ANTIBACTERIAL ACTIVITY OF SOME MEDICINAL PLANTS EXTRACTS AGAINST ESCHERICHIA COLI AND SALMONELLA TYPHIMURIUM ISOLATED FROM DOMESTIC CHICKEN IN AL-QADISSIYA PROVINCE

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ABSTRACT

The aim of present study was conducted to evaluate the inhibitory activity of ethanolic and chloroformic extracts of some medicinal plants{ pomegranate peel (*Punicagranatum*) , oak trunks (*Quercusacuta*),thyme fruit(*Thymus vulgaris*)andCinnamon tree cortex *(Cinnamomumzeylanicum*)}at different concentrations (50, 100, 200 and 400 mg/ml) against *Escherichia coli* and *Salmonella Typhimurium* isolated from fecal samples of domestic chickens (suffering from signs of enteritis infection) and compared their activity with effectiveness of standard reference antibiotics used in this study and by measuring the zones of inhibition produced around the holes after incubation on Muller-Hinton agar.

The results exhibited variable susceptibility of tested microorganisms for different concentration of extracts. In present study, the activity of most these medicinal plants extracts was associated with high concentrations. The results showed ethanolic and chloroformic extracts of thyme and Cinnamon as well as,ethanolic extracts of pomegranate peel, oak exhibited significant effectiveness against *E.coli* isolates while, same isolates werethe more resistant bacteria for chloroformic extracts of pomegranate peel and oak.

The ethanolic and chloroformic extracts of oak andCinnamon showed good antibacterial activity against *salmonella Typhimurium*isolates, except ethanolic extract of oak at concentration 50 mg/mldid not show any antibacterial activity against*Salmonella Typhimurium* isolates.Ethanolic and chloroformic extracts of thyme as well as, ethanolic extracts of pomegranate peel showed moderate antibacterial activity against *Salmonella Typhimurium*isolates while;chloroformic extracts of pomegranate peel did not show any antibacterial activity against same isolates. In this study, the standard antibiotics (nalidixic acid, lincomycin, rifampin, chloramphenicol, streptomycin, amoxicillin/clavulanic acid and novobiocin) showed low effective in inhibition the growth of *E.coli* and*Salmonella typhimurium* isolates while,cephalothin showed no effect in inhibition against the growth of the tested organisms.

INTRODUCTION

Salmonella and *E. coli* has long been recognized as an important zoonotic pathogen of economic significance in animals and humans.*E. coli* resides in the intestinal tract of all mammals and in poultry and wild birds. The relative abundance of *E. coli* in avian species is dependent on climate, diet, body mass and host factors; hosts living in close proximity to human habitations are more likely to harbor *E. coli* than hosts living away from humans (1).*Salmonella* infected chickens represent a source of pathogens for humans, causing severe illnessand even death. *Salmonella Typhimurium*is also the most frequently isolated serovar from globalfood-borne outbreaks. Poultry are one of the most important reservoirs of *Salmonellae* that can betransmitted to humans through the food-chain.Antimicrobial resistance in zoonotic enter pathogens including *Salmonella* and *Escherichia coli* in food animals is of special concern to human health because these bacteria are likely to transfer from the food chain to humans(2).

Plants are important source of potentially useful structures for the development of new chemotherapeutic agents even against some antibiotic-resistant strains. The first step towards this goal is the *in vitro* antibacterial activity assay (3).The use of new compounds to prevent antibiotic resistance of pathogenic species and are not based on existing synthetic agents. Where,Plants and their essential oils are potentially useful sources of antimicrobial compounds. Numerous studies have been published on the antimicrobial activities of plant compounds against many different types of microbes, including food-borne pathogens (4, 5).*Punicagranatum* Linn (pomegranate) belonging to family of *Punicaceae*. The medicinal parts are the root, bark, fruits, peel of the fruit and the flowers (6). With regards to the popular therapeutic uses of pomegranate, it has known as an anti-diarrhea, antiparasitic agent for treatment of ulcers, diuretic, with antibacterial activity (7). *P. granatum*has the ability to inhibit the activity of *Staphylococcus aureus*(Gram positive)*, Escherichia coli, Klebsiellapneumoniae, Proteus vulgaris,* and *Salmonella typhi* (Gram negative) organisms (8). *Quercus* (oak) are used as an astringent, antiseptic and hemostatic. *Quercus*is also used to treat acute diarrhea and inflammation. Moreover, the decoction of these plants could be used for burns and cuts (9).

