

Effect of some plant extracts on some pathogenic bacteria

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SUMMARY

This study was concerned with the antimicrobial effect in vitro of aqueous and ethanolic extracts of three species of plants (*Chlorocyperus rotundus* L., *Dianthus chinensis* L. and *Glycyrrhiza glabra* L.) were assayed against four species of pathogenic bacteria (*Escherichia coli*, *Proteus mirabilis*, *Staphylococcus aureus* and *Streptococcus pyogenes*). All isolates were sensitive to aqueous and ethanolic extracts of (*Dianthus chinensis* L.) singly and all combination except aqueous extracts of (*Chlorocyperus rotundus* L., *Dianthus chinensis* L. and *Glycyrrhiza glabra* L.) did not inhibit any of the test organisms. The aqueous and ethanolic extracts of (*Chlorocyperus rotundus* L. singly did not inhibit of gram-negative organism, so the aqueous and ethanolic extracts of (*Glycyrrhiza glabra* L.) singly did not inhibit gram-positive organism. The highest inhibition zone of 16 mm was observed with a combination of extracts on *Streptococcus pyogenes*.

key words: Antimicrobial, Concoctions, Pathogenic, susceptibility.

INTRODUCTION

Traditional medical practice has been known for centuries in many part of world, this traditional include extract and release the active substances from the higher plants to treat infections is an age old practice in traditional medicine (Onyeagba *et al*, 2004). Traditional medical practice has been vary from one country to another. Numerous plants and herbs are used all over the world by traditional medicine practitioners. The use of herbs is the most ancient approach to healing known. The herbal medicine may be in form of powders, liquids, liniments, and incisions (Apat, 1979). Roots, barks, and leaves of various plants are employed in ethnomedicine. Plant extracts are given singly or as concoctions for various eliminate. More than 70% of the people living in some area of the world depend on these various form of concoction and herbal decoctions for the treatment of some diseases (Kimbi and Fagbenro-Beyioku, 1998). Many investigations have demonstrated the antimicrobial activity of the constituents of some higher plants that which appears the same effects of antibiotics this work gives some cheap and benefit treatments for some microbial bacteria and skin fungal (Rocio and Rson, 1982; Akobundu and Agyakwa, 1987; Almagboul *et al*, 1988; Misra *et al*, 1992 ;

Hablemariam *et al*,1993;Braniner and Grein ,1994;Corthout *et al*,1992).The alkaloids mixtures which extract from Zizyphus plant have antimicrobial effects (Ghedira *et al* ,1994). In the scanner study observed 52 from 82 species of plants which used in indian a traditional medical practice have antimicrobial activity against one or more than pathogenic bacteria (Ghedira *et al* , 1994) .Quite a number of chemical compounds of plant origin(alkaloids, tannin, coumarin ,resins and saponin) have been shown to possess of microbial origin, in diseases of microbial origin (Harbone ,1973; Geisman,1962; Shihata,1951).The plants function as a result of antimicrobial activity against the causative agents(Safowora,1993).The work reports the antimicrobial effect of(*Chlorocyperus rotundus* L.,*Dianthus chinensis* L.and *Glycyrrhiza glabra* L.) and there combination on some bacterial species .This is in pursuance of the effects to search for drugs from plants and the verification of the scientific basis of some know.

MATERIAL AND METHODS

The bacterial isolates were obtained from laboratory of Diyala hospital and were preserved in agar slants.The bacterial isolates used are *Escherichia coli* , *Proteus mirabilis* , *Staphylococcus aureus* , *Streptococcus pyogenes*, were grown in Muller-Hinton agar in 37 C⁰ for 24 hr.The plants were obtained from city herbarium.These plants (*Chlorocyperus rotundus* L., Rhizomes , *Dianthus chinensis* L.,Fruits and *Glycyrrhiza glabra* L., Roots) were washed and peeled , cut in to pieces and dried under the sun light for one week .The dried plants were ground using an electric blender. 10 g of the ground material (*Chlorocyperus rotundus* L. Rhizomes, *Dianthus chinensis* L. ,Fruits and *Glycyrrhiza glabra* L. Roots) were soaked in 50 ml of hot sterile water and allowed to stand for 72 hr.The extracts were obtained by filtration . Similarly, 10 g of the ground samples were soaked in 50 ml of the 90% ethanol in conical flasks sealed with foil and allowed to stand for 72 hr .They were filtered to obtain ethanolic extracts were stored at 4C⁰ when not in use (Onyeagba et al ,2004). Susceptibility testing :- sterile paper disks (what man No 1 filter paper) 5 mm diameter were impregnated with different extracts and mixtures (table 1) and dried in a hot air for 5 min. The antibiotic Ciprofloxacin 30 mg was used as control for the susceptibility testing.The extracts and its combination are summarized in table 1.

