

The Application Of Essential Oil Extract From Local Bay Leaves To Prevent Carbon Dioxide Corrosion

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Abstract

Natural gas pipelines are highly susceptible to carbon dioxide (CO₂) corrosion due to the acidic environment formed when free water mixes with the CO₂ present in the transported natural gas. Currently, industrial inhibitors used to prevent this type of corrosion are either toxic and/or very costly, and more suitable ones are continuously being developed and tested. Literature shows that the essential oil extracts from many indigenous plants/leaves contain corrosion inhibition properties due to the presence of major adsorption centers within the molecular structure. The *Pimenta racemosa* species of bay leaves is abundantly grown in the Caribbean region but has never been tested before. This study found that approximately 60% of the oil extracted from local bay leaves is comprised of the chemical eugenol, which has the desired properties for corrosion inhibitor development. Gravimetric and electrochemical testing show an inhibitor efficiency in the range 82 to 91 percent (%) which is similar to that obtained from other indigenous plants found worldwide. In addition to this high inhibitor efficiency, further experimental tests show that the integrity of the coating makes oil extract from local bay leaves a suitable green chemical for corrosion inhibitor application in natural gas pipelines.

Keywords: Carbon dioxide corrosion, inhibitor efficiency, *Pimenta racemosa*, essential oil extract