



The 9th International Electronic Conference on Medicinal Chemistry (ECMC 2023)

01–30 November 2023 | Online

Evaluation of the Antioxidant Activity of Alkaloids Extracted from *Peganum harmala* Seeds

Chaired by **Dr. Alfredo Berzal-Herranz** and **Prof. Dr. Maria Emília Sousa**



pharmaceuticals



Salima DEROUICHE^{1, 2,*}, Fatima Zohra BABA AHMED², and Mohammed Gherib¹

¹ Laboratory 5 of Sustainable Management of Natural Resources in Arid and Semi-Arid Zones, Department of Natural and Life Sciences, Institute of Sciences, Salhi Ahmed University Center, P B 66, 45000. Naama, Algeria ;

² Laboratory of Physiology, Physiopathology and Biochemistry of Nutrition PPABIONUT. Department of Biology, Faculty SNVTU, University of Tlemcen .



* Corresponding author: derouiche-salima@hotmail.fr





Evaluation of the Antioxidant Activity of Alkaloids Extracted from *Peganum harmala* Seeds

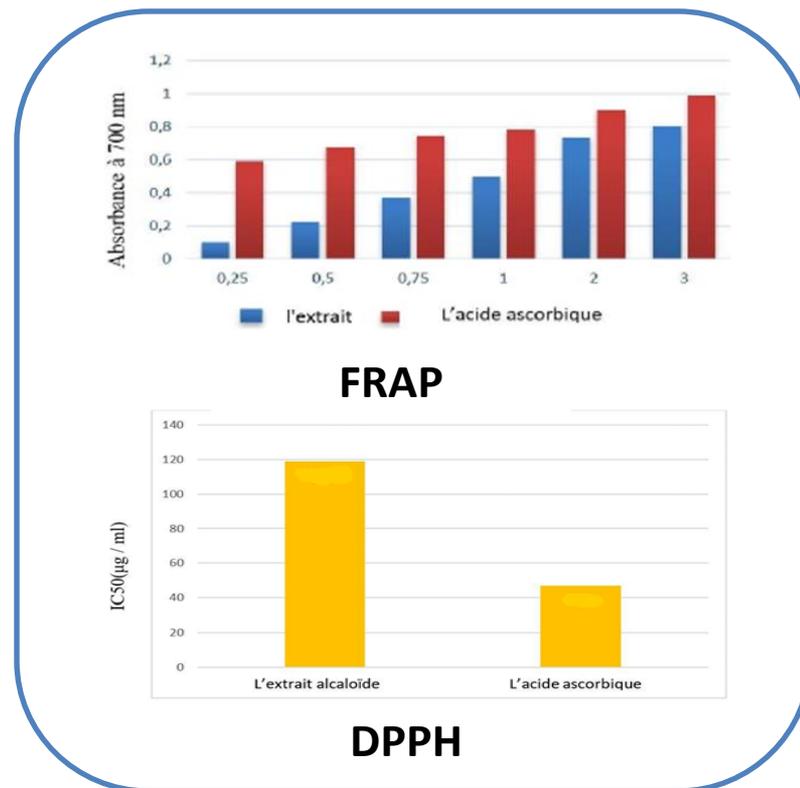
Graphical Abstract



*Peganum
harmala*



Alkaloid extract



Antioxidant capacity



Abstract:

Wild Syrian rue (*Peganum harmala* L. family Zygophyllaceae) is well known in North Africa. It is widely used in traditional medicine. Recent years of research has demonstrated different pharmacological and therapeutic effects of *P. harmala* and its active alkaloids. This research aims to examine the antioxidant properties of alkaloids extracted from *Peganum harmala* seeds. Alkaloids were extracted using the organic solvent extraction method to obtain a total alkaloid extract. The extraction of alkaloids from *Peganum harmala* seeds gave a high yield of 3.49%. Antioxidant activity was assessed by two tests: DPPH (2, 2 diphényl 1 picrylhydrazyl) and FRAP (Ferric reducing antioxidant power). The evaluation of the DPPH• free radical scavenging power showed that the inhibitory concentrations expressed in IC₅₀ obtained was 118.96 µg/ml. In addition, the FRAP method indicated that alkaloid extract from *Peganum harmala* seeds possess a good iron reducing power compared with standard antioxidant (ascorbic acid). These results suggest that alkaloids of *Peganum harmala* seeds have the potential to be exploited as a new food product and are a reservoir of bioactive molecules with prospective applications as ingredients for value-added, functional, and/or pre-servative food products.

Keywords: Alkaloid extract; antioxidant activity; *Peganum harmala*;



Introduction

Recently, bioactive secondary metabolites of natural products from medicinal plants are extremely useful in pharmaceutical and food industries due their biological activities.

Peganum harmala L., which is called harmal, wild rue or Syrian rue is an important member of the family of Zygophyllaceae. It is a perennial plant that spontaneously grows in arid and semiarid regions. It is widely, distributed in predesertic regions of North Africa. This medicinal plant has numerous pharmacological activities that can be attributed to the active alkaloids. Various reports have indicated that β -carboline alkaloids and quinazoline alkaloids are primarily found in the *P. harmala* seeds with percentage about 6% of total dry weight. These alkaloids was reported to have antibacterial, antioxidant, cytotoxic and immuno modulation activities (shaheen et al., 2020; Herraiz et al., 2010; Zaker et al., 2007).

This study is designed to evaluate the antioxidant potential of alkaloids extracted from *P. harmala* seeds from the Naâma region with two methods.



Results and discussion

1. Appearance and yield of total alkaloids extracted from *Peganum harmala* seeds :

The extraction of total alkaloids from the seeds of *Peganum harmala* was carried out by polar organic solvent extraction method where the seeds are treated first by an alcoholic acid solution which carries the alkaloids in the form of soluble salts. The extractive solution is then separated and alkalized which releases the alkaloids. These last are taken up by an organic solvent. This technique allowed us to obtain a light brown color extract with a yield 3.48%.

These results are consistent with the work of Wang et al in 2022 where they found 3.03%



Results and discussion

2. Antioxidant Activity of Alkaloid Extract from *Peganum harmala* seeds:

The in vitro antioxidant activity of our alkaloid extract was evaluated by two methods: the DPPH test and the iron reducing activity technique (FRAP).

The reduction of the DPPH radical was determined by the decrease in its absorbance at 517 nm induced by antioxidants. The *Peganum harmala* alkaloid extract makes the stable free radical (2,2-diphenyl-1-picrylhydrazyl to diphenyl-picrylhydrazine) in yellow color with an IC₅₀ of 118.96 µg/ml which shows moderate activity than the standard (ascorbic acid) which brings stability to DPPH with an IC₅₀ of 47.06 µg/ml. Our results are in contradiction with the results of Guergour et al (2015) (IC₅₀ of 107.91 µg/ml in comparison with ascorbic acid which is 4.24 µg/ml).

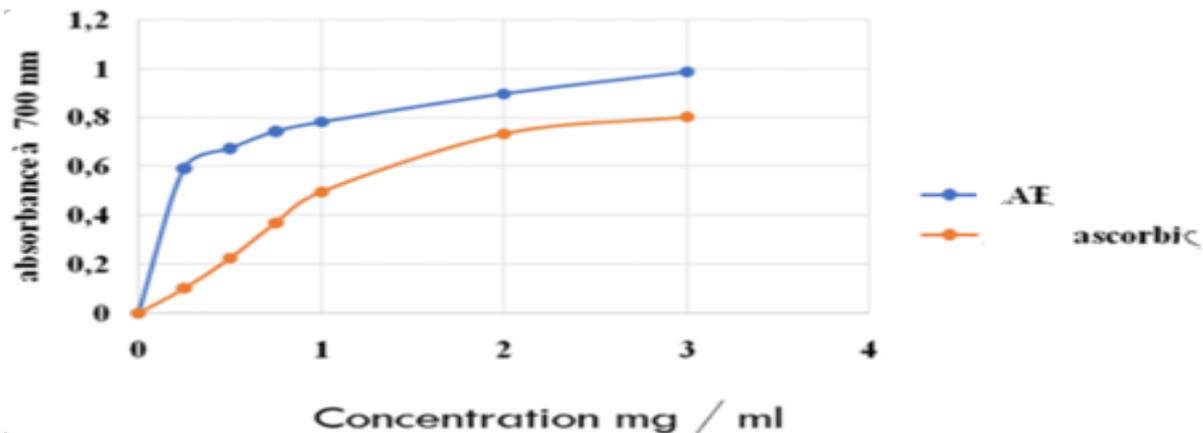




Results and discussion

The reduction capacity based on the transformation of ferric iron Fe^{3+} into ferrous iron Fe^{2+} in the presence of alkaloid extract from peganum harmala seeds.

The 50% reduction percentage for Iron at a concentration of 0.5 mg/ml is 22.5%, while for ascorbic acid is 67.4%. From these data, we conclude that our extract has a very low capacity compared to ascorbic acid. These results are in agreement with the results of (Guergour et al., 2018)





Conclusions

Alkaloids from *Peganum harmala* seeds exhibited good free radical scavenging activity and has the capability to be effective against many illnesses. These alkaloids might be used as potential sources of natural compounds with antioxidant activity and for potential pharmaceutical applications



Acknowledgments

Authors would like to thank Dr. Gordo. B (University of Nâama, Algeria) for the identification of the plant material.