

ABSTRAK

Korosi merupakan permasalahan umum yang sering terjadi dalam industri terutama yang menggunakan material logam Baja ST 40. Penggunaan inhibitor kimia sintetis yang umum dipakai saat ini dinilai kurang ramah lingkungan karena bersifat toksik, sehingga diperlukan alternatif berbahan dasar alami. Penelitian ini bertujuan untuk menganalisis pengaruh tiga jenis inhibitor organik, yakni ekstrak daun jambu biji, daun pepaya, dan daun belimbing wuluh terhadap laju korosi plat Baja ST 40. Metode yang digunakan adalah eksperimen laboratorium, di mana setiap jenis inhibitor organik masing-masing digunakan untuk merendam 4 plat baja dengan durasi yang berbeda (15, 30, 45, dan 60 menit), kemudian direndam dalam air laut selama 20 hari. Laju korosi dihitung dengan metode kehilangan massa (*weight loss*), sedangkan efektivitas inhibitor dianalisis melalui perbandingan dengan sampel tanpa inhibitor. Hasil penelitian menunjukkan bahwa seluruh jenis inhibitor organik mampu menurunkan laju korosi. Ekstrak daun jambu biji memberikan kinerja terbaik dengan rata-rata laju korosi 0,25 mmpy dengan efisiensi tertinggi 71,4%, diikuti daun pepaya dengan rata-rata 0,29 mmpy dengan efisiensi tertinggi 68,3%, serta daun belimbing wuluh sebesar 0,33 mmpy dengan efisiensi tertinggi 58,7%. Data tersebut menegaskan bahwa semakin lama waktu perendaman dalam larutan inhibitor organik, semakin efektif kemampuan inhibitor dalam melindungi logam dari serangan korosi. Hasil ini juga menunjukkan bahwa penggunaan inhibitor organik dapat menjadi solusi ramah lingkungan untuk mengurangi kerusakan korosi logam dalam industri.

Kata kunci: Ekstrak Daun Belimbing wuluh, Ekstrak Daun Jambu Biji, Ekstrak Daun Pepaya, Inhibitor Organik, Korosi Baja ST 40

ABSTRAK

Corrosion is a common problem that often occurs in the industry, especially those that use ST 40 steel metal material. The use of synthetic chemical inhibitors that are commonly used today is considered less environmentally friendly because they are toxic, so a natural-based alternative is needed. This study aims to analyze the effect of three types of organic inhibitors, namely guava leaf extract, papaya leaf, and star fruit leaf waluh on the corrosion rate of ST 40 steel plate. The method used was a laboratory experiment, in which each type of organic inhibitor was used to soak 4 steel plates of different durations (15, 30, 45, and 60 minutes), then immersed in seawater for 20 days. The corrosion rate was calculated by the weight loss method, while the effectiveness of the inhibitor was analyzed by comparison with samples without inhibitors. The results of the study show that all types of organic inhibitors are able to reduce the rate of corrosion. Guava leaf extract provides the best performance with an average corrosion rate of 0.25 mmpy with the highest efficiency of 71.4%, followed by papaya leaves with an average of 0.29 mmpy with the highest efficiency of 68.3%, and star fruit leaves of 0.33 mmpy with the highest efficiency of 58.7%. The data confirm that the longer the immersion time in an organic inhibitor solution, the more effective the inhibitor's ability to protect the metal from corrosion attack. These results also show that the use of organic inhibitors can be an environmentally friendly solution to reduce metal corrosion damage in industry.

Keywords: *Star Leaf Extract, Guava Leaf Extract, Papaya Leaf Extract, Organic Inhibitor, Steel Corrosion ST 40*