

Antimicrobial and Light-Enhanced Antimicrobial Activities, Cytotoxicity and Chemical Variability of All Tunisian *Eryngium* Species

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Abstract

This study was performed on all *Eryngium* species growing in Tunisia in order to evaluate their intra and interspecies variabilities and to investigate their biological activities. These species are used in traditional medicine, and literature about the phytochemical investigations of most of them is scarce. Antimicrobial and light-enhanced activities were tested against multiresistant microorganisms and extended spectrum beta-lactamase producing bacteria (ESBL). All studied species showed antimicrobial effect with several MIC values lower than 70 µg/ml. Tested *Eryngium* species have proven to be a promising source of photoactive compounds, while light-enhanced activity offers an alternative for the inactivation of pathogenic microorganisms which is currently subjected to a great interest. This is the first report of this activity in genus *Eryngium*. A significant improvement of antimicrobial activity with UV irradiation was observed, mainly for *E. dichotomum*, *E. ilicifolium* and *E. triquetrum*. Cytotoxicity, studied for the first time for the most species, was evaluated against cancer (J774) and non-cancer (WI38) human cell lines. Chemical composition of volatile compounds presented in the most active crude extracts (petroleum ether extracts) of the aerial parts was investigated using GC/MS analysis and was submitted to statistical analyses. It revealed their high content of bioactive phytochemicals, particularly oxygenated sesquiterpenes like spathulenol, ledol and α-bisabolol but also hydrocarbon sesquiterpenes such as β-bisabolene and copaene, as well as polyacetylene derivatives such as falcarinol. Statistical analyses permitted to evaluate the interrelations between all Tunisian *Eryngium* species.

Keywords: *Eryngium*; antimicrobial; chemical variability; cytotoxicity; photoactivation.

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