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STUDY EFFECT OF ESSENTIAL OILS ON RESISTANT BACTERIA

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ABSTRACT

The purpose of this work was to examine the effectiveness of essential oils for inhibition of growth of microorganisms by the paper disc agar diffusion method. Essential oils from (Clococynth, Lupin, Castor, Snak) were evaluated on gram positive bacteria *(staphylococcus aureus*) and gram negative bacteria *(pseudomonas aeruginosa) a*nd compared with standard antibiotic ampiciline. From the results, the four essential oils showed the greatest inhibition (inhibition zone from 31 to 14) mm to *staphylococcus* aureus and (inhibition zone from 22 to 11)mm to *pseudomonas aeruginosa* in minimum inhibitory concentration (MIC) ranged (50-100)µL\ml.

INTRODUCTION

For over thousands of years now, natural plants have been seen as a valuable source of medicinal agents with proven potential of treating infectious diseases and with lesser side effects compared to the synthetic drug agents. The objective of this research was to evaluate of plant extracts and phytochemicals on standard microorganism strain as well as multi–drug resistant which were isolated from hospitals. Moreover, we investigated the synergistic effects of extracts with antimicrobial activity in association with antibiotics against drugs resistant bacteria. The use of alternative medical therapy has increased the interest of pharmacologists over the past decade. In recent years a large number of essential oils and their constituents have been investigated for their antimicrobial properties against bacteria and fungi, various essential oils are biocides against abroad range of organisms [1-4], even though pharmacological industries have produced a number of new antibiotics in the last decades, resistance to these drugs by microorganisms has increased, for these reason, researches and studies developed new drugs either synthetic or natural from medicinal plants .Most of these plants contain many compounds, consequently, they are multipurpose drugs at the same time such as phenols, alkaloids, tannins, glycosides, saponins, flavanoids , carbohydrates, peptides, free amino acids [5-9].

For a long period of time, plants have been a valuable source of natural products for maintaining human health ,with more intensive studies for natural therapies ,the use of plants compounds for pharmaceutical purpose has gradually increased in world.

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MATERIALS AND METHODS

The four oils of (Clococynth, Lupin, Caster, Snak) were supplied from Alzahraa company for essential oils in Baghdad. The oils (100% pure essential oil) were stored in dark bottles until use.

Assay of antimicrobial activity

Antimicrobial activity was tested by the filter paper disc diffusion method against gram positive bacteria (*Staphylococcus aureus*) and gram negative bacteria (*Pseudomonas . aeruginosa*), 0.1 ml of the bacterial suspensions was seeded on agar ,each essential oil (25 mg of 100% from oil) diluted to several concentration ranged (50-150) µl/ml to determine minimal inhibitory concentration (MIC) respectively. These discs were impregnated with each oil, then, the discs were placed at the plates and incubated for 48h at 32ºC. The least concentration of the four oils showing a clear zone of inhibition (measured with a meter rule). Antibiotic ampicillin was used as positive control and standard, the assays were performed with two replicates [6-10].

RESULTS AND DISCUSSION

The main objective of this study is to examine the antimicrobial activities of the four oils, there is a relationship between the chemical structures of the most abundant compounds in the tested essential oils antimicrobial activity [11,12]. The results (Table.1) revealed that the four oils were more active against gram positive bacteria *S.aureus* than gram negative bacteria *P.aeruginosa.* Generally, The results showed that the four oils had great inhibitory effect against tested bacteria when compared with Synthetheic antibiotic ampiciline ,these oils showed inhibition Zone(From 31 to 14) mm at minimal inhibitory concentration ranged from (50-100) µl/ml respectively, *on S.aureus* while they showed inhibition zone (from 22 to 11)mm *on P.aeruginosa*. It has proved that various oils possess bacteriostatic and bactericidal effects and most of these oils contain many active compounds, they are multipurpose drugs at the same time ,their activity comes from the presence of hydroxyl groups in phenols ,which are capable to bind with the enzymes and inhibit their action and presence of carbonyl groups which confirmed the presence of electronic density on this compound , resulting in enhancing their ability to inhibit microbial growth [13-16].

Table 1. Antibacterial activity of the four oils and zone of inhibition (mm)

The oils	Zone of inhibition (mm)	
	P.aeruginosa	***S.aureus***
Castor	**31**	**22**
Clococynth	**28**	**20**
Lupin	**15**	**17**
Snak	**14**	**11**
Ampiciline(1mg/ml)	**36**	**25**

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