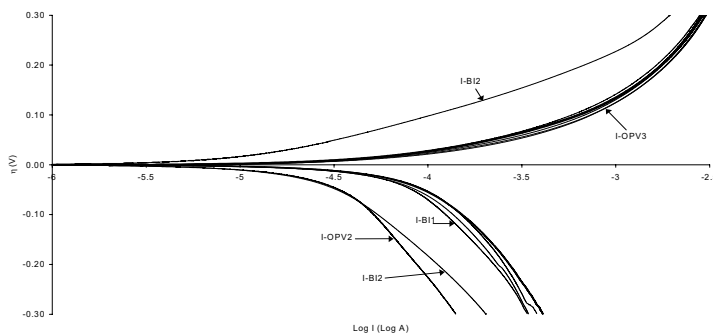


Imidazole compounds compared to oligofenilvinilenbisquinolines as corrosion inhibitors
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The use of corrosion inhibitors in petroleum industry is one of the most practical methods to provide protection to metallic equipments used. It is known that the corrosion inhibition efficiency of organic compounds is related to their adsorption properties. Thus, the compounds most frequently used in the oil industry are the organic ones [1]. Such inhibitors could contain heterocyclic compounds [2] with one or more atoms of Nitrogen [3,4], Oxygen [5] or Sulfur [6]. Furthermore, it has been established that the electronic density of a donor atom in inhibitor molecules, molecular geometry and size, as well as the presence of heteroatoms [7] induce better adsorption properties to inhibitor molecules on the metallic surface [8,9]. In this work, a comparative study between imidazole (I-B11, I-B12) and oligofenilvinilenbisquinoline (I-OPV1, I-OPV2, I-OPV3) compounds as corrosion inhibitors was carried out. Carbon steel (SAE 1018) electrode immersed in a NACE TM 0177 like solution was used as corrosive system. The arrangement has been studied before [10] and it is believed that the compounds selected will serve as precursors of corrosion inhibitors. Imidazole compounds have two possible coordination sites to the metallic atoms; one of them is the free electron pair of the heteroatoms of the molecule and the other is the π bound present. Oligofenilvinilenbisquinolines were chosen due to the vinyl bounds conjugated to the iminic bound of the quinolinic segment, this characteristic gives the molecule coordination properties to the metallic structure that can be used to design corrosion inhibitors. During the experimental



work, potentiodynamic polarization curves were obtained on the system in absence and in presence of the evaluated compounds varying the concentration of the compounds and the immersion time of the electrode, without and with stirring the system. Several concentrations of the compounds were tested: 5, 25, 50 and 100 ppm. In general, it was observed that the inhibition effect of the I-B12 compound increases as the concentration of the compound increases; however, the other compounds only show inhibition of the cathodic branch. Figure 1 shows the inhibition effect of 100 ppm of each compound. It is worth to emphasize the inhibiting properties of the I-B12 compound to both oxidation and reduction reactions.

While, I-OPV2 compound has its inhibition effect only to the reduction reaction. Conversely, I-B11, I-OPV1 and I-OPV3 compounds have insignificant effect to anodic and cathodic branches; even the I-OPV3 compound presents an increase in oxidation currents at the 100-ppm concentration. In addition, an immersion study of the electrode in presence of the compounds was carried out in order to identify the time effect on the inhibiting properties. The polarization curves showed a decrease in corrosion currents in presence of each compound after 48 hr of immersion time. Stirring effect was also tested and only I-B12 compound showed uniformity on the inhibition efficiency as the immersion time increase. Table 1 shows the corrosion potential (E_{corr}), polarization resistance (R_p) and inhibition efficiency (%E) of the compounds evaluated. As can be observed in this table, the I-B12 compound has no significant effect on the corrosion potential, but the polarization resistance increases in one order of magnitude. All the other compounds, although have an increase in the polarization resistance do not present increase in the inhibition efficiency. From these results is possible to propose the I-B12 compound to design a new family of corrosion inhibitors, which are being synthesized at UAEH, and other experimental tests are being carried out to confirm the high efficiency of the compound.

Compd.	E_{corr} (V)			R_p (ohm)			%E		
	3 hrs	24 hrs	48 hrs	3 hrs	24 hrs	48 hrs	3 hrs	24 hrs	48 hrs
Blank	-0.6320	-0.6241	-0.6374	192	117	204	--	--	--
I-B11	-0.6549	-0.6625	-0.6613	853	1100	860	62	71	62
I-B12	-0.6232	-0.6424	-0.6169	2152	2050	2088	85	84	85
I-OPV1	-0.6519	-0.6667	-0.6348	516	1673	1936	37	81	83
I-OPV2	-0.6555	-0.6580	-0.6445	1279	895	1488	75	64	78
I-OPV3	-0.6555	-0.6703	-0.5792	897	776	1346	64	58	76

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Figure 1 Potentiodynamic polarization curves obtained on a carbon steel SAE 1018 electrode immersed in a buffered solution like NACE TM 0177, in presence of 100 ppm of imidazole and oligofenilvinilenbisquinoline compounds. Scan rate 0.1 mVs^{-1} .

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