

Inhouse Inhibitor For Mitigating Corrosion In The Algerian Oil And Gas Industry

Authors : Hadjer Didouh, Mohamed Hadj Meliani, Izzeddine Sameut Bouhaik

Abstract : As global demand for natural gas intensifies, Algeria is increasing its production to meet this rising need, placing significant strain on the nation's extensive pipeline infrastructure. Sonatrach, Algeria's national oil and gas company, faces persistent challenges from metal corrosion, particularly microbiologically influenced corrosion (MIC), leading to substantial economic losses. This study investigates the corrosion-inhibiting properties of *Calotropis procera* extracts, known as karanka, as a sustainable alternative to conventional inhibitors, which often pose environmental risks. The *Calotropis procera* extracts were evaluated for their efficacy on carbon steel API 5L X52 through electrochemical techniques, including potentiodynamic polarization and electrochemical impedance spectroscopy (EIS), under simulated operational conditions at varying concentrations, particularly at 10%, and elevated temperatures up to 60°C. The results demonstrated remarkable inhibition efficiency, achieving 96.73% at 60°C, attributed to the formation of a stable protective film on the metal surface that suppressed anodic and cathodic corrosion reactions. Scanning electron microscopy (SEM) confirmed the stability and adherence of these protective films, while EIS analysis indicated a significant increase in charge transfer resistance, highlighting the extract's effectiveness in enhancing corrosion resistance. The abundant availability of *Calotropis procera* in Algeria and its low-cost extraction processes present a promising opportunity for sustainable biocorrosion management strategies in the oil and gas industry, reinforcing the potential of plant-based extracts as viable alternatives to synthetic inhibitors for environmentally friendly corrosion control.

Keywords : corrosion inhibition, *calotropis procera*, microbiologically influenced corrosion, eco-friendly inhibitor

Conference Title : ICC 2024 : International Conference on Chemistry

Conference Location : Istanbul, Türkiye

Conference Dates : November 07-08, 2024