

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*