NATURAL COMPOUNDS FOR *ECO-FRIENDLY* CORROSION INHIBITION OF STEEL PIPELINES

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Abstract

Steel pipes are used for industrial fluids transport. Extracts with natural compounds from some ***Brassicaceae*** sources showed important anticorrosion effects on steel material. Extracts of broccoli, cabbage, black radish, rapeseed and cauliflower were electrochemically tested in H_2SO_4 0.5M, in a conventional glass three-electrode cell with a Pt counter electrode, saturated calomel (SCE) as reference electrode and steel working electrode (WE). Electrochemical experiments (Tafel curves) were performed with a Voltalab 80 (Radiometer, Copenhagen) equipped with a Volta Master7 software. The potentiodynamic measurements were started at -600 mV cathodic potential to anodic potential +250 mV, at a scan rate 1 mV/s and room temperature. Before each experiment, open circuit (OPC) was applied to WE during 30 minutes.

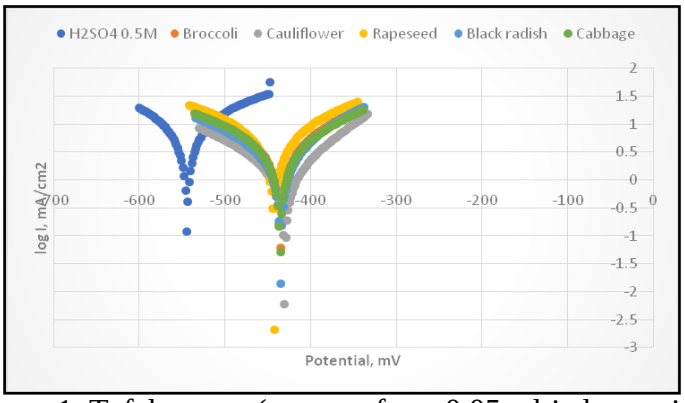

Figure 1. Tafel curves (extracts from 0.05g dried material)

The corrosion rate decreased from 119 mm/year in case of sulfuric acid 0.5M to about 2-7 mm/year when concentrated extracts were used. Surface morphology of WE were studied after work using a SEM method (Scanning Electron Microscope Inspect S + EDAX Genesis XM 2i (FEI, Holland), at HV = 30.00 kV and at magnification 3000, in vacuum mode.

[1] Ngobiri N.C., Oguzie E.E., Li Y., Liu L., Oforka N.C., Akaranta O., Eco-friendly Corrosion Inhibition of pipeline steel using *Brassica Oleracea*, Hindawi Publishing Corporation, International Journal of Corrosion, vol.2015, http://dx.doi.org./10.1155/2015/404139.