ABSTRAK

Korosi merupakan proses degradasi logam akibat reaksi kimia dengan lingkungannya, dipicu oleh faktor seperti kelembapan udara, oksigen, dan elektrolit asam. Penanganan korosi konvensional sering memakan biaya tinggi, sehingga dikembangkan metode inhibisi yang murah, efektif, dan ramah lingkungan, salah satunya penggunaan inhibitor organik dari bahan alami. Penelitian ini menggunakan bubuk kopi robusta sebagai inhibitor organik yang tidak beracun, murah, dan mudah diperoleh, diaplikasikan pada baja ST 41 dalam media NaCl 4%. Laju korosi diukur dengan metode weight loss melalui perendaman spesimen pada variasi konsentrasi inhibitor 0%, 20%, 30%, dan 40%, serta waktu perendaman 14, 28, 42, dan 56 hari. Proses pembuatan inhibitor dilakukan dengan ekstraksi maserasi, yaitu melarutkan bubuk kopi halus dalam etanol 70%. Selanjutnya, media korosif dibuat dengan menambahkan NaCl 4% ke larutan inhibitor pada konsentrasi tersebut, diikuti perendaman benda uji. Hasil penelitian diharapkan memberikan alternatif inhibitor alami yang efektif untuk mengurangi laju korosi pada baja.

Kata kunci: Baja ST 41, ekstrak biji kopi, inhibitor organik, korosi

ABSTRACT

Corrosion is the degradation process of metals due to chemical reactions with their environment, triggered by factors such as air humidity, oxygen, and acidic electrolytes. Conventional corrosion control methods are often costly, prompting the development of affordable, effective, and environmentally friendly inhibition techniques, one of which involves organic inhibitors derived from natural materials. This study utilized robusta coffee powder as a non-toxic, inexpensive, and readily available organic inhibitor, applied to ST 41 steel in a 4% NaCl medium. Corrosion rates were measured using the weight loss method through immersion of specimens at inhibitor concentrations of 0%, 20%, 30%, and 40%, with immersion periods of 14, 28, 42, and 56 days. The inhibitor was prepared via maseration extraction by dissolving finely ground coffee powder in 70% ethanol. Subsequently, the corrosive medium was created by adding 4% NaCl to the inhibitor solutions at the specified concentrations, followed by immersion of the test specimens. The results are expected to provide an effective natural inhibitor alternative for reducing corrosion rates in steel.

Keywords: ST 41 steel, coffee bean extract, organic inhibitor, corrosion