ABSTRACT

The phytochemical profiling of the leaf extract of Crateva religiosa G.Forst. reveals that, the presence of phytochemical constituents like Carbohydrates, Flavanoids, Phenols, Saponins and Tannis etc. In addition to this, the plant also having very good ethnobotanical background. The present study is the preliminary approach to validate the occurrence of various potential phytochemicals, which are present in the leaf extract of Crateva religiosa G.Forst., further studies are suggested to reveal the active principle behind it.

KEYWORDS: Phytochemical screening, Crateva religiosa G.Forst., Capparaceae.

INTRODUCTION

Medicinal plants have long played important roles in the treatment of diseases all over the world.[1] Phytotherapy is considered relatively safe as it contains multiple chemicals with a specific composition acting as ‘effect-enhancing and/or sideeffects neutralizing’, though there is limited scientific evidence for this assumption. Medicinal plants are a source for a wide variety of natural antioxidants and are used for the treatment of diseases throughout the world.[2]

The market for herbal drugs has grown at an impressive rate due to a global resurgence in traditional and alternative healthcare systems and therefore medicinal plants have great economic importance.[3] However loss of biodiversity, over-exploitation and unscientific use of medicinal plants, industrialization, biopiracy, together with lack of regulation and infrastructure are the major impediments to the growth of herbal medicine. Conservation, proper research based on traditional knowledge, quality control of herbal medicine and proper documentation are essential in the 21st century for the growth of herbal medicine usage world.[4]

In India about 90% of plant materials are collected from wild sources, many of the plants have become rare, threatened, endangered or vulnerable due to the destructive harvesting. The Ethno-botanical survey indicates that about 8,000 species of medicinal plants are used by many tribal communities for traditional medicinal preparation.[5] About 427 ethnic communities and folk healers use around 8000 species of medicinal plants in different parts of India.[6] India is endowed with rich wealth of medicinal plants which are widely used by all section of peoples either directly as folk remedies or different indigenous system of medicine or indirectly in the pharmaceutical preparations of modern medicines.[7]

MATERIALS AND METHODS

Details of the selected Plant

Crateva religiosa G. Forst. (Capparaceae). [8]

Description: Small trees; bark smooth, grey; blaze dull yellow, speckled. Leaves digitately trifoliate, alternate, sessile, capitate. Fruit a berry, globose, 2.5 cm across, apex acuminate, margin entire, glabrous, cartaceus; lateral nerves 6-8 pairs, parallel, slender, prominent, intercostae reticulate, faint. Flowers bisexual, white, in terminal corymbs; pedicel 2.5-5 cm long; sepal 4, 5 mm long, free, oblong, adnate to the lobed disc; petals 4, ca.1.5 cm, white, long-clawed, obovate; disc incurved, nectariferous; stamens many, free, not much longer than the petals, inserted at the base of gynophore; gynophore to 2.5 cm long; filaments to 4 cm long; anthers basifixed; gynophore 1-3 cm long; ovary ellipsoid, superior 1-[2]-celled, ovules many; stigma sessile, capitate. Fruit a berry, globose, 2-2.5 cm across, smooth, turning to red; seeds brown, reniform, smooth (Fig. 1.).

Local Name: Mavalingam
FL. & Fr.: Mar. – Aug.
Habitat: Dry deciduous forests
**Phytochemical Screening**

**Ethyl alcohol extract:** The shade dried powdered leaves (5 gm) were exhaustively extracted with 95% ethanol using a soxhlet apparatus.

**Aqueous extract:** The dried powders 10 gm of the leaf mixed with 100 ml of distilled water and stirring with the mechanical stirrer (ROTEK magnetic stirrer 0601). The extract was filtered through Whatmann No.1 filter paper. It was stored in airtight container in a refrigerator below 100°C.

Phytochemical screening was carried out based on standard procedures (Table I).