Thymus vulgaris (thyme) a member of the family Lamiaceae, is a small shrub by plant with a strong spicy taste, which grows in several regions of the world (10).The ethanolic

extract of Thyme contains many phytochemicals substances including terpenoids, tannins and polyphenolic compounds as well as flavonoids. The different components diffusing at different rates may have been responsible for the varying zones of inhibition obtained in against the susceptible microorganisms. This plant is assumed to have compounds which have a potential antimicrobial activity its important compounds are flavonoids. Flavonoid's activity is probably due to their ability to complex with extra cellular and soluble proteins and to complex with bacterial cell walls and lipophilic flavonoids may also disrupt bacterial membranes. (11) .The antibacterial activity of cinnamon has been attributed to the presence of some active constituents (12). The objective of the present study was conducted to evaluate the inhibitory activity ofsome medicinal plants extracts against *Escherichia coli* and *Salmonella Typhimurium.*

MATERIALS AND METHODS

Isolation and identification of microorganisms:

Clinical isolates of the following bacteria: *E. coli* and *Salmonella Typhimurium* were isolated from fecal samples of domestic chicken suffering from signs of enteritis infection .Where,50 fecal samples of infected domestic chicken were collected from different poultry farms in Al-Qadissiya province. Fecal samples were inoculated in buffered peptone water in test tubes (5ml) incubated at 37 ºC for 18-24 hours.The bacteria have been diagnosed according to (13). All bacteria isolates were cultured on nutrient broth and were incubated for 24 h. at 37ºC before use.

Medicinal plants

Dry medicinal plants pomegranate Peel(*Punicagranatum*), oak trunk (*Quercusacuta*), Thyme fruit (*Thymus Vulgaris*) and Cinnamon tree cortex *(Cinnamomumzeylanicum*)} were purchased from a local market in Al-Diwanyia city and were identified in the national Iraqi institute for herbs., Baghdad, Iraq.

Antibiotics

Nine standard antibiotics had been chosen according to their broad-spectrum activity used as positive control against each of the test microorganisms, they include:- cephalothin(KF)30mcg,nalidixicacid(NF)30 mcg, rifampin (RA) 5mcg ,cefotaxime (CTX)10mcg,lincomycin(L)10mcg,chloramphenicol(C)10 mcg ,amoxicillin

/clavulanic acid(AMC)20/10 mcg,streptomycin(S)25mcg and novobiocin (NV)30 mcg .All these antibiotics carried the same trade name that was (Bioanalyse) ®.

Preparation of extracts

Both Ethanolic and Chloroformic extracts were accomplished according to the method of Le Grand *et al*., (14). Briefly 50 gm. of each powdered plant sample was mixed with 250 ml for each of the ethanol (96%) and the Chloroform. The mixture was kept for 2-5 days in tightly sealed containers at room temperature and it was shaken several times daily. This mixture was filtered through filter paper to remove the coarse plant materials. Further extraction of the residue was repeated 3-5 times until a clear supernatant extraction liquid was obtained. The filtrates of each tested plant were evaporated to dryness using a rotary evaporator at 40ºC. The final dried samples were weighed and stored until use**.**

Serial dilutions:

A serial dilution of each extract was prepared for studying of their antibacterial activity at different concentrations. It was done by diluting 2 gm of each dry extract with 5 ml of 96% ethanol as well as, 5ml of chloroform to obtain stock solutions at a concentration of 400 mg/ml. From there stock solutions various concentrations were made including: 200 mg/ml (consist of 2 ml each of extract solutions (96% ethanol and chloroform) and 2 ml each of the stock solutions at 400 mg/ml concentration), 100 mg/ml (it was made by adding 1 ml each of extract solutions(96% ethanol and chloroform) to 1 ml each of the extract solutions at a concentration of 200 mg/ml), and 50 mg/ml (prepared by drawing 1 ml each of the extract solutions at a concentration of 100 mg/ml and adding to 1 ml each of extract solutions {96% ethanol and chloroform}) (15).

Antibacterial activity:

E. coli and *Salmonella Typhimurium* isolates were sub-cultured in nutrient broth (HIMEDIA Laboratories, Mumbai-India) that were prepared according to the instructions given by the manufacturing company. After that, several colonies of *E. coli* and *Salmonella Typhimurium* were suspended by using sterile cotton swab in sterile tube containing 10 ml of nutrient broth mixed, and incubated at 37ºC for 24 hours to produce bacterial suspension revealed by the presence of turbidity (16).

The standardized inoculum suspension was inoculated within 15-20 minutes. Mueller-Hinton Agar (HIMEDIA Laboratories, Mumbai-India) which is a growth media used for testing antibiotics and the chosen plant extracts susceptibility of the tested microorganism was prepared also according to the manufacturer guide. This media was poured aseptically at 45 ^{0}C into sterilized Petri plates by using sterile pipette (20 ml capacity) on the flat horizontal surface to a depth of 20 mm. After complete solidification, a standard cork borer of 5 mm diameter was used to cut 5 uniform wells on the surface of each agar plate aseptically (with exception of those plates used for antibiotic study). A sterile cotton swab was dipped into the bacterial suspension produced by *E. coli and Salmonella Typhimurium* to be inoculated on the Mueller-Hinton agar surface by streaking of the swab over its. Finally and after the inoculums were dried, 0.1 ml of each concentration of each plant extract was dropped into the wells of its inoculated plates ie., each plate contained 4 different concentrations of each plant extract (50, 100, 200, and 400 mg/ml) besides 0.1 ml each of 96% ethanol and chloroform which considered as a negative control was dropped in one well on the same extract plate. As well as one disc of each antibiotic control was placed with a sterile forceps over the surface of its own plate (so that 3 different discs of antibiotics were applied over each plate). All plates were incubated at 37 ^{0}C for 24 hours. Zone of inhibition around each well measured in mm with the ruler (17).

