

ABSTRAK

OPTIMASI WAKTU KONVERSI METIL ESTER DARI MINYAK BIJI KARET (*Hevea brasiliensis*) MENJADI SENYAWA NITROGEN DAN UJI AKTIVITAS SEBAGAI INHIBITOR KOROSI BAJA LUNAK

Oleh

DEVY YULIYANDA

Pada penelitian ini dilakukan optimasi produk amidasi metil ester minyak biji karet dengan dietanolamina menggunakan katalis zeolit A berbasis sekam padi dengan variasi waktu 24, 48, 72, dan 96 jam menjadi senyawa nitrogen. Metil ester diperoleh melalui proses transesterifikasi minyak biji karet dengan metanol dan zeolit A lalu direfluks pada suhu 70 °C. Senyawa nitrogen diperoleh melalui reaksi amidasi dengan mereaksikan metil ester dengan dietanolamina di dalam *autoclave* lalu dimasukkan dalam oven 100 °C selama 24, 48, 72, dan 96 jam dengan waktu pengadukan selama 1 jam. Produk amidasi dikarakterisasi dengan FTIR dan GC-MS selanjutnya digunakan sebagai inhibitor korosi baja lunak menggunakan metode *wheel test* dan morfologi permukaan sampel baja dikarakterisasi dengan SEM. Produk amidasi yang mengandung senyawa nitrogen pada variasi waktu 24, 48, 72, dan 96 jam secara berturut-turut yaitu 15,61%, 20,10%, 25,93%, dan 26,10% namun masih didominasi oleh dietanolamina. Uji aktivitas inhibisi senyawa nitrogen dengan 4 variasi waktu mendapatkan hasil yang baik dengan memperoleh persen proteksi secara berturut-turut 95,71%, 94,96%, 93,49%, dan 93,24%. Hal ini juga didukung oleh hasil yang sama dengan analisis morfologi permukaan menggunakan SEM. Berdasarkan hasil yang diperoleh menunjukkan bahwa senyawa nitrogen yang berasal dari minyak biji karet memiliki potensi sebagai *green corrosion inhibitor*.

Kata kunci: Minyak biji karet, zeolit A, transesterifikasi, amidasi, inhibitor korosi, *wheel test*.

ABSTRACT

OPTIMIZATION OF THE CONVERSION TIME OF METHYL ESTER FROM RUBBER (*Hevea brasiliensis*) SEED OIL INTO NITROGEN COMPOUNDS AND TEST ACTIVITY AS A CORROSION INHIBITOR OF MILD STEEL

By

DEVY YULIYANDA

In this research, optimization of the amidation of rubber seed oil methyl ester with diethanolamine to produce nitrogen compounds was carried out using zeolite-A as catalyst. To obtain optimum reaction time, experiments were carried out at different reaction times of 24, 48, 72, and 96 hours. Methyl ester was obtained by transesterification of rubber seed oil with methanol using zeolite-A as catalyst and refluxed at 70 °C. Nitrogen compounds were obtained through an amidation reaction by mixing methyl esters with diethanolamine followed by stirring for 1 h. The mixture was transferred into an autoclave and then the autoclave was placed in an oven at 100 °C for 24, 48, 72, and 96 hours. The amidation product was characterized by FTIR and GC-MS, and then used as a corrosion inhibitor for mild steel using the wheel test method and the surface morphology of the steel sample was characterized by SEM. The amidation products containing nitrogen compounds at various times of 24, 48, 72, and 96 hours were 15.61%, 20.10%, 25.93%, and 26.10% respectively but the products were still dominated by diethanolamine. Inhibition activity tests demonstrated that nitrogen compounds provide high protection as indicated by the percentage of protection in the range of 93.24 to 95.71%. These results are supported by the surface morphology of the metal sample as seen by SEM, suggesting that nitrogen compounds derived from rubber seed oil have potential as green corrosion inhibitors.

Keywords: Rubber seed oil, zeolite A, transesterification, amidation, corrosion inhibitor, wheel test.