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RESEARCH ARTICLE

Antimicrobial Activity of Olive Leaf Extract and Dental Gel against Some Pathogenic Fungi and Bacteria

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Abstract

The results of chemical detesters for some active substances in Olive leaf extract Revealed that contains Glycosides, Flavones, Saponine, Alkaloids and Turbines The statistical analysis of the results showed of the inhibitory effect of olive leaf extract on the growth of some pathogenic fungi, there are significant differences below the level of probability ($P<0.05$) between the inhibitory effectiveness of olive leaf extract of the studied species, compared with the standard antifungal (Itraconazole) used as control in the present study, table (2). The alcoholic extract of the olive leaf plant gave higher inhibition impact compared with the inhibitory effect of Itraconazole at the concentration 100% (Figure 1), the inhibitory effect of the extract at concentration of 100 % was (32, 35, 33, 36, 31, 35) mm to species (*T. mentagrophytes*, *T. verrucosum*, *M. gypseum*, *M. audouinii*, *T. schoenleinii*, *M. canis*) respectively, while was the inhibitory effect of Itraconazole (30, 31, 30, 34, 30, 30) mm respectively.

Keywords: *Denta gel, Olive leaves extravt, Antimicrobial Activity, Pathogenic bacteria.*

Introduction

Olive Leaf Extract consider as a natural, dietary supplement commonly used and cultivated for years, also the biological activity benefits of Olive Leaf have only recently become fully realized [1]. The morphology of *Olea europaea* small and ever green tree, the height 20 feet or more [2].The tree is cultivated in several Mediterranean countries, Chile, Peru, and South Australia. Olive Leaf Extract have moderate antimicrobial , mild to moderate antifungal, and strong antiviral action [3].

Olive leaf extract show helpful in acute and chronic illness viral and yeast infection by *candida*. Important hypoglycemic, antibacterial, antiviral, antifungal, antioxidant, and vaso-diliatory effects [4]. Broad-spectrum antimicrobial agent recorded by Olive leaf extract is for internal various topical applications and therapeutic use [5]. The oleuropein active compound in olive leaves monoterpene glycoside of the class known as secoiridoids [6]. The Olive Leaf Extract and oleuropein derived hydrolysis such, aglycone, elenolic acid, and elenolate calcium, a salt derived from elenolic acid found in olive oil polyphenolic portion[7]. Often a bacterial sinus infection like *staphylococcus mutans* not killed for the first one by the medication used therefore use denta gel and olive leave extract and other infection underlying brings on recurring attacks of sinusitis [8]. The present stud was aim to evaluate the *in vitro* antifungal and antibacterial antidermatophyte activity of olive leaves extracts and denta gel.

Materials and Methods

Sample Collection and Preparation: Olive leaves extract collected in January 2017. The leaves dried in the laboratory then sieved. Twenty five grams of the eaves powder dissolved in 250 ml of 80 % methanol mixing fore 24hrs and dried in oven 37c [9]. The strains used in the present study Trichophyton *mentagrophytes, Trichophyton verrucosum, Microsporum gypseum, Microsporum audouinii, Trichophyton shoenleinii, Microsporum canis and Staphylococcus mutans.*

Were collected and identified based on microscopically and morphologically from central laboratories of ministry of health /Baghdad - Iraq. Fungal inoculum and

prepared in order to use it in biological activity, Fungal inoculum is prepared by taking the growth fungus from the colony surface between 5-7 days then transfer it to 5ml normal saline vial. Then mix it using vortex [10]. Fifty µg for extract of olive leaves extract and Itraconazol were dissolved in DMSO and then shacked strongly to obtain of stock solution use it in the biological activity.

Then 0.1 ml from each olive leaves extract (25, 50, 75, 100 mg/ml) and itroconazole, applying in pits and incubated plates at temperature 30 °C, these plates were examined of daily until recording of the results. Antibacterial activity of olive leaves extract and denta gel (sodium saccharin formaldehyde), as described on the package. Each formula concentration (15, 25, 50 mg/ml) tested against *staphylococcus mutans* using method of agar well diffusion method [11].