Statistical analysis:

Data were expressed as mean ± S.E.M. Statistical reading and comparison among the groups was performed by one way analysis of variance (ANOVA) using SPSS program version 18 followed by least significant differences (LSD) test with a p- value ≤ 0.05 was considered significant(18).

RESULTS AND DISCUSSION

An outbreak of *Salmonella Typhimurium* or *E. coli* among domestic chicken can have great financial consequences for an animal enterprise but also be a threat for public health as there is a risk for transmission of the infection through the environment (2). In present study, *E. coli* was detected in 22% (11/50) of feces samples while; Detection rate of *Salmonella Typhimurium* was 10% (5/ 50) of feces samples of domestic chicken suffering from signs of enteritis infection. with the increasing occurrence of bacterial

resistance changes in the concentration of the test material against available antibiotics, it has become essential to look for new antibiotics. Most of the antibiotics available today come from natural origin, especially from various microbial or plant sources. Medicinal plants become important sources of drugs production.It can also be possible source for new potent antibiotics to which pathogenic strains are not resistant (19). In this study,each extract was tested against each of *E. coli and Salmonella Typhimurium* isolates. The antibacterial activity of the extracts was recorded as the mean diameter of the resulting inhibition zones of growth measured in (millimeters). The different extracts and standard antibiotics showed various degrees of zones of inhibition in the culture media depending mainly on the bacterial species, type of solvents used for extraction process in addition to concentration of extract.

The antibacterial activity of the tested plants extracts on *E. coli*:

The results of antibacterial activity of the tested plants extracts on *E. coli*were summarized in Table (1)which was varied according to the type of plant and the used concentration.The results showed that there were significant differences ($P< 0.05$) between the results obtained by the different concentrations that had been used for each of tested plant extracts .In this study, ethanolic extracts of pomegranate peel showed good antibacterial activity against *E. coli* with a zone of inhibition as followed according to the studied concentrations (400, 200, 100, 50 mg\ml) 10.6± 0.13, 10±0.36, 14.64±0.42, 18.83± o.3 mg\ml respectively. These resultsare agreed with found by (20) in that ethanolic extract of pomegranate peel has shown high antimicrobial activity against *E.coli*.

The ethanolic extract of oak showed antimicrobial activity against *E.coli* isolates with gave a zone of inhibition according to the studied concentrations (9.33±0.42, 12.66±0.42, 14.5±0.56, 20±1.11) mg\ml respectively (figure 1). These results were agreed with (21) concluded that ethanolic extract of oak trunk have antibacterial activity against both Gram positive and Gram negative bacteria in culture media. The antibacterial effectiveness of the oak ethanolic extract may result from the synergistic effect of a number of compound which are present in this plant especially to the tannins and polyphenolic compounds. Several esters of gallic acid as n-propyl gallate, n-octylgallate and n-dodecyl gallate have shown antibacterial effectiveness inside antioxidant activity. Gallic acid is considered one of the components of the extract has no activity against bacteria, although it was previously reported to have inhibitory

activity against *E.coli*. (22). In this study, the chloroformic extract of pomegranate peel and oak did not show any antibacterial activity against *E. coli* isolates.

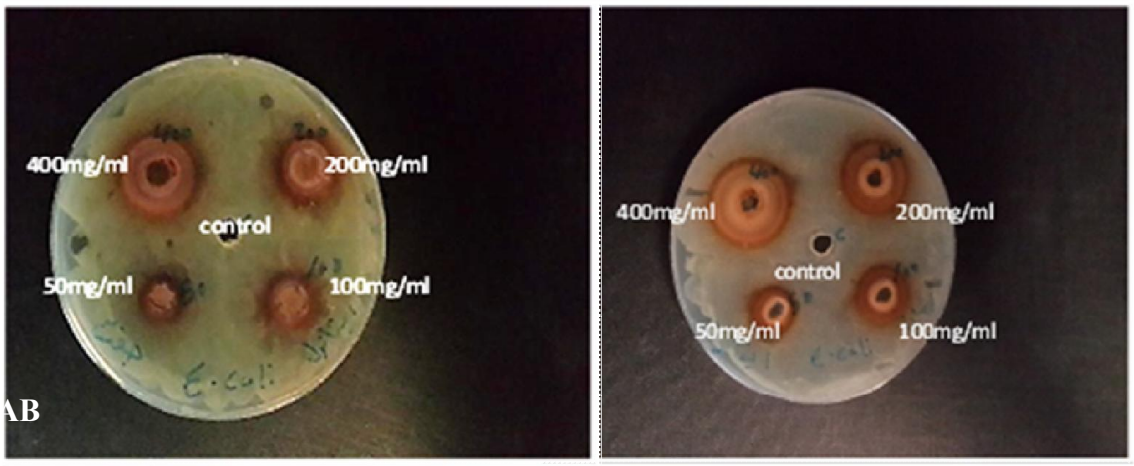
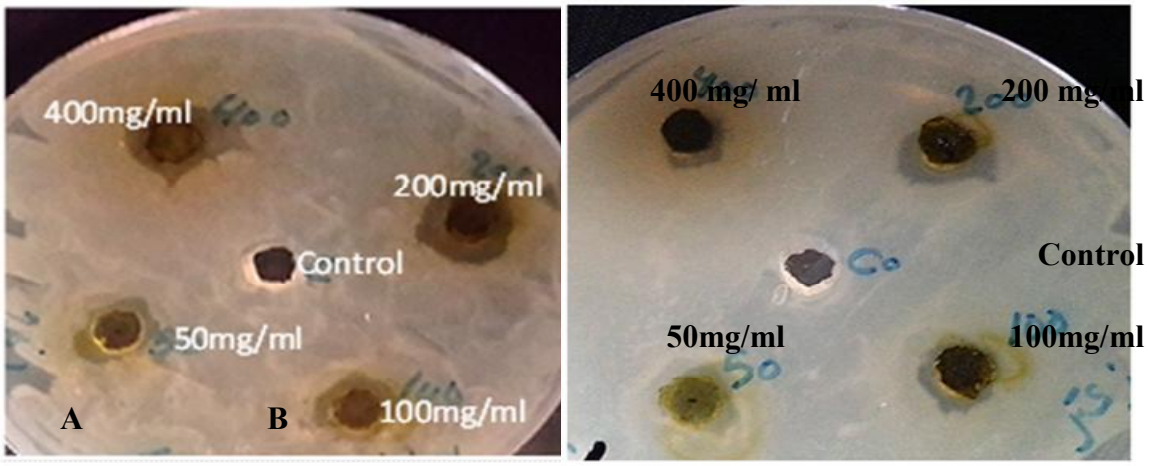


