

ABSTRACT

CONVERSION OF COCONUT OIL DERIVED METHYL ESTERS INTO NITROGEN COMPOUNDS AS GREEN CORROSION INHIBITOR

By

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This study was carried out as an attempt to convert methyl esters derived from coconut oil into nitrogen compounds by reacting the methyl esters with diethanolamine. To produce methyl ester, coconut oil was refluxed with methanol at 70 °C for 3 hours in the presence of zeolite-A catalyst. To produce nitrogen compounds, three samples were prepared by carrying out experiment in an autoclave then heated in an oven at 80 °C for 24 hours, at 100 °C for 24 and 48 hours. The products of the reactions were analyzed using GC-MS and FTIR, then utilized as corrosion inhibitor for mild steel in CO₂ saturated brine solution using Wheel test method. The inhibition activity of the samples was evaluated in terms of percentage protection and surface morphology of the sample using SEM-EDX method. The experimental results obtained revealed that the experiments conducted at 80 °C for 24 hours and at 100 °C for 24 hours only produced nitrogen compounds as a minor component, but in the sample produced from the experiment carried out 100 °C for 48 hours, a series of nitrogen compounds were produced, contributing 53.54% to the composition. The results of corrosion testing experiments revealed that the samples exhibit corrosion inhibition activity, with the highest protection of 97.9% was provided by the sample prepared at 100 °C for 48 hours. Without ignoring the need for further research, the results obtained in this study suggest that the nitrogen compounds derived from coconut oil possess promising potential as green corrosion inhibitor.

Keywords: zeolite-A, coconut oil methyl ester, nitrogen compounds, corrosion inhibitor, and wheel test.