

ABSTRACT

Corrosion is one of the main obstacles in the use of metals, especially ST-41 steel which is widely applied in the industrial sector. Efforts to overcome this problem include the use of natural inhibitors, such as mangosteen peel extract, which is considered more environmentally friendly. This study aims to determine the effect of variations in the immersion time of ST-41 steel in a mangosteen peel extract solution on the corrosion rate, as well as to observe changes in the morphology of the metal surface using the SEM method. The study was conducted by immersing steel specimens in a mangosteen peel extract solution for 10, 20, 30, and 40 minutes, followed by immersion in rainwater for one month. The corrosion rate was analyzed using the gravimetric method, while observations of the metal surface were carried out using a Scanning Electron Microscope (SEM). Based on the test results, data obtained that the longer the immersion time, the lower the corrosion rate that occurs. The highest corrosion rate value was recorded in samples without immersion (42.33 mpy), and the lowest was recorded in samples with immersion for 40 minutes (8.46 mpy). The inhibitor efficiency also showed an increase, with the highest efficiency of 80.01% at the longest immersion time. The results of SEM observations show that the formation of a protective layer on the metal surface is more optimal as the immersion time increases.

ABSTRAK

Korosi merupakan salah satu kendala utama dalam penggunaan logam, khususnya baja ST-41 yang banyak diaplikasikan dalam bidang industri. Upaya untuk mengatasi permasalahan ini salah satunya dilakukan melalui pemanfaatan inhibitor alami, seperti ekstrak kulit manggis, yang dinilai lebih ramah lingkungan. Penelitian ini bertujuan untuk mengetahui pengaruh variasi waktu perendaman baja ST-41 dalam larutan ekstrak kulit manggis terhadap laju korosi, serta untuk mengamati perubahan morfologi permukaan logam menggunakan metode SEM. Penelitian dilakukan dengan merendam spesimen baja dalam larutan ekstrak kulit manggis selama 10, 20, 30, dan 40 menit, kemudian dilanjutkan dengan perendaman dalam air hujan selama satu bulan. Laju korosi dianalisis menggunakan metode gravimetri, sedangkan pengamatan permukaan logam dilakukan melalui Scanning Electron Microscope (SEM). Berdasarkan hasil pengujian, diperoleh data bahwa semakin lama waktu perendaman, semakin rendah laju korosi yang terjadi. Nilai laju korosi tertinggi tercatat pada sampel tanpa perendaman (42,33 mpy), dan terendah pada perendaman selama 40 menit (8,46 mpy). Efisiensi inhibitor juga menunjukkan peningkatan, dengan efisiensi tertinggi sebesar 80.01% pada waktu perendaman terlama. Hasil pengamatan SEM menunjukkan bahwa pembentukan lapisan pelindung pada permukaan logam lebih optimal seiring meningkatnya waktu perendaman.