Electrochemical measurements and theoretical calculations on the inhibitive interaction of *Plectranthus amboinicus* leaf extract with mild steel in hydrochloric acid

K.K. Anupama, K. Ramya, Abraham Joseph

PII: S0263-2241(16)30578-4
DOI: http://dx.doi.org/10.1016/j.measurement.2016.10.030
Reference: MEASUR 4392

To appear in: *Measurement*

Received Date: 13 October 2015
Revised Date: 6 September 2016
Accepted Date: 11 October 2016

Please cite this article as: K.K. Anupama, K. Ramya, A. Joseph, Electrochemical measurements and theoretical calculations on the inhibitive interaction of *Plectranthus amboinicus* leaf extract with mild steel in hydrochloric acid, *Measurement* (2016), doi: http://dx.doi.org/10.1016/j.measurement.2016.10.030

Electrochemical measurements and theoretical calculations on the inhibitive interaction of *Plectranthus amboinicus* leaf extract with mild steel in hydrochloric acid.

Anupama K K, Ramya K and Abraham Joseph*

Department of Chemistry, University of Calicut, Calicut University P O, Kerala, India.

Email *drabrahamj@gmail.com*

Abstract

The corrosion inhibition property of *Plectranthus amboinicus*leaves extracts for mild steel in HCl has been studied using EIS and potentiodynamic polarization techniques. Two main constituents of the leaf thymol and 1, 8-cineole were also monitored for their inhibition behaviour, both in the individual form and in combination with each other. EIS studies revealed that the dried and fresh leaf extracts of PA (PADE and PAFE) show fairly good inhibition efficiencies (upto98 % for PADE and 93 % for PAFE) in the studied system. Potentiodynamic polarization studies revealed the mixed type inhibition behaviour of the extracts. The synergism studies and theoretical calculations done using Gaussian 03 program revealed that the combination of thymol and cineole exhibited enhanced inhibition efficiency compared to the individual forms. The weight loss measurements also revealed the inhibition potential of the extracts. The mode of adsorption of the extracts was found obeying Langmuir isotherm.

Key words: Acid solutions; EIS; Acid corrosion; Acid inhibition; Polarization

*For correspondence