Nutriant agar (NA) was used. $1.5*10^8$cfu/ml *S. mutans* spread on (NA), three wells of 4 mm diameter were made into the agar medium. Three wells were filled with 100 µl of different concentrations that prepared from denta gel and olive leaves extract Antimicrobial activity of dentagel and plant extract was estimated through measuring diameter of the inhibition zone against the *S. mutans* [12].

Statistical Analysis

Results presented in the current experiments were subjected to statistical analysis tested by agar-well diffusion method between activity of concentrations extracts and denta gel, results recorded antifungal and antibacterial .The one way analysis significant differences are determined in rate of probability 5% as the statistical analysis includes of variance (ANOVA) and using test of less significant difference LSD [13].

Results and Discussion

The drug resistance wide spread against antibiotics commonly used became one of the major problems that's lead to use alternative substance antimicrobial from microbes and plants still a rich source of therapeutic agents [14]. The uses of medicinal plantsconsider essential material to support the basic health lead to developing countries [15].

Active compounds in Olive leaf extract the results of chemical detesters for some active substances in Olive leaf extract Revealed that contains Glycosides, Flavones, Saponine, Alkaloids and Turbines as shown in Table (1). This result is consistent with the findings of the [16], in addition to [17], who find the extract contain a compound called aromatic Cyperone-a is responsible for the inhibitory effectiveness of the alcoholic extract [18].

Table 1: The chemical detection of the medically active substances for alcoholic extracts of Olive leaf

Plant name	**olive**
Effective matters	alcoholic extract
Glycosides	-
Alkaloides	-
Tannins	-
Saponins	+
Resins	-
Flavones	-
Terpenes	+

Influence of Alcoholic Extract of the Olive Leaf Plant on the Growth of the Studied Dermatophytes

The statistical analysis of the results showed of the inhibitory effect of olive leaf extract on the growth of some pathogenic fungi, there are significant differences below the level of probability ($P<0.05$) between the inhibitory effectiveness of olive leaf extract of the studied species, compared with the standard antifungal (Itraconazole) used as control in the present study, Table (2). The alcoholic extract of the olive leaf plant gave higher inhibition impact compared with the inhibitory effect of Itraconazole at the concentration 100% (Figure 1), the inhibitory effect of the extract at concentration of 100 %

was (32, 35, 33, 36, 31, 35) mm to species (*T. mentagrophytes*, *T. verrucosum*, *M. gypseum*, *M. audouinii*, *T. schoenleinii*, *M. canis*) respectively, while was the inhibitory effect of Itraconazole (30, 31, 30, 34, 30, 30) mm respectively.

