Evaluation of Antibacterial Activity of Water and Alcoholic Extracts of Coriandrum Sativum (Fruit)

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Abstract

Aqueous and alcoholic extract of Coriandrum sativum (Fruit) were evaluated against pathogenic bacteria. Results showed that the [MIC] of aqueous extract for these pathogenic bacteria (Staphylococcus aureus, Klebsiella pneumonia, Pseudomonas aeruginosa and E. coli) ranged between (8192-16384) μg/ml while MIC of alcoholic extract for above pathogenic bacteria ranged between (4096-16334) μg/ml. There is no significant difference between the two extracts effective.

قدّر الفعالية البيولوجية للمستخلص المائي والكحولي لتمار نبات الكزيرة

قاسم محمد ألانباني  جدعو احمد السامرائي  جدعو محمد هجيد

المستخلص

تم قياس وتقدير الفعالية البيولوجية للمستخلص حبة الكزيرة المائي والكحولي تجاه بعض البكتريات المرضية. أظهرت النتائج باستخدام تركيز مختلفا في الوسط اللازم أن معدل التركيز المثير للمستخلص المائي يتراوح وركازة المخللات البكتيرية ( س.ا.د) من (128-8192) ميكونغرام/ملتر. وان التركيز المثير عليها من المستخلص الكحولي يتراوح ما بين (256-16334) ميكونغرام/ملتر. لا توجد فوارق معنوية بين المستخلصين، بسبب تقارب الاستعداد للمحلولين.
Introduction
Coriandrum Sativum belong to Umbelliferae family its an annual aromatic herb 30-91 cm high. The herb was grown in the Mediterranean region central and Eastern Europe, Eastern Asia and North and South America (1,2). In Iraq it was cultivated in a small scale as winter crop especially in the middle and lower regions (1). The leaves and stems yield were a pleasant aromatic odor and are used as a flavoring agent (1). Coriander was cuminative tonic stomachic antibilious and refrigerant, it was employed also to control the distasteful odor of some medicine and the seeds were chewed to remove foul smell of the mouth and they were considered useful to eliminate intoxicating effect of liquors (1,2), it also used to decrease the sugar levels in blood (3,4) also to stimulates the secretion of gastric juices and spasmytic in vitro, it has antibacterial and antifungal effects and inhibition of growth and lactoxin production in Aspergilla parasites due to its contents of essential oil (2,5,6), anticonvulsant effects (7). In folk medicine, Coriander was also used for digestive, gastric complaints; in other culture for coughs, chest pains, bladder, complaints leprosy rash, fever, dysentery, externally, for headaches oral, and pharyngeal disorder halitosis post partial complications (2). Also seeds having antiperoxidative effect and hypolidemic (8,9). Chemical analysis Coriander gave the following composition. Coriander yield colorless pale yellow oil the chief constituent of which was linalal (4-7%). The other constituents were δ-pinene, β-pinene, δ-eumene dipentene, Y-terpinene, phellandrene, terpinolene, and traces of geraniol, 1-borneal, n-decylaldehyde (2,11,12,13). Besides the essential oil the seeds also contain a dark brown fatty oil (21%) having a Coriander like smell contains about 2-3% unsaponifiable matter and also insoluble fatty acids like palmitic, petroselinic and linoleic acid (1).

Materials and Methods
1. Collection plant
Coriandrum sativum (fruits) were obtained from markets, cleaned and crushed to fine powder then kept at (25 °C).

2. Methods of extraction
In order to obtain plants extracts for evaluation of their bactericidal activity the following procedures were carried out.

2.1 Alcoholic extract
The coriandrum sativum (fruits) were cleaned and was extracted by soxhlet apparatus over night with 500 ml 95% ethanol, the solution filtered using filter paper No.1, then the extract was evaporated to nearly dryness under reduced pressure and transferred to glass Petri-dish and completely dried by incubator (14).

2.2 Water extract
50 gm of fine powder of the fruits infused in distilled water (500 ml) and placed in a sterile conical flask and stirred by magnetic stirrer at room temperature for 24 hrs. the slurry was filtered and the extract was evaporated under reduced pressure nearly to dryness. The residue was transferred to glass Petri-dish and dried completely to solidify in an incubator, then kept in refrigerator (14).

2.3 Biological activity of the extract
2.3.1 Bacterial isolates
Bacterial isolate were obtained from microbiology department, college of medicine, Tikrit University, each of the following were included in present of study.

1-Staphylococcus aureus.
2-Pseudomonas aeruginosa.
3-Klebsilla pneumonia.
4-Escherichia coli.


3.2 Determination of minimal inhibitory concentration (MIC) of alcoholic and aqueous extracts of *Coriander fruit*. This was performed according to the procedure described by Kady et al. (15) Muller-Hinton agar plates contained concentrated alcoholic and aqueous in 2-fold dilution were prepared, all plates were inoculated with bacteria and incubated at (37 °C) for 24 hrs. The Mics of the extract was determined as the test shows growth inhibition.

**Results and Discussion**

Minimal inhibitory concentration (MIC) of aqueous and alcoholic extracts for some bacterial isolates

The results showed that antibacterial activity was performed by increasing the concentration of extracts in the media, the MIC of aqueous extract for *Staphylococcus aureus*, *Klebsiella pneumonia* and *E. coli* ranged between (4096-8192) µg/ml while for *Pseudomonas aeruginosa* was (8192) µg/ml Table (1). (MIC) of alcoholic extracts for *Staphylococcus aureus* ranged between (4096-8192) µg/ml. MIC for *Pseudomonas aeruginosa* was (8192 µg/ml). (MICs) for *Klebsiella pneumonia* and *E. coli* ranged between (8192-16384 µg/ml) Table (2). The results showed that there were no significant difference between aqueous and alcoholic extract activity against bacteria isolates which may be due to the similarity of constituents of the two solvents and may have the nearest polarity.

**Table (1): Minimal inhibitory concentration (MIC) of aqueous extract Coriandrum sativum (fruit) to some bacterial isolates**

<table>
<thead>
<tr>
<th>Isolate</th>
<th>No. of strain</th>
<th>512</th>
<th>1024</th>
<th>2048</th>
<th>4096</th>
<th>8192</th>
<th>16384</th>
<th>32768</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>2(20)</td>
<td>4(40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Klebsiella pneumonia</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>6(60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>8(80)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(+) growth are seen in all isolates  
(-) no growth.

**Table (2): Minimal inhibitory concentration (MIC) of alcoholic extract Coriandrum sativum (fruit) for some bacterial isolates**

<table>
<thead>
<tr>
<th>Isolate</th>
<th>No. of strain</th>
<th>512</th>
<th>1024</th>
<th>2048</th>
<th>4096</th>
<th>8192</th>
<th>16384</th>
<th>32768</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>2(20)</td>
<td>4(40)</td>
<td></td>
<td></td>
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<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Klebsiella pneumonia</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>4(60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>6(80)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(+) growth are seen in all isolates  
(-) no growth.
References
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