Figure (1) Inhibition zones of *E.coli* growth on Mueller-Hinton agar produced by (A)ethanolic extract of oak (B) ethanolic extracts ofpomegranate peel , the peripheral four wells contained extract concentrations (50, 100, 200, and 400 mg/ml).The central well contained 0.1 ml of 96% ethanol.

The results revealed that ethanolic and chloroformic extracts of thyme exhibited antibacterial activity against *E. coli* .Whereas,ethanol extract of thyme showed relatively same antibacterial activity and gave a zone diameterof inhibition(10.66±0.8, 13.5±0.61, 12.5±0.42 and 11± 0.36)mm at concentrations 50, 100, 200 and 400 mg/ml respectively while, the chloroformic extracts showed moderate antibacterial activity with gave a zone diameter of inhibition(9.16± 0.54,10.33±0.42 ,11.5± 0.56 and18.5± 0.5 mm)at concentrations 50, 100, 200 and 400 mg/ml respectively (figures 2).These results agreed with, (35) who showed antibacterial activity of thyme extracts by inhibiting the growth of both Gram-positive and Gram-negative bacteria.The major antimicrobial components of thyme are caffeic acid, tannins and thymol (23); tannins can be toxic to filamentous fungi, yeasts, and bacteria. Condensed tannins have been determined to bind cell walls of bacteria, preventing growth and protease activity (24).The antibacterial activity has been attributed to the presence of some active constituents in the extracts where,themechanisms of action in the growth inhibition of bacteria are involved, such as destabilization of cytoplasmic and plasma membranes, inhibition of extracellular

microbial enzymes and metabolisms, and deprivation of the substrate required for microbial growth (25,26).The site (s) and number of hydroxyl (-OH) groups on the tannins are also thought to be related to their relative toxicity to microorganisms, with increased hydroxylation resulting in increased toxicity (27, 28).



Figure(2) Inhibition zones of *E.coli* growth on Mueller-Hinton agar produced by (A)chloroformic and (B) ethanolic extracts ofthyme, the peripheral four wells contained extract concentrations (50, 100, 200, and 400 mg/ml), whereas the central well contained 0.1 ml of chloroform and 96% ethanol.

Ethanolic extract of Cinnamon showed moderate antibacterial activity against *E.coli* isolates and gave a zone diameter of inhibition with standard error (SR)(9.66 ± 0.61, 12.33±0.61, 14± o.8 and 15.16± 0.3) mm at concentrations 50, 100, 200 and 400 mg/ml respectively and the chloroformic extracts of Cinnamon showed best antibacterial activity with gave a zone diameter of inhibition(10.33 ±0.42, 11.33±0.33, 15± 0.68 and 21.5±0.76) mm at concentrations 50, 100, 200 and 400 mg/ml respectively (figures 3)and these result agreed withStudies suggested that the antibacterial activity of Cinnamon was probably due to their major component, cinnamaldehyde and their properties could be multiple. An important characteristic of plant extracts and their components is their hydrophobicity, which enable them to partition the lipids of the bacterial cell membrane and mitochondria, disturbing the cell structures and rendering them more permeable. Extensive leakage from bacterial cells or the exit of critical molecules and ions will lead to death. (29).