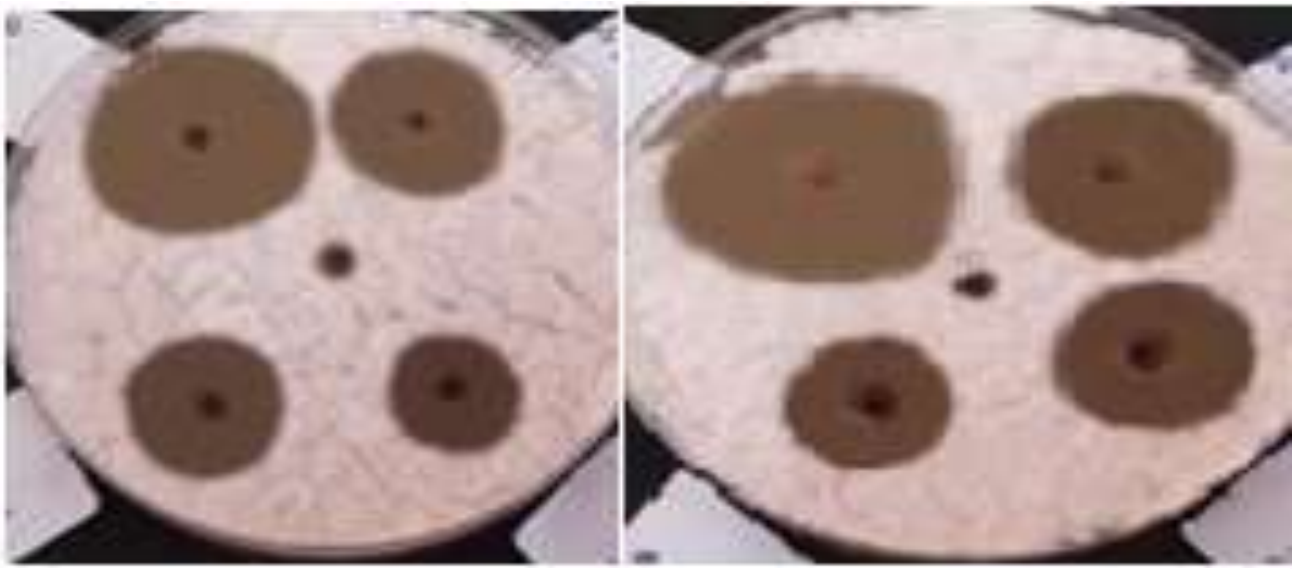

Figure 1: effect of alcoholic extract of the olive leaf in growth species *T. mentagrophytes* and *M. canis* on SDA medium at temperature 27 °C for period (4-7) days

All the rest of the concentrations of extracts (75, 50, 25) may be superiorities of standard antifungal in influence on the fungal species, Table (2).

Table 2: the inhibitory effect of olive leaf extract on the growth of some pathogenic fungi

Extract Concentration / Fungus Name	100	75	50	25	Itraconazole	0	Value F	The Table F
						Inhibition zone diameter (mm)		
Trichophyton mentagrophytes	32±0.57 A	26±0.57 B	24±0.57 C	19±0.57 D	30±0.28 E	0±0 D	620	3.11
Trichophyton verrucosum	35±0.57 A	30±0.57 B	25±0.57 C	23±0.57 D	31±0.57 E	0±0 D	722.42	3.11
Microsporum gypseum	33±0.57 A	25.6±0.33 B	24±0.57 C	19±0.57 D	31±0.57 E	0±0 D	641.23	3.11
Microsporum audouinii	36±0.57 A	30±0.57 B	24±1 C	22±0.57 D	32±0.65 E	0±0 F	437.09	3.11
Trichophyton shoenleinii	31±0.57 A	27±0.57 B	22±1.52 C	18±0.57 C	30±0.2 A	0±0 D	247.85	3.11
Microsporum canis	35±0.57 A	29±0.57 B	26±0.57 C	23±0.52 D	30±1.5 E	0±0 D	267.76	3.11
Percentage	46.3	34.25	20.10	22.03	27.2	0	-	-

The findings are described in the table average of three replicates ± standard error. • F-test of below probability (P≤0.05).

Diameter average of inhibition at concentrations of 75% was (26, 30, 26, 30, 26, 28)mm, respectively, while diameter average of inhibition at the concentrations of 50% (23, 24, 23, 23, 21, 25) mm, respectively , at the same time inhibition percentage at the concentrations 25% rage between(19 to 23) mm.

