

ANTIBACTERIAL ACTIVITY OF SEEDS OF IRAQI DATES

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ABSTRACT

Herbal medicine has its roots in every culture around the world,) One of the most important medicinal herbs is dates palm (*Phoenix dactylifera* L.) which is well documented worldwide possesses several highly beneficial properties were investigated for their antibiotic activity against pathogenic bacteria by using three types of seed extraction: aqueous, ethanol and chloroform. Result show that most of seed extract possesses potential antibacterial activity against the tested bacteria, it is suggested that date seed must be used as an antibiotic to treat bacterial infections.

Key Words :Date, Seed, Khistawi, Zahdi, Iraq, pathogenic bacteria, antibiotic

No: of Tables: 2

No:of References: 19

INTRODUCTION

Herbal medicines have been widely utilized as effective remedies for the prevention and treatment of multiple health condition for centuries by almost every known culture.(1) U.S. continues to see an increase in the use of herbs.(2) worldwide it is estimated that 80% of the population uses herbal in the developing world are as high as 95%.(3) Although in modern medicine may exist side by side with such traditional practice , herbal medicines have often maintained their popularity for historical and cultural reasons. Such products have become more widely available commercially, especially in developed countries.(4) Many pharmacological drugs used today were derived from botanicals and the medicinal use of botanically derived compound pre-dates modern medicine. A survey in 2001 found that 122 compounds used in modern pharmacology were originally derived from botanical sources (5) One of the most important medicinal herbs is dates palm (*Phoenix dactylifera* L.) which is well documented worldwide .The importance of date palm culture is unique as it is one of the most important trees that is successfully cultured and remains productive for a long time. (6) Over 400 date cultivars are cultivated in Iraq. They can be identified by their characteristic fruit appearance, texture and fall. (7) Each part of the palm tree can be used to produce items of value for the Community and it has been found that the date palm possesses several highly beneficial properties such as antiviral, antifungal, antioxidant, antihyperlipidemic activity and hepatoprotective activity. (8) The date seeds form part of the integral

date fruit. Depending on variety and grade quality, the seeds represent about 6–12% of the total weight of the mature date. (9) They contained 7.1–10.3% moisture, 5.0–6.3% protein; 9.9–13.5% fat; 46–51% acid detergent fibre; 65–69% neutral detergent fibre; and 1.0–1.8% ash. Seed had a substantial amount of oil that needed to be characterized for constituent components, biological activities and stability. Seed contained large quantities of fibre and, possibly, resistant starch that may have potential health benefits. (10) In addition to its use in animal feed to enhance growth (11) it's also turned into non-caffeinated coffee by the Arabs.(12)In current work, we investigate the antibacterial activity of seeds extraction of two types of Iraqi dates. Extracts of seeds were studied for their antibacterial effect against the Gram positive strains *Staphylococcus aureus* and *Streptococcus pyogenes* and the Gram negative strains *Escherichia coli* and *Pseudomonas aeruginosa*.

MATERIAL AND METHOD

Date seeds of both Khistawi and Zahdi were collected, washed thoroughly in running tap water, rinsed in distilled water and shade dried for one week in open air, crushed using mortar and pestle, Powdered seeds were macerated by aqua, ethanol and chloroform.The extract was then shaken and filtered and the solvent was partially removed in a vacuum evaporator so that the final volume reduced to one-third of its first volume. The antibacterial assay was performed using paper disc diffusion method. Sterile filter paper discs (5 mm in

diameter) impregnated with different test extracts were then placed on the surface of inoculated agar plates. The plates were then incubated at 37C° for 24 h after which microbial growth was determined by measuring the diameter of the inhibition zone (mm). Each extract was analyzed in triplicate, the mean values are presented.

RESULT

The inhibition zone of growth of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Escherichia coli* and *Pseudomonas aeruginosa* is cleared in Table No. 1 and 2

Khistawi Seed extract	<i>Staphylococcus aureus</i>	<i>Streptococcus pyogenes</i>	<i>E. coli</i>	<i>Pseudomonas aeruginosa</i>
Aqueous	9	8	12	-
Ethanol	10	14	8	12
chloroform	12	16	10	7

Table No. 1

Inhibitory zone of Khistawi seed extract against pathogenic bacteria by (mm).

Zahdi Seed extract	<i>Staphylococcus aureus</i>	<i>Streptococcus pyogenes</i>	<i>E. coli</i>	<i>Pseudomonas aeruginosa</i>
Aqueous	17	5	14	-
Ethanol	18	12	10	9
Chloroform	14	14	15	8

Table No. 2

Inhibitory zone of Zahdi seed extract against pathogenic bacteria by (mm)

DISCUSSION

Results obtained in the present study show that most of seed extract possesses potential antibacterial activity against the tested bacteria; however, ethanol and chloroform extracts was found to be more effective antimicrobial agents than the aqueous extracts (Table 1). *Pseudomonas aeruginosa* which is a notoriously difficult organism to control with antibiotics or disinfectants were affected by most of seed extraction that seemed to be promising in find such antibiotic. The inhibition of bacterial growth by these extracts could be due to the presence of some active compounds which may act alone or in combination to inhibit bacterial growth (13) The extraction of biological active compounds mainly depend upon the solvent used in extraction process.(14) In any research in phytotherapy, it is necessary to choose solvent according to biological activity required and not that which gives a high amount on bioactive compounds.From there crude extract or fraction expressing good biological capacity indicates that the substance with powerful biological effect exists in this extract and must be isolated and purified to confirm its pharmacological and medical use. (15) Water is called the universal solvent because more substances dissolve in water than in any other chemical. This has to do with the polarity of each water molecule. The hydrogen side of each water (H₂O) molecule carries a slight positive electric charge, while the oxygen side carries a slight negative electric

charge.This helps water dissociate ionic compounds into their positive and negative ions. The positive part of an ionic compound is attracted to the oxygen side of water while the negative portion of the compound is attracted to the hydrogen side of water. (16,17) Ethanol is the second most important solvent after water, it is a very polar molecule due to its hydroxyl (OH) group, with the high electronegativity of oxygen allowing hydrogen bonding to take place with other molecules. Therefore it attracts polar and ionic molecules. Meanwhile The ethyl (C₂H₅) group in ethanol is non-polar. Ethanol therefore attracts non-polar molecules.Thus, ethanol can dissolve both polar and non-polar substances.(18) Ethanol is a common solvent in Cosmetics such as perfumes, Food colorings and flavorings such as vanilla essence, Medicinal preparations such as antiseptics, Some cleaning agents and Industry as it is the least toxic of the alcohols , which makes it more suitable for use in industry and consumer products. (19) chloroform is considered to be an organic nonpolar solvent and thus it will dissolve some moderately polar molecules. However, because chloroform have some polarity, it can dissolve compounds ranging from moderately polar to moderately nonpolar.(20,21)

The bacterial inhibition may be attributable to date seed extract's heat-labile bioactive components attaching to bacterial surface. The bioactive component, namely, protein and some derived polyphenolic compounds such as polysaccharides, lignans and

bioflavonoids, are present in reasonable amounts in date seed (22)

CONCLUSION

According to the results obtained from this study, it is suggested that date seed must be used in treatment of the infections as an antibiotic for wide spread of gram positive and gram negative bacteria.

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