PHYTOCHEMICAL SCREENING AND CORROSION INHIBITIVE BEHAVIOR OF ETHANOLIC APRICOT POMACE

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Despite the high inhibition efficiency of various synthetic inhibitors most of them are not safe and produce dangerous wastewaters which are harmful for the ecosystem and human health. Therefore, the use of cost-effective and eco-friendly corrosion inhibitors have attracted the high consideration of researchers. One of the most important classes of eco-friendly corrosion inhibitors is the extract of different parts of plants. The extracts obtained from natural sources consist of a large amount of various chemical constituents containing aromatic rings, carbonyl (-C=O), carboxylic (-COOH), hydroxyl (-OH) and amine (-NH, -NH_2) group. As a result, these compounds can be potential inhibitors forretarding the corrosion process of mild steel in acidic media. There are a large number of reports on the use of green corrosion inhibitors based on the extracts of plants. This study aims to investigate the inhibition performance of an ethanol extract of apricot cake (ACE) on the corrosion of mild steel in 0.5 M NaCl under different experimental conditions. The present study was carried out to identify the components present in the ethanol apricot cake extract by GC-MS analysis.

The phytochemical screening helped us to highlight the presence of 3,4,5-trihydroxybenzoic acid (Gallic acid), Chlorogenic acid, 3-(3,4-Dihydroxyphenyl)-2-propenoic acid (Caffeic acid), 2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxy-4H-chromen-4-one (Quercetin), Catechin. Various experimental models including iron (III) reducing capacity, total antioxidant capacity, DPPH radical scavenging activity were used for characterization of antioxidant activity of extract. The results indicate the efficacy of ethanolic apricot pomace in scavenging the DPPH radicals depending on concentration. The total antioxidant activity is 460.86 ± 2.63 mg of AsA/g of the extract. The antioxidant activity of ACE was high (92 %) at 100 μg/mL. The radical scavenging activity of these extract is may be due to the involvement of phenolic compounds and also owing to the existence of other antioxidant secondary metabolites like flavonol, terpenoids, tannins etc. In the investigated experimental condition, the maximum inhibiting efficiency in the range of 94.6% was obtained by the addition of 500 ppm APE, after about 48 h of exposure to the inhibitor-containing electrolyte. The results of the surface analysis performed by SEM and AFM confirm that APE is able to retard the steel corrosion by the formation of a compact and homogeneous surface layer on the metallic surface. The anodic and cathodic corrosion current density curves in presence of inhibitors are shifted towards lower current density region as compared to the blank. This reveals that the inhibitors decrease the corrosion current and thus reduce the corrosion rate. The presence of protective film on the surface that formed in solution with apricot pomace extract result in a considerable shift in the cathodic branches and to a lesser extent in the anodic branches of the polarization curves. Thus the inhibitors are said to be mixed type, but predominantly cathodic.

References

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