

Comparison of Commercial and Natural Henna as Corrosion Inhibitor for Mild Steel in Acidic Media

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Structured Abstract

Background: Commercial Henna Extract (CHE) and Natural Henna Extract (NHE) has been used as inhibitor to protect the surface of Mild steels. Green corrosion inhibitors are cost-effective and environmentally friendly, derived from natural resources. Green inhibitor was used to reduce hazardous waste into the environment and develop eco-friendly chemicals. This research is to investigate the corrosion inhibition efficiency (I.E.) of Lawsone (2-hydroxy-1,4-naphthoquinone) as green inhibitor to protect Mild steel in acidic media.

Methods: The sample from Commercial and Natural Henna. Both samples were extracted by the maceration process and used as inhibitor. The characterization process was analyzed by the Fourier Transform Infrared (FTIR). Mild steel was polished and rinsed multiple times with distilled water, degreased with acetone. The mild steel was immersed in 1 M of HCl. Finally, the mild steel was cleaned with distilled water, dried, and weighed and the weight loss was recorded in data.

Results: The FTIR spectra shows the presence of the functional group of Henna extract which Lawsone. The effect of immersion of the IE of NHE and CHE for mild steel corrosion in 1.0 M of HCl was investigated by immersing the Mild steel in inhibitor solution for 30 min, 1 hour, 6 hour and 24 hours. Increasing immersion period from 30 minute to 1 hours, there is a slightly decrease in IE which from 75% to 55%. Followed with immersion from 6 hours to 24 hours show drop of IE 36.36% to 16.67% for NHE compared to CHE, show in decreasing of IE but still less efficient than NHE. Increase in concentration of acid may affect the effectiveness of inhibition efficiency of henna to protect the mild steels against corrosion. This is caused by the protective layer's formation process may be disrupted with high acidic media with low concentration of inhibitor.

Conclusion: NHE was found to be an effective Inhibitor compared to CHE against corrosion in HCl solution and the findings show, it can be useful for developing eco-friendly and cost-effective inhibitor in corrosion process.

Keywords: NHE, CHE, Corrosion Inhibitor, Inhibition Efficiency.

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