

Antibacterial and antifungal activity of the extract Of medicinal plant *Malva neglecta* Wallr

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الفعالية المضادة للبكتيريا والفطريات لمستخلصات نبات الخباز

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المستخلص

اجريت هذه الدراسة على نبات الخباز من صنف الخبازيات حيث يعتبر من اكثر النباتات استخداما محاولة تحديد دور النبات في الجانب الصحي وقيمه الطبية وتم دراسة خلاصات مختلفة (n-hexane, chloroform, ethyl acetate, crude and water.) من نبات الخباز وملاحظة فعاليتها المادة للبكتيريا والفطريات. وكانت السلالات البكتيرية المختبره هي :

(*Escherichia coli*, *Staphylococcus epidermidis*, *Klebsiella pneumonia*, *pseudomonas aeruginosa* and *Bacillus cerus*). (*Aspergillus niger*, *Fusarium solani*). هيو أظهرت الدراسة تأثيرا واضحا لخلاصات نبات الخباز بالصد من السلالات البكتيرية والفطرية المذكورة اعلاه وهذا التأثير تم مقارنته مع المضاد الحيوي الاموكسيسيكلاف (الاموكسيلين وحامض الكلافيولينك). ويعود هذا النشاط القوي لبعض المواد الكيميائية التي تم تحديدها ضمن مكونات نبات الخباز وبالنظر لامتلاك نبات الخباز نشاطا ضد هذه السلالات البكتيرية والفطرية، فبالنالي يمكن استخدام نبات الخباز لعلاج مختلف الأمراض والاصابات.

Abstract

The most commonly used plant namely *Malva neglecta* (family Malvaceae) was brought under study after observing their medicinal values. The aim of this study is to demonstrate the antibacterial activity of *Malva neglecta* Wallr against (*Escherichia coli*, *Staphylococcus epidermidis*, *Klebsiella pneumonia*, *pseudomonas aeruginosa* and *Bacillus cerus*) and to determine the antifungal activity of these plants against the fungi (*Aspergillus niger*, *Fusarium solani*). The study showed that the *Malva neglecta* have potent activity against tested bacterial species and fungal species. The plant showed best activity against most of the bacterial and fungal strains, therefore these plant can be used to treat different microbial disease and infections.

Keywords: *Malva neglecta*, Antibacterial, Antifungal

Introduction

Plant represent a great part of our life. They represent a source of foods, medicine, clothes, and fuels and are very rich source of potent medicine. They contain many active ingredients that fight against pathogenic microorganisms. Because of their availability and affordability: plant extracts act as antimicrobial agents that destroy different pathogens cells. [1]. The *Malva neglecta* was known as common mallow. The *Malva neglecta* distributed widely: Qraw in Europe, Asia and North of Africa [2]. *Malva neglecta* acts as a medicine for many diseases in different countries. Due to its high mucilage contents it is used as demulcent and emollient for skin inflammation, acne eczema symptoms. *Malva neglecta* can reduce pathogens that cause inflammation of skin and gastric diseases and its used for, broken bone, help abdominal pain and to treat swelling, dermatitis, burns, and throat infection [3]. *Malva neglecta* can reduce bronchitis, urinary tract infections. [4-5]. *Malva neglecta* act as a potent drug that its spectrum cover the gram positive and negative bacterial strains. The active constituents as phenols, flavonoids and tannins aid *Malva neglecta* in destroying pathogens cell [6].

Due to *Malva* contain (Malvone A: 2-methoxy-5,6-dihydroxy-1,4-naphthoquinone) anthocyanins. Anthocyanin can bind to bacteria wall and induce bacteria stasis, and other substances that have antibacterial properties [7]. As a result, widespread of drug resistance among bacteria isolated from Iraqi patients, especially in Wasit province this work was carried out as an attempt to find alternative

plant extract with antimicrobial and antifungal activity. So, *Malva* was collected for this purpose. The aim of our work is to demonstrate the antimicrobial activity against tested bacterial strains (*E. coli*, *K. pneumonia*, *B. cereus*, *St. epidermidis* and *S. typhi*) and antifungal activity against (*A. niger*, *F. solani*).

MATERIALS AND METHODS

Plants Collection

Malva neglecta plant was collected from local market. The *Malva neglecta* species are identified and authenticated by the Iraqi, National Herbarium, Baghdad

Preparation of extracts

Malva neglecta was washed under running tap water and dried in air. Grinding plant to powder. Plant was placed in methanol for 10 days. Extraction performed 3 times then filtered. Then the obtained filtrate subjected to evaporation. The extract dissolve in n-hexane, chloroform, ethyl acetate, and water.

