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Mots-clés : Graine de *Datura stramonium* ; Extraction ; Activités biologiques ; Inhibition de la corrosion ; Toxicité.

Valorization of a wild Moroccan plant: biological, pharmacological and physicochemical evaluations.

Abstract:

The aim of this study was to extract value from the seeds of “*Datura stramonium*”, a wild plant belonging to the Solanaceae family that is abundant in the Middle Atlas, Khenifra province.

Extraction was carried out using a sequential method with solvents of different polarities.

The inhibitory power of the extracts was assessed by studying *in vitro* biological activities, *in vivo* pharmacological effects and the anticorrosion properties of mild steel in 1 M HCl.

The results showed that the solvents chloroform, methanol, water and hexane offered successively good extraction yields. The extracts were rich in alkaloids, fatty acids, terpenes and polyphenols, in varying percentages. The ethanolic extract of *Datura stramonium* revealed a remarkable antioxidant capacity by inhibiting free radicals (DPPH). *In vitro* tests of all extracts revealed significant antimicrobial activity, particularly for ether, methanol and ethanol extracts, which proved more effective against four bacterial strains (*E. coli*, *S. aureus*, *B. subtilis* and *P. mirabilis*) than the antibiotics oxacillin and cefuroxime.

In addition, ether and methanol extracts showed marked antifungal activity against *A. niger* and *C. albicans*. In most of the extracts tested, *Datura stramonium* also showed a significant pharmacological profile, reducing oedema in rats. In addition, the acute toxicity study revealed no signs of *in vivo* toxicity, confirming the safety of the extracts at the concentrations tested.

As for corrosion inhibition on mild steel in 1 M HCl, *Datura stramonium* seed extracts showed excellent properties, as demonstrated by electrochemical, thermodynamic and quantum studies. SEM/EDX analysis confirmed these results with the formation of a protective layer on the metal surface.

Keywords: *Datura stramonium* seed; Extraction; Biological activities; Corrosion inhibition; Toxicity.