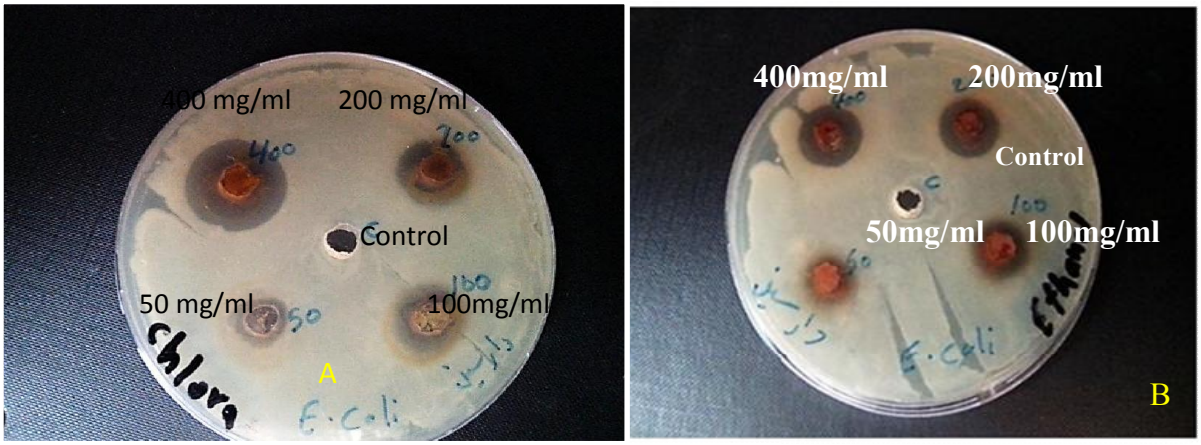


Figure (3)Inhibition zones of *E.coli* growth on Mueller-Hinton agar produced by (A)chloroformicextracts and (B) ethanolic extracts of Cinnamon, the peripheral four wells contained extract concentrations (50, 100, 200, and 400 mg/ml), whereas the central well contained 0.1 ml of chloroform and 96% ethanol.

Table (1) Effect of some medicinal plantextracts at different concentration on*E. coli*

Concentration of extracts	Zone of growth inhibition (mm)							
	pomegranate peel(*Punicagranatum)*		oak (*Quercusacuta*)		Thyme *(Thymus Vulgaris)*		Cinnamon(*Cinnamomumzeylanicum*)	
	Ethanol	Chlorofor	Ethanol	Chloroforn	ethanol	Chloroform	Ethanol	Chloroform
50	10.6± 0.13^{Ab}	0± 0^{Aa}	9.33±0.42^{Ab}	0± 0^{Aa}	10.66±0.8^{Ab}	9.16± 0.54^{Ab}	9.66 ± 0.61 ^{Ab}	10.33 ±0.42^{Ab}
100	10±0.36^{Ab}	0± 0^{Aa}	12.66±0.42^{Bb}	0± 0^{Aa}	11± 0.36^{ABb}c	10.33±0.42^{Ab}	12.33±0.61 ^{Bc}	11.33±0.33^{Abc}
200	14.64±0.42^{Bc}	0± 0^{Aa}	14.5±0.56^{Ca}	0± 0^{Aa}	12.5±0.42^{BCb}	11.5± 0.56 ^{Bb}	14± o.8^{Cc}	15± 0.68 ^{Bc}
400	18.83± o.3^{Cc}	0± 0^{Aa}	20±1.11^{Cc}	0± 0^{Aa}	13.5±0.61 ^{Cb}	18.5± 0.5 ^{Cc}	15.16± 0.3 ^{Cd}	21.5±0.76^{Ce}

Negative control	**0± 0Da**	**0± 0^{Aa}**	**0± 0Da**	**0± 0^{Aa}**	**0± 0Da**	**0± 0Da**	**0± 0Da**	**0± 0Da**

.Different capital letters mean significant differences for vertical values at level (p<0.05).

· Different small letters mean significant differences for horizontal values at level (p<0.05).

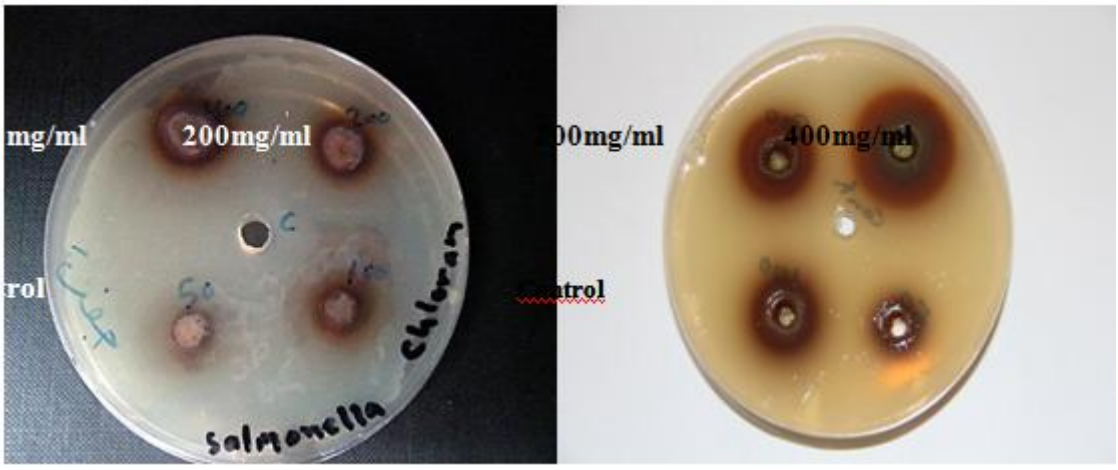
· Results for 5 isolates for each bacterium with SE.

