

Antibacterial Activity of *Origanumvulgare* Leaves against Different Types of Bacteria Isolated from Urinary Tract Infection Patients in Baghdad/Iraq

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Abstract

In the gift study, antibacterial drug potency of *Origanumvulgare* was studied on four sorts of morbidic microorganism isolated from urinary tract infection patient samples, *Staphylococcus aureus*, *E. coli*, *Klebsiella pneumonia*, and *Sallmonellatypfi* by agar well diffusion assay. The repressive effects of this leaves extract were compared with control distilled water. The inhibition result of *Origanumvulgare* in numerous concentration against microorganism growth were studied, the results showed that there's an excellent inhibition growth on all studied microorganism isolates except *Klebsiella pneumonia*. This study conclude that the data ensure the antibacterial drug potential and highlight the promising role of oregano as new lead structure within the explore for novel antibacterial drug agents. Therefore, any experiment involving a bigger sample size and extract a concentration is deserve analysis.

Keywords: antibacterial drug, *Vulgare*.

Introduction

A large style of antibiotics square measure normally used for the treatment of great infections caused by microorganism. In recent years, multiple drug resistance has developed thanks to indiscriminate use of existing antimicrobial medication within the treatment of infectious diseases. Resistance of antimicrobial drug could be a threat to humanity as a result of most of the infection inflicting by microorganism has become multi drug resistant [1].

Microorganism that immune to antibiotic might keep folks sick longer, and typically folks square measure unable to recover in the least, as a result of the priority concerning the facet effects of standard drugs, natural merchandise square measure used as an alternate to traditional treatment in healing and treatment of assorted diseases has been on the increase within the previous few decades.

Oregano plays a primary role world trade each as 'whole' dried leaves and in ground type [2]. The leaves of oregano similarly as its volatile oil square measure used medicinally.

The oregano oil has been used historically for metastasis disorders, stomach upset, cavity, auto immune disorder and tract disorders. The active part of oregano is carvacrol and uses as a food preservative. Alternative chemical elements embody terpene, gammacariofilene, Canfor, linalool, alpha-pinene and phenol.

Recent studies have incontestable oregano is taken into account opposed hyperglycemic, antiviral inhibitor, anti-mutagenic [3], antifungal [4], and antibacterial drug. The employment of natural antimicrobial compounds is very important not just for the preservation of food however additionally for the management of human and plant diseases of microbic origin. This study was aimed to gauge the antibacterial drug activity of oregano against completely different species of microorganism.

Materials and Methods

Preparation of Decoction

The oregano leaves extract was prepared by boiling 10 g dried leaves of oregano in 100 ml distilled water in a conical flask for 15 minutes.

The flask was removed from heat and allowed to cool, and then the extract in flask was filtered to obtain clear decoction.

Antibacterial Activity

Antibacterial activity was performed by (Agar well diffusion method), Agar well diffusion method is widely used to evaluate the antimicrobial activity of plants or microbial extracts.

Similarly, to the procedure used in disk-diffusion method, same amount 15-20 mL of Mueller-Hinton agar was used as a medium poured on glass petro plates of same size and allowed to solidify and Mueller- Hinton broth was used for the preparation of inoculums. Four to five isolated colonies of tested organisms were picked by sterile loop and inoculated in tubes of MHB (5 ml in each). The inoculated tubes were incubated at 37°C for 24 hours and matched with 0.5 McFarland Nephelometer turbidity standards [5].

The agar plate surface was streaked by a sterile cotton swab with the reference bacterial strain. Then, a hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork borer or a tip, and a volume (100 μ L) of the antimicrobial agent or extract solution was poured with micropipette in the bore. The plates were allowed to standby for 30 min. The plates were incubated at 37°C for 24 h. After incubation inhibition zone diameters were measured to the nearest millimeter (mm).

Statistical Analysis

Mean zone of inhibition and standard deviations were Calculated.

Results and Discussion

Within the gift study, liquid decoction of oregano showed antibacterial drug Activity against several microorganism isolates tested (Table 1). This was assessed by evaluating the presence of inhibition zone.

