



Research paper

Evaluation of solvent influence on phytochemical content and antioxidant activities of two Algerian endemic taxa: *Stachys marrubifolia* Viv. and *Lamium flexuosum* Ten. (Lamiaceae)

Ihcène Bouasla^a, Tarek Hamel^b, Choukri Barour^c, Asma Bouasla^{a,d,*}, Maram Hachouf^e, Oumaima Maroua Bouguerra^a, Mahfoud Messarah^a

^a Laboratory of Biochemistry and Environmental Toxicology, Faculty of Sciences, Badji Mokhtar University, BP 12 Sidi Amar, Annaba, Algeria

^b Laboratory of Plant Biology and Environment, Faculty of Sciences, Badji Mokhtar University, BP 12 Sidi Amar, Annaba, Algeria

^c Laboratory of Aquatic and Terrestrial Ecosystems, Faculty of Natural and Life Sciences, Mohamed Chérif Messaâdia University, Souk Ahras, 41000 Algeria

^d Faculty of Natural and Life Sciences, Mohamed Chérif Messaâdia University, Souk Ahras, 41000, Algeria

^e Laboratory of Applied Biochemistry and Microbiology, Faculty of Sciences, Badji Mokhtar University, BP 12 Sidi Amar, Annaba, Algeria



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Solvent extraction. **Abbreviation:** 2,

2-diphenyl-picryl-hydrazyl (DPPH)

Nitroblue tetrazolium (NBT), Ferric reducing

antioxidant power (FRAP)

Stachys marrubifolia Viv. (*S. marrubifolia*)

Lamium flexuosum Ten. (*L. flexuosum*)

Atomic Absorption Spectrometry (AAS)

Inductively coupled plasma-mass spectrometry

(ICP-MS)

Principal component analysis (PCA)

ABSTRACT

Introduction: *Stachys* and *Lamium* genera have been widely used in traditional medicine. This is the first study attempting to determine the biological active compounds, mineral elements content and *in vitro* antioxidant activities of two Algerian endemic taxa (*Stachys marrubifolia* Viv. and *Lamium flexuosum* Ten.), as well as evaluating the solvent influence on our studied parameters.

Methods: This experimental study conducted phytochemical screening, followed by mineral elements content determination. Extracts were prepared using various solvents with different polarities (water/methanol, ethyl acetate, and butanol), after that polyphenols, flavonoids, tannins, flavanols, and orthodiphenols levels were determined. In addition, the *in vitro* radical scavenging evaluation (DPPH, NBT/Riboflavin and FRAP assay) and the total antioxidant properties (β -carotene/linoleic acid and phosphomolybdenum assay) were assessed.

Results: The obtained results clearly showed mineral elements richness and demonstrated that different extracts contained various biological active compounds with substantial amounts (high content of flavonoids, medium content of orthodiphenols, anthocyanins as well as flavanols, and low content of total phenols as well as tannins). Ethyl acetate was shown to be the most effective for the extraction of these compounds. Also, we noted that all extracts had diverse antioxidant capacities with IC₅₀ values varying between (0.18±0.05 and 3.12±0.18 mg/g), and the relative differences depended on species, fractions, and testing methods.

Conclusion: Our study clearly shows that solvent extracts had a remarkable influence on all studied parameters, confirming the strong correlation between phytochemical constituents and antioxidant activities. Therefore, it justifies the use of these endemic taxa in traditional medicine.

1. Introduction

For thousands of years, people have been using what they find in their surroundings to treat their diseases. Phytotherapy has its origins in many civilizations and because of their easy access, acceptance by patients and their effectiveness, plants can provide potential raw material to inform the development of new drugs [1]. Plants are thought to be a safer alternative to modern medicine because their derived products

are frequently considered to be less toxic than their synthetic equivalent, with few or no side effects [1,2].

Due to its strategic location and its vast area which give it a great variety in biotic and abiotic diversity, Algeria is considered as a hotspot in terms of floral biodiversity. It has a floral richness even in endemic species recognized worldwide [3]. As the census studies indicate, there are approximately 3000 different species of plants in Algeria, of which 15% are endemic. This percentage corresponds to more than 406 taxa.

* Corresponding author at: Faculty of Natural and Life Sciences, Mohamed Chérif Messaâdia University, Souk Ahras, 41000 Algeria/ Laboratory of Biochemistry and Environmental Toxicology, Faculty of Sciences, Badji Mokhtar University, BP 12 Sidi Amar, Annaba, Algeria.

E-mail addresses: ihcene.bouasla@yahoo.fr, ihcene.bouasla@univ-annaba.dz (I. Bouasla), tarek_hamel@yahoo.fr (T. Hamel), c.barour@univ-soukahrass.dz (C. Barour), a.bouasla@univ-soukahrass.dz, asmabouaslauniv@yahoo.fr (A. Bouasla), mmessarahdz@yahoo.fr (M. Messarah).

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