

## Evaluation of Antimicrobial activity in Some Medicinal Plants were Growth in Karbala'a Desert

د. إبراهيم صالح عباس / كلية الصيدلة / جامعة كربلاء  
د. مروج صالح مهدي / كيمياء حياتية / كلية الصيدلة / جامعة كربلاء  
م. م. جواد كاظم عيسى / علوم حياة / كلية العلوم / جامعة واسط

### الخلاصة

تم دراسة التأثيرات المضادة للبكتريا الموجبة والسالبة لصبغة الكرام

*Staphylococcus aureus, Bacillus subtilis, Escherichia coli, and Proteus vulgaris.*

لعشرين مستخلص كحولي لمجموعة من النباتات البرية النامية في كربلاء وقد اظهرت النتائج ان للنباتات ادناه فعالية ضد البكتريا

*Achillea santolina, Teucrium polium, Artemisia campestris, Alhagimourorum medic, Peganum harmala, Astragalus hamosus, and Atriplex hoetensis.*

### Abstract

Twenty ethanolic extracts of medicinal and wild plants were screened for their antibacterial activity against *Staphylococcus aureus, Bacillus subtilis, Escherichia coli, and Proteus vulgaris.* Using gar diffusion technique, it was found that *Achillea santolina, Teucrium polium, Artemisia campestris, Alhagimourorum medic, Peganum harmala, Astragalus hamosus, and Atriplex hoetensis* possess a potent antibacterial effect.

### Introduction

The development of microbial resistance toward substances which have selective lethal or inhibitory action upon them due to eradication these antibiotics as therapeutic. this problem has prompted a continual search for a new source of antimicrobial agents. Antibiotics, at the present time are produced either synthetically or through microbial fermentation plant. However, may provide an additional source for antimicrobial substances (1). For vast years amount of work has been performed to survey wild plants for their antimicrobial effect (2-7), and for the isolation of

the isolation of the activate ingredients (8-11). Nevertheless, the use of antimicrobial active component isolated from medical or wild plants have been limited to antiseptics and disinfectants and no application of such ingredients have yet been reported in systematic therapy (9-12). The plant flora in Iraq needs the more study and screening to determination new antimicrobial agents. The object of this study include investigation the antibacterial activity of some wild plants were grown in Karbala'a desert.

## Materials and Methods

The applied test micro-organisms were included *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, and *Proteus vulgaris*, were obtained from laboratory of Pharmacy College of Karbala University, and Al-Hussainy Hospital. This study was carried out by three triplicates for each isolate of test micro-organism.

The cultures were maintained in nutrient agar slops following overnight incubation at 37 C° and were subcultured at two weeks intervals to obtain of pure culture. The antibacterial assay was included the Erlenmeyer flasks containing 50 mL portions of nutrient broth were inoculated with the desired test micro-organisms and incubated at 37 C° in an orbital shaker at 100 osc / min. After 18 hours of incubation, a required volume of the culture was added to 200 mL nutrient agar. The agar was then poured on a glass plate (35 x 25 cm) and after solidification holes (10 mm) were made. To facilitate the removal of the agar pellets a cork connected to a vacuum pump was used and 0.2 mL aliquots of different aqueous concentration (0.5, 1,5, and 25 mg / mL) of various plant extractors were placed in each well.

The plates incubated at 37 C° and examined after 16 hours for the presence of inhibition zones. Streptomycin sulphate (0.5 mg / mL) was used as a standard growth inhibitor, while water was used as the experimental control. The evaluation of antimicrobial activity was depending on inhibition zone area. All determination was made in triplicates, the plant extraction was included the dried plant materials were ground and extracted three times at room temperature with 80 % ethanol. The three portions were then combined and evaporated under vacuum at 40 C° to dryness. The dried extracts then tested for their antibacterial activity. Streptomycin was used as antibiotic effect for these micro-organisms were used in this study, all results were analyzed and calculated the less significance differences depend on Dinkon test.

## Results and Discussion

The present study reported the screening of the antibacterial activity of twenty ethanolic total extracts of twenty wild plants against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, and *Proteus vulgaris*. From different methods available for testing antimicrobial effect, agar diffusion was selected. The main advantage for applying this method is that it does not required sterilizing the plant extracts before test because ethanol used as a disinfection and then evaporate before test. The plants extracts were used in this study showed in Table 1, only 14 plant extracts were showed antibacterial activity as indicated by the formation of inhibition zone in Table 2. Their activities varied according to the test micro-organism. The results are referring to these plants under test have many active compounds such as glycosides, tannin, alkaloids, phenolic compound that very affected against widely spectrum of micro-organism. Some results of these extracts were corresponding with other results were obtained from Palestinian medicinal plants (13).

