

## THE USING OF THE BEAR BRANCH EXTRACT AS POTENTIAL CORROSION INHIBITOR FOR COPPER IN ACID MEDIA

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### Abstract

The paper investigates the corrosion inhibition property of the Bear Branch (*Heracleum sphondylium*) extract for copper in acid HNO<sub>3</sub> solution. Potentiodynamic polarization and chronoamperometry techniques were used in this study in order to evaluate the inhibition efficiency of the proposed corrosion inhibitor in the mentioned solution. The Tafel plot method employed to determine value of the the corrosion current  $i_{corr}$  as well as the corrosion rate. For a better simulation of the adsorption process of the extract on the metal surface, an equivalent circuit (EEC) has been modelled by using the data provided from the electrochemical impedance spectroscopy measurements. The possible interactions between the organic natural compounds molecules present in the extract of *Heracleum sphondylium*, have been evaluated by means of quantum chemical calculations and molecular modelling.

### Introduction

As environmental protection laws begin to become more stringent on compounds used in corrosion protection, research has turned to finding compounds with ever lower environmental impact, low cost, and high inhibitory efficiency [1].

Lately, natural extracts have received a lot of attention for this purpose due to the complexity of the molecules of the natural compounds in their structure, the multiple bonds, the heteroatoms, or in some cases, the rings that respect the rules of aromaticity [2].

In the case of copper corrosion in nitric acid environment, previously published studies that have been carried out assessed the electrochemical behaviour of some organic compounds like Triazine derivatives [3], computational and experimental studies on heterocyclic imidazole derivatives [4], respectively theoretical and experimental studies of some amino acids such as L-methionine, L-methionine sulfoxide and L-methionine sulfone [4]. From the point of view of natural extracts used as copper corrosion inhibitors in acidic media, remarkable inhibitory efficiencies have been reported for the extract of cherokee rose (*Rosa Laevigata*) [5], an attempt to test the inhibitory effect of the Bear Branch extract in the corrosion in acid media has not been already performed.

### References

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