PRELIMINARY PHYTOCHEMICAL SCREENING OF Terminalia arjuna Linn. BARK EXTRACTS

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Abstract

Terminalia arjuna (Combretaceae) is a tree of the genus Terminalia. It is commonly known as Arjuna or Arjun tree in English and Marudhamaram in Tamil. They grow on river banks or near dry beds in Bangladesh, Madhya Pradesh, West Bengal, and central India. The bark of Terminalia arjuna acts as a cardiotonic and is helpful to lower down the blood pressure and pulse rate, and may boost up the aerobic exercise capacity. Major chemicals present in the bark are saponins, flavonoids, tannins and phytosterols. It has antibacterial antimutagenic, antioxidant, hypolipidemic, and hypocholesterolaemic and anti-inflammatory effects. Preliminary phytochemical constituents of Terminalia arjuna bark extracts were evaluated in the present study. The Terminalia arjuna bark was extracted with respective solvents namely Hexane, Chloroform, Ethyl acetate and Methanol. Qualitative phytochemical screening of Terminalia arjuna barks extracts were assessed by standard methods. Maximum number of phytochemicals was present in the chloroform bark extract.

Key words: Terminalia arjuna, Marudhamaram, Phytochemical screening and Solvent extracts.

1. Introduction

Terminalia arjuna (Combretaceae) is a tree of the genus Terminalia. It is commonly known as Arjuna or Arjun tree in English and Marudhamaram in Tamil. Terminalia arjuna can be propagated by seed, and also by root-suckers, stumps and air-layering. Average 1000 seed weight is 1408 g (Mandal et al., 2010).

The tree components are widely used in traditional medicine in several continents in the world for the treatment of numerous diseases including, abdominal disorders, bacterial infections, colds, sore throats, conjunctivitis, diarrhea, dysentery, fever, gastric ulcers, headaches, heart diseases, hookworm, hypertension, jaundice, leprosy, nosebleed, edema, pneumonia and skin diseases. The bark of Terminalia arjuna acts as a cardiotonic and is helpful to lower down the blood pressure and pulse rate, and may boost up the aerobic exercise capacity. Major chemicals present in the bark are saponins, flavonoids, tannins and phytosterols. It has antibacterial antimutagenic, antioxidant,
hypolipidemic, and hypocholesterolaemic and anti-inflammatory effects. It is used in the treatment of fractures, ulcers, hepatic and showed hypcholesterolemic, antibacterial, antimicrobial, antitumoral, antioxidant, antiallergic and antifeedant, antifertility and anti-HIV activities (Kapoor et al., 2014), Terminalia arjuna is reported that to possess strong hydrolipidemic properties. It is trusted that the saponin glycosides in Terminalia arjuna may be responsible for its inotropic effects, while the flavonoids/phenolics may supply antioxidant activity as well as vascular amplification activity, in this manner authenticating the multiple activities of this plant for its cardio-protective function (Phani Kumar et al., 2013). Considering the above points in view, this study evaluated the phytochemicals of Terminalia arjuna bark extracts.

2. Materials and Methods

Collection of Plant material

Healthy, disease free, mature barks of Terminalia arjuna were collected from Yelagiri Hills, Vellore District of Tamil Nadu, India.

Preparation of solvent leaf extracts

The bark powder of Terminalia arjuna (1 g) was extracted with 20 ml of respective solvents namely Hexane, Chloroform, Ethyl acetate and Methanol. After the extraction process, the solvents were removed by air drying using vacuum in a rotary - evaporator at 40 °C to obtain crude extract and stored at 18 °C in refrigerator.

Phytochemical screening

Phytochemical screening of Terminalia arjuna bark extracts were assessed by standard method as described by Savithramma et al. (2011) and Selvaraj et al. (2014).

Test for Tannins: One ml of the bark extract was added to 1 ml 5 % Ferric chloride. Formation of dark blue or greenish black indicates the presence of tannins.

Test for Saponins: One ml of the bark extract was added to 1 ml distilled water and shaken in graduated cylinder for 15 mins. Lengthwise formation of 1 cm layer of foam indicates the presence of saponins.

Test for Quinones: One ml of the bark extract was added to 1 ml Conc. sulphuric acid. Formation of red color indicates the presence of quinones.

Test for Flavonoids: One ml of the bark extract was added to 1 ml Conc. 2N sodium hydroxide. Formation of yellow color indicates the presence of flavonoids.

Test for Alkaloids: One ml of the bark extract was added to 2 ml Conc. HCl. Then, few drops of Mayer’s reagent were added. Presence of green color or white precipitate indicates the presence of alkaloids.

Test for Glycosides: One ml of the bark extract was added to 3 ml chloroform and 10 % ammonium solution. Formation of pink color indicates the presence of glycosides.

Test for Terpenoids: One ml of the bark extract was added to 2 ml chloroform along with Conc. sulphuric acid. Formation of red color at the interface indicates the presence of terpenoids.

Test for Phenols: One ml of the bark extract was added to 2 ml distilled water followed by few drops of 10 % ferric chloride. Formation of blue/green color indicates the presence of phenols.

Test for Steroids: One ml of the bark extract was added to 2 ml chloroform and 1 ml sulphuric acid. Formation of reddish brown ring at interface indicates the presence of steroids.

Test for Coumarins: One ml of the bark extract was added to 1 ml 10 % NaOH. Formation of yellow color indicates the presence of coumarins.
of Soxhlet extractor. Various parts of the plants such as the leaves, fruits, bark, roots even the seed have been used for preparation of medicine. *Terminalia arjuna* was screened for the presence of phytochemical constituents like Triterpene glycosides, arjubenin, arjutenoside, arjunaphthalanolside, together with oleanolic and arjunic acids, terminic acid, acardenolide. Antioxidants (flavones, tannins, oligomeric proanthocyanidins), have also been isolated from the root bark of *Terminalia arjuna*. The bark of *Terminalia arjuna* is known to contain phytosterols (β-sitosterol), ellagic and oleanolicic acids, magnesium, zinc, copper and tannins. The whole tree is so rich on calcium that even the soil it grows on becomes rich on this element too (Ramesh and Dhanraj, 2015).

Table – 1: Phytochemical screening of *Terminalia arjuna* bark extracts

<table>
<thead>
<tr>
<th>Test</th>
<th>Hexane</th>
<th>Chloroform</th>
<th>Ethyl Acetate</th>
<th>Methanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Glycosides</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Phenols</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Steroids</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Terpenoids</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Quinones</td>
<td>-</td>
<td>+</td>
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<td>+</td>
</tr>
</tbody>
</table>

All the phytochemical constituents were tested in different extracts like hexane, chloroform, ethyl acetate, and methanol. It was noted that methanol extract of *Terminalia arjuna* bark extract showed the presence of phytochemical constituents like saponins, tannins, glycosides, steroids, terpenoids, quinones. The chloroform extract of *Terminalia arjuna* bark extract showed the presence of steroids, flavonoids, phenols, terpenoids, quinones and glycosides. The hexane extract showed the presence of 5 phytochemical constituents out of 10. The ethyl acetate extract showed the presence of 4 phytochemical constituents out of 10 (Table - 1).

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4. References

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