Antibacterial activity of Italic leaves Aqueous Extract Against Two Pathogenic Bacteria

Aml Hendi Salih¹, Rajaa Hendi Salih², Madeha H. Hussain³, Ali S. Hassoon*⁴

¹,³Department of Pharmacy, Medical Institute Tech. Mansour / Middle Technical University/ Iraq
²(Department of Biological Science, College of Science / Mustansiriya University, Iraq)
³(Department of Soil and Water Techniques, Al-Musaib Tech. College/ Al-Furat Al-Awsat Technical University, Iraq)

*Correspond Author:
ALI S. HASSOON: alisalealtaie2015@gmail.com, com.hs.ali@atu.edu.iq

Abstract
This research was achieved to detect the antibacterial efficacy of Eruca Sativa leaves aqueous extract against Two pathogenic bacteria, Two bacterial isolates Escherichia coli and Staphylococcus aureus were isolated from cases of infected wound were used in this study. The anti-bacterial efficacy of Eruca Sativa Italic leaves extract was detected by measuring the inhibition zone in millimeters in 3 plates and the average was considered. The results showed Eruca Sativa extract inhibit both bacterial spp and the mean inhibitory zone for S.aureus was 14.2 mm and for E.Coli was 9.0mm.the mean inhibitory zone of Ampicillin was 20mm for S.aureus and 21.3mm for E. coli distilled water shown no antibacterial activity.

Keywords: Eruca Sativa, leaves aqueous extract, S. aureus, E. Coli

How to cite this article: Salih AH, Salih RH, et al (202Antibacterial activity of Italic leaves aqueous extract against two pathogenic bacteria, Ann Trop Med & Pub Health; 23:S409. DOI: http://doi.org/10.36295/ASRO.2020.23123

Introduction
Eruca sativa (syns. Eruca vesicaria subspecies sativa (Miller) Thell., Brassica erucab L.) is an annual edible plant belongs to the Brassicaceae family. It used as leaves vegetable for their tart, fresh, flavor, peppery, and bitter. This plant is also called garden rocket, (Flora of NW Europe: Eruca vesicaria) (South African, New Zealand, Irish, Australian, and British), and eruca. However, others names are "rocket salad "rucola", "rucoli", "rugula", "colewort", and "roquette".

E. sativa, is very popular as salad vegetables, is a natively type of Eruca to countries of Mediterranean sea like Syria, Portugal, Turkey, Lebanon, and Morocco (Blamey and Grey-Wilson, 1989).

Eruca sativa is growing to height ranged from 20 to 100 cm. Its leaves has pinnate shape which have four-teen deep, small, a large terminal lobe and lateral lobes. Its flowers ranged from two to four centimeters, orderly in a corymb in an exemplary Brassicaceae fashion, a creamy-white petal with purple veins, have a yellow stamen; the sepal is shed shortly after opening the flower. The fruit is a pod (siliqua) ranging in length from 12-35 mm with the apical beak, and contains many seeds (edible). This species has a number of chromosome 2n=22. (Blamey and Grey-Wilson, 1989) Griffiths and Huxley,1992.
Some medicinal plants contain both a harmful and beneficial substance that can enhance and/or delay an individual's health. The basis for this is that it is important to examine and re-examine the medicinal plant to identify active, harmful, and harmless components. The herbs don’t only give us chemicals with the medicinal values, but they also give us trace elements and useful nutrients. The trace elements and minerals are the chemical materials that our bodies required for many physiological and biological processes which considered necessary to maintain the health. Minerals involve compounds of phosphorus, calcium, sulfur, potassium, magnesium, chlorine, and sodium. Trace elements are necessary for health of human which involve iodine, selenium, zinc, copper, iron, manganese, chromium, and molybdenum. The microorganism has the genetic capability to acquire and transfer the resistance to the antibiotic then lead to generate new main health problems in the world. This forced the scientists to seek for new drugs from biological resources like plants (Khoobchandani, et al, 2010). Anti-microbial compounds derived from plants may inhibit different bacteria through various mechanisms and give medical values to treat resistant bacteria infections (Stein et al., 2005). The herb needs to be scientifically evaluated for its antimicrobial efficacy toward antibiotic-resistant bacteria in spite of developing a new drug from phyto-sources (Simoes and Rosa, 2009).

The infection of *S. aureus* can transmit throughout the contact with the pus cells from the injured wounds, with skin contact with the infected persons, or with equipments of the infected persons like clothing, sheets, towels, or athletic object. Joint replacements put the persons particularly at risk of pneumonia, septic arthritis, and endocarditis. *S. aureus* is an important cause of the chronic biofilms infection in the medical implants, and the toxins repressor is part of the pathway of infections (Tong, et al., 2015).