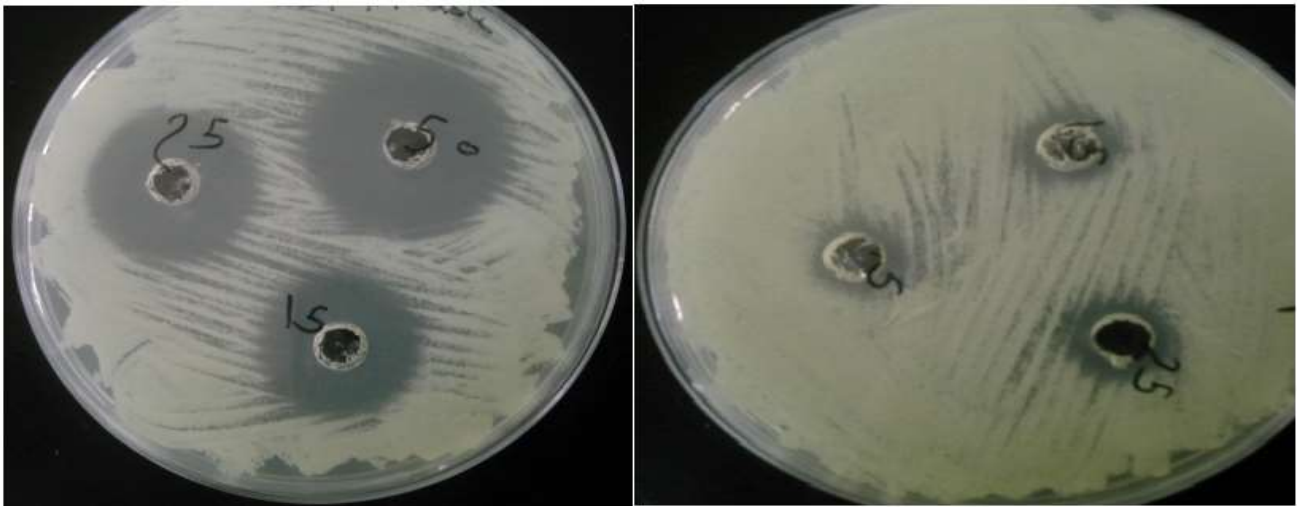

Figure 2: Effect of alcoholic extract of the olive leaf and dental gel in growth *Staphylococcus mutans* of Nutrient Agar medium at temperature 37 °C for period 48 hrs

Table 3: The susceptibility pattern of dental gel and olive leaf extract on the growth of *Staphylococcus mutans.*

		Concentration mg/ml Inhibition zone diameter (mm)		
		50	25	15
dental gel	*Staphylococcus mutans*	19.0 D	16.33 E	12.5 FG
Olive leaf extract		29.0 A	20.33 B	18.66 DE

Activity of olive leaf extract may be due to the presence of most of the compound one of the most active compounds in the extract. This has anti-microbial effectiveness, as well as the strong aromatic smell [19].The high inhibitory effectiveness of olive leaf extract related to the mechanism of action of this compound to inhibit of RNA building from inhibition of enzyme RNA polymerase in the pathogenic bacteria and fungi. also olive leaf extracts' working to discourage the DNA building and protein, that's lead to inhibits the action of other enzymes such as enzymes which contain on Thoil group such as enzymes alcohol dehydrogenase and thoiredoxin reductase. The toxicity of olive leaf on cells of mammals at the concentration of 100 mg / ml, while the concentration is considers much less for microbes [20]. The reason for high sensitivity of bacteria and fungi toward the extract lack of contain her Glutathione which work on activation of basic enzymes containing thoil and functionally disrupted by the active compounds [21]. Olive leaf extracts which prevents the Fatty acids formation and sterols and many other compounds, leading to damage of fungal cell membrane and bacterial cell. Also *Paracoccidioides brasiliensis*, which adds a new target for the work of active compound in effect on some microbial enzymes [22].

It had been observed during the study that the inhibition rate percentage in bacteria and fungi depends on the rapid growth of microbes, if increase the concentration growth the inhibition become less and vice versa that's the same on bacteria, and the reason for that is to slow spread in culture medium to olive leaf extracts from the drilling to the culture medium of solid against bacteria and fungi [23].

References

1. Vukovic N, Milosevic T, Sukdolak S, Solujic S (2007) Antimicrobial Activities of Essential Oil and Methanol Extract of *Teucrium montanum*. eCAM., 4(S1):17-20.
2. Visioli FA, Poli C (2002) Gall. Antioxidant and other biological activities of phenols from olives and olive oil, Med. Res. Rev., 22:65-75.
3. Lee OH, Lee BY (2010) Antioxidant and antimicrobial activities of individual and combined phenolics in *Olea europaea* leaf extract. Bioresour. Technol., 101:3751-3754.
4. Khayyal MT, el-Ghazaly MA, Abdallah DM, Nassar NN. Okpanyi SN, Kreuter MH (2002) Blood pressure lowering effect of an olive leaf extract (*Olea europaea*) in L-NAME induced hypertension in rats. Arzneimittelforschung., 52:797-802.
5. Aziz Nil, Farag SE, Mousa LA, Abo-Zaid MA (1998) Comparative antibacterial and

antifungal effects of some phenolic compounds. Microbios.., 93(384):43-54.

6. Trevors JK (1986) Plasmid curing in bacteria. FEMS Microbiology Reviews, 32:149-157.
7. Nafiseh, Karoubi G, Sairamalinga, Reddy K, Ramesh, Jayasimha, Rayalu D (2014) Analysis of antibiotic resistant genes in bacteria. International Journal of Analytical, Pharmaceutical and Biomedical Sciences, 3:2278-02246
8. Patwardhan RB, Dhakephalkar PK, Chopade BA (2015) Antibacterial and plasmid curing activities of root extracts of *Plumbago zeylanica*. International Journal of Herbo Medica., 2(1):13-25.
9. Maniatis T, Fritsch EF, Sambrook J (1982) Molecular Lactamase at amassachusetts chronic-care Facility-Antimicrob. Agents' chemother., 34(11):2194-2199.
10. Duke JA, Wain KK (1981) Medicinal Plants of the World. Computer Index with More.
11. Ficarra P, Ficarra R, de Pasquale A, Monforte MT, Calabro ML (1991) HPLC analysis of oleuropein and some flavonoids in leaf and bud of *Olea europaea* L. Il Farmaco. 46:803-815.
12. De Laurentis N, Crescenzo G, Lai OR, Milillo MA (1997) Investigation on the extraction and concentration of oleuropein and flavonoids in *Olea europaea* L. based products. Pharm. Pharmacol. Lett., 7:27-30.
13. Visiol F, Galli C (2002) Biological properties of olive oil phytochem-icals, Crit. Rev. Food Sci. Nutr., (42):209-221.
14. Sylvia Li Z, Philip LH, Young-Tae C, Paul LH (2003) Anti-HIV activities of Olive leaf extract (OLE) and modulation of host cell gene expression by HIV-1infection and OLE treatment. Biochemical and Biophysical Research Communications, 307:1029-1037.
15. Fabiani R, Rosignoli P De, Bartolomeo, Fuccelli R, Servili M, Montedoro G *et al* (2008) Oxidative DNA damage is prevented by extracts of olive oil, hydroxytyrosol, and other olive phenolic compounds in human blood mononuclear cells and HL60 cells. The Journal of Nutrition, 138:1411-1416.
16. Cooper LR, Chang DB, Martin CJ, Ancker Johnson B (1974) Restricted diffusion in biophysical systems. *Biophys. J*., 14 (3) 161-177 CTPA - Cosmetic, Toiletry and Perfumery Products Association. [on line]. Available in: http:/ www.ctpa.org.uk/reg/define/bulk.htm. Acessed in: 02/05/2004.
17. Drake Te, Maibach Hi (1976) Allergic contact dermatitis and stomatitis caused by acinnamic aldehyde-flavored toothpaste. *Arch. Dermatol*., 112 (2): 202-203.
18. Mangena T, Muyiam Ny (1999) Comparative evaluation of the antimicrobial activities of essential oils of *Artemisia afra*, *Pteronia incana* and *Rosmarinus officinalis* on selected bacteria and yeast strains. *Lett. Appl. Microbiol.,* London, 28 (4): 291-296.
19. Marchant S (2001) The predominant microflora of nursing caries lesions. *Caries Res.*, v. 35 (6): 397-406.
20. Mattie M (1981) Kinetic of antimicrobial action. *Rev. Infect. Dis*., 3: 19-27.
21. Mattson MA, Jensen OC, Dutcher RA (1947) Triphenyltetrazolium chloride as a dye for vital issues. *Am. J. Med. Sci*., 106: 294-295.
22. Nascimento GGF, Locatelli J, Freitas PC, Silva GL (2000) Antibacterial activity of plant extracts and phytochemicals on antibiotic-resistant bacteria. *Braz. J. Microbiol.* São Paulo, 31 (4): 247-256.
23. Nostro A, Cannatelli A M, Morelli I, Cioni PL, Bader A, Marino A, Alonzo V (2002) Preservative properties of *Calamintha officinalis* essential oil with and without EDTA. *Lett. Appl. Microbiol.*, London, 35 (5): 385-389.
24. OHARA TM (1992) *Aplicação do cloreto de trifeniltetrazólio no teste de limite microbiano em medicamentos e cosméticos.* São Paulo, 211. (Tese de Doutorado, Faculdade de Ciências Farmacêuticas, USP).
25. Orth DS (1979) Linear regression method for rapid determination of cosmetic preservative efficacy. *J. Soc. Cosmet. Chem*., New York, 30: 321-332.