The antibacterial activity of medicinal plant extracts on *SalmonellaTyphimurium*

The results of antibacterial activity of medical plant extracts on *salmonella Typhimurium* are showed in Table 2. Ethanol extract of pomegranate peel showed antibacterial activity against *Salmonella typhimurium* with gave a zone diameter of inhibition (9.16±0.3, 14.5±0.56, 26.66±0.4and 17.66±o.2 mm.) at concentrations 50,100,200and 400 mg/ml respectively. These results agreed with Naz*et al*.(30)who is reported that the extracts of *P. granatum* have antimicrobial activity against *Salmonella* .The constituents of *P. granatum*include gallocatechins, delphinidin, cyanidin, gallic acid,ellagic acid, pelargonidin and sitosterol, which are very wellknown for their therapeutic properties (31).

Pomegranatepeel is used to treat infections present in human sexual organs as well as mastitis, acne, folliculitis, pile, allergic dermatitis, tympanitis, scalds, diarrhea, dysentery and as an antioxidant (32). Chloroform extract of pomegranate peeldid not show any antibacterial activity against *Salmonella Typhimurium* isolates.

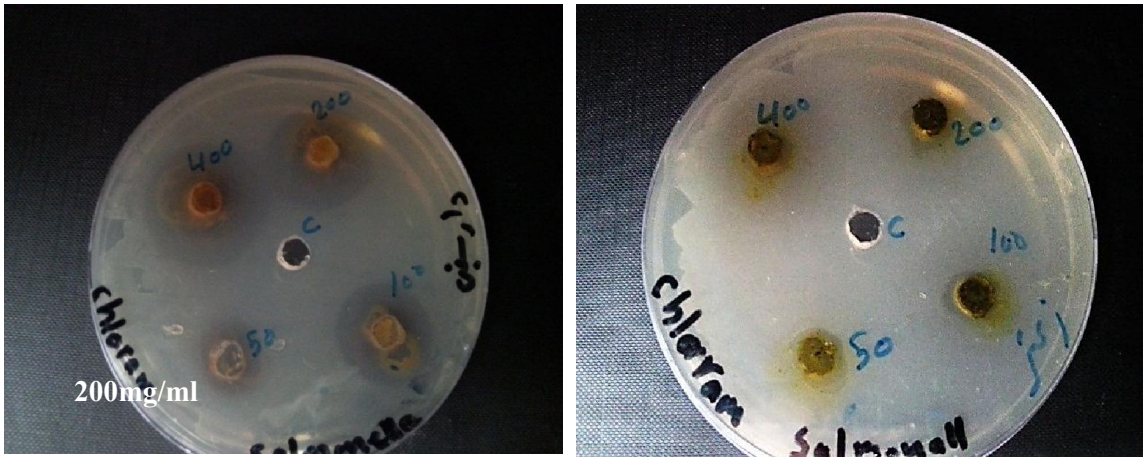
The ethanolic extracts ofoak were exhibited antibacterial activity against *Salmonella typhimurium* with gave a zone diameter of inhibition 10.83±0.3, 12.5 ± 0.5 and 22.16±0.62 mm. at concentrations 100,200and 400 mg/ml respectively while, Ethanol extract of oak at concentrations 50 mg/ml did not show any antibacterial activity against same isolates . The chloroform extract of oak showed best antibacterial activity against *Salmonella typhimurium* with gave a zone diameter of inhibition16.33±0.61, 19± o.25, 15.83±0.47 and 23.16±0.87 mm. at concentration 50, 100,200and 400 mg/ml respectively (Figure 4).Where,the found of antibacterial substances in the ethanolic extract of *Q. acuta*as compound II (4,5-Di-o-galloyl (+) –protoquercitol) and compound III (3,5-Di-o-galloyl (+)-protoquercitol) correspond with some reports on the antibacterial activities of several species of queues (33).



Figure(4)Inhibition zones of *Salmonella Typhimurium* growth on Mueller-Hinton agar produced by (A)The chloroform extract of *oak* and (B)The ethanol extract ofpomegranate peel the peripheral four wells contained extract concentrations (50, 100, 200, and 400 mg/ml), whereas the central well contained 0.1 ml each of chloroform and 96% ethanol.

Ethanolic extract of thyme were found to have inhibitory effect against *Salmonella. typhimurium* isolates with gave a zone diameter of inhibition 9.16±o.7, 12.33±0.42,10.66±0.49 and 13.66± 0.88 mm. at concentrations 50,100,200and 400 mg/ml respectively while, chloroformic extract of thyme showed relatively same antibacterial activity against *Salmonella typhimurium* isolates and gave a zone diameter of inhibition11.66±0.42, 11.33 ± o.61, 11.66±0.49 and 12.2± 0.56 mm.at concentration 50,100,200and 400 mg/ml respectively. The main constituents of thyme include thymol, carvacrol and flavonoids often thought to have strong inhibition activity against both Gram-positive and Gram-negative bacteria such as *Clostridium botulinum, Escherichia coli* and *Salmonella typhimurium* (34,35).

