Comparative Phytochemical Screening of Leaves and Flowers of *Thevetia peruviana* L.

Rajan Jani*, Dhruv Pandya, Dr Archana Mankad and Dr Himanshu Pandya

Department of botany, Bio-informatics, Climate change and Impacts Management, University School of Science, Gujarat University, Ahmedabad, Gujarat.

Abstract:

Plants derived bioactive compounds have been the focus of recent research due to their health promoting effects. *Thevetia peruviana* L. plant belongs to Apocynaceae family. The present investigation was carried out to assess the qualitative phytochemical analysis of leaves and flowers of *Thevetia peruviana* L. In the study three different solvents were used for the phytochemical screening named Methanol, Chloroform and Aqueous. Different solvent screening showed the presence of Alkaloids, Flavonoids, Phenols, Terpenoids and Glycosides. Since the plant contain high quantities of these new bioactive potential compounds, it is reliable to possess large number of pharmacological values like antioxidants, antifungal, antibacterial, anti-inflammatory, antiulcer, diuretics activities and are being employed for the treatment of different ailments in the indigenous system of medicine.

Key words: *Thevetia peruviana* L., Phytochemicals, Secondary metabolites.

Introduction:

The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants leaves, stem bark, fruits and roots that have defence mechanism and protect from various diseases. Natural products from plants called secondary metabolites are the end products of primary metabolites such as carbohydrates, amino acid, and chlorophyll lipid so on. They are synthesis large variety of chemical substances known as secondary metabolites which include alkaloids, steroids, flavonoids, terpenoids, glycoside, saponia, tannins, phenolic compounds etc. *Thevetia peruviana* L. plant is famous ornamental plant, but it also having different phytochemicals like alkaloids, flavonoids, phenols, glycosides, terpenoids etc. The study was focused on the screening of leaves and flowers of *Thevetia peruviana* L. in methanolic, chloroformic and aqueous solvents.

Material and Methodology:

Collection of Plant material:

The fresh leaves and flowers of *Thevetia peruviana* L. were collected from Randesan, Gandhinagar, Gujarat, India. (December-2018). The plant material was identified by Dhruv Pandya, Teaching Assistant, Department of Botany, Bio-informatics, Climate change and Impacts Management, School of Science, Gujarat University.
Plant Extract Preparation method:

The flowers and leaves were air dried for 7 days and crushed to form powder of dried plant material. The powdered samples were obtained after pulverisation then they were subjected to successive extraction with organic solvents such as chloroform, methanol and aqueous by dry crude extraction. 10gm weighed powdered material of each sample were treated with different solvents including methanol, chloroform and distilled water and incubated for 24 hrs on shaker. After one day all the samples were filtered with the help of whatman filter paper no.1. The filtered extracts were kept at room temperature for evaporation of solvents. After 2 days we got the crude extract of each sample.

Qualitative Analysis of Secondary metabolites:

Test for Alkaloids:

3 mg extract were dissolved individually in 3 ml ethanol and 1 N HCL was added then filtered it with whatmann filter no. 1. The filtrates were used to test the presence of Alkaloids.

Mayer’s test: 1 ml filtrate was treated with 2 ml Mayer’s reagent; cream colour precipitation indicates the presence of alkaloids.

Wagner’s test: 1 ml filtrate was treated with Wagner’s reagent; reddish brown colour indicates the presence of alkaloids.

Dragendroff’s test: 1ml filtrate was treated with 2 ml Dragendroff’s regent; orange red colour precipitation indicates the presence of alkaloids.

Test for Flavonoids:

Lead acetate test: 1 ml liquid extracted was treated with 10 % lead acetate solution; formation of yellow precipitation indicates the presence of flavonoids.

H₂SO₄ test: 1 ml extract was treated with few drops of H₂SO₄; orange colour precipitation indicates the presence of flavonoids.

Alkaline reagent test: 1 ml extract was treated with few drops of dil. NaOH and few drops of dil. HCL; yellow colour turns in to colour less soln. indicates the presence of flavonoids.

Zinc hydrochloride reduction test: 1 ml extract was treated with zinc dust and conc. HCL; formation of red colour indicates the presence of flavonoids.

