

Preliminary Phytochemical Screening Analysis and Therapeutic Potential of *Tecoma stans* (L.)

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Abstract

Tecoma stans is a tropical flowering plant which is used in herbal medicine treatment for diabetes, digestive problems etc. Different extracts of the leaves of *Tecoma stans* were evaluated as antibacterial potential against the growth of some human bacterial strains using the disc diffusion and minimum inhibitory concentration (MIC) method. The methanol and aqueous extracts of *Tecoma stans* showed significant effect against the tested bacteria *Escherichia coli*, *Serratia marcescens*, *Bacillus subtilis*, *Micrococcus luteus*, *Staphylococcus aureus* using a standard as Amoxicillin(1g/ml) compared leaf extract preliminary phytochemical analysis revealed the presence of saponins, alkaloids, tannin, flavonoids, steroids, phenolic compound and glycoside in all the methanol extract and tannins, steroids and glycoside are absence in aqueous extract. The present finding provides scientific evidence to support the updated information on its phytochemical and pharmacological activity and its traditional uses.

Keyword: *Tecoma stans*, phytochemical screening, antibacterial activity, methanol extract, pharmacological activity, alkaloids, flavonoids.

1. INTRODUCTION:

Tecoma Stans (L.) Juss. Ex kunth as yellow bells from family Bignoneacea. It is an ornamental and semi evergreen tropical shrub which is used traditionally for different treatment for disease and pharmacological activities. It leaves are opposite odd-

pinnate and up to 20 cm in length, with 4 or 5 leaflets. Flowers are yellow, faintly scented, borne in short, dense, terminal clusters. Plants have provided a source of inspiration for novel drug compounds. Traditional medicine using plant extracts continues to provide health coverage for over 80% of the world's population. Almost all the plants of *Tecoma stans* are of medicinal importance and used traditionally for the treatment of various ailments [1]. The plants' leaves, flowers, barks and roots have been used as choleric activity, mild cardiotoxic and muscle relaxant. Pharmacological uses *Tecoma stans* have been used in herbal medicine treatment for reducing blood glucose [2], control of yeast infections, as powerful diuretic activity, vermifuge and tonic [3].

Flower and leaves have some medicinal value for the treatment of various cancer [4]. The primary applications of *Tecoma stans* have been found in treating diabetes and digestive problems [5]. The literature survey reveals that the *Tecoma stans* possesses various bioactive compounds such as flavonoids, alkaloids, steroids, saponins, tannins, phyto sterols, triterpenes, phenols and glycosides [6-7]. The present study was aimed at the preliminary phytochemical screening of *Tecoma stans* plants by using aqueous and organic solvent extracts of the leaves. Various phytochemicals present in *Tecoma stans* are responsible for medicinal value of the plants.

2. MATERIALS AND METHODS:

2.1 Collection of plant material:

The *Tecoma stans* plant was collected in the month of December 2015 from college campus Sitapur, Surguja (Chhattisgarh). The plant was then identified by their vernacular names and later it was compared with the herbarium of the Department by the botanist. The leaves of *Tecoma stans* were collected and separated and then dried under shade drying for 4-5 days. Then the dried leaves are ground and sieved to get nearly fine amorphous powder.

2.2 Preparation of Extracts:

The air dried powder (120g) was extracted by Soxhlet apparatus with 360 ml of 80% methanol and 360 ml of water for 6 Hrs. at room temperature. All the extracts were concentrated under reduced pressure at 45°C and then stored in an air tight container for further study.

2.3 Preliminary Phytochemicals Screening:

All the dried extracts were dissolved in specific reagents through standard procedure [8] and tested for phytoconstituents using standard methods described by Sofowara and Trease & Evans [9-10].

2.4 Screening of Anti bacterial Activity

Anti bacterial activity is a process of inhibiting the growth of microbes. Anti bacterial agents inhibits the growth of microbes. The standard bacterial test organisms were sub cultured on freshly prepared nutrient agar the extracted samples were inoculated in to the culture using disc diffusion method. Leaf extract of *Tecoma stans* was treated for anti bacterial activity using disc diffusion method. Nutrient agar medium was prepared sterilized and used as growth medium for bacterial culture. 15ml of sterilized medium was poured into each Petri plate, covered semi half and allowed to solidify. The test micro organism like gram negative; *Escherichia coli*, *Serratia marcescens* gram positive; *Bacillus subtilis*, *Micrococcus luteus*, *Staphylococcus aureus* were inoculated into the petri plates using sterile cotton swabs .

