

## Antibacterial activity of extracts from *Artemisia herba alba*

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### Abstract

Extract of *Artemisia herba alba* were evaluated for their antibacterial activity against Gram negative bacteria like *E. coli* , *Pseudomonas aeruginosa* and Gram positive bacteria like *Staphylococcus aureus* . The inhibitory effect *in vitro* was defined as the difference between the growth rate without herbs and the growth rate in the presence of an extract uses four solvent methanol , water , chloroform and acetone .The study revealed that methanole at concentration 16 mg most active against Gram negative bacteria like *E.coli* and *Pseudomonas aeruginosa* , followed by chloroform and then acetone and water extract .

### التأثير البكتيري لخالصة نبات الشيح البلدي

هدى صالح الجبوري و ثامر مظك جاسم و نادية ابراهيم صالح

كلية الصيدلة - جامعة تكريت - تكريت - العراق

### الخلاصة

اختبر التأثير البكتيري لخالصة نبات الشيح البلدي على البكتريا السالبة لصبغة غرام مثل الاشريشية القولونية ، الزوائف الكاذبة و البكتريا الموجبة لصبغة غرام مثل المكورات العنقودية الذهبية .التأثير البكتيري في المختبر يعرف بأنه الاختلاف بين نسبة نمو البكتريا بدون خالصة العشب و نسبة نمو البكتريا بوجود خالصة العشب . بأستخدام اربع مذيبات هي الماء و الكحول و الكلوروفورم و الاسيتون ، أظهرت نتائج الدراسة ان المستخلص الكحولي بتركيز 16 ملغم له اعلى فعالية ضد البكتريا السالبة لصبغة غرام مثل الاشريشية القولونية و الزوائف الكاذبة ، يليه الكلوروفورم ثم الاسيتون و الماء .

Keywords : *Artemisia herba alba* , antibacterial

## Introduction

Artemisia is a slow shrub plant that grows in several countries. Artemisia has been used as antihelminthic and vermifuge(1). Although several antibacterial drugs are available at present, its use is limited by a number of factors such as; low potency, poor solubility, emergence of resistant strains and drug toxicity. Therefore it is needed for the discovery of new, safer and more effective antibacterial agents (2,3). The aerial parts of this plant are used in traditional medicine in Iraq against diabetes (4). The aim of the present study was to evaluate the antibacterial activity of Artemisia plant extracts against pathogens.

## Material and methods

All specimens were cleaned then ground by mortar and pestle then sieved. One gram of the sieved material was soaked in 5 ml of distilled water, 70% ethanol, chloroform and acetone for one day at 35°C with shaking, then filtered through filter paper Whatman No.1. The filtrate was centrifuged and the supernatant fluid was coined as crude liquid aqueous extract or as crude fluid ethanol, chloroform, acetone extract. The dried preparation were evaporated under vacuum rotary evaporator at 40°C until dry or thick syrup was obtained, then syrup was left in drying oven at 45°C until drying, this was coined as dried aqueous extract or dried ethanol, chloroform, acetone extract of the plant. Which at specific quantities in nutrient agar to assay its inhibitory effect on the bacteria. Ampicillin, Tetracycline, Amoxicillin and Gentamicin was added to the growth media at concentration of 1 mg/ml in another set of plate.

### Antibacterial assay

The inhibitory effect was done by more than one method.

#### a)- Disc diffusion method :

Filter paper disc were soaked in solution of extracts then placed on the surface of the agar medium. The inhibition zone around the paper disc was measured. This method did not give reproducible results (5).

#### b) - Colony diameter test :

The method of Kady et al by incorporating the plant extract in the growth medium at concentrations ranged from 4 to 16 mg (dried plant extract) per one ml of nutrient agar in Petri dishes. The agar was inoculated by the bacteria, plugged out from old culture of *Staph. aureus*, *E. coli* and *Pseudomonas aeruginosa* growth on nutrient agar then the plate incubated at 37°C and the colony was estimated by measuring ( mm ) two perpendicular diameters of the colony. Two groups of control plates were used. The first group nutrient agar with no addition extract, the second group with 1 mg of oxytetracycline, amoxicillin, gentamicin and ampicillin for each treatment. Three plates were used and each test was repeated three times. The reading were then averaged and presented in tabular form from the analyzed by analysis of variance to show the statistical significance of the data.

## Results

The results of Artemisia extracts are presented in Table (1) and Table (2). Which summarizes the colony growth of bacteria on agar with and without the plant extracts. The methanolic extract of Artemisia were more effective, than others inhibit the growth of Gram negative bacteria like *E.coli* at concentration 8, 12, 16 mg.



*Pseudomonas aeruginosa* at concentration 4, 8, 12, 16 mg, and inhibit Gram positive bacteria like *Staphylococcus aureus* at concentration 8, 12, 16, mg . It is clear from table (1) that the tested bacteria varied in their sensitivity to the inhibitory effect of Artemisia plant extract.

### Discussion

Additional antibacterial agents must be developed to successfully control the new and emerging human bacterial pathogens resistant to available antibacterial .Intense selective pressure on plants by bacterial pathogen has resulted in the evolution of a wide range of phytochemicals with antibacterial activity. This study has evaluated the antibacterial activity of plants commonly consumed in Tikrit and other parts of the world. Both were proved to be good solvents in extracting inhibitory substances from

tested plant. This work showed that methanolic Artemesia extract are the most effective of used here this result agreement with Tona, etal and Aide Portillo, etal (6,7) these authors reported that methanol was more efficient than acetone in extracting phytochemical from plant material. The report on this results constitute also a scientific basis to justify and support the use of these preparations for the antibacterial particularly in Iraq traditional medicine (8,9) . From the data obtained in this work , it is suggested that may play an important role in the antimicrobial activity (10). Extracts of Artemisia herba alba have been reported to possess numerous biological activity (11). The results presented in this communication provide impetus for the further investigation of highly active Artemisia herba alba species to discover the compounds responsible for their biological activity .

Table(1) : Average colony diameter (in mm) of tested bacteria.

Bacterial types Type of extracts	<i>E.coli</i>				<i>Pseudomonas aeruginosa</i>				<i>Staph . aureus</i>			
	4 mg	8 mg	12 mg	16 mg	4 mg	8 mg	12 mg	16 mg	4 mg	8 mg	12 mg	16 mg
Water extract	-	-	-	4	-	-	-	-	-	-	6	8
Methanol extract	-	2	3	8	6	7	10	10	-	4	5	12
Chloroform extract	-	2	4	-	9	-	8	9	-	-	-	4
Acetone extract	3	3	-	8	-	-	4	6	-	-	5	6

- : No effect

**Table (2) : Average colony diameter (in mm) of the tested bacteria with antibiotic as control.**

Bacterial types	Bacterial Antibiotic Control	<i>E.coli</i>	<i>Pseudomonas aeruginosa</i>	<i>Staph.aureus</i>
	Amoxicillin	-	-	12
	Ampicillin	10	-	-
	Gentamicin	15	6	-
	Tetracyclin	10	-	5

- : No effect

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