Table 1: Antibacterial drug activity of aqueous decoction of dried leaves of *Origanum vulgare* on clinical bacterial isolates

Organism	No. of isolates	Mean zone of inhibition in millimetre \pm standard deviation of decoction
<i>Escherichia coli</i>	8	6.9 ± 1.5
<i>Klebsiella pneumoniae</i>	8	-
<i>Salmonella typhi</i>	8	8.9 ± 4.4
<i>Staphylococcus aureus</i>	8	13.3 ± 5.7

The results showed great variation in antibacterial activity of oregano. The decoction exhibited maximum activity against 13.3 mm mean zone of inhibition \pm 5.7 Standard deviation) of *Staphylococcus aureus* (Fig 1.A) followed by *Salmonella typhi* ($8.9 \text{ mm} \pm 4.4 \text{ SD}$) (Fig.1.B) and

Escherichia coli ($6.9 \pm 1.5 \text{ SD}$) (Fig.1.C), while some strains showed complete resistance to the extract (Fig.1.D). There is no antibacterial activity of oregano against *Klebsiella pneumoniae* with all oregano concentrations.

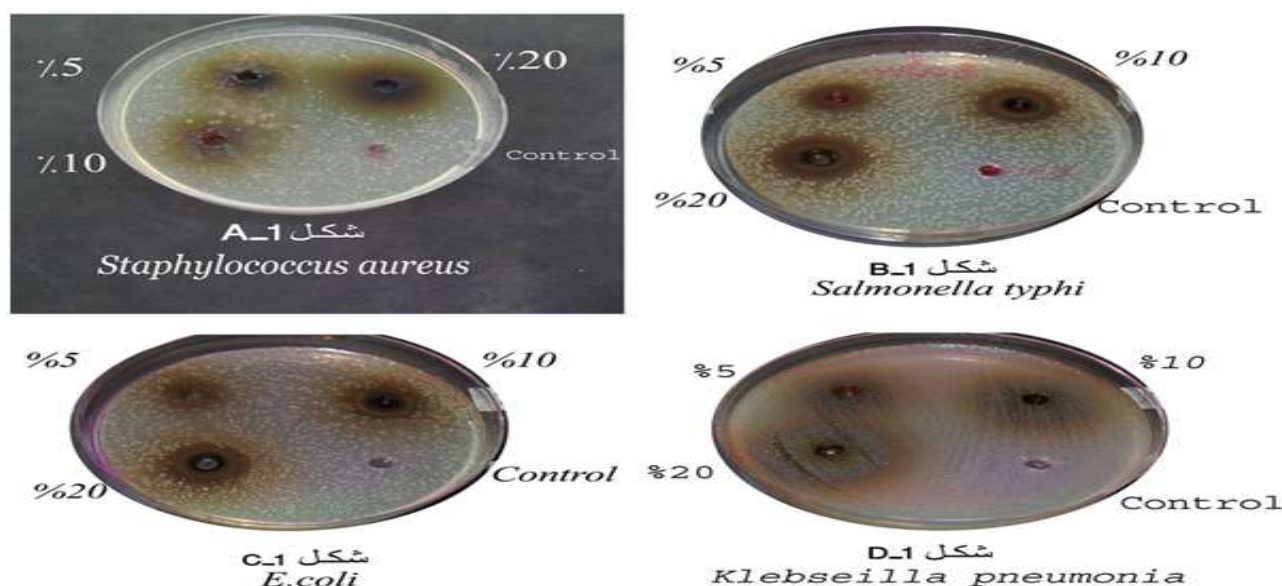


Fig.1.A.B.C.D. inhibition zones of oregano against bacterial growth.

Oregano contains polyphenols, including numerous flavones, [6]. Fibre, iron, manganese, vitamin E, iron, calcium, omega fatty acids, manganese, and tryptophane. It's most vital element is its essential oil, that contains over sixty completely different compounds, with the first ones being carvacrol and phenol, whereas lesser extensive compounds embrace p-cymene, γ -terpinene, caryophyllene, spathulenol, germacrene-D, β -fenchyl alcohol and δ -terpineol [7].

