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Experimental and quantum study of anticorrosive activity and biological activities of natural and synthetic substances

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The present work is devoted to the study of the inhibition of corrosion of mild steel, antioxidant activity and antimicrobial effect for plant extracts and synthetic products. Theobjective is, on the one hand, to contribute to the valorization of three plants that growthspontaneously in the region of the Rif, Morocco. On the other hand, to evaluate the potentialitiesof synthetic compounds. The experimental studies carried out were corroborated by thetheoretical study in order to develop a correlation between the results obtained from theexperimental measurements and the effect of the molecular structure using the DFT method. The anticorrosive effect was evaluated in a molarhydrochloric acid environment using gravimetric and electrochemical methods. Theexperimental results showed that the inhibitors tested showed good corrosion inhibition. In vitro evaluation of the antioxidant activity of the various phenolic extracts of threeplants and the synthetic phenolic compounds was carried out by three methods: trapping the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical, the β-carotene bleaching (βCB) and the ferric reducing antioxidant power (FRAP). Thus, the results obtained have shown that the antioxidant activities are interesting and aredependent on the content of phenolic compounds. The various extracts and synthetic compounds were also screened for their possibleantimicrobial activity against different strains. This evaluation was carried out by the methodof diffusion of the disc on Muller-Hinton Agar (MHA). In this work, the Pistacialentiscus showed good activity antimicrobial against most ofthe strains tested. In addition, the synthetic compounds have been found tobe interesting with encouraging potential. Thus, the study of electronic properties by the DFT method suggested that the antifungal effect of the synthetic compounds is correlated with the molecular structural effect.

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