

The valorization of bioactive compounds through phytochemical investigation, antioxidant activity and histo-anatomical study of a medicinal plant from Mila city, Algeria (*Ecbalium elaterium* L.)

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The aim of this work is the study of new biologically active agents, derived from an endemic medicinal plant widely used by the Algerian population, which is *Ecbalium elaterium*. Our study is composed of two complementary axes, namely a botanical study and a phytochemical study of the leaves of this species. Phytochemical screening was carried out by specific coloring and precipitation reactions. The results of the powder macerate and the extract of aerial parts of *Ecbalium elaterium* L. showed the presence of various bioactive compounds such as terpenoids, steroids, tannins, reducing compounds, flavonoids, etc. On the other hand, the absence of saponins, leucoanthocyanes, and, anthraquinones was noticed. The quantification of total antioxidant capacity was evaluated through the study of the antioxidant activity of the plant ethanolic extract using DPPH radical scavenging technique. The botanical study was made by a macroscopic and microscopic analysis of the vegetative organs of *Ecbalium elaterium* L. by the analysis of vegetal material, both integral and as powder using optical microscopy. Histo-anatomical details were highlighted by coloration with an original combination of reagents for the double coloration of cellulose and lignin using Congo red and methyl green reagents. The botanical analysis revealed all the macroscopic and microscopic characteristics which allow the botanical identification of *Ecbalium elaterium* L. However, further, detailed studies are urgently needed to check the therapeutic potentiality, safety, and mechanism of action of *Ecbalium elaterium* L. In perspective, we plan to deepen the study of this species using innovative extraction methods.

Keywords: bioactive, phytochemical, medicinal, histo-anatomical, *Ecbalium elaterium*, antioxidant activity.