Comparative Evaluation of the Protection Performance of Admixed Tea Tree and Grapefruit Essential Oil Extracts on Mild Steel and Alloy Steel 3310

Abstract:

Analysis and description of inhibition efficiency results for tea tree and grapefruit essential oil extracts (TTGP) on mild steel (MS) and alloy steel 3310 (AS3310) in 0.5 M H2SO4 solution was done. The results show TTGP performed effectively on MS at 2% to 3.5% TTGP concentration with final inhibition values of 71.70%, 79.25%, 83.58% and 92.45% at 240 h of exposure. Inhibition efficiency generally increased with TTGP concentration and exposure time, although inhibition efficiency at 2.5% 3% TTGP concentration decreased with exposure time. Effective TTGP inhibition performance on AS3310 occurred at 3% and 3.5% TTGP concentration only with final values of 72.50% and 73.25%. Inhibition efficiency of TTGP on AS3310 varied non-proportionately with its concentration. With respect to exposure time, inhibition efficiency of TTGP on AS3310 at all concentrations decreased. Results from ANOVA analysis shows TTGP concentration significantly influenced the performance output of TTGP extract with statistically significant factor of 85.73% and 84.78% (MS and AS3310). The corresponding values for exposure time, though determined to be statistically relevant is overwhelmingly far below the influence of exposure time at values of 4.63 and 14.27. Standard deviation data shows inhibition efficiency of TTGP on MS varied minimally from mean values at all concentrations (excluding 1.5% and 2% TTGP concentration). The corresponding values for TTGP on AS3310 were also generally low at all concentrations signifying stable inhibition performance. Data showed 48% and 18% of MS and AS3310 inhibition efficiency results are greater than 80% effective inhibition performance threshold at margins of error of 12.64% and 10%

Info:

Periodical:
Key Engineering Materials (Volume 943)
Pages:
127-134
DOI:
https://doi.org/10.4028/p-6985md
Citation:
Cite this paper
Online since:

March 2023
Authors:
Omoregie Osamudiame, Anthony Chisom Nissi, Odukomaiya Oluwademiladeogo Oluwakayode, Uriewhu Victory Oghoho, Okeke Chukwuemeka Daniel, Ifon Princewill Smart, Peter Arome Chosen Lemuel, Osondu Raymond Nwabeze, Roland Tolulope Loto*
Keywords:
Acid, Adsorption, Carbon Steel, Corrosion, Inhibitor
Export:
RIS, BibTeX
Price:
39,50 €

* - Corresponding Author