Electrochemical Impedance Evaluation of Uracil and Thymine Pyrimidine Derivatives and its Nucleosides Compounds as a Non-toxic Corrosion Inhibitors of Steels in 1M HCl

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EIS study was used to evaluate the corrosion inhibiting properties of two pyrimidine derivate bases: thymine and uracil, and their related nucleosides: thymidine and uridine. Different concentrations of these compounds were monitored in a system comprising samples of the steel type API-5L-X52 exposed to 1M HCl using an IM6-Zahner electrochemical workstation. EIS spectra showed that the Rct increased with increasing inhibitor concentration in the electrolyte. It was also found that the best corrosion inhibition efficiency, IE, was reached with only 30 ppm for the compound bases (thymine, 93.8% or uracil, 80.5%), in comparison to their nucleosides (thymidine, 79.3% or uridine, 73.5%, respectively). The corrosion inhibition kinetics of thymine was studied at 30 ppm for 350 hours immersion in order to determine its performance as a function of time; its IE capacity remained practically over 80%. This is sufficient reason to consider the thymine compound as the best corrosion inhibitor.

Keywords: Pyrimidine derivatives, Nucleosides compounds, Corrosion inhibitors, EIS study, Steel.