*S. aureus* can be sleeping in human bodies for several years undetected. When the symptom begins to appear, the host becomes contagious for 2 weeks, and the total disease lasts for few weeks. The diseases can be fatal if untreated. *S. aureus* infections can be very severe (Masalha, et al, 2001).

Most strains of *E. coli* don’t lead to any disease, but the virulent strains can cause hemorrhagic colitis, neonatal meningitis, urinary tract infections, Crohn's disease, and gastroenteritis. Common symptoms and signs involve serious abdominal hemorrhagic colitis, vomiting, diarrhea, cramps, and at times fever. Also, in unusual cases, virulent strains are answerable for necrosis of bowel (death of tissues) and perforation without progression to peritonitis, sepsis, mastitis, gram negative pneumonia, and hemolytic uremic syndrome. The very young child is more probably to develop a severe disease like hemolytic-uremic syndrome. Nevertheless, healthy peoples of all ages are with a risk of serious consequences which maybe increase as a result for infection by Escherichia coli (Vogt and Dippold, 2005).

**Objective**

This research was conducted to detect the Antibacterial efficacy of *Eruca Sativa* leaves aqueous extract against Two pathogenic bacteria

**Material and Method**

**Bacterial isolates**

Two bacterial isolates *E. coli*, and *S. aureus* were isolated from cases of infected wound. The isolates were identified according to (Collee et al 1996). Preparation of bacterial inoculum.
Single isolated colonies from each bacterial spp were inoculated separately into BHI (Brain Heart infusion) broth which obtained from (oxoid, UK) and then incubated at 37°C for 18 hr.

**Sensitivity test**

Disc diffusion method is used usually qualified by Bauer *et al.* (1966). 0.1 mL of each bacterial broth with approximately (1.5 x 10^8) CFU/mL was streaked on Brain Heart infusion (BHF) agar (oxoid, UK). Sterile discs 5 mm in diameter, the first containing 10 mL (micro liter) of Eruca Sativa extract, the second disc was 0.25 mg Ampicillin, as a positive control, and the third containing 10 micro liter of Sterile distilled water as a negative control. Discs were placed on BHI agar surface and then incubated for 24 hr at 37°C. The sensitivity test was done in triplicate for each bacterial spp.

**Results**

The antibacterial activity of Eruca Sativa leaves extract has been detected through measurement of zone of inhibition in millimeters (mm) in three plates, and the average was considered.

*Eruca Sativa* extract inhibit both bacterial spp and the mean inhibition zone for *S. aureus* was 14.2 mm and for *E. coli* was 9.0 mm.

- The mean inhibition zone of Ampicillin was 20 mm for *S. aureus* and 21.3 mm for *E. coli*.
- Distilled water showed no antibacterial activity.

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>E. Sativa extract</th>
<th>Positive control</th>
<th>Negative control</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staph. Aureus</em></td>
<td>14.2</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td><em>E. Coli</em></td>
<td>9</td>
<td>21.3</td>
<td>-</td>
</tr>
</tbody>
</table>

- = means no inhibition zone

**Discussion**

The intact fresh plant contain several bioactive constituents with health benefit but some heat labile photochemical were destroyed on cooking (Kim and Ishii 2006). Our results indicate the activity of *Eruca Sativa* leaves aqueous extract against *E. coli* and *S. aureus* but the difference in sensitivity may be due to the cell wall structure of each organism. (Mahesh and Satish 2008). *S. aureus* was more susceptible than *E. coli*, this result was in agreement with Entesar and Amal 2007).

When Eruca Sativa leaves were cut, glucosinolates secondary metabolites were released and hydrolyzed by myrosinase enzyme to from methyl – isothiocyanate, Allyl – isothiocyanate and 4-methyl sulfinyl – butyl – isothiocyanate. (Antonious et al., 2009; Vig et al., 2009). Ishiki *et al.* (1992) find that Allyl – isothiocyanate posses antibacterial efficacy toward two Gram-negative and positive bacteria of (*E. coli* and *S. aureus*).

Borges *et al* explain the effect of Allyl – isothiocyanate on cell integrity resulting in potassium leakage and also affect iodine uptake.
Conclusion: From this work we can conclude the *Eruca sativa* leaves extracts act as good antibacterial compound for both gram positive and gram negative bacteria.

References


Flora of NW Europe: *Eruca vesicaria*


Hussein S. Study the effect of Eruca Sativa leaves extraction on male fertility in Alpino mice. J. Al-Nahrain University 2013, 16: 143-46.