The Antibacterial Activity

The crude extract and its solvents tested against bacterial strains (*E. coli*, *K. pneumonia*, *B. cereus*, *St. epidermidis* and *S. typhi*) to demonstrate the antibacterial activity according by Well diffusion assay. The media (Nutrient agar) was poured into Petri dishes (9cm). The stock solution of crude extract and its solvents place in Dimethyl sulfoxide (DMSO) 4 mg/ml. According to the modified method of [8], was made in agar media using cork borer followed. Inoculation of bacterial cultures into agar media by using cork

borer to make wells in agar media wells .then place extract and its solvents in dilutions into wells. (0.1ul in 0.9ul DMSO). These Petri dishes were incubated for 24 hours at 37⁰C. The augmentine (glaxo smithkline egipt) was used as standard. The diameter of zones of inhibition was measured in mm [9].

The Antifungal Activity

The extract and its solvents tested against two fungal strains (*A. niger* and *F. solani*,) to demonstrate the antifungal activity of them. The stock solutions of crude and other fractions were prepared in DMSO i.e. 4mg/ 1ml. By using Agar tube dilution method [10] . One ml from each dilution was added to sterilized test tubes, then 9 ml sterilized media (Nutrient agar) was added to each tube. With two tubes one poisitive and one negative for fungal growth.seven days at 25⁰C. After seven days the fungal growth was observed in each tube with reference to the (positive) fungal containing test tubes.

Determination of phytochemical screening:

The fresh extract was subjected to standard phytochemical analyses formed different constituents such as alkaloids, glycosides, phenols, tannins and amino acids as earlier described by [11].

RESULTS AND DISCUSSION

The results of this study revealed that there is good activity of the extract of *Malva neglecta* against bacteria (table 1), and the more susceptible bacteria were *K.pneumoniae* and *B. cerus* followed by

the bacteria *P.aeurginosa* in the case of n-Hexane.

The results also showed that there is high activity agains the fungi *Aspergillus niger* and *Fusarium solani* in most tested extract (table 2).

The major chemical compounds of the plant under study was phenolies ,tannins ,amino acid ,alkaloids and glycosides table (3) .This compouned give for *Malva* plant various pharmacological properties .This results agreement with (12). The results of antibacterial assay indicated the *Malva* plant extracts exhibited high bacterial activity, The extracts were found strong antibacterial effects against (*E. coli* ,*K. pneumoniae*,*P.aurginosa*, *St. epidemidis* and *B. cerus*),The activity of crode and chloroform were highest against all the five strains of bacteria , crode give inhibition zone ranges from(8 – 13) and chloroform (10 – 13) table (1) . N-hexane extract showed inhibition zone range (12- 15) table (1) against all strains of bacterea except *E. coli* . Ethyl acetate and water extracts showed inhibition zone range (12- 13) table (1). But no activity for Ethyl acetate against *E. coli* and no activity for water extract against *St epidemidis* table (1). All this fractions of *Malva* (crode ,n-hexane, chloroform, ethyl acetate, and water) showed highest antifungal activity against both (*A. niger*, *F.solani*) except water extract don't showed any activity against *F.solani* table (2) . Our work demondtrate the antibacterial and antifungal ability of *Malva neglecta* . Activity of *Malva* against pathogens demonstrated by measuring inhibition zones diameters...The tested bacterial strains are (*E. coli*,*K. pneumoniae*,*P. aurginosa*, *St. epidemidis* and *B. cerus*) and the fungi used are (*A. niger* and *F.*

solani). That the *Malva neglecta* exert antimicrobial action on pathogens cell due to production of phytochemicals.(Tannins, flavonoids and phenols). Phytochemicals inhibit adherence of pathogen to cell and they act by resembling hormones, signal

transduction and genes expression process, and binding them to bacterial wall and induction bacteria stasis.[13 , 14]. as the phytochemical screening showed that.

Table (1) Antibacterial activity of *Malva neglecta* extracts measured as diameter (mm) of inhibition zone

Plant Sample	Fractions	E. coli	St.epidermidis	K.pneumoniae	P.aeruginosa	B. cereus
Malva neglecta	Crude	8	10	12.5	11	13
	n-Hexane	0	12	15	13	15
	Chloroform	12	11	13	12	10
	Et.acetate	0	12	13	13	13
	Water	10	0	14.5	10	10

Table (2) Antifungal activity of *Malva neglecta* extract

Plant sample	Fractions	A.niger	F. Solani
Malva neglecta	Crude	+	+
	n-hexane	+	+
	Chloroform	+	+
	Et.Acetate	+	+
	Water	+	-

Table (3) The major chemical compounds of Malva neglecta

Phytochemical screening	Malva neglecta
Phenolics	+
Tannins	+
Amino acids	+
Alkaloids	+
Glycosides	+

Conclusion

The study demonstrates powerful antimicrobial activity against many gram positive and gram negative bacterial

strains and antifungal activity against many fungi. So we recommended the

Malva neglecta plant for treatment of pathogenic microbial strains and can be used as alternative for antibiotic drugs.

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