Evaluation of Phytochemical & Antimicrobial activity of selected Dry fruit extracts

Omm-e-Hany1, Zia-ul-Rehman1, Asia Neelam1, Sikandar Khan Sherwani2, Sagar Aryal3, Hasnain Nangyal4

1Institute of Environmental Studies, University of Karachi, Karachi, Pakistan, 75300
2Department of Microbiology, FUUAST, Karachi, Pakistan
3Department of Microbiology, St. Xavier’s College, Kathmandu, Nepal
4Department of Botany, Hazara University, Mansehra, KPK, Pakistan

Corresponding Author:
Omm-e-Hany
Institute of Environmental Studies, University of Karachi, Karachi, Pakistan, 75300
Email: hany786@yahoo.com

Abstract

Since from the many years scientist has been investigated and emphasis on natural origin material for the control and treatment of various infections. The present study was conducted to investigated for their phytochemical & antibacterial properties of the extract Peanut, Apricot and walnut. Phytochemical screening revealed the presence of reducing Sugars, saponins, anthraquinones, terpenoids & tannins in all the tested dry fruits while alkaloids were only detected in walnut, whereas flavonoids were only examined in apricot extract. Antibacterial activity were also subjected against three pathogenetic bacteria Bacillus subtilis, Escherichia coli & Staphylococcus aureus. Only the extract of walnut extract showed the highest activity against Bacillus subtilis (7 ± 0.2 mm), Escherichia coli (8.2 ± 0.1) and Staphylococcus aureus (8.2 ± 0.1). While the extracts of peanut and apricot moderately exhibit the tested bacteria. In general, through this preliminary study it is concluded that the extract of walnut was found to be more effective against the pathogenic strains of bacteria as well as full of beneficial phytochemical compounds.

Key words: Antimicrobial activity, Apricot, Dry fruits, Extract, Peanut, Walnut.

Introduction

Like medicinal plants, dry fruits also perform a vital role in the health of the human population and society. Their beneficial values lie on their chemical constituted that induced, enhanced and maintain a proper physiological action on the human body. These phytochemicals are primary and secondary macromolecules. Primary molecules include proteins, Chlorophyll and some other sugars whereas secondary molecules have terpenoid, alkaloids and phenolic compounds [1, 2]. The presence of phenolic compounds and alkaloids, tannins, flavonoids improving health system, as well as low down the potential risk of degenerative diseases by decrease the level of oxidative stress, and suppress oxidative molecular [3, 4]. The current study is meant to evaluate the antimicrobial potential and phytochemical analysis.
Materials and Methods

Collection and extraction of dry fruits
The dry fruit samples of peanut, Apricot and Walnut were collected from local markets of Karachi, Pakistan. The samples were first crushed into powder form by using crusher and then 100ml of mineral water was added to these powdered samples respectively in order to make dilute samples.

Phytochemical evaluation
Qualitative phytochemical analysis of the dry fruit extract carried out using standard procedures. Screenings will be done for carbohydrates, glycosides, proteins, amino acids, saponins, flavonoids, alkaloids and tannins.

Test for anthraquinones
The 0.5 gm of each dry fruit extract with 10 ml sulphuric acid were boiled, then filtered. Later, add 5ml chloroform in filtrate. The layer of chloroform was pipette out in another test tube and add 1 ml of dilute ammonia solution. Sudden change of color confirms the presence of anthraquinones.

Test for reducing sugars (Fehling’s test)
The dry fruit extract (0.5 gm in 5 ml of water) of individual sample was added to boiling Fehling’s solution (A and B) in a reaction tube. The change of color were observed for positive reaction.

Test for saponins
To 2ml of the extracts was added 6ml of water into a test tube. The mixture was shaken vigorously and observed in the formation of persistent foam that confirms the presence of saponins [5].

Test for terpenoids
1ml of chloroform was reacted with 2ml of extract, then added few drops of Concentrated Sulphuric acid. A reddish brown precipitation produced immediately indicated the presence of terpenoids [5].

Test for flavonoids
Few drops of ferric chloride solution treated with an extract that result in the formation of blackish red colour indicating the presence of flavonoids [6].

Test for tannins
One percent of gelatin solution containing sodium chloride was added. Appearance of white precipitate indicates the presence of tannins [7].

Test for alkaloids
Extracts were dissolved in 1 ml of hydrochloric acid and filter them individually. Filtrated were treated with a few drops of Wagner’s reagent (Iodine in potassium Iodide). Appearance of Brown/reddish precipitate indicates the presence of alkaloids [7].