### Table 1: Protocol used for the screening of various phytoconstituents.

<table>
<thead>
<tr>
<th>Test</th>
<th>Requirements</th>
<th>Procedure</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>–1% HCl&lt;br&gt;–Meyers’ reagent</td>
<td>2 ml of the extract was mixed with 0.2 ml of 1% HCl. Then 1 ml of Meyers’ reagent was added</td>
<td>Any precipitate or turbidity indicates the presence of alkaloids</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>Benedict’s Test-&lt;br&gt;Benedict’s reagent</td>
<td>Filtrates were treated with Benedict’s reagent and heated gently</td>
<td>Orange red precipitate indicates the presence of reducing sugars</td>
</tr>
<tr>
<td></td>
<td>Fehling’s Test: -&lt;br&gt;Fehling’s reagent A&amp;B</td>
<td>Filtrates were hydrolysed with dil. HCl, neutralized with alkali and heated with Fehling’s A &amp; B solutions</td>
<td>Formation of red precipitate indicates the presence of reducing sugars</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>–Magnesium ribbon&lt;br&gt;-Conc.HCl.</td>
<td>About 1 ml of the extract was mixed with few fragments of magnesium ribbon and conc. HCl</td>
<td>The appearance of pink or magenta-red colour indicates the presence of flavonoids</td>
</tr>
<tr>
<td>Glycosides</td>
<td>–Glacial acetic acid&lt;br&gt;–Ferric chloride&lt;br&gt;-Conc. H₂SO₄.</td>
<td>A small portion of the extract was mixed with 2 ml of glacial acetic acid containing 1-2 drops of ferric chloride solution. The mixture was then poured into another test tube containing 2 ml of conc. H₂SO₄.</td>
<td>The appearance of brown ring indicates the presence of glycosides</td>
</tr>
<tr>
<td>Phenols</td>
<td>–Ferric chloride</td>
<td>A small portion of the extract was mixed with 2 ml of ferric chloride solution</td>
<td>The appearance of green or blue colour indicates the presence of phenols</td>
</tr>
<tr>
<td>Saponins</td>
<td>–Distilled water</td>
<td>1 ml of the extract was diluted with 20 ml of distilled water and shaken vigorously</td>
<td>The formation of stable foam indicates the presence of saponins</td>
</tr>
<tr>
<td>Steroids</td>
<td>–Acetic anhydride&lt;br&gt;-H₂SO₄</td>
<td>A small portion of the extract was mixed with 2 ml of acetic anhydride. Then 2 ml of H₂SO₄ was added by the sides of the test tube</td>
<td>The appearance of bluish-green or violet colour indicates the presence of steroids</td>
</tr>
<tr>
<td>Tannins</td>
<td>–Distilled water&lt;br&gt;-0.1% Ferric chloride</td>
<td>A small portion of the extract was diluted with 20 ml of distilled water and boiled in a boiling tube. Then few drops of 0.1% ferric chloride were added</td>
<td>The appearance of brownish green or blue-black colour indicated the presence of tannins</td>
</tr>
<tr>
<td>Terpenoids</td>
<td>–Chloroform&lt;br&gt;-H₂SO₄</td>
<td>A small portion of the extract was mixed with 2 ml of chloroform. Then 3 ml of H₂SO₄ was carefully added</td>
<td>The appearance of reddish brown or pinkish brown ring/colour indicates the presence of terpenoids</td>
</tr>
</tbody>
</table>
RESULTS AND DISCUSSIONS

Ethanobotanical uses

Ethanomedicinal uses are the stem, roots and leaves of 
_Crateva religiosa_ G. Forst. have great medicinal value.
The plant is used internally as well as externally. The
fermented leaves are edible. It is bitter in taste. The bark
is medicinal. The Juice from it raises the appetite and
used as a laxative. The wood is also used in match box
industries. Externally, the paste or its leaves or skin of
bark is applied in cervical adenitis, abscess, wounds and
also in rheumatic pain. The decoction of bark skin or
roots is used in urinary problems, kidney stones, fever,
vomiting and gastric irritation. Leaves are externally
used in rheumatism; internally they are given as
febrifuge and tonic. Leaf extract is applied to soles of
feet to relive swelling and burning sensation. [10]

Phytochemical Screening

The present study was conducted to analyse
phytochemical screening of the leaf extract of _Crateva
religiosa_ G.Forst. The present investigation reveals that,
the presence of phytochemical constituents like
Carbohydrates, Flavanoides, Phenols, Saponins and
Tannis were present in both aqueous and alcoholic leaf
extracts of _C. religiosa_. Among these Carbohydrates,
Flavanoides, Phenol and Tannin were present in aqueous
leaf extract of the selected plant. Similarly
Carbohydrates and Saponins were present in ethyl
alcohol leaf extract of the same plant. The phytochemical
constituents like Alkaloids, Glycosides, Steroids and
Terpenes were altogether absent in both aqueous and
alcoholic leaf extracts of _C. religiosa_. In addition to that,
the phytochemical constituent like Carbohydrates were
present in both both aqueous and alcoholic leaf extracts
of _C. religiosa_ (Table 2).

Similarly phytochemical screening of barks and roots of
_Crateva religiosa_ G.Forst. reveals the presence of
saponins, flavonoids, sterols and glucosilinates and ceryl
alcohol, friedelin, cadabicinediacetate, lupeol, betulinic
acid and diosgenin. [9] Likewise the analysis of fruits
discloses the occurrence of glucocapparin, beta-
sitosterol, triacontane, triacontanol, pentadecane,
octanamide, 12-tricosanone and friedelin. [10]

Table-2: Phytochemical screening of leaf extract of _Crateva religiosa_ G.Forst.

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Aqueous extract</th>
<th>Ethyl alcohol Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloides</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Flavanoides</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Glycosides</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Phenol</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Saponins</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>Steroids</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Tannin</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Terpenes</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

(+): Presence; (-): Absent

SUMMARY AND CONCLUSIONS

The phytochemical screening of the leaf extract of
_Crateva religiosa_ G.Forst. reveals that, the presence of
phytochemical constituents like Carbohydrates,
Flavanoides, Phenols, Saponins and Tannis etc. More
over this plant is also having very good ethnobotanical
background. Because most parts of the taxa are variously
used for the treatments of different ailments. In this,
the present study is the preliminary approach to validate
the occurrence of various potential phytochemicals, which
are present in the leaf extract of the selected taxa such as
_Crateva religiosa_ G.Forst., further studies also required
to reveal the active principle behind it.

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