



The Lignin of Oil Palm as Green Corrosion Inhibitor of Steel: A Comprehensive Study on Native Soda and Kraft Lignin

Ebrahim Akbarzadeh

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Lignin is one of the most abundant biopolymers on the earth. The pulping processes produce huge amounts of lignin from its lignocellulosic waste. One of the applications of lignin could be corrosion inhibitor. Initial corrosion studies on native soda lignin and Kraft lignin without any treatments have shown good inhibition on mild steel in 3.5% of sodium chloride solutions. The inhibitive efficiencies increased with the increase in concentrations. Both lignins can adsorb onto the metal surface physically and then react chemically with iron ions to form a protective film that hinders further corroding process. Electrochemical tests were performed on three lignin monomers namely p-Cumaric acid, Ferulic acid and Hydroxybenzaldehyde on mild steel. A full factorial method was used to study the main and interaction effects on these monomers. Ferric-lignin complex formation on steel surface as a protective layer was found to be the main reaction that gives good thermal stability. The adequate correlation between ferric-lignin formation and good inhibition efficiency resulted from the corrosion studies show that lignin can be a potential inhibitor on steel surface.

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