Qualitative Analysis of Secondary Metabolites of Flowers of *Tecoma Stans* (L.) Juss Ex Kunth

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Abstract

Tecoma stans L. is an important ornamental plant belongs to Bignoniaceae family. The study was focused on the secondary metabolites screening of the plant. Flowers were selected as part for screening. Aqueous and chloroformic extracts were prepared for the analysis. As the results showed that in the flowers alkaloids, flavonoids, saponins, terpenoids are present. These phytochemicals can be helpful to cure different types of diseases in plants as well as in humans. So, *Tecoma stans L.* is one of the important ornamental and it can be medicinal plant because of the presence of different phytochemical constituents.

Key words: *Tecoma stans L.,* Secondary metabolites, Medicinal importance, Flowers

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, saponins, tannins, phenolic compounds etc. *Tecoma stans L.* is famous ornamental plant found in India. It has so many phytochemicals. The study was focused on the screening of Aqueous and chloroformic extracts of the flowers.

Material and Methodology

The fresh floweres were collected from R. R. Mehta College of Science and C. L. Parikh College of Commerce, Palanpur, Banaskantha, Gujarat. The plant material was identified by Dr Dhruv Pandya, Assistant Professor Department of Botany, R. R. Mehta College of Science and C. L. Parikh College of Commerce, Palanpur, Banaskantha, Gujarat.

Extract Preparation Method:

The Flowers were air dried for 4 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 Distilled water and chloroform 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.

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.

H_2SO_4 test: 1 ml extract was treated with few drops of H_2SO_4; 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.

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. H_2SO_4 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 H_2O test: 1 ml of test solution was dissolved in bromine H_2O; 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 result of flower screening the alkaloids, flavonoids, saponins and terpenoids are present in the flowers of *Tecoma stans* L. Many of the researchers previously worked on the leaves and bark of the plant but *Tecoma* flowers extract still has to be screened by few researchers.

Phytochemicals	Qualitative Tests	Flowers of *Tecoma stans* L.	
		Aqueous	Chloroform
Alkaloids	Mayer`s Test	-	-
	Wagner`s Test	+++	++
Flavonoids	Lead acetate Test	-	-
	H$_2$SO$_4$ Test	-	+
	Alkaline Reagent Test	+	-
Phenols	Ferric Chloride Test	-	-
	Lead acetate Test	-	-
Saponins	Frothing Test		+++
Tannins	Ferric Chloride Test	+++	++
	Lead acetate Test	-	-
Terpenoids	Salkowski`s Test	-	++
	Copper Acetate Test	++	-
Glycosides	Bromine H$_2$O Test	-	-
	Keller-killiani Test	-	-

Table:1 Showing the presence and absence of secondary metabolites in different Solvents

- **Shows absence, + shows presence, ++ shows average presence, +++ shows higher presence of the secondary metabolite.**

Conclusion:

The screening of secondary metabolite of Flowers of *Tecoma stans* L. showed the presence of different phytochemicals so we can consider this plant as medicinal plant and the study will be useful for the quantitative analysis of secondary metabolites present in the plant parts. Even pharmacological tests like antimicrobial, antitumor, antiviral can be performed further.

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