Influence of Phenolic Compounds on Antioxidant and Anticorrosion Activities of *Ammi visnaga* Extracts Obtained Ultrasonically in Three Solvent Systems

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The purpose of this research was to study the correlation between phenolic compounds and antioxidant as well as anticorrosive activities of different extracts of *Ammi visnaga*. The antioxidant capacity was evaluated by 2,2-diphenyl-1-picrylhydrazyl (DPPH[•]). The phenolic compounds, namely, total phenol content (TPC), total flavonoids content (TFC), and condensed tannins (CT), were determined by Folin–Ciocalteu, Quettier–Deleu, and Broadhurst methods, respectively. In addition, the inhibiting effect of different extracts of *A. visnaga* on mild steel in 1 M HCl solution was investigated by potentiodynamic polarization (PP) and electrochemical impedance spectroscopy (EIS). The obtained results revealed that the mixed aqueous extract had a high level of phenolic compounds when compared with pure solvents. Hydroalcoholic extract had the highest radical trapping capacity ($IC_{50} = 1.7$ mg/mL) compared with standard butylated hydroxytoluene (BHT) ($IC_{50} = 0.2$ mg/mL). The PP tests showed that the extracts act as mixed inhibitors, whereas EIS measurements indicated that action inhibition of mild steel can be explained by the adsorption of active compounds at the metal surface. The trends between condensed tannins and antioxidant activity, as well as the inhibition efficiency derived from Tafel plots and EIS, were revealed, respectively.

Keywords: *Ammi visnaga* extract; TPC; TFC; condensed tannins; antioxidant activity; corrosion inhibition.

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