Antibacterial assay
The antimicrobial activity of infusion samples were done by using the method of Disc Diffusion [8]. The strains of bacteria (Escherichia coli, Staphylococcus aureus & Bacillus subtilis) were collected from the Institute of Environmental studies, University of Karachi (UoK), Pakistan. The Purity of cultures was checked before test. Nutrient agar was used for this method. In Disc diffusion method filter paper disc of 6 mm contained 0.03 ml were added. Another set of petri dishes were prepared on the same way in which standard antibiotic disc contained Cefixime and levoflaxacin were used as a control were placed. After incubation at 37 °C for 24 hour, the antibacterial activity was examined by note the presence of zone of inhibition. For accuracy of results, all the test were performed in triplicate.

Result and Discussions
The infusion of three dry fruits (peanuts, walnuts and apricots) were used in the present studies to investigate their phytochemical and bacterial inhibition potential. The results of screening of the phytochemical are shown in (Table 1). Seven bioactive constituents includes Anthraquinones, Reducing sugars, Saponins, Terpenoids, Flavonoids, Tannins & Alkaloids were tested for their qualitative analysis. All the infusion extracts of dry fruits showed positive for Anthraquinones, Reducing sugars, Saponins, Terpenoids & Tannins test, while Alkaloids were only detected in walnut and Flavonoids only present in apricot.
### Table 1: A qualitative phytochemical analysis of the selected dry fruits.

<table>
<thead>
<tr>
<th>SN.</th>
<th>Phytochemical test</th>
<th>Peanut</th>
<th>Apricot</th>
<th>Walnut</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Anthraquinones</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2.</td>
<td>Reducing sugars</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3.</td>
<td>Saponin</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>Terpenoids</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5.</td>
<td>Flavonoids</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Tannins</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7.</td>
<td>Alkaloids</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

(+) presence of subjective phytochemical compound, (-) absence of subjective phytochemical compound

### Table 2: Zone of Inhibition of the tested bacteria in the different dry fruit extracts (mm).

<table>
<thead>
<tr>
<th>Test organism</th>
<th>Peanut</th>
<th>Apricot</th>
<th>Walnut</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bacillus subtilis</em></td>
<td>5 ±0.1mm</td>
<td>2±0.1mm</td>
<td>7±0.2mm</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>1.5 ± 0.01mm</td>
<td>2.7±0.01mm</td>
<td>8.2±0.1mm</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>2 ±0.1mm</td>
<td>4±0.2mm</td>
<td>8.2±0.1mm</td>
</tr>
</tbody>
</table>

The antibacterial potential results of dry fruits i.e. peanut, apricot and walnut are summerized in (Table 2) which showed inactive or low inhibition potential of apricot against *Bacillus subtilis* (2±0.1mm), *Escherichia coli* (2.7±0.01mm) & *Staphylococcus aureus* (4 ± 0.2) respectively, while in peanut the zone of inhibition was also very insignificant and calculated as *Bacillus subtilis* (5±0.1mm), *Escherichia coli* (1.5±0.01mm) & *Staphylococcus aureus* (2 ± 0.1). However, the activity of extract of walnut is slightly high among all the subjective samples *Bacillus subtilis* (7±0.0.2mm), *Escherichia coli* (8.2± 0.1mm) & *Staphylococcus aureus* (8.2 ± 0.1),which correlated the strong antioxidant activity of selected walnut. Regarding the results of walnut our studies somehow support the research [9], who explore the biological characteristic of Iranian walnuts and their inhibitory pattern on growth of bacteria. On the bases of this result this study demonstrated the presence of phytochemical constituents as well as antimicrobial activity of dry fruits particularly in peanut, apricot & walnut. Dry fruits particularly, apricot, peanut & walnut contain several phytochemicals constituted, which possess strong antioxidant activities as well as resist and cure the cancer and other chronic
diseases by preventing the cells from free radical species.

**Conclusion**
The result obtained from this preliminary studies indicates the walnut, peanuts and apricots are the important and promising source of natural bioactive compounds, which not only inhibit the growth of bacteria in body but also act as a potential therapeutics for cardiovascular disease & cancer treatment. However, further studies are required to find out more illusional effects of subjective samples in order to replace synthetic medications with natural remedies. Hence, it is concluded that among all three selected dry fruits i.e. peanut, apricot & walnut. The extract of walnut was higher effect against tested bacteria than other extracts.

**References**