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## Natural plants: An efficient inhibitors of mild steel corrosion in H<sub>2</sub>SO<sub>4</sub> acid

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The effect of aqueous extract of three natural plants called: *Tribulus Terrestris* (TTAE) (Inh. 1), *Vachellia Nilotica* (VNAE) (Inh. 2) and *Cymbopogon Schoenanthus* (CSAE) (Inh. 3) as inhibitors of mild steel corrosion in 1.0N H<sub>2</sub>SO<sub>4</sub> acid solution at 30°C was investigated using weight loss (WL), electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization (PDP). The results showed that the three inhibitors worked well to inhibit the corrosion of mild steel in 1.0N H<sub>2</sub>SO<sub>4</sub> acid, depending on the following order: TTAE> VNAE>CSAE. The addition of increasing amount of the studied inhibitors inhibit the corrosion rate of mild steel and maximum inhibition efficiency of 91.37%, 88.51%, and 87.14% respectively was obtained at 2.0 g/L<sup>-1</sup>. Different adsorption isotherm models were tested and Langmuir adsorption isotherm showed best fit with the parameters. The inhibition mechanism was discussed based on adsorption on mild steel surface from 1.0N H<sub>2</sub>SO<sub>4</sub> acid solution. The analysis of FTIR spectra established the formation of a strong bond between inhibitors species and mild steel surface.



Figure 1: Macroscopic images for mild steel specimen in the absence and presence of the studied inhibitors.



Figure 2: Laboratory procedures for the preparation of the studied inhibitors

## Recent Publications

1. Aisha H Al-Moubaraki, Aisha A Al-Howiti, Mervat M Al-Dailami and Enas A Al-Ghamdi (2017) Role of aqueous extract of celery (*Apium graveolens* L.) seeds against the corrosion of aluminium/sodium hydroxide systems. *Journal of Environmental Chemical Engineering* 5:4194-4205.
2. Aisha H Al-Moubaraki and Hind H Al-Rushud (2017) Anticorrosive effects of leek seeds aqueous extract (*Allium ampeloprasum* Var. *Kurrat*) on aluminum alloys 6061, 7075 and 2024 in Seawater. *Organic and Medicinal Chemistry International Journal* 3(5):1-10.
3. Aisha H Al-Moubaraki (2018) Potential of borage flowers aqueous extract, *Borago officinalis* L., against the corrosion of mild steel in phosphoric acid. *Anti-Corrosion Methods and Materials* 65:53-65.
4. Aisha H Al-Moubaraki and Hind H Al-Rushud (2018) The red sea as a corrosive environment: corrosion rates and corrosion mechanism of aluminum alloys 7075, 2024, and 6061. *International Journal of Corrosion* 1-15.

5. Ehteram A Noor, Aisha H Al-Moubaraki and Azza A Al-Ghamdi (2019) Continuous studies on using camel's urine as nontoxic corrosion inhibitor–corrosion inhibition of Al–Cu alloy in alkaline solutions. Arabian Journal for Science and Engineering 44(1): 237-250

### **Biography**

Aisha H Al-Moubaraki is an Associate Professor of Physical Chemistry at University of Jeddah KSA. Her research interest are in corrosion behavior of metals in aqueous solutions-kinetic and thermodynamic studies; corrosion inhibition of metals in aqueous solutions by some organic and natural inhibitors and corrosion behavior of metals in natural environments such as soils and seawater.

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