Feasibility of *Citrus aurantifolia* and *Daucus carota* Peel Extracts as Corrosion Inhibitors of Aluminium

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Abstract

Waste-products coming from fruits and vegetables are produced regularly in huge amounts in almost every part of the world. Interestingly, extracts from carrot and lime peels can be used as an environmentally friendly corrosion inhibitors to effectively combat environmental problems caused by metallic corrosion. This study investigated the presence of phytochemical contents of carrot and lime peels to determine the corrosion inhibition effects on aluminum coupons. This was done by open Sun-drying separately both waste-products for fourteen days, and then extracting 30 g of each using 500 mL of distilled water for thirty minutes. Phytochemical screening revealed the presence of bioactive compounds such as alkaloids, tannins, saponins and flavonoids. The researchers also employed the use of aluminum coupons that were submerged in 250ml (0.250L) of 1.0M HCl with different concentrations of both plant-extracts such as: 0.1, 0.2 and 0.3 grams. The aluminum coupons were retrieved from the test medium in intervals of 24 hours for four days. Each coupon was weighed prior to testing and their final weight was obtained after retrieval from the testing medium. The results showed that as the concentration of the inhibitor increases, the rate of corrosion decreases. It also shows that when the concentration of the inhibitor increases, the inhibitor efficiency also increases. Likewise, the minimum corrosion rate for lime extract was 0.0038 mm/y and for the carrot extract was 0.0045 mm/y, both with a 0.3 g/L concentration and occurred at 72 hours. Therefore, with the increase in concentration of the inhibitor, corrosion rate decreases steadily at constant temperature as time progresses. Also, the results for both extracts fall under the category of outstanding which has a value of < 0,02 mm/y in the relative corrosion resistance. It is concluded that carrot and lime extracts can be

effective natural-corrosion-inhibitors that are highly available, economical, non-toxic and environmentally friendly.
Keywords: corrosion, phytochemicals, lime peels, carrot peels, corrosion inhibitors, aluminum coupons.