



Comparing the effectiveness of the antibiotics and medicinal plants to influence the bacteria *Propionibacterium acne* which causing acne

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ABSTRACT

The effect a group of plants was tested like. *Ocimum basilicum* oil *La-vandula*, *Azadirachata indica* against *Propionibacterium acne* acne-causing. The results showed the effect of aquatic extracts of plant leaves under study starting from the lowest user concentration of 100 mg/ml down to the largest inhibiting zone with a concentration of 500 mg/ml. Antibiotic, bacterial allergy testing was performed with the same concentration used for medicinal plants for comparison and demonstration of the synergistic effect of both species. It is believed that the differential effect on pathogenic bacteria is caused by both types of use due to the characteristic chemical composition of the plants under study and the emergence of antibiotic resistance in bacteria as a result of excessive use of antibiotics or the abandonment of treatment. From this study, we recommend the introduction of medicinal plants in the pharmaceutical industry to reduce the effects of antibiotics on the human body.



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INTRODUCTION

Acne disease spreads between 70-87% of the world's Youth (Layton, 2010) because of sexual hormone disorder and gradually disappears with age and occurs due to clogged hair follicles of dead skin cells and accumulation of fat and spreads in the face, tenderness and chest (Kligman, 1974) appears as red and black blisters or in the form of pus-filled white pellets.

Boils are an important indicator of inflammation in acne Infected (Borelli *et al.*, 2006; Jappe, 2004), the bacteria are distributed primarily in the sebaceous

glands, and these infections are produced in adolescents in conjunction with the maturation of the sebaceous glands and the production of various hormones in the body (Sugita *et al.*, 2005). Acne occurred because of the increase of some factors such as increased stimulation indrogen of sebaceous glands, or skin infections due to the infestation of *Propionibacterium acne* bacteria that cause an increase formation of fatty acids or cause the genetic factors (Kerkhof *et al.*, 2006).

Due to the microbial resistance a grit many studies (Yoo, 2010; Hammer, 2012, Dryden *et al.*, 2004) to reach effective and safe treatments at the same time against pathogenic microorganisms such as *p. Acne*, *S. aureus*, and *S. epidermidis*.

Our use in researching medicinal plants and their aromatic oils to test them as an effective treatment and to see how they can discourage the growth of germs causing acne to be used in the medical industries as suitable compounds for skin care and minimise the effects of acne;

1. ***Ocimum Basilicum***: which is renowned for its antibacterial properties which make it one of the best ingredients for the treatment of acne and skin infections and helps to maintain the

freshness and purity of the skin (Fang *et al.*, 2004).

2. ***Azadirachta Indica***: Many studies have proven their effectiveness on bacteria and fungi, with (Pai, 2004) proving the effect of neem gum on Streptococcus and proven bacteria (Alzoreky, 2003) effective plant on *Bacillus cereus*, *E coli*, *Salmonella*, *Lactobacillus spp.* And a wide range of bacteria in India and the Middle East as mentioned (Fabry, 1998) which are a very strong fungal infection as stated (Sairam *et al.*, 2000) where they tested its effect on *Candida spp.* Plant oil and leaves have a significant role in the treatment of skin diseases such as acne, eczema, psoriasis and warts, as well as its use in cosmetic and skin cleaning tools as it contains elements that help regenerate and revitalise the skin (Thas, 2008).
3. ***Lavandula***: the oldest herbs used by the Romans and the Greeks by means of its antibacterial properties, viruses, fungi, burns and insect bites (Cavanagh., 2002).

METHODOLOGY

The plants were collected after the diagnosis of their classification, isolated leaves and parts of the plants and left to dry in the air in dedicated spaces for this purpose and at the laboratory temperature for two weeks, was crushed by the mortar and then the electric machine to get the plant powder used in the study. Our Take 1 gm of each plant and blend with 10 ml of sterile water to obtain a standard solution with a concentration of 100 mg/ml. Mixed the solution by a magnetic stirrer for 24 hours at room temperature and then 4 hours at 60-70 temperature with the constant shake. Before then put the solution in the centrifuge for 3 minutes 5000 RPM.

The oils were diluted with ethyl alcohol to make a storage solution in 1000ml, the concentrations tested were (50, 100, 250 ml). As for the antibiotics that were used to demonstrating the ability of bacteria to resist antibiotics, the method was the disks propagation method: National Committee for Clinical Laboratory Standards. The performance standard for Antimicrobial Susceptibility Testing. Approved Standard M2-A7, 7th ed., National Committee for Clinical Laboratory Standard, Pennsylvania, 2000. The concentration of 500 mg/ml was used for all types of antibiotics under study, which is the lowest concentration used with herbs and shows how the bacteria can be allergic or resistant. The concentration of 500 mg/ml was used for all types of antibiotics under study, which is the lowest concentration used with herbs and shows how the bacteria can be allergic or resistant.