Ethanolic and chloroformic extracts of cinnamon showed good antibacterial activity against *Salmonella.typhimurium* isolates where, Ethanol extracts gave a zone diameter of inhibition 10 ± 0.25,16 ± 0.25, 20.16± 0.4 and 21.5±0.56 mm. at concentrations 50,100,200and 400 mg/ml respectively while, chloroform extract of cinnamon gave highest a zone diameter of inhibition 13.33±0.71, 20.83 ±o.47 , 24.16± 0.6 and 27.5± 0.34 mm. at concentration 50,100,200and 400 mg/ml respectively (figure 5).Cinnamaldehyde is the active compound in cinnamon and the earlier studies suggested



A **B**

Figure(5)Inhibition zones of *Salmonella. Typhimurium* growth on Mueller-Hinton agar produced by (A) The chloroformicextractof cinnamon and (B) The chloroformic extract of thyme ;the peripheral four wells contained extract concentrations (50, 100, 200, and 400 mg/ml), whereas the central well contained 0.1 ml of chloroform .

that the antibacterial activity of cinnamon was probably due to this compound found in cinnamon and cinnamaldehyde is also a natural antioxidant (36).

Table(2) Effect of some medicinal plant extracts at different concentration on *SalmonellaTyphimurium*

Concentrations of extracts	Zone of growth inhibition (mm)							
	Pomegranate(*Punicagranatum*)		oak (*Quercusacuta*)		thyme(*Thymus Vulgaris*)		cinnamon (*Cinnamomumzeylanicum*)	
	Ethanol	Chloroform	Ethanol	Chloroform	Ethanol	Chloroform	Ethanol	Chloroform
50	9.16±0.3^{Aa}	0± 0^{Ab}	0 ± 0 ^{Ab}	16.33±0.61^{Ac}	9.16±o.7^{Aa}	11.66±0.42 ^{Ad}	10 ± 0.25 ^{Aa}	13.33±0.71^{Ae}
100	4.5±0.56 ^{Ba}	0± 0^{Ab}	10.83±0.3^{Bc}	23.16±0.87^{Ba}	12.33±0.42 ^{Be}	11.33 ± o.61^{Ace}	16 ± 0.25 ^{Bf}	20.83 ±o.47^{Bg}
200	17.66±o.21^{Ca}	0± 0^{Ab}	12.5± 0.5 ^{Cc}	15.83±0.47^{Cd}	10.66±0.49 ^{Ce}	11.66±0.49 ^{Ace}	20.16± 0.4 ^{Cf}	24.16± 0.6 ^{Cg}

400	**26.66±0.42^{Da}**	**0± 0^{Ab}**	**22.16±0.62^{Dc}**	**19± o.25 ^{De}**	**13.66± 0.88 ^{Be}**	**12.2± 0.56 ^{Ae}**	**21.5±0.56 ^{Dc}**	**27.5± 0.34 ^{Da}**
Control negative	**0± 0^{Ea}**	**0± 0^{Aa}**	**0± 0^{Ea}**	**0± 0^{Ea}**	**0± 0 ^{Da}**	**0± 0^{Aa}**	**0± 0^{Ea}**	**0± 0^{Ea}**

.Different capital letters mean significant differences for vertical values at level (p<0.05).

· **Different small letters mean significant differences for horizontal values at level (p<0.05).**

· **Result for 5 isolates for each bacterium with SE.**

The effect of the standard antibiotics on *E. coli* and *Salmonella Typhimurium*

The standard antibiotics used in this study also produced antibacterial activity against *E. coli*with the following zones of inhibition snalidixic acid (NF)(15.33 ± 0.81)mm., cefotaxime (CTX) 5.55 ± 1.42mm.,lincomycin (L)5.77 ± 1.45 mm.,rifampin (RA)10.66 ± 0.28mm., chloramphenicol (C)10.44 ± o.41mm., amoxicillin/clavulanic acid (AMC)2.33 ± 1.16 mm., streptomycin (S)16.33 ± 0.37mm.andnovobiocin (NV)15.33 ± 0.4 mm. *Salmonella Typhimurium*was variably susceptible to eight of the used standard antibiotics; nalidixic acid (NF),cefotaxime (CTX), rifampin (RA) ,chloramphenicol (C), amoxicillin/ clavulanic acid (AMC),lincomycin (L) and Novobiocin (NV)with gave zones of inhibitions(9.44 ± 0.24,6.22 ± 1.57,5.55 ± 1.4, 2.44 ± 1.22, 6.44 ± 1.6, 6.22 ± 1.56 and 11.44 ± 0.37)mm.respectively.cephalothin showed no effect against the growth of the tested organism (table 3).

Antibiotic resistance is a complex phenomenon, especially in veterinarymedicine, because of the number of animal species, the diversity of rearingenvironments, the differences in the range of pathogenicity mechanisms andcomplex epidemiology (37). The resistant bacteria can be transmitted from animals to humans through direct contact, via food, etc. Although antimicrobial resistance isa concern for animal health, little is known about the magnitude of this problem.A wide variety of animal pathogens have been reported to be resistantagainst different antimicrobial compounds, e.g. *E. coli* of calves, pigs, and poultry(38).