RESULTS AND DISCUSSION

The result in table(2) showed the effects of aqueous and ethanolic extracts of (*Chlorocyperus rotundus* L.) applied singly did not exhibit any inhibition on the growth of *E. coli* and *Proteus mirabilis* , while (*Glycyrrhiza glabra* L.) applied singly did not exhibit any inhibition on the growth of *Staphylococcus aureus* and *Streptococcus pyogenes*. The aqueous and ethanolic extracts of (*Dianthus chinensis* L.) singly exhibit inhibition on the growth of test organisms. The combination of aqueous extracts of (*Chlorocyperus rotundus* L., *Dianthus chinensis* L. and *Glycyrrhiza glabra* L.) yielded no inhibition, where as the combination of their ethanolic extracts inhibited the growth of test organisms, this could be as a result of better extraction with alcohol. The combination of aqueous and ethanolic extracts of (*Chlorocyperus rotundus* L.+*Dianthus chinensis* L.) , (*Chlorocyperus rotundus* L.+*Glycyrrhiza glabra* L.) and (*Dianthus chinensis* L.+ *Glycyrrhiza glabra* L.) and control inhibition all organisms but the (*Dianthus chinensis* L.+ *Glycyrrhiza glabra* L.) has the highest effects on the test organisms , although its effects on the gram-positive organisms was found to be higher than of the gram-negative organisms. This finding agrees with that of other authors (Almagboul *et al*, 1988 ; Apata, 1979; Braniner and Grein, 1994; Hablemariam *et al*, 1993; Oboh *et al*, 1992; Onyeagba *et al*, 2004).

More detailed of scientific study of traditional medical practices were needed to ensure that expensive therapeutic knowledge of some plants are preserved and also to provide the scientific evidence for their effects.

(Table 1) Extracts and Combination of Extracts.

S.No.	Extract/Combination
1	<i>Chlorocyperus rotundus</i> (Aqueous extracts)
2	<i>Chlorocyperus rotundus</i> (Ethanolic extracts)
3	<i>Dianthus chinensis</i> (Aqueous extracts)
4	<i>Dianthus chinensis</i> (Ethanolic extracts)
5	<i>Glycyrrhiza glabra</i> (Aqueous extracts)
6	<i>Glycyrrhiza glabra</i> (Ethanolic extracts)
7	C+D (Aqueous extracts)
8	C+D (Ethanolic extracts)
9	C+G (Aqueous extracts)
10	C+G (Ethanolic extracts)
11	D+G (Aqueous extracts)
12	D+G (Ethanolic extracts)
13	C+D+G (Aqueous extracts)
14	C+D+G (Ethanolic extracts)
15	Control (Ciprofloxacin)

(Table 2). Diameter (mm) of inhibition zone produced by various extracts of plants.

Bacterial isolates/plant extracts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Escherichia coli</i>	-	-	3	11	5	8	7	13	7	12	10	14	-	6	15
<i>Proteus mirabilis</i>	-	-	9	7	9	9	11	8	4	8	7	12	-	8	17
<i>Staphylococcus aureus</i>	5	5	6	8	-	-	10	15	11	13	11	15	-	7	15
<i>Streptococcus pyogenes</i>	9	8	4	9	-	-	8	13	7	9	10	16	-	6	10

- = No inhibition

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أثر بعض المستخلصات النباتية في بعض البكتريا المرضية

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الخلاصة

درس أثر المستخلصات المائية و الايثانولية لثلاثة انواع نباتية (السعد *Chlorocyperus rotundus* L. ، القرنفل *Dianthus chinensis* L. والسوس *Glycyrrhiza glabra* L.) في نمو اربعة عزلات من البكتريا المرضية (*E. coli*, *Proteus mirabilis*, *Staphylococcus aureus*, *Streptococcus pyogenes*) حيث اظهرت النتائج حساسية جميع العزلات البكتيرية لمستخلصات نبات القرنفل وكذلك لمزيج مستخلصات جميع الانواع النباتية عدا المستخلص المائي لها حيث لم يظهر أي تأثير على الانواع البكتيرية. ان المستخلص المائي ومستخلص الايثانول لنبات السعد لم يظهر أي أثر تثبيطي للبكتريا السالبة لصبغة كرام وكذلك مستخلصات نبات السوس لم تظهر أي أثر تثبيطي على البكتريا الموجبة لصبغة كرام وان اعلى تثبيط (16 mm) لوحظ لمستخلص الايثانول لنباتات القرنفل والسوس في بكتريا (*Streptococcus pyogenes*) .