

inhibition of aluminium in HCl was found to enhance significantly with aqueous extracts of *Lasia spinosa* (stalk and leaf) and *Artocarpus camanci* (fruit peel). The optimum values of the volume of extracts, inhibitor extract concentration, solution temperature, exposure time and HCl concentration determined by changing one variable at a time were found to be 3.5 ml, 0.035 (v/v), 30 °C, 1.0 h and 1.0 M, respectively. Moreover, the percentage inhibition efficiency and surface coverage were found to increase with increasing concentration of plant extract due to the increase in the extent of adsorption of plant components onto the aluminium surface, indicating that adsorption is a principal mode of corrosion inhibition. The effect of anions, commonly

found in industrial environments and/or in the atmosphere, investigated under different experimental conditions, indicated that I^- , CO_3^{2-} , $C_2O_4^{2-}$ and SO_4^{2-} act as corrosion inhibitors for aluminium, and the inhibition effect further increases in the presence of plant extracts. On the other hand, the extent of corrosion of aluminium in the presence of Cl^- , MnO_4^- and $Cr_2O_7^{2-}$ is reduced by the addition of plant extracts into the HCl acid medium. More importantly, *Lasia spinosa* is a better corrosion inhibitor than *Artocarpus camanci* for aluminium in HCl medium.

Keywords: Acidic medium, aluminium, anions, *Artocarpus camanci*, corrosion inhibition, *Lasia spinosa*

Abstract No: SB 24

Inhibition of corrosion of aluminium by natural substances

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Use of economical and environmentally friendly materials for inhibition of corrosion of metallic substances has become an attractive alternative. Plant-based materials, owing to the presence of electron-rich compounds, would lead to increase in the electron density of metallic surfaces when in contact, thereby inhibiting corrosion. In this respect, inhibitive action of peel extracts of *Citrus aurantiifolia* and *Solanum lycopersicum* on aluminium corrosion in acidic and alkaline media was investigated using the mass loss method and electrochemical techniques. According to mass loss measurements, inhibition efficiency for both extracts in 0.50 M HCl medium increased with increase in inhibitor concentration and decreased with solution temperature and immersion time. Further, the inhibition

efficiency of *Citrus aurantiifolia* is higher than that of *Solanum lycopersicum*. Open circuit potential (OCP) values shift to more negative values in HCl medium and to more positive values in NaOH medium when the concentration of both inhibitors is increased. Negative potentials indicate the adsorption of the inhibitor at the active sites of the electrode surface retarding both anodic dissolution of aluminium and the generation of hydrogen gas at the cathode. However, positive OCP displacement cannot be recognized as a cathodic or anodic inhibitor. The results thus reveal that both *Citrus aurantiifolia* and *Solanum lycopersicum* extracts behave as mixed-type inhibitors on aluminium.

Keywords: *Citrus aurantiifolia*, corrosion inhibition, mass loss, open circuit potential, *Solanum lycopersicum*