

## **An Insight into in-situ interactions through ex-situ methods**

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### **Abstract**

The inhibition efficiency of caffeine in controlling corrosion of carbon steel, immersed in an aqueous solution containing 60 ppm chloride, in the absence and presence of  $Zn^{2+}$ , has been evaluated by weight loss method. Caffeine alone is not a good corrosion inhibitor. However, in the presence of  $Zn^{2+}$ , it shows a better inhibition efficiency. This suggests a synergistic effect existing between caffeine and  $Zn^{2+}$ . For example, 50 ppm caffeine has 10% inhibition efficiency (IE) and 50 ppm  $Zn^{2+}$  has 41% IE. Interestingly their combination has IE greater than 90%. The protective film has been analysed by ex-sit techniques such as fourier transform infrared spectra, x-ray diffraction and fluorescence spectra. A suitable mechanism of corrosion inhibition is proposed basedon the results of the above techniques and polarization and AC impedance studies.