Study Effect of Plant Extraction for Quercus Infectoria on Some Species of Bacteria

Basim Kadhim Breesam$^1$ and Jasim A. Abdullah$^2$

$^1$Al Mosawat Intermediate School, Wassit Education Directorate, Wassit, Ministry of Education, Iraq
$^2$Department of Clinical Laboratories, College of Applied Medical Sciences, University of Kerbala, Kerbala, Iraq.

ABSTRACT

Objectives: This study focused on observing the effectiveness of the inhibitory effect of two types of treatments on bacterial growth in three types of bacteria, as Amoxicillin was used as a treatment and oak (peat) Quercus infectoria (bark) in a plant extract form so that we observe the inhibitory effect of these substances on the growth of bacteria.

Methods: The current study included Quercus infectoria (bark) oak as extract and Amoxicillin as a treatment and three bacterial types: Staphylococcus aureus, Escherichia coli, Klebsiella pneumonia and this study was conducted to note the inhibitory effect of peat extract and amoxicillin on growth.

Results: Through this study, we observed that the inhibitory action of peat plant extract was better than Amoxicillin on Staphylococcus aureus, Escherichia coli, Klebsiella pneumonia, while Amoxicillin had no significance effect on the Escherichia coli, Klebsiella pneumonia for all concentration as noted that at best Concentration of 0.12 mg/ml of peat extract when compared with amoxicillin treatment.

Conclusion: No significant difference was observed between the concentrations of the plant extract and its effect on bacteria, as it was noted that the extract plant had a highly effect on both types of positive and negative bacteria of Gram stain and better than amoxicillin treatment.

INTRODUCTION

According There has been an increasing bacterial resistance to antibiotics during the past decades and globally. Moreover, antibiotics are sometimes associated with antibiotic effects on the host, including suppression of immunization hypersensitivity and sensitive reaction. For these reasons, alternative treatments have been used to combat microbial growth, and alternative treatments of plant origin are effective in treating infectious diseases while relieving many side effects simultaneously that are often associated with bacterial inhibition of industrial treatments. In this context, medicinal plants are a good source of alternative therapies that have an inhibitory effect on microbial growth. However, there has been an increase in the number of poisoning outbreaks caused by...
the bacteria that cause foodborne disease, and the development for bacterial resistance to antibiotics currently available necessitated the search of inhibiting compounds. The growth of innovative microbes and many local plants is readily available, frequently used and affordable in traditional folk medicine since they have been produced on a wide range of compounds with vital activity, on several occasions, using Plant extract is more preferred over the use of other therapeutic compounds in medicine 2. Amoxicillin It is an antibiotic from the penicillin group use for treat some types of bacterial infections that will not use for the flu, colds, or other viral infections. This treatment is found in several forms including oral capsules or oral syrup used to treat bacterial infections such as some respiratory infections. Urine, ear infection, and boils of teeth. It kills bacteria that cause injury and is sometimes use to get rid of bacteria. H pylori. These bacteria were previously thought to causes ulcers and stomach functions via preventing of formation of the bacterial cell wall. This is means that it stop any bonding between the peptidoglycan polymer chains of the stomach lining which is the major component of the cell wall 1. 

Quercus infectoria is widely known as manjakani , which is a small trees native to Greece, Asia Minor and Iran, it is also popularly knowing as oak tree as in Figure 1 and it have been widely use as medical plants from ancient time because it was through experiments it was found that it contains Large quantities of bioactive compounds such as tannin, ellagic acid, seringic acid, and gallic acid, as well as the main compounds found in oak is tannin 50-70%, aelagic acid and gallic acid. Tannic acid and precious acid are derivatives of tannins, as they possess antioxidant, antifungal, antimicrobial and antimicrobial activity so Quercus infectoria has a high activity as an antibacterial that depends on the presence of tannin. And the transfer of cell proteins so the origin of compounds with vital activity extracted from medical plant has enabled the phenomenon of their physiological activities by medical researchers. This medical plant is used in India as a powder of teeth to treatment of toothache and gingivitis and in Asian countries it have been used for centuries in traditional medicine for treat infections, and hemorrhoids caused by dermatitis can be treated with the crushed application of oak quercus infectoria as an ointment on the skin as an ointment on the skin The potential medicinal properties of this plant have prompted researchers to study it in some detail 5. 

The aim of the study focuses for observing the effects of raw crude of Quercus infectoria and comparing it with Amoxicillin drug and then we note the effect of these substances on three types of bacteria are Staphylococcus aureus, Escherichia coli and Klebsiella pneumonia because the side effects of the antibiotic high on human health In this project we try to use alternative therapy as an antibiotic that can treat or prevent the growth of bacteria.

