

## THE EFFICACY OF *THYMUS SERPILLUM* EXTRACT IN MITIGATING STEEL CORROSION IN HCL SOLUTION

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### Abstract

*The inhibitory effect of Thyme (Thymus serpyllum) extract (TSE) on the corrosion of two steel types in 4% HCl solutions was investigated (Steel 1 - DC01 and Steel 2 - X5 CrNi 18-10). Steel samples were chemically prepared followed by the examination of corrosion rate in both uninhibited and inhibited HCl solutions. Four solutions were used: Solution 1: 4% HCl, Solution 2: 4% HCl + 0.5g/L TSE, Solution 3: 4% HCl + 1g/L TSE, and Solution 4: 4% HCl + 1.5g/L TSE. Corrosion resistance of steel in examined solutions was determined by weight loss and electrochemical impedance spectroscopy methods. The samples were immersed in the solutions for 2h, 4h, 6h, 8h, 24h, 48h, and 168h. Corrosion indicators such as corrosion rate ( $\pi$ ), and the inhibitor protective factor ( $z$ ) were calculated according to data obtained by weight loss method. The highest protection factor of TSE in 4% HCl was 94.42% for steel 1 at 1.5 g/L, and 96.61% for steel 2 at 1.0 g/L, demonstrating the effectiveness of TSE as a corrosion inhibitor. Electrochemical impedance spectroscopy results showed the increase in corrosion resistance of both steel types with increase in inhibitor concentration in HCl solution, supporting the obtained weight loss results.*

**Keywords:** thyme extract, green inhibitors, corrosion, protection factor, electrochemistry.