

ABSTRAK

Korosi merupakan permasalahan utama pada material baja karbon rendah seperti ASTM A36, terutama pada lingkungan air laut yang bersifat agresif. Penelitian ini bertujuan untuk menganalisis pengaruh konsentrasi zat pelarut alkohol pada proses ekstraksi kulit buah naga merah sebagai inhibitor korosi alami terhadap laju korosi baja ASTM A36. Ekstrak kulit buah naga merah dibuat menggunakan variasi konsentrasi alkohol sebesar 70%, 89%, dan 96%, kemudian diaplikasikan melalui proses perendaman baja selama 1, 3, dan 5 hari. Spesimen selanjutnya diuji dalam media air laut selama 30 hari. Laju korosi dihitung menggunakan metode kehilangan berat (weight loss), sedangkan efisiensi inhibitor ditentukan berdasarkan perbandingan laju korosi dengan dan tanpa inhibitor. Hasil penelitian menunjukkan bahwa peningkatan konsentrasi alkohol dan lama waktu perendaman secara signifikan menurunkan laju korosi baja. Nilai laju korosi terendah diperoleh pada konsentrasi alkohol 96% dengan waktu perendaman 5 hari sebesar 0,0032 mmpy, disertai efisiensi inhibitor tertinggi mencapai 82,32%. Temuan ini menunjukkan bahwa ekstrak kulit buah naga merah berpotensi sebagai inhibitor korosi alami yang ramah lingkungan dan efektif untuk perlindungan baja di lingkungan laut.

Kata kunci: Korosi; Inhibitor Alami; Kulit Buah Naga Merah; Baja ASTM A36; Alkohol

Abstract

Corrosion is a major issue affecting low-carbon steel materials such as ASTM A36, particularly in aggressive marine environments. This study aims to evaluate the effect of alcohol solvent concentration in the extraction process of red dragon fruit peel as a natural corrosion inhibitor on the corrosion rate of ASTM A36 steel. The extraction was carried out using alcohol concentrations of 70%, 89%, and 96%, followed by steel immersion for 1, 3, and 5 days. The specimens were then exposed to seawater for 30 days. The corrosion rate was determined using the weight loss method, while inhibitor efficiency was calculated by comparing corrosion rates with and without inhibitor treatment. The results indicate that higher alcohol concentration and longer immersion time significantly reduce the corrosion rate of steel. The lowest corrosion rate of 0.0032 mmpy was obtained using 96% alcohol concentration with a 5-day immersion period, accompanied by the highest inhibitor efficiency of 82.32%. These findings demonstrate that red dragon fruit peel extract has strong potential as an environmentally friendly and effective natural corrosion inhibitor for steel protection in marine environments.

Keywords: Corrosion; Natural Inhibitor; Red Dragon Fruit Peel; ASTM A36 Steel; Alcohol