

ABSTRAK

Korosi merupakan permasalahan utama pada baja karbon ASTM A36 yang banyak digunakan pada lingkungan maritim karena tingginya kandungan ion klorida dalam air laut. Penelitian ini bertujuan untuk menganalisis pengaruh inhibitor korosi alami dari ekstrak daun jeruk purut, daun jeruk nipis, dan daun nanas terhadap laju korosi baja karbon ASTM A36 dalam media air laut, menentukan inhibitor yang paling efektif, serta mengamati karakteristik kerusakan permukaan baja secara mikroskopik. Metode penelitian yang digunakan adalah metode eksperimental dengan pengujian laju korosi menggunakan metode kehilangan berat (weight loss). Spesimen baja direndam dalam larutan inhibitor dengan variasi waktu perendaman 1, 2, dan 3 hari, kemudian direndam dalam air laut selama 30 hari. Hasil penelitian menunjukkan bahwa penambahan inhibitor alami mampu menurunkan laju korosi baja ASTM A36 secara signifikan dibandingkan tanpa inhibitor. Semakin lama waktu perendaman inhibitor, semakin rendah laju korosi yang dihasilkan. Inhibitor ekstrak daun jeruk nipis menunjukkan efektivitas tertinggi dengan nilai laju korosi terendah sebesar $\pm 0,11$ mmpy, diikuti oleh ekstrak daun jeruk purut dan daun nanas. Hasil pengamatan mikroskopik menunjukkan bahwa korosi yang terjadi berupa korosi seragam dan korosi sumur, di mana spesimen dengan inhibitor memiliki tingkat kerusakan permukaan yang lebih rendah. Penelitian ini membuktikan bahwa ekstrak daun jeruk purut, jeruk nipis, dan nanas berpotensi digunakan sebagai inhibitor korosi alami yang ramah lingkungan.

Kata kunci: korosi, inhibitor alami, baja ASTM A36, air laut, laju korosi

ABSTRACT

Corrosion is a major problem for ASTM A36 carbon steel widely used in marine environments due to the high chloride ion content in seawater. This study aims to analyze the effect of natural corrosion inhibitors derived from kaffir lime leaves, lime leaves, and pineapple leaves on the corrosion rate of ASTM A36 carbon steel in seawater, determine the most effective inhibitor, and observe the surface damage characteristics using microscopic analysis. The research method used was an experimental method with corrosion rate testing based on the weight loss method. Steel specimens were immersed in inhibitor solutions with immersion times of 1, 2, and 3 days, followed by immersion in seawater for 30 days. The results showed that the addition of natural inhibitors significantly reduced the corrosion rate of ASTM A36 carbon steel compared to specimens without inhibitors. Longer inhibitor immersion times resulted in lower corrosion rates. Lime leaf extract showed the highest inhibition effectiveness with the lowest corrosion rate of approximately ± 0.11 mmpy, followed by kaffir lime leaf extract and pineapple leaf extract. Microscopic observations revealed uniform corrosion and pitting corrosion, where specimens treated with inhibitors exhibited less surface damage. This study confirms that extracts from kaffir lime leaves, lime leaves, and pineapple leaves have strong potential as environmentally friendly natural corrosion inhibitors.

Keywords: corrosion, natural inhibitor, ASTM A36 steel, seawater, corrosion rate