Thirteen extracts were found active against *Staphylococcus aureus*, *Bacillus subtilis*. Both of which are Gram positive bacteria, only three plants (*Achillea santolina*, *Teucrium polium*, and *Artemisia campestris*) had inhibitory action upon Gram negative organisms (*E. coil*, and *P. vulgaris*). Moreover, *E. coil* was more resistance than *P. vulgaris*, *Capparis spinosa*, *Tamarix sp.*, *Citrullus colocynthis*, *Tribulus terrestris*, and *Peganum harmala*. In addition to anti-gram-positive effect, and inhibitory action upon *P. vulgaris* only. For further identification and isolation of the active ingredient, plants which elicited a diameter of inhibition zone of more than 15 mm at concentration of 25 mg / mL were considered highly active. *Achillea santolina*, *Atriplex hortensis*, *Alhagim murorum*, *Teucrium polium*, *Artemisia Campestris*, and *Peganum harmala* were selected for further investigation and are presently under study.

**Table 1: Plants tested for antibacterial active**

Plant species	Part of the plant tested	Family	Weight of extract plant material (g)	Weight of the extract (g)
<i>Achillea santolina</i>	Aerial	Composite	50	13-25
<i>Capparis spinosa</i>	Aerial	Capparidaceae	100	18-50
<i>Canvolvulus stachydifolius</i>	Leaves	Convollaceae	50	11-50
<i>Ephedra foliata</i>	Aerial	Gentacea	50	9-60
<i>Senecio vernais</i>	Aerial	Compositae	50	11-30
<i>Tribulus terrestris</i>	Aerial	Labiatae	50	13-50
<i>Adiantum capillus</i>	Aerial	Polypodiaceae	50	9-70
<i>Agropyron repens</i>	Aerial	Gramineae	100	16-90
<i>Tribulus terrestris</i>	Fruit	Zygophllaceae	100	10-50
<i>Citrullus colocynthis</i>	Fruit	Cucurbitaceae	100	11-20
<i>Tamarix sp.</i>	Aerial	Tamaricaceae	50	8-21
<i>Chenopodium ambrosoides</i>	Leaves	Chenopodiaceae	50	10-18
<i>Euphorbia Sp.</i>	Leaves	Euphrobiaceae	100	7-50
<i>Alhigimourorum Medic</i>	Aerial	Leguminosae	100	13-50
<i>Anagallis arvensis</i>	Leaves	Primulaceae	50	8-90
<i>Artemisia Campestris</i>	Aerial	Compositae	50	16-40
<i>Astragalus hamosus</i>	Leaves	Papilionaceae	50	10-98
<i>Atriplex hoetensis</i>	Leaves	Chenopodiaceae	100	16-70
<i>Bacopa monniera</i>	Leaves	Scropphulari Acee	50	11-40
<i>Peganum harmala</i>	Aerial	Zygophlla Ceae	100	18-25

**Table 2: Diameter of inhibition zone produced by active plant extracts.**

<i>Plant species</i>	Part	Concentration Mg / m	Diameters of inhibition zone by millimeter unites			
			<i>S. aures</i>	<i>B. subtitis</i>	<i>E. coil</i>	<i>P. vulgaris</i>
<i>Capparis Spinosa</i>	Aerial	1	0	0	0	0
		5	11	0	0	11
		25	13	12	0	13
<i>Ephedra foliata</i>	Aerial	1	0	0	0	0
		5	0	0	0	0
		25	12	11	0	0
<i>Astragalus hamosus</i>	Leaves	1	13	13	0	0
		5	16	17	0	0
		25	19	19	0	0
<i>Achillea Santolina</i>	Aerial	1	0	0	18	17
		5	14	15	20	19
		25	25	18	23	23
<i>Atriplex Hoetensis</i>	Leaves	1	12	1	0	0
		5	14	12	0	0
		25	20	17	0	0
<i>Citrullus Colocythis</i>	Fruits	1	11	0	0	12
		5	12	11	0	13
		25	18	15	0	16
<i>Alhginourorum Medic</i>	Aerial	1	0	0	0	0
		5	13	11	0	0
		25	17	15	0	0
<i>Tamarix Sp.</i>	Aerial	1	0	0	0	0
		5	0	0	0	11
		25	0	0	0	13
<i>Teucrium Polium</i>	Aerial	1	11	11	0	0
		5	13	12	11	13
		25	18	16	14	20
<i>Artemisia Campestris</i>	Aerial	1	13	0	0	12
		5	15	12	0	13
		25	17	16	13	18
<i>Senencio Vernais</i>	Aerial	1	0	12	0	0
		5	12	13	0	0
		25	16	16	0	0
<i>Tribulus Terrestris</i>	Fruit	1	0	0	0	0
		5	0	0	0	0
		25	13	11	0	14
<i>Agropyron Repens</i>	Aerial	1	0	0	0	0
		5	0	0	0	0
		25	0	15	0	14
<i>Peganum harmala</i>	Aerial	1	0	0	0	0
		5	0	0	0	0
		25	17	20	0	19
<i>Streptomycin</i>		0.5	22	22	22	23

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