AR.I., Solomon, M.M., Haruna, K. *et al.* Evaluation of the corrosion inhibition efficacy of *Cola acuminata* extract for low carbon steel in simulated acid pickling environment. *Environ Sci Pollut Res* **27**, 34270–34288 (2020). https://doi.org/10.1007/s11356-020-09636-w

Download citation

- Received31 March 2020
- Accepted05 June 2020
- Published16 June 2020
- Issue DateSeptember 2020
- DOIhttps://doi.org/10.1007/s11356-020-09636-w

Keywords

- **Plant biomaterials**
- **Kola nut**
- **Corrosion inhibition**

- **Greenness**
- **Adsorption**