Pew test: 1 ml of extract was treated with pieces of metallic magnesium and 2-3 drops conc. HCl were added; formation of brownish colour indicates the presence of flavonoids.

Test for Phenols:

Ferric chloride test: 1 ml extract was treated with few drops of 5% ferric chloride solution; formation of bluish black colour indicates the presence of phenols.

Lead acetate test: 1 ml extract was treated with 2-4 ml 10 % acetic acid; formation of yellow colour precipitation indicates the presence of phenols.
Test for Saponins:
Frothing test: About 0.5 mg of extract was shaken with 5 ml of distilled water; formation of froth (appearance of creamy small bubbles) show the presence of saponins.

Test for Tannins:
Lead acetate test: 1 ml of extract was treated with 1 ml 10% lead acetate solution; white colour precipitation indicates the presence of tannins.

Ferric chloride test: Small quantity of extract was mixed with water and heated in water bath, the mixture was filtered and 0.1% ferric chloride soln. was added to filtrates; dark green colour indicates the presence of tannins.

Test for Terpenoids:
Salkowski’s test: Few mg of extract mixed with 2 ml of chloroform and 3 ml of conc. H₂SO₄ was carefully added to form a layer; an appearance of reddish-brown colour ring indicates the presence of terpenoids.

Copper acetate test: extract was dissolved in water and treated it with 5% copper acetate solution; formation of emerald green precipitation indicates the presence of terpenoids.

Test for Glycosides:
Bromine H₂O test: 1 ml of test solution was dissolved in bromine H₂O; formation of yellow colour precipitation indicates the presence of glycosides.

Keller-Kiliani test: 2 ml of test solution was treated with few drops of glacial acetic acid and 1% ferric chloride solution mixed, concentrated Sulphuric acid was added and observed for the formation of two layers; lower reddish brown and upper acetic acid layer which turns bluish green indicates a positive test for glycosides.

Results and discussion:
As per results of Secondary metabolites analysis of leaves; Methanolic leaves extracts showed the presence of Alkaloids, Flavonoids, Phenols, Tannins and Terpenoids. Chloroformic leaves extracts showed presence of Alkaloids. Aqueous leaves extracts showed presence of Alkaloids, Flavonoids, Phenols.

As per results of secondary metabolites analysis of flowers; Methanolic flowers extract showed presence of Alkaloids, Flavonoids, Phenols, Tannins and Terpenoids. Chloroformic extracts of Flowers showed presence of Alkaloids.
Table-1 showing Qualitative analysis of secondary metabolites in methanolic, chloroformic and aqueous extracts of leaves and flowers.

<table>
<thead>
<tr>
<th>Phytochemicals</th>
<th>Tests</th>
<th>Parts of <em>Thevetia peruviana</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Leaves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methanol</td>
</tr>
<tr>
<td><strong>Alkaloids</strong></td>
<td>1) Dragendroff’s Test</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>2) Mayer’s Test</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3) Wagner’s Test</td>
<td>+</td>
</tr>
<tr>
<td><strong>Flavonoids</strong></td>
<td>1) Lead acetate Test</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>2) H₂SO₄ Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3) Alkaline Reagent Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>4) Zinc Hydrochloride Reduction Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>5) Pew Test</td>
<td>-</td>
</tr>
<tr>
<td><strong>Phenols</strong></td>
<td>1) Ferric Chloride Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2) Lead acetate Test</td>
<td>+</td>
</tr>
<tr>
<td><strong>Saponins</strong></td>
<td>1) Frothing Test</td>
<td>-</td>
</tr>
<tr>
<td><strong>Tannins</strong></td>
<td>1) Ferric Chloride Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2) Lead acetate Test</td>
<td>+</td>
</tr>
<tr>
<td><strong>Terpenoids</strong></td>
<td>1) Salkowski’s Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2) Copper Acetate Test</td>
<td>+</td>
</tr>
<tr>
<td><strong>Glycosides</strong></td>
<td>1) Bromine H₂O Test</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2) Keller-Killiani Test</td>
<td>-</td>
</tr>
</tbody>
</table>

+ indicates Presence and – indicates Absence.
Conclusion:

Thevetia peruviana is an ornamental plant but it also has different phytochemicals like alkaloids, flavonoids, phenols, terpenoids etc and because of the presence of secondary metabolites it might have different medicinal properties.

References:
