Antibacterial activity of Saponins extract from Sider (Ziziphus spina_christi)

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Abstract

Saponin extract from Sider (Ziziphus spina_christi) were evaluated for his antibacterial activity against gram negative bacteria like E.coli, Proteus mirabilis and gram positive like Staphylococcus aureus, Streptococcus pneumoniae. The inhibitory effect in vitro was defined to appear inhibition zone around the paper disc [paper disc method]. The study revealed that 30% (w/ v) concentration most active against bacteria.
Introduction

Undoubtedly medicinal plants are relevant in both developing developed nations of the world as sources of drugs or herbal extracts for various chemotherapeutic purposes. Also the use of plant derived natural compounds as part of herbal preparations as alternayive sources of medicaments continues to play major roles in the general wellness of people all over the world (1). Natural products play an important role in drug development programs of the pharmaceutical industry (2). Sider (Ziziphus spina_christi) plant more distribution in south and middle of Iraq and used in folk medicine (3,4,5). It is contain saponin compounds (4). Saponins are high-molecular-weight glycosides, sugar moiety linked to a triterpene or steroid aglycone. The classical definition of saponins is based on their surface activity; many saponins have detergent properties, give stable foams in water, show haemolytic activity, have a bitter taste and are toxic to fish (piscicidal). Such attributes, while not common to all saponins, have frequently been used to characterize this class of natural products. However, because of the numerous exceptions which exist, saponins are now more conveniently defined on basis of their molecular structure, namely as triterpene or steroid glycosides (6, 7). Saponins are glycosylated triterpenoid, steroid, orsteroidal alkaloid molecules which occur constitutively in agreat many plant species (8, 9, 10, 11).These molecules have an oligosaccharide chain (6). The aim of the present study was to evaluate antibacterial activity of saponine extract from leaves (Inedible) of Sider (Z.spina-christi) against bacterial pathogens.

Plant material

Leaves of Sider (Z.spina-chrisit) were collected in January, 2005 in Nassriya, Iraq
Extraction of crude from plant

Air-dried powdered leaves of Sider (550 g) was extracted with 70% Ethanol (EtOH) (24h x 600 mL) at room temperature. The EtOH solution was concentrate to a small volume (150 mL) by low-pressure evaporation at <50 OC and extracted in succession with chloroform (24h x 100ml) and n-Butanol (24h x 100 mL). The n-BuOH layer was concentrated to dryness giving the saponins extract (8.5g) (12, 13).

Tests of saponin compounds

(1) Aqueous solution of saponin extract has been prepared in test tube and shake after that produced soapsuds was stay for long time.

(2) 5 mL from aqueous solution of saponin extract in test tube and added 5 mL from ammonia silver nitrate after that put in water bath at 100OC (5 minutes) when test tube cooled produced silver mirror on inner surface of the test tube (14).

Antibacterial assay

Paper disc method

The disc made from filter paper (whatman No1) have 5 mm diameter and sterilized by autoclave after that soaked in aqueous solution have concentration (10%, 20% and 30% w/v) of crude saponin extract then placed on the surface of the agar medium. The inhibition zone around the paper disc was measured (15, 16).

Results and Discussion

The results of test saponins in crude extracts from leaves of sider give stable foams in water for long time and the second test produced silver mirror on inner surface of the test tube. Saponins have shown activity against a broad range of microorganisms including bacteria, filamentous fungi and yeasts (17,
The results of antibacterial activity are presented in table (1) and table (2), which summarize the inhibition zone around the paper disc measured by diameter. The concentration 30 % (w/ v) were more effective inhibition zone of Gram negative bacteria like E-coli , Proteus mirabilis and Gram positive like Staphylococcus aureus , Streptococcus pneumoniae . But concentration 10 % (w/ v) did not have inhibite effective both Gram negative and Gram positive. In concentration 20 % (w/ v) just Staph.aureus and E-coli .This study agreement with Kabir et al (19), Tschessche (20).We can use this study for development new antibacterial for need when some bacterial pathogen resistant to available antibiotical agents.Sider (Z.spina-chrisit) plant more distribution in south and middle of Iraq and used in folk medicine (3, 4), can help for make when new antibacterial cheap cost by use inedible portions of Sider will increase the utilisation of the region's natural resources. When can isolation compounds of saponin from crude after that found which compound has highly biological activity, this is extract broad spectrum activity on both gram negative and gram positive.

Table (1) Diameter inhibition zone (mm) of Gram\textsuperscript{-ve} Bacteria

<table>
<thead>
<tr>
<th>Type of bacteria</th>
<th>Concentration of extract (w/ v)</th>
<th>%\textsuperscript{10}</th>
<th>%\textsuperscript{90}</th>
<th>%\textsuperscript{&gt;1}</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.coli</td>
<td></td>
<td>15 mm</td>
<td>11 mm</td>
<td>--</td>
</tr>
<tr>
<td>Pseudomon.aenginosa</td>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Proteus mirabilis</td>
<td></td>
<td>9mm</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Table (2) Diameter inhibition zone (mm) of Gram\textsuperscript{+ve} Bacteria

<table>
<thead>
<tr>
<th>Type of bacteria</th>
<th>Concentration of extract (w/ v)</th>
<th>%\textsuperscript{10}</th>
<th>%\textsuperscript{90}</th>
<th>%\textsuperscript{&gt;1}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph.aureus</td>
<td></td>
<td>15 mm</td>
<td>11 mm</td>
<td>--</td>
</tr>
<tr>
<td>Strep pyogenes</td>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Strep,pneumoniae</td>
<td></td>
<td>11 mm</td>
<td>--</td>
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</tr>
</tbody>
</table>

Note: -- no inhibition zone.
References:


