EVALUATION OF TANNIN EXTRACT FROM COCONUT HUSK AS GREEN CORROSION INHIBITOR OF STEEL IN HYDROCHLORIC ACID

NURSYAHIIRAH BINTI JOHARI

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ABSTRACT

EVALUATION OF TANNIN EXTRACT FROM COCONUT HUSK AS GREEN CORROSION INHIBITOR OF STEEL IN HYDROCHLORIC ACID

Commercial corrosion inhibitor from inorganic salts and salts of heavy metal were used worldwide are harmful to human health and toxic to animals and plants. Besides, they also have a negative impact on the ecology of the receiving area and the quality of surface and ground water. Therefore, various studies have been done to find alternative ways to reduce this problem and coconut husk from natural sources is the subject of study to find an alternative compound to overcome this issue. The objective of this research is to evaluate tannin extract from coconut husk as green corrosion inhibitor of steel in hydrochloric acid. Tannic acid and tannin extract from coconut husk were tested for corrosion test by immersion testing using weight loss measurement method. The result shows that tannic acid corrosion inhibitor has proven to have higher inhibition efficiency with increasing the concentration of corrosion inhibitor concentration. Same goes to tannin extract from coconut husk corrosion inhibitor has proven to have higher inhibition efficiency in acidic medium. The inhibition efficiency both tannic acid corrosion inhibitor (TACI) and tannin extract from coconut husk corrosion inhibitor (TECHCI) were found to be at the highest for 2.5 g/L and 2.5 mL/L in 0.5 M HCl medium respectively. Tannin extract from coconut husk were found to exhibit higher inhibition efficiency at 57.21% compared to tannic acid at 48.33%. There are significant differences for surface morphology of steel coupon for immersion test with and without corrosion inhibitor. This has proven that natural sources such as coconut husk does have the potential of being developed into a green corrosion inhibitor to fight against corrosion in acidic environment.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Corrosion is an irreversible interaction between an interfacial material (polymer, metal, concrete, wood, and ceramic) and its environment that results in material consumption or dissolution of an environmental component into the material (Vadivu *et al*., 2016). It is commonly referred to as rust when the material consists of iron element. It converts refined metals to more chemically stable oxide, hydroxide, carbonate, or sulphide forms (Karki & Singh, 2017).

Metals that were exposed in industrial environments will susceptible to corrosion especially in acidic environment. Hydrochloric acid (HCl) is a powerful reducing acid, which makes it extremely corrosive to most substances. It is also known as hydrochloric acid or muriatic acid. HCl is monoprotic, which means it dissociates readily in water, resulting in an excess of H^+ ions in solution. The high concentration of H^+ ions results in a pH level of 0-1.