

## Inhibition of C-steel Corrosion by Green Tea Extract in Hydrochloric Solution

R. Salghi<sup>1,\*</sup>, S. Jodeh<sup>2</sup>, Eno E. Ebenso<sup>3,\*</sup>, H. Lgaz<sup>1</sup>, D. Ben Hmamou<sup>1</sup>, M. Belkhaouda<sup>1</sup>, I. H. Ali<sup>4</sup>, M. Messali<sup>5</sup>, B. Hammouti<sup>6</sup>, S. Fattouch<sup>7</sup>

<sup>1</sup>Laboratory of Applied Chemistry and Environment, ENSA, University Ibn Zohr, PO Box 1136.Agadir, Morocco.

<sup>2</sup>Department of chemistry, An\_ Najah National University, P.O. Box 7, Nablus, Palestine.

<sup>3</sup>Material Science Innovation & Modelling (MaSIM) Research Focus Area, Faculty of Agriculture, Science and Technology, North-West University (Mafikeng Campus), Private Bag X2046, Mmabatho 2735, South Africa

<sup>3</sup>Department of chemistry, An-Najah National University, P.O. Box 7, Nablus, Palestine.

<sup>4</sup> Chemistry Department of, College of Science, King Khalid University, Abha, Saudi Arabia

<sup>5</sup> Chemistry Department, Faculty of Science, Taibah University, 30002, Al-Madinah Al-Mounawwara, Saudi Arabia

<sup>6</sup>LCAE-URAC 18, Faculty of Science, University of Mohammed Premier, Po Box 717 60000 Oujda, Morocco

<sup>7</sup> LIP-MB, INSAT, University of Carthage, Tunisia.

\*E-mail: [r.salghi@uiz.ac.ma](mailto:r.salghi@uiz.ac.ma) ; [Eno.Ebenso@nwu.ac.za](mailto:Eno.Ebenso@nwu.ac.za)

doi: 10.20964/2017.04.46

Received: 13 August 2016 / Accepted: 22 February 2017 / Published: 12 March 2017

---

Inhibition ability of green tea extract (**GTE**) on the C38 steel (CS) in 1.0 M HCl was evaluated using different methods such as: weight loss, electrochemical impedance spectroscopy (*EIS*) and potentiodynamic polarization (*PDP*) methods at various temperatures. Polarisation curves show that **GTE** acts essentially as mixed-type inhibitor controlling cathodic and anodic reactions with slight predominant in cathodic branches. *EIS* results indicate the increase of resistance transfer ( $R_t$ ) while double layer capacitance ( $C_{dl}$ ) decrease in the rise of green tea extract (**GTE**) concentrations. Obtained results also showed that the inhibition efficiency decreased with a rise in the temperature. Activation energy ( $E_a$ ), enthalpy ( $\Delta H_a^*$ ) and entropy and ( $\Delta S_a^*$ ) of corrosion process were estimated using experimental measurements.

---

**Keywords:** Inhibition, Corrosion, Green Tea Extract, Steel

[FULL TEXT](#)

© 2017 The Authors. Published by ESG ([www.electrochemsci.org](http://www.electrochemsci.org)). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).