Table (3)The effect of standard antibiotics on *E.coli and Salmonella Typhimurium*

Antibiotics	Zone of growth inhibition (mm)	
	E. coli	*Salmonella Typhimurium*
Cephalothin (KF)30mcg	0 ±0 ^{A}	0 ± 0^{A}
Nalidixicacid (NF)30mcg	15.33 ± 0.81 ^{B}	9.44 ± 0.24 ^{B}
Cefotaxime(CTX)10mcg	5.55 ± 1.42 ^{C}	6.22 ± 1.57 ^{C}
Lincomycin (L)10mcg	5.77 ± 1.45 ^{C}	6.22 ± 1.56 ^{C}
Rifampin (RA)5mcg	10.66 ± 0.28 ^{D}	5.55 ± 1.4 ^{C}
Chloramphenicol (C)10mcg	15.33 ± 0.4^{B}	2.44 ± 1.22 ^{D}
Amoxicillin/clavulanic acid (AMC)20/10mcg	2.33 ± 1.16 ^{E}	6.44 ± 1.6 ^{C}
Streptomycin (S)25mcg	16.33 ± 0.37 ^{B}	11 ± 0.23^{B}
Novobiocin(NV)30mcg	10.44 ± o.41^{D}	11.44 ± 0.37 ^{B}

- **The similar letters denote to statistical non-significant differences whereas the different letters denote to significant differences at ($p<0.05$)**

CONCLUSION

More extracts of medicinal plant studied have shown inhibitory effect on the growth ofthe bacteria studied, although of distinct forms.Some extracts were greater antimicrobial activity than tested antibiotic.This was attributed to similarity in the mechanism of action of these plant and antibiotics.It is thereforerecommended that the nature and the number of the activeantibacterial principles involved in each plant extract be studied in detail.

الفاعلية المضادة للجراثيم لمستخلصات بعض النباتات الطبية ضد جراثيم اشريشيا القولون *Escherichiacoli* والسالمونيلا تايفوميوريم *Salmonella Typhimurium*المعزولة من الدجاج المحلي في محافظة القادسية

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الخلاصة

تهدف الدراسة الى تقييم النشاط المضاد للجراثيم لمستخلصات الايثانولية والكلوروفورم لبعض النباتات الطبية (قشور ثمرة الرمان *Punicagranatum* وجدوع البلوط *Quercusacuta* وثمرة الزعتر *Thymus Vulgaris*وقشور شجرة القرفة *Cinnamomumzeylanicum*)ضد جراثيم*E.coli*و *Salmonella Typhimurium*المعزولة من عينات البراز للدجاج المحلي (المصاب باعرض التهاب الامعاء) بعد تحضير تراكيز مختلف لكل من المستخلصات النباتية وهي(50,100,200, 400) ملغم/مل، ومقارنة نشاطها مع فعالية المضادات الحيوية القياسية المستخدمة في هذه الدراسة وذلك بواسطة قياس نطاق التثبيط بعد حضنهاعلى الوسط الزرعي اكارمولر هنتن(Muller-Hinton agar)

وقد اظهرت النتائج وجود حساسية مختلفة للجراثيم المفحوصة للتراكيز المختلفة لمستخلصات النباتية الطبية وارتبط النشاط التثبيطي لهذه المستخلصات مع التراكيز العالية .وبينت النتائج ان المستخلصات الايثانولية والكلوروفورم لنباتات الزعتر والقرفة وكذلك لمستخلصات الايثانولية لقشور ثمرة الرمان ونبات الجفت اظهر تاثيرا تثبيطيا متباينا نسبيا ضد عزلات جرثومة اشريشيا*E.coli*،في حيننفس العزلات البكتيرية كانت اكثر مقاومة لمستخلصات الكلوروفورم لقشور ثمرة الرمان وكذلك لنبات الجفت.

وبينت المستخلصات الايثانولية والكلوروفورم للجفت والقرفة فاعلية مضادة للجراثيم جيدة ضد عزلات جرثومة *Salmonella typhimurium*، ما عدا المستخلص الايثانولية بتركيز 50ملغم/مل فلم تبين اي فعالية تثبيطية ضد نفس العزلات الجرثومية .اما المستخلصات الايثانولية والكلورفورم لنبات ثمرة الزعتر وكذلك مستخلصات الايثانولية لقشور ثمرة الرمان فقد اظهرت فعالية مضادة للجراثيم معتدلة ضد عزلات جرثومة *Salmonella typhimurium*،في حين مستخلصات الكلوروفورم لقشور ثمرة الرمان لم تبين اي فعالية تثبيطية ضد نفس العزلات الجرثومية ،وفي هذه الدراسة اظهرت المضادت الحيوبة القياسية (nalidixic acid, lincomycin, rifampin, chloramphenicol, streptomycin, amoxicillin/clavulanic acid and novobiocin) فاعلية منخفضة في تثبيط نمو عزلات جراثيم *E.coli* and*Salmonella Typhimurium*،بينما cephalothin لم يبين اي تاثير تثبيطي في نمو الجراثيم المفحوصة .

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