Corrosion Inhibition of Copper by *Capparis spinosa* L. Extract in Strong Acidic Medium: Experimental and Density Functional Theory

Fadel Wedian^{1,*}, Mahmoud A. Al-Qudah¹ and Ghassab M. Al-Mazaideh²

¹ Department of Chemistry, Faculty of Science, Yarmouk University, P.O. Box 560, Irbid, 22163-Jordan

² Department of Chemistry, Faculty of Science, Tafila Technical University, P.O. Box 179, Tafila, 66110-Jordan

*E-mail: alwedian@yu.edu.jo

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Inhibition efficiency of *Capparis spinosa* (CS) extract on the corrosion of copper metal in 1.0 M nitric acid solution was studied by weight-loss and potentiodynamic measurements. The inhibition efficiency that increases with the rise of the concentrations of CS extract but decreases with the rise of temperature. A maximum inhibition efficiency of 82.7% was achieved by using 440 ppm of inhibitor. The thermodynamic parameters showed that the adsorption of CS extract on copper is physical, spontaneous, and favored at low temperatures. The adsorption of CS extract on the surface of copper obeyed the Langmuir adsorption isotherm at 25, 35 as well as at 45°C. The weight loss, potentiodynamic, and quantum chemical calculations are in a good agreement and reveal that the CS extract is a good inhibitor of copper in acidic solution.

Keywords: *Capparis spinosa*; copper; corrosion inhibitor; acidic inhibition; DFT.

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