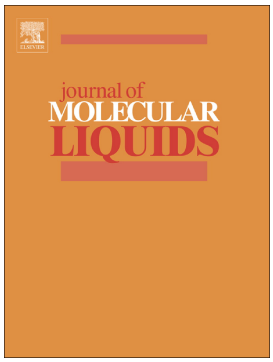

Low cost aqueous extract of Pisum sativum peels for inhibition of mild steel corrosion

Monika Srivastava, Preeti Tiwari, S.K. Srivastava, Ashish Kumar, Gopal Ji, Rajiv Prakash

PII: S0167-7322(17)33927-2
DOI: https://doi.org/10.1016/j.molliq.2018.01.137
Reference: MOLLIQ 8591

To appear in: *Journal of Molecular Liquids*

Received date: 26 August 2017
Revised date: 30 December 2017
Accepted date: 24 January 2018

Please cite this article as: Monika Srivastava, Preeti Tiwari, S.K. Srivastava, Ashish Kumar, Gopal Ji, Rajiv Prakash , Low cost aqueous extract of Pisum sativum peels for inhibition of mild steel corrosion. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), https://doi.org/10.1016/j.molliq.2018.01.137

Low Cost Aqueous Extract of *Pisum Sativum* Peels for Inhibition of Mild Steel Corrosion

Monika Srivastava[†], Preeti Tiwari[†#], S. K. Srivastava[i], Ashish Kumar[†], Gopal Ji [‡], Rajiv Prakash[†*]

[†]School of Materials Science and Technology, Indian Institute of Technology (Banaras Hindu University), Varanasi, India

[i] Department of Physics, Institute of Science, Banaras Hindu University, Varanasi, India

[‡]Department of Materials and Chemistry, Research Group Electrochemical and Surface Engineering, Vrije University of Brussels, Pleinlaan 2, 1050 Brussels, Belgium

*Corresponding Authors Email: rprakash.mst@iitbhu.ac.in

[#] First two authors are having equal contributions.

Abstract

This work investigates the potential of *Pisum Sativum* (green pea) peels for the inhibition of mild steel corrosion in hydrochloric acid (HCl) at varied temperatures. Various techniques, like weight loss measurements, tafel polarization curves, electrochemical impedance spectroscopy (EIS), UV-visible and Fourier transform infrared spectroscopy (FT-IR), scanning electron microscopy (SEM) and atomic force microscopy (AFM), have been used to test the inhibition properties of aqueous *Pisum Sativum* peels extract (APSPE) in acid media. The results indicate that APSPE effectively inhibits the corrosion of mild steel by covering the active corrosion sites on the mild steel surface and thus lowers the electrochemical activity of the surface exposed in HCl solution. The maximum inhibition efficiencies of APSPE system at 400 mgL^{-1} concentration in 1M HCl are reported as: 91%, weight loss; 87% polarization curves; and 90% by EIS. The corrosion behavior of mild steel in presence of APSPE has also been investigated in the range of 1 to 4 M HCl at room temperature as well as at varied temperatures (303-333 K) in 1 M HCl. The process of mild steel corrosion inhibition in HCl by APSPE has been explained by ion chromatography analysis and DFT calculations.