The sterilized discs were soaked in different solvent extract like methanol and Aqueous leaf (1 µg/ml) and were dried at 50⁰C. Then the dried discs were placed on medium plated seeded with micro organisms and also prepared control and standard (Amoxicillin (1 µg/ml). Then plates were incubated at 37⁰C. Then the zone of inhibition was measured after 24 hours.

3. RESULTS AND DISCUSSION

Medicinal plants are the most exclusive source of life saving drugs for majority of the world population. The result obtained in the phytochemical screening of the *Tecoma stans* plants (Table 1) varied according to the solvents used for the extraction of the leaves.

Table-1: Phytochemical analysis of the different solvent extract of *Tecoma stans* leaves

Phytochemicals	Test / Reagent	Solvent used for extraction	
		Methanol	Aqueous
Saponin	Foam and NaOH	+	+
Alkoloids	Mayers test	+	+
Tannins	FeCl ₃ and Lead Acetate	+	-
Flavonoidsnew	Shinoda test	+	+
Steroids	Salkowski test	+	-
Phenolic Compound	FeCl ₃ test	+	+
Glycoside	Legal test	+	-

(+): Present ;(-): Absent

Methanol extract of the leaves showed the presence of all the secondary metabolites studied saponins, alkaloids, tannins, flavonoids, steroids, phenolic compound and glycosides which would be the bioactive constituents of the plant. Aqueous extract showed saponins, alkaloids, flavonoids and phenolic compounds from leaves of *Tecoma stans*. Saponins are glycosides occurring widely in plants. Saponins possess hypocholesterolemic and anti diabetic properties [11]. Flavonoids have been proven to display a wide range of pharmacological and biochemical actions such as antimicrobial and carcinogenic activities [12-16]. The presence of hydroxyl group of plant phenolic compound is responsible for their free radical screening ability [17] and singlet oxygen quencher. The presence of tannin in the extracts may explain its potent bioactivities known to possess potent anti oxidant activities [18]. Alkaloids are the most efficient therapeutically significant plant substance. The pharmacological uses of *Tecoma stans* in herbal medicine can be attributed to the phenolic and other secondary metabolites from the plants.

Antibacterial activity of methanol and aqueous extracts of *Tecoma stans* were evaluated by measuring the diameter of zones and MICs value of growth of inhibition on some human pathogenic bacteria (Table-2).

Table 3: Anti Bacterial Activity of Methanol and Aqueous extract from leaves of *Tecoma stans*

Micro-Organism	Zone of Inhibition (mm) of Leaf Extract		Controlled (1 µg/ml)	Standard (Amoxicillin) (1 µg/ml)
	Methanol Leaf (1 µg/ml)	Aqueous Leaf (1 µg/ml)		
<i>Escherichia coli</i>	12.10	15.70	-	25.20
<i>Serratia macrescens</i>	7.50	8.79	-	24.00
<i>Bacillus subtilis</i>	10.20	11.35	-	22.80
<i>Micrococcus luteus</i>	11.32	6.30	-	23.10
<i>Staphylococcus aureus</i>	8.35	14.45	-	24.30

In this study, the antimicrobial activities of the methanol extract and aqueous extract of *Tecoma stans* leaves gave different zone of inhibition on the organism tested. The extract exhibited strong antibacterial activity against all the five bacterial strains used with diameter of inhibition zone.

By performing the zone of inhibition (mm) of different leaf extract, the zone of inhibition of aqueous leaf extract was found to inhibit the microbers to a greater extent than methanol extract and less activity was observed against *Micrococcus letues*. The maximum inhibitory effect was reveled *Escherichia coli* 15.70 mm and *Staphylococcus aureus* 14.45 mm. The present investigation has shown that the methanol and aqueous extract of *Tecoma stans* leaves have active phytochemicals which are able to inhibit the growth of pathogenic bacteria.

5. CONCLUSION

The present Study indicated that the extract from leaves of *Tecoma stans* had a potent anti bacterial activities. The present investigation also suggests that leaves of *Tecoma stans* may be utilized as effective and safe natural source for anti bacterial agents. These activities could be due to strong occurrence of compound such as flavoids, tannins, alkaloids and saponins. Further, *Tecoma Stans* seems to be held great potential for in depth investigation for various biological activities and the obtained through this work may be useful in developing new formulation with more therapeutic value.

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