EVALUATION OF ANTI-BACTERIAL ACTIVITY OF FOENICOLUM VULGARE (L.) MILL EXTRACTS ON SOME SPECIES OF PATHOGENIC BACTERIA

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Key words: Foeniculum vulgare, Acetone, Inhibitory effect.

ABSTRACT

The inhibitory effects of five extracts (50% aqueous ethanol, acetone, ethylacetate, chloroform and water) from Foeniculum Vulgare (L.) Mill, on the growth of Gram-positive bacteria (seven isolates) and Gram-negative bacteria (seven isolates) were by using the paper disc plate method (1). All the investigated extracts exhibited various degree of inhibition on all tested bacteria, except 50% aqueous ethanal extract which was unable to inhibit the growth of Bacillus subtilis bacteria.

INTRODUCTION

Foeniculum Vulgare (L.) Mill (umbelliferae) is found in wild state of world, in many parts of Europe and Asia. Also found in Iraq especially northern Iraq particularly in the region near Sulaimaniya and Mosul.

This plant have a wide pharmacological application, for complaints of chest, kidney and spleen. The aim of this study is to examine inhibitory effect of water, 50% aqueous ethanol, acetone, ethylacetate and chloroform extracts of Foeniculum Vulgare (L.) Mill (umbelliferae) plant.

MATERIALS AND METHODS

Fennel seeds was collected from spices aromatics shops in Basrah (Iraq). Unless other wise stated all Solvents used were of analytical grade and with out further purification.

Extraction of fennel seeds.

One hundred twenty five grams of ground seeds of fennel, were extracted with (250)ml of distilled water, 50% aqueous ethanol, acetone, ethylacetate and chloroform respectively. Then then
stirring at room temperature for (24) hours. The solvents were removed by rotary evaporator under vacuum at 40°C to produce the extracts.

Antibacterial activity

All extracts were tested for their antibacterial activity by agar diffusion technique. The plates were incubated at (37°C) for (24) hours and zones of inhibition were measured in mm.

RESULTS AND DISCUSSION

The inhibitory effects of five extracts (water, 50% aqueous ethanolethylacetate, acetone and chloroform) of fennel seeds against seven Gram positive and seven Gram negative microorganisms were studied. The data (Table 1) for inhibition zones of various bacterial isolates indicate that all these extracts showed promising antibacterial activity against both Gram positive and Gram negative microorganisms, except the 50% aqueous ethanol seed extract, which showed no effect on the B. subtilis and Cl. Perferigens growth.

Water seed extract was found to have high effect against Gram positive and Gram negative bacteria, than 50% aqueous ethanol extract, except the effect against Staph. epidermidis, Corynebacterium pyogenes and proteus sp. 50% aqueous ethanol have little more effect than water extract.

Comparison between the effects of extracts obtained by organic solvents, the results in table 1 showed that chloroform extract have the highest effect against the growth of most microorganisms under investigation except in case of B. subtilis, Ps. aeruginosa, E. coli and Cl. Perferigens and this effect due to the presence of essential oils in the chloroform extract of fennel. It reported that essential oils of thyme cinnamon were highly active against both Gram - positive and Gram negative bacteria.

The results obtained during this study also showed that water seed extract had more inhibitory effects against the Gram negative bacteria, than the other extract except in case of proteus sp.

The anti-bacterial activity against both groups Gram positive, negative bacteria and zones of inhibition showed in pictures from 1 up to 14.
Table (1):- Primary screening of fennel extracts against some Gram-positive and Gram-negative bacteria

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>Gram – positive bacteria</th>
<th>Zone of inhibition for extracts (mm)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
</tr>
<tr>
<td>1 Staph. aureas</td>
<td>14</td>
<td>12</td>
<td>16</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>2 Corynebacterium pyogenes</td>
<td>13</td>
<td>14</td>
<td>12</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>3 Staph. epidermidis</td>
<td>13</td>
<td>13</td>
<td>11</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>4 Str. faecalis</td>
<td>20</td>
<td>20</td>
<td>23</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>5 Str. viridans</td>
<td>22</td>
<td>10</td>
<td>8</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>6 B. subtilis</td>
<td>10</td>
<td>0</td>
<td>16</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>7 Cl. Perfringens</td>
<td>10</td>
<td>0</td>
<td>15</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>8 P. Arugmosa</td>
<td>16</td>
<td>13</td>
<td>11</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>9 E. Coli</td>
<td>33</td>
<td>14</td>
<td>10</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>10 Proteus sp.</td>
<td>6</td>
<td>11</td>
<td>11</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>11 Enterobacter sp.</td>
<td>40</td>
<td>13</td>
<td>26</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>12 Pasteurella multctica</td>
<td>39</td>
<td>12</td>
<td>25</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td>13 Klebsiella sp.</td>
<td>32</td>
<td>15</td>
<td>28</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>14 Mycobacterium pneumoniae</td>
<td>30</td>
<td>13</td>
<td>25</td>
<td>21</td>
<td>29</td>
</tr>
</tbody>
</table>

I = water
II = 50% aqueous ethanol extract
III = Ethylacetate extract
V = chloroform extract
IV = Acetone extract
1) Staph. aureus
2) Corynebacterium pyogenes
3) Staph. epidermidis
4) Str. fecalis
5) Str. viridans
6) B. subtilis
7) Cl. Perfringens
8) *Ps. aeruginosa*

9) *E. Coli*

10) *Proteus sp.*

11) *Enterobacter sp.*

12) *Pasteurella multicaida*

13) *Klebsilla sp.*

14) *Mycobacterium pneumoniae*
تقييم فعالية مستخلص حبة اللحوطة ضد بعض أنواع البكتيريا المرضية

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الخلاصة

تعد حبة اللحوطة من النباتات المفيدة المتواجدة في بلادنا والتي تستخدم لمعالجة العديد من الأمراض كالتهاب الصدر وإمгал البطن والاضطرابات المعدية وقد تضمنت الدراسة معالجة بعض مستخلصات هذه النباتات على نمو بعض أنواع البكتيريا المرضية.

وبينت هذه الدراسة تم الإثبات المبديء على إعتقال مستخلصات اللحوطة، 50% من الكولون البكري والالتهاب والأورام الفقارية المصاحبة لديهم بعض أنواع البكتيريا المرضية الموجبة والسلبية لصيغة كرام حيث استخدمت أربعة عشر نوعًا من هذه البكتيريا المرضية.

REFERENCES