Antibiotics used in this work were Co-trimoxazol (CT), doxycilin (DO), erythromycin (ER), clindamycin (CM), azithromycin (AZ) and tetracycline (TE), vancomycin (van), amoxicillin, gentamycin (Gen), penicillin (pen), nystatin (nes) On growth Propionibacterium acens, in 37c for 24 hours.

Microorganisms: A number of acne- bacteria causing isolates were used in the Qadisiyah/Iraq, isolated directly from school students ranging from 13-17 years, (25) isolated in the form of swabs from infected areas cultured on the Blood Agar media for 48 hours and make the biochemical test (indol, Gram +, catalase, Esculin test and identified the bacteria was *p. acne*.

RESULTS AND DISCUSSION

Measuring the synergistic effectiveness of antibiotics against isolated bacteria

To estimate the synergistic effectiveness by observing the presence or absence of growth by measuring the inhibition diameters in the pits in which the antibiotics were found. We used the concentration of 500 mg/ml and after the incubation in 24 h. The results shown in the table were recorded by measuring the inhibition diameters of the used concentrations. See results in Table 1.

In table 1, bacteria allergy to commonly used antibiotics for the treatment of acne caused by *Propionibacterium acens* bacteria has been tested to compare the use of antibiotics and medicinal plants for treatment and the most effective knowledge. After the test the bacteria showed resistance against a wide spectrum of antibiotics such as tetracycline resistance (TE), Doxycilin (DO), erythromycin (ER), Failure to respond to these antibiotic treatments in important concentrations lead to the Appearance of advanced bacterial strains antibiotic resistance, leading to other problems When treatment stopped as stated (Agarwal *et al.*, 2011; Sunday, 2009). Our results included the bacteria were Appear resistance against (vancomycin (van) Co-trimoxazol (CT, penicillin (pen), nystatin, amoxicillin, clindamycin (CM) in the same concentration.

The above results should research alternative methods such as the use of medicinal plants for treatment to reduce the side damage to use antibiotics that are appropriate with nature of human body and not to have a resistance to the high concentrations of antibiotics.

Measure the synergistic effects of the medicinal plant against isolated bacteria

Plant extracts have been used in our current study, and to estimate the degree of synergy and quality by observing the presence or absence of growth by

Table 1: Antibiotics sensitivity test

	amox	van	tet	Az	CM	ER	DO	CT	pen	Nes
<i>Propionibacterium acens</i>	R	R	R	R	R	R	R	R	R	R

Table 2: The main causative agent of acne (Bacteria) and inhibition zone resulting from the use of effective plants measured by (mm) after the incubation 24 hours at 37 m

Pathogenic bacteria	<i>Ocimum basilicum</i> oil	<i>Azadirachata indica</i>	<i>Lavandula</i>
Concentration In Mg/ml	100	250	500
<i>Propionibacterium acnes</i>	2	5	7
		4	6
		12	4
		8	18

measuring the inhibition diameters in the perimeter of the pits in which the plant extracts were recovered. See results in table 2.

In Table 2, *Ocimum basilicum* Oil extract has an effect at 500 mg/ml with inhibition zone 7 mm, where this plant effectively defines its aquatic extracts against microbiota, including the bacteria under study, and proves this by inhibition zone during the experiment.

The effect of *Azadirachta indica*, the activity of the plant aquatic began at the lowest concentration of 100 mg/ml (12 mm inhibition zone) in the highest concentration used. The effect of the plant is due to the chemical structure which consists of a group of chemical compounds that have a strong influence as (mahmoodin and tetranortriterpenoids such as (nimbin), zadirone, epoxyazadiradione, azadiradione, deacetylnimbin, protolimonoid, naheedine such as phytochemicals responsible (Hammer, 2012).

Lavender oils have shown a high efficiency from the lowest concentration 250mg/ml led to total inhibition of bacteria (18 mm). The biggest effect recorded from medicinal plants type used in our experiment on the bacteria was the lavender oil.

Currently, it is one of the most important herbs that enter the soap industry and some medicinal preparations as an antibacterial agent especially acne., it also helps to soothe skin infections and the resulting red spots. (Cavanagh and Wilkinson, 2002) also indicated the usefulness of lavender in the treatment of certain antibiotic-resistant bacteria species such as MRSA (Methicillin-resistant *S aureus*) and VRE (Vancomycin-resistant *E faecalis*) and (Lis-Balchin, 1999) browse the anti-fungal plant activity.

CONCLUSIONS AND RECOMMENDATIONS

We infer from the current study and what has been found from previous studies: that medicinal plants possess effective chemical structures against the bacteria that causing damage skin like acne as shown in the results above. Because of the evolution of the mechanisms of resistance and the multiplicity of forms and the seriousness of the multiple use of antibiotics, especially skin ointments, because they contain effective formulas that enable

them to enter the metabolic pathways and also cause a defect in the secretion of hormones such as hydrocortzins we suggest developing a study Effective plant compositions as natural and effective substances, and pharmaceutical companies adopt the process of developing these products by introducing them as an active ingredient instead of chemical antibiotics.

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