MATERIALS AND METHODS

Preparation of the vegetable extract:
We used a sterile mixer to break down the plant into small quantities and add 40 g of the plant in the flask then add 140 ml from ethanol alcoholic and then put a mixture in rocking incubate at 24 hours to dissolved the plant compounds through the alcohol and pour in tube into the alcohol The tubes are placed in a centrifuge to separate the sludge from the leachate, then the filtrate is taken and the residue removed. The extract filter is poured into glass plates and left for 24 hours until the alcohol evaporates and then collects the extract .

Culture:
The medium is prepared according to the information found in the box and then placed in glassy flasks and the sterile media is sterilized by the studs for 15 minutes at 121c and 1psi. 

Inoculation of Bacteri:
Three dilutions of bacteria are prepared in three test tubes for each bacterium. Pour 10 milliliters of broth fed into the first tube and 9 milliliters with the remainder of the tubes, then take 1 milliliter and put into first the first tube and from it we take 1 milliliter and put in the 2nd tube and be a 2nd dilution . Concentrations of the antibiotic and the plant crude are prepared in three concentrations(0.04, 0.08 and 0.12)mg. Pouring the implant media into the plate, then leaving it to harden, after which the bacteria are cultured, where three plates are taken for each bacterium. Holes are made in the culture medium in the dish to place 100 micro liters of extract and antifouling in the dishes and for each bacterial type. Plates are placed in a dish incubator for 24 hours at 35-37c. You read and calculate the results. The lowest damping diameter (MIC) is calculated 5.
**Statistical analysis**
Statistical analysis included the use of a completely randomized design as data were entered into the program, and data includes rate for inhibition zone and number of bacterial isolates and others data use to knowing the differences between the numbers.

**RESULTS**
In our study we showed the results appearance the effect of extract plant on *Staphylococcus aureus* is best than Amoxicillin drug and in extract plant the best result appeared in concentration 0.12mg/ml is 2.725 fallow by 0.08,0.04mg/ml are 2.225 and 2.175 respectively that mean when the concentration is high the extract plant give a best result ,and this result can be show in Figures 2,3 and 4 and Table 1.

And we showed the extract plant have good effect in bacteria *Echerichal coli* while the amoxillin drug don’t have any effect in this type of bacteria and the best concentration done in extract plant is 0.12mg/ml is 2.25 and fallow by 0.08mg,0.04mg/ml are 2.725 and 2.775 respectively it is also done well in high concentration on this bacteria this result can be show in Figures 5,6 and 7 and Table 1.

Also we seen the extract plant done very well in compare with amoxillin drug ,where the last do not appear any effect in *Klebsiella pneumonia* also the best concentration in 0.04mg/ml is 2.425, fallow by 0.08,0.12mg/ml are 2.425 and 2.25 respectively, in this bacteria the plant done well in low concentration this result can be show in Figures 8,9 and 10 and Table 1. also we notice those plant have an effective in both positive and negative gram bacteria.

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Inhibition diameter (mm)</th>
<th>Anti con</th>
<th>Concentration of plant extract</th>
<th>LSD&lt;sub&gt;0.05&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amoxicillin</td>
<td>mg/ml</td>
<td>Concentration (mg/ml)</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>2.757 ± 0.075</td>
<td>A</td>
<td>0.344</td>
<td>2.725 ± 0.17</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>2.05 ± 0.15</td>
<td>A</td>
<td>0.842</td>
<td>2.25 ± 0.436</td>
</tr>
<tr>
<td><em>Klebsiella spp.</em></td>
<td>2.5 ± 0.3</td>
<td>A</td>
<td>0.878</td>
<td>2.425 ± 0.07</td>
</tr>
</tbody>
</table>

* The setting indicates the average damping diameter (mm) ± standard error.
* Letters with similar horizontal orientation indicate significant differences (p<0.05) between the plant extract concentrations of bacteria.
* Small, horizontally similar small letters indicate that there no significant difference (p<0.05) between extract concentrations of bacteria.
Figure 4. Plant extraction in concentration (0.12)mg/ml & Amoxillin drug on Staphylococcus aureus.

Figure 5. Plant extraction in concentration (0.04)mg/ml & Amoxillin drug on Escherichia coli.

Figure 6. Plant extraction in concentration (0.08)mg/ml & Amoxillin drug on Escherichia coli.

Figure 7. Plant extraction in concentration (0.12)mg/ml & Amoxillin drug on Escherichia coli.
DISCUSSION

In our current study we try to prove the anti-bacterial efficacy (inhibitory action) of the *Qurcus infectorius* against three types of pathogenic bacteria and we concluded that when we use a high concentration of the extract it gives a better result, while some research has used *Qurcus infectorius* to evaluate the activity. The antimicrobial growth of this plant on some pathogenic bacteria such as *Escheria coli*, *Staphylococcus aureus* and *Bacillus subtilis*, and the plant extract prepared from different polar solvents and examined. Their efficacy was then used in a tablet propagation method and compared with commercial antibiotics, as it was observed that plant extracts showed good anti-bacterial growth activity and all negative bacteria that were required for Gram stain were treated with both water and alcoholic extracts for *Qurcus infectoria*, the alcohol extracts were measured with the type of alcohol. Damping Qatar (MIC) *Escheria coli*, *Staphylococcus aureus*, *Bacillus subtilis* and 0.625 milliliters mg, respectively. In this report, the result has found that the effect of plant extract on bacteria that are positive for gram pigment is more than negative for gram pigment, which is due to the more resistant behavior in such negative bacteria of gram pigment as a layer of lipopolysaccharide can work in its outer membrane, which acts as an additive against inhibitor Bioactive molecules.
total was 241 diagnosed bacterial isolates after implanting swabs on different implant media, a results indicate that most frequent of the isolated were Staphylococcus aureus 32.78%, Escheria coli 14.94%, 9.96%, Klebsiella pneumoniae 6.64%, Klebsiella oxytox A 1.24%. most of these isolates showed a high resistance level to the generally available antibiotic, so the study concerned with assessing the anti-microbial effect of Quercus infectoria, aqueous and alcoholic extract (Ethanol and methanol) on the isolated bacterial type. The minimum inhibitory concentration (MIC) of the alcohol (ethanol) extract on Staphylococcus aureus was 3.125 mg / mL and that effect on Escheria coli, Klebsiella pneumoniae was 6.25 mg / mL while the aqueous and alcoholic extract (ethanol and methanol) had 25.5 12.0 had a effect of 5.2.5. / Milliliters, respectively, on Pseudomonas aeruginosa, Klebsiella pneumoniae, respectively . In one study, the results showed that the three extracts of Quercus infectoria possessed antimicrobial activity as well as against tried and tested shared microorganisms that cause wound injuries at a concentration of variation between 0.781 mg/ml and 25 mg/ml. These results support the use of these plants in treating wound infection and that the ethanol extract showed the strongest activity followed by the methanol extract and the aqueous extract and this indicates that the ethanol extract is better than both other solvents that were used in this study and may be due to ability of ethanol to extract a wide variety in chemical compounds from plants , and this study was supported via others research that’s stated the raw powder (peat) Quercus infectoria was founded to be effective against for positive and negative Gram stain bacteria . Yellow hazelnut inhibiting effects perhaps due to the presences of some photochemical components. According to previous study, Quercus infectoria contains high levels from tannin of both hydrolysable and dense form that forms the protein's irreversible nodes rich in proline leading to inhibited of cell protein formation . It is can be conclude a Quercus infectoria extract has a beneficial effects as antiseptic and may be used to treat wound infections caused by bacteria causing the disease . In another study, I noticed that the methanolic alcohol extract from the bark of the Quercus infectoria plant was tested against 11 bacterial isolates from the hospital and determined the lowest inhibitory concentration (MIC) of three bacterial strains (P.mirabilis, MRSA and MSSA). Quercus infectoria. Depending on some results obtain the value of (MIC) P.mirabilis was 5mg /ml. The (MIC) value of (MSSR and MSSA) was 1.25mg /ml . Other studies have noted that acetone and water extract from the bark of the Quercus infectoria have been high antibacterial activity, may appears depending on the presences of tannin. The antimicrobial activity for tannin may be related to its ability to inhibit microbial adhesion, enzymes, transport conditions and cell protein. In the study of the possibility of using ethanol extract of the bark Quercus infectoria plant as an anti-inflammatory to investigate the use of forms in the body for acute and chronic inflammations, both embodiments three doses that were used show effective anti-inflammatory activity when compared to the antibiotic (diclofenac) in an impressive manner, the lower dose used (250mg/kg) was most effected in reducing inflammations, and in one study Oak plant (peat) had higher activity against fungi than bacteria . Some studies indicate that the aqueous solution is the best solvent capable of extracting gallic acid and tannic acid . That extracted tannic acid was found to prevent the growth of positive and negative bacteria of the Gram stain . In addition, these compounds may contribute to the use of other antibiotic drugs. An antigen of mutagenicity and a contractile substance .

REFERENCES


