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Research Article

ANTIBACTERIAL ACTIVITY OF *TECOMASTANS* AGAINST GRAM POSITIVE AND GRAM-NEGATIVE BACTERIA

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Abstract:

Many herbal remedies have so far been employed for the treatment and management of various ailments since the beginning of human civilization. Tecomastans Juss. (Bignoniaceae) is a plant widely distributed in Mexico and frequently used for the treatment of Diabetes mellitus symptomatology. The aim of the review is to determine the antibacterial activity of plant Tecomastans (family Bignoniaceae) using various crude extracts of it. Antibacterial activity was tested against both Escherichia coli (gram negative) and Lactobacillus (gram positive) bacteria using Ciprofloxacin as standard at concentration of 5mcg. Results against selected microorganisms were assayed using zone of inhibition, showed that methanolic crude extracts of plant Tecomastans is most active against gram negative strains of bacteria (Escherichia coli).

Keywords: Antibacterial Activity, Zone of inhibition, Tecomastans, Gram positive and negative bacteria

INTRODUCTION:

In recent years, there has been growing interest in alternative therapies and the therapeutic use of natural products, especially those derived from plants. This interest in drugs of plant origin is due to several reasons, namely, conventional medicine can be inefficient (e.g. side effects and ineffective therapy), abusive and/or incorrect use of synthetic drugs results in side effects and other problems. The Bignoniaceae family comprising of about 110 genera and 650 species is a family of flowering plants, commonly known as the Trumpet Creeper family, Jacaranda family, Bignonia family, or the Catalpa family. Plant species belonging to this family are distributed worldwide, but most of them occur in the tropical and sub-tropical countries. However, a number of temperate species also grow in North America and East Asia. Although the family is small, the bignoniaceae plants are important for their reported bio-active constituents and diverse pharmacological activities. Bignoniaceae family plants are also widely used in traditional medicinal systems of a number of countries, where folk and tribal medicinal practitioners use a number of species for treatment of diverse ailments. The seven species of Bignoniaceae family plants in use were *Crescentiacujete*, *Heterophragmaadenophyllum*, *Oroxylumindicum*, *Stereospermumsuaveolens*, *Tabebuiaargentea*, *Tecomagaudichaudi*, and *Tecomastans*. This review aims at describing the traditional uses, pharmacognostical, phytochemical profiles and therapeutic potential of various parts of *Tecomastans* (L.) Juss.exKunth, which has been used in traditional practice for many years in Mexico as the main remedy in the treatment of diabetes.

1. Classification:

- **Domain:** Eukaryota
- **Kingdom:** Plantae
- **Subkingdom:** Viridaeplantae
- **Phylum:** Tracheophyta
- **Subphylum:** Euphyllophytina
- **Infraphylum:** Radiatopses
- **Class:** Magnoliopsida
- **Subclass:** Lamiidae
- **Superorder:** Lamianae
- **Order:** Scrophulariales
- **Family:** Bignoniaceae
- **Tribe:** Tecomeae
- **Genus:** *Tecomastanz*
- **Specific epithet:** *stans*- (L.) Juss. ex Kunth
- **Botanical name:** - *Tecomastans*

Description of *Tecomastans*:

Tecomastans is a promising species in the trumpet vine family, Bignoniaceae that is native to the Americas with many synonyms and common names. Synonyms include *Bignonia stans* L., *Gelsemiumstans*(L.) Kuntze, *Stenolobiumstans*(L.) Seem and Common names, Yellow Trumpet bush, Yellow Bells, Yellow Elder, Ginger-Thomas, and Esperanza. *Tecomastans* is the official flower of the United States Virgin Islands and the national flower of The Bahamas. It is a flowering perennial shrub or small tree, 5-7.6 m in height. Bark is pale brown to grey and roughens with age. Leaves are opposite, compound and imparipinnate with 2 to 5 pairs of leaflets and a larger single terminal leaflet. Leaflets are lanceolate, up to 10 cm long, with serrated margins, mid-green above and soft to the touch. Flowers occur

in clusters at the ends of the branches and are trumpet shaped with 5 rounded lobes, 6 cm long, pale to bright yellow, with faint orange stripes at the throat. Fruits are narrow, slightly flattened to pointed capsules, up to 20 cm long, containing many winged seeds; green when young, pale brown on ripening and remain on the tree in untidy clusters for many months.

1 Ethnobotany:

Tecomastansleaves bark, and roots contain many biologically active chemicals, and extracts from those tissues have been used in traditional folk medicine to treat many diseases and conditions. Leaves are used throughout Mexico and Central America for diabetes and urinary disorder control. Roots are used as diuretic, vermifuge.

2 Phytochemistry:

Chemical constituents of this botanical species are well known; triterpenes, hydrocarbons, resins and a volatile oil. The biosynthesis of these monoterpene alkaloids in callus tissues of Tecomastanshas been studied, together with the identification of the presence of lapachol and other primary and secondary plant metabolites such as: sugars (glucose, fructose, sucrose and xylose), triterpenoids (ursolic and oleanolic acids and α -amyrine), p-sitosterol and phenolics (chlorogenic, caffeic, vanillic, o-cumaric and sinapicn acids). All of these compounds have already been identified in the whole plant at different concentrations. Recently the presence of iridoid glycosides, indolic compounds in the leaves and a new phenylethanoid, 2-(3,4-dihydroxyphenyl) ethyl-2-O-[6-deoxy- α -L- mannopyranosyl- 4- (3, 4 dihydroxyphenyl) -2-propenoate]-beta-Dglucopyranoside, and a novel monoterpene alkaloid, 5-hydroxy-skytanthine hydrochloride, along with eleven known compounds in the fruits and flowers was established in Tecomastans.

MATERIALS & METHODS:

1 Plant materials:

Fresh leaves of plant Tecomastanz was collected from SSJ College of pharmacy surroundings and were taken for investigation of antibacterial property. Fresh plant materials were washed under running tap water, air dried in shade for about 7 days and then homogenized to make fine powder.

2 Preparation of Crude extracts:

90 grams of shade dried leaves powder of TecomaStanz is weighed and packed with a muslin cloth. Packed dried powder is kept for soxhalation for 6 hours using Chloroform, and then powder is removed and kept for drying. The crude extract is left for air drying for about 1 week until all the volatile substance in it dries. The similar process is continued for air dried powder with Methanol and water, crude extract is left for drying.

3 Bacterial strains:

Bacterial strains used in this study were Escherichia coli, and Lactobacillus. The bacterial strains were maintained in nutrient broth, routinely sub-cultured. These bacteria served as test pathogens for antibacterial activity assay.

1. Screening for antibacterial activity:

