

Article

## Determination of the antifungal activity of *Dorema ammonium* extract

Reman M. Salih<sup>1</sup>, and Yass K. Abbass<sup>1,\*</sup>

Department of Biology, College of Education for Pure Sciences, University of Thi-Qar, Iraq

\* Correspondence: Yass.bio@utq.edu.iq

Available from: <http://dx.doi.org/10.21931/RB/CSS/2023.08.01.8>

### ABSTRACT

The current investigation included estimating the efficiency of aqueous and ethanolic plant extracts of *Dorema ammoniacum* plant in inhibiting the growth of fungi, where the ethanolic extract recorded a higher rate of inhibition than the aqueous extract. It is more effective when the concentration is increased in inhibiting the growth of two types of *Candida*, *C. albicans* and *C. krusei*. The aqueous extracts of *Dorema ammoniacum* had no toxic effect on human red blood cells at concentrations (100, 200, 300) mg/ml at an incubation period of 3 hours. As a result of the widespread use of medicinal plants as antimicrobial drugs, the absence of toxicity on the host cells is considered essential because it is an inexpensive, easy-to-apply, quick-results method and is safe when used as a drug.

**Keywords:** *Dorema ammoniacum*, D. Don, cytotoxicity activity, Antimicrobial activity.

---

### INTRODUCTION

Since the beginning of civilization, plants and their products have been used as medicines. In recent years, it has been noticed that the interest in studying medicinal plants as medicinal products is increasing daily in different parts of the world.<sup>1</sup> According to World Health Organization data, about 80 % of the world's population relies mostly on traditional medicine, with most of this medicine containing plant extracts or active ingredients<sup>2,3</sup>. The first to give the name "pharmacology" to medicinal plants was the German scientist Seidler in 1851 AD, which is the science that is concerned with the botanical origins of drugs in their natural or raw form in terms of morphological, taxonomic, structural and chemical terms, how to extract effective ingredients and their impact on humans and other organisms<sup>4</sup>. The scientist Dragendrooff defines a medicinal plant as anything of plant origin, and it is used medicinally as a medicinal plant<sup>5</sup>. More than "3.3 billion" individuals in developed countries use medicinal plants regularly, and medicinal plants refer to various plants used in herbal medicine, which is the basis of traditional medicine<sup>6</sup>. Humans have relied on nature for simple needs such as medicines, shelter, food, fragrances, clothing, tastes, fertilizers, individuals and modes of transportation throughout history<sup>7</sup>. Medicinal plants are an essential source of active biological compounds with therapeutic value for many diseases<sup>8</sup>. Plants remain an essential source for providing the

human species with new medicines, and some beneficial properties attributed to plants have been identified. Treatment by medicinal plants may depend on experimental results for hundreds to thousands of years. Medicinal plants are used in many medicinal uses as they contain a substance or group of substances. Effective and capable of treating a specific disease or reducing its incidence <sup>9</sup>. Many plants have inhibitory activity against pathogenic organisms because they contain effective compounds and their lack of side effects. Plant extracts have been used to limit the growth of microbes in several investigations <sup>10</sup>. The plant *Dorema ammoniacum* D. Don belongs to the Apiaceae family. It is a herbaceous perennial and sometimes perennial plant that grows to a height of about "1-2 meters. The leaves are compound or often alternated, the flowers are white or yellow, and the fruit is dry, splintered and split into two fruits. They are often polygonal and oval. The plant *D.ammoniacum* D.Don has a brownish-purple color, and pollination is mixed by insects <sup>11</sup>.

## MATERIALS AND METHODS

### Samples collection

This study used the plant *Dorema ammoniacum*, available in the local market of perfumers and sellers of medicinal herbs in Baghdad. An electric mill ground it, and the powder was kept in opaque glass bottles with a tight lid until use.

### Preparation of extract

The aqueous and alcoholic extract *Dorema ammoniacum* was prepared, weighing 50 g of dry plant powder, then placed in the extractor Soxhlet and added 500 ml, then filtered the extract using filter papers of the type Whatman-N0-1 (England) and allowed the extract to dry and the dry matter was collected and kept in tightly closed containers. Refrigerate at 4°C until use <sup>13,14</sup>.

### Antimicrobial assay

In this study, four types of bacteria were used. To evaluate the effectiveness of the aqueous and ethanolic extracts of *Dorema ammoniacum* against these species, the agar well diffusion method was used <sup>15,16</sup>.

## RESULTS AND DISCUSSION

### Antifungal activity

Plant extracts, both aqueous and ethanolic, were tested against two types of *Candida*, *C. albicans* and *C. krusei*. According to the findings of this investigation, there were differences in the inhibitory ability of these extracts, where the ethanolic extract recorded a higher percentage of inhibition than the aqueous extract, and it was more effective when the concentration was increased in inhibiting growth, the relationship between Phenols and glycosides.

Fungi	Concentrations are mg/ml.			
	Solvent	100	200	300
<i>C. albicans</i>	alcoholic	15.00 ± 1.00	20.33 ± 1.52	23.66 ± 0.57
	Aqueous	22.33 ± 1.15	26.33 ± 1.52	28.66 ± 2.08
<i>C. krusei</i>	Aqueous	17.00 ± 1.00	21.33 ± 2.51	23.33 ± 1.52
	alcoholic	22.33 ± 2.51	± 2.08 25.33	± 2.3027.33

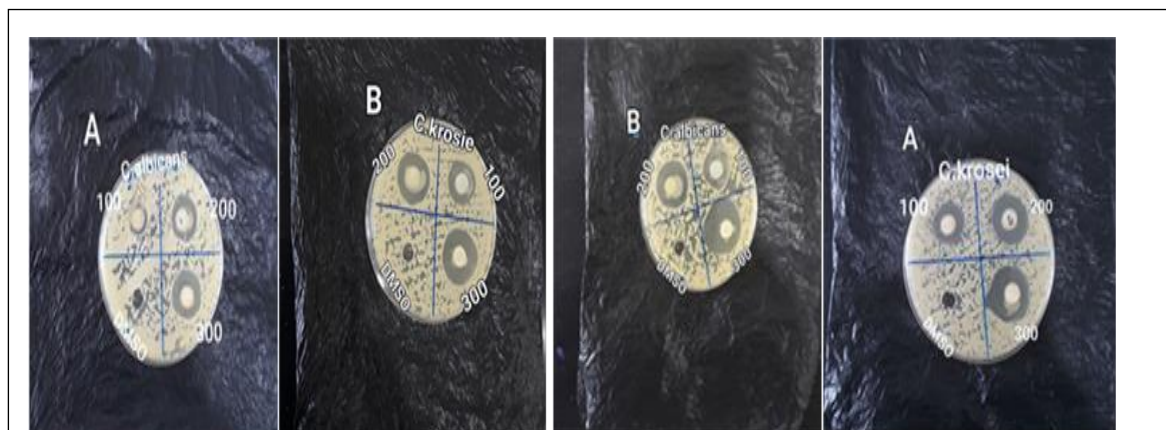
**Table 1: The effectiveness of the aqueous and alcoholic extracts of *Dorema ammoniacum* against the two *Candida* yeast.**

Cytotoxicity towards human erythrocytes	Concentrations	
non-toxic	100	1
non-toxic	200	2
non-toxic	300	3
non-toxic	Negative control factor (blood + DMSO(	4
non-toxic	Control factor II (blood + normal line )	5
toxic	Positive control factor (blood + tap water)	6

**Table 2: cytotoxicity results of the aqueous extract of *Dorema ammonium***

\*Each value in the table is an average of three replications

\*The mean represents the area of inhibition measured in mm (mean  $\pm$  S.D.).



**Figure 1: shows the efficacy of aqueous and ethanolic extracts of *Dorema ammonicum* A - aqueous extract B - ethanolic extract.**

### Cytotoxicity

Through the results, it was shown that the aqueous extract of the *Dorema ammonium*, according to the concentrations used, does not dissolve red blood cells.

### DISCUSSION

The effectiveness of the extract of the western fascicle is because it contains a lot of active substances through the detection results of the GC-MS device. It was found to contain some fatty acids, including Palmitic acid and Oleic Acid, which produce antifungals and bacteria, as the fats prevent microbes by dispersing the cell membrane for fungi and bacteria, and this study agrees with<sup>17</sup>. As a result of the widespread use of medicinal plants as antimicrobial drugs, the absence of toxicity to the host cells is essential because it is an inexpensive, easy-to-apply, quick-results method and is safe when used as drugs<sup>18</sup>.

## CONCLUSION

The emergence of an apparent and high-efficiency efficacy of the alcoholic extract, regardless of *Dorema ammoniacum*, the aqueous extract, on all bacterial isolates and yeasts. The cytotoxicity results showed that the plant extract did not break down red blood cells and had no toxic effect. The effectiveness of plant extracts on fungi is higher than on other types of microorganisms. It is observed that increasing the concentration of the extract leads to an increase in the diameter of inhibition.

## References

- 1 Khatri P; Jamdagni P; Sindhu A and Rana JS. Antimicrobial potential of important medicinal plants of India. *International Journal of Microbial Resource Technology*, **2016**; 3(1):301-308.
- 2 WHO. Monographs on selected medicinal plants World Health Organization, Geneva. **1993**.
- 3 Al-Saeedi, Walaa Yas Lahmoud. Evaluate the efficiency of aqueous and alcoholic extracts of oak fruits and fenugreek seeds compared to "some fungicides" in controlling fungi associated with bean and spinach seeds. Master's Thesis, College of Science, University of Al-Qadisiyah. **2012**.
- 4 Julia, F. Morton, Major Medicinal Plants, Botany, Culture and Uses, Charles C. Thomas publisher, Florida, U.S.A, **1977**. P. V.
- 5 Al-Ajili, Abdullah Sabbar Abboud and Hussam Kanaan Waheed. The importance of medicinal plants and their uses in ancient civilizations, *Journal of the Faculty of Arts, Vol.* **2017**, 123: 377-392.
- 6 Singh, R. Medicinal plants: A review. *Journal of Plant Sciences*, **2015**; 3(1): 50-55
- 7 Dar, R. A.; Shahnawaz M., and Qazi, P. H. General overview of medicinal plants: A review. *The Journal of Phytopharmacology*, **2017**; 6(6):349-351
- 8 Pandey, D. and Gupta, A. K. Recent Advances in Medicinal Plant Secondary Metabolites as the Alternate Bioactive Therapy. for Better. **2020**.
- 9 Al-jabr, Charter. Research and determination of secondary metabolites of khat and polycaria plants and evaluation of biological activity. Thesis for obtaining a Ph.D., University of Manhour, Constantine. **2010**.
- 10 Al-Daoudi, Hanin Fadel Abbas. Effect of some plant extracts and antibiotics on some species of the genus *Staphylococcus* spp isolated from the upper respiratory tract. Master's Thesis, College of Education for Girls, Tikrit University, Iraq. **2018**.
- 11 Hassan, Ahmed Abdel Moneim. Production of secondary and non-traditional vegetables, first part. The Arab House for Publishing and Distribution, Cairo. **2004**.
- 12 Mobeen, A.; Siddiqui M. A.; Quamria M. A.; Ittrat, M., and Imran-Khan, M. D. Therapeutic potential of Ushaq (*Dorema ammoniacum* D. Don): A unique drug of Unani medicine. *Int J Unani Integ Med*, **2018**; 2(1): 11-16.
- 13 Harborne , J . B . Phytochemical methods a guide to modern techniques of plant analysis ,2<sup>nd</sup> ed. Chapman and Hall , London , New York . **1984**; p288.
- 14 Al-Sultani, Aseel Karim Jabbar. Effect of terpenoid, alkaloid and crude phenolic compounds extracts of *Chrozophora tinctoria* L. on some aspects of the life performance of *Musca domestica* L. (Diptera: Muscidae) with isolation and identification of the active compounds using high-performance liquid chromatography (H.P.L.C.). Master's Thesis, College of Science for Girls, University of Babylon. **2015**.
- 15 Hammer, K. A. ; Carson, C. F. and Riley, T. V. In vitro activity of *Melaleuca alternifolia* (tea tree) oil against dermatophytes and other filamentous fungi. *Journal of Antimicrobial Chemotherapy*. **2002**;50(2):195-199.
- 16 Jabbar, Malik Muhammad. Inhibitory activity of *Spirulina* sp. and *Chlorella* sp. Against some types of pathogenic bacteria. Master Thesis, College of Education for Pure Sciences, Dhi Qar University. **2021**.
- 17 Bergsson, G.; Hilmarsson, H. and Thormar, H. Antibacterial, antiviral and antifungal activities of lipids. *Lipids and essential oils as antimicrobial agents*, **2011**; 47-80

- 18 Chiu, Y. J. ; Chou, S. C. ; Chiu, C. S. ; Kao, C.P. ; Wu, K. C. ; Chen, C. J. ; Tsai, J. C. and Peng, W. H. Hepatoprotective effect of the ethanol extract of *Polygonum orientale* on carbon tetrachloride-induced acute liver injury in mice. *Journal of Food and Drug Analysis*, **2018**; 26(1):369-379

Received: May 15, 2023/ Accepted: June 10, 2023 / Published: June 15, 2023

Citation: Salih, R.M.; Abbass, Y.K. Determination of antifungal activity of *Dorema ammonium* extract.

Revis Bionatura 2023;8 (1) 8. <http://dx.doi.org/10.21931/RB/CSS/2023.08.01.8>