Additionally, the chemical compounds tributaries to flavour are terpene, pinene and ocimene. As we have a tendency to all apprehend, carvacrol is majorly accountable for the biological activities of oregano [8] and is considered as a biocidal, resulting in bacterial membrane perturbations that lead to leakage of intracellular ATP and potassium ions and ultimately cell death [9].

Oregano has shown antimicrobial activity in a number of studies. In 2007, the oil, binary compound infusion and boiling *Origanum vulgare* were assessed [8] for medicine activity against eleven completely different genera of Gram negative bacilli by disc diffusion methodology. The aqueous infusion also showed important repressive activity against *Klebsiella pneumoniae* ($20.1 \text{ mm} \pm 6.1 \text{ SD}$), *Escherichia coli* ($15.8 \text{ mm} \pm 1.5 \text{ SD}$), *Salmonella typhi* (16.1 ± 3.8) and few alternative organisms, this study was in agreement with previous study with (*E. coli*, *Salmonella typhi*), however non-agreement with *Klebsiella pneumoniae*.

Besides, in 2009, the antibacterial potential of infusion, boiling and oil of oregano (*O. vulgare*) against 111 gram-positive microorganism isolates happiness to twenty three completely different species associated with three genera was studied [10].

The infusion and essential oil of oregano exhibited activity against several organisms including *S. aureus* and *S. saprophyticus* but all the tested isolates were found resistant to decoction of oregano, this study non-agreement with the present study which is showed the antibacterial activity of oregano against *Staph. aureus* a lot of sensitive. From the present study, it is clear that, decoction of *Origanum vulgare* showed the highest antibacterial activity against *S. aureus* followed by *Salmonella typhi* and *E. Coli*, which is in agreement with the on top of mentioned studies and another experiment

[11] evaluating the action of carvacrol against *S. aureus*. In 2014, the inhibitor and medicine activities of infusion, decoction and hydro alcoholic extract of oregano were evaluated and compared [12].

The samples were effective against each gram-negative and gram-positive microorganism. The hydro alcoholic extract showed the best effectuality against *Escherichia coli*. Moreover, the study [12] steered that the utilization infusion/decoction can avoid the toxic effects shown by oregano essential oil, widely reported for its antioxidant and antimicrobial properties.

A similar study in 2017, tested the antimicrobial effect of hot and cold water extracts and infusions of oregano and thyme against twenty unhealthful strains, and every one extracts were found effective [13].

Within the gift study, no activity was seen against the tested samples of *Klebsiella pneumoniae*. This would possibly most likely result to the strategy of preparation of extract is completely different (such as length of boiling or extract concentration). Further, *Klebsiella pneumoniae* a lot of resist as a result of it's a capsule.

Moreover, the current study concerned a restricted sample size and therefore the separation and purification of the crude extracts would possibly show a rise in bioactivity than the crude extracts, thus is that the increased antimicrobial activity shown by bound active elements of *O. vulgare*.

This may well be because of the very fact that, there are various compounds among the crude extracts, which can have interfered with the actions of one another. Once they were separated by numerous purification strategies, the inhibiting effect of one on the other had reduced significantly. (14) Furthermore; the lack of upper concentrations of plant extracts to diffuse through the agar medium may cause impairment in drug diffusion. it's a significant limitation within the analysis of the antimicrobial effects of plant extracts mistreatment the agar diffusion methodology [15].

Conclusion

The study confirms the medicine potential of the leaves extract of *Origanum vulgare* against some of the common clinical isolates.

Highest activity was noted against *Staphylococcus aureus* (13.3 mm \pm 5.7 SD), followed by and *S. typhi* (8.9 mm \pm 4.4 SD) *Escherichia coli* (6.9mm \pm 1.5SD). No inhibition was seen against *Klebsilla pneumonia*. The results are in conformity with many of the similar studies in the past

and emphasis the propitious role of oregano as an antimicrobial agent. The observations noted during this study would like additional development in terms of enlarged range of isolates and standardization of extract concentrations. It's going to be extended to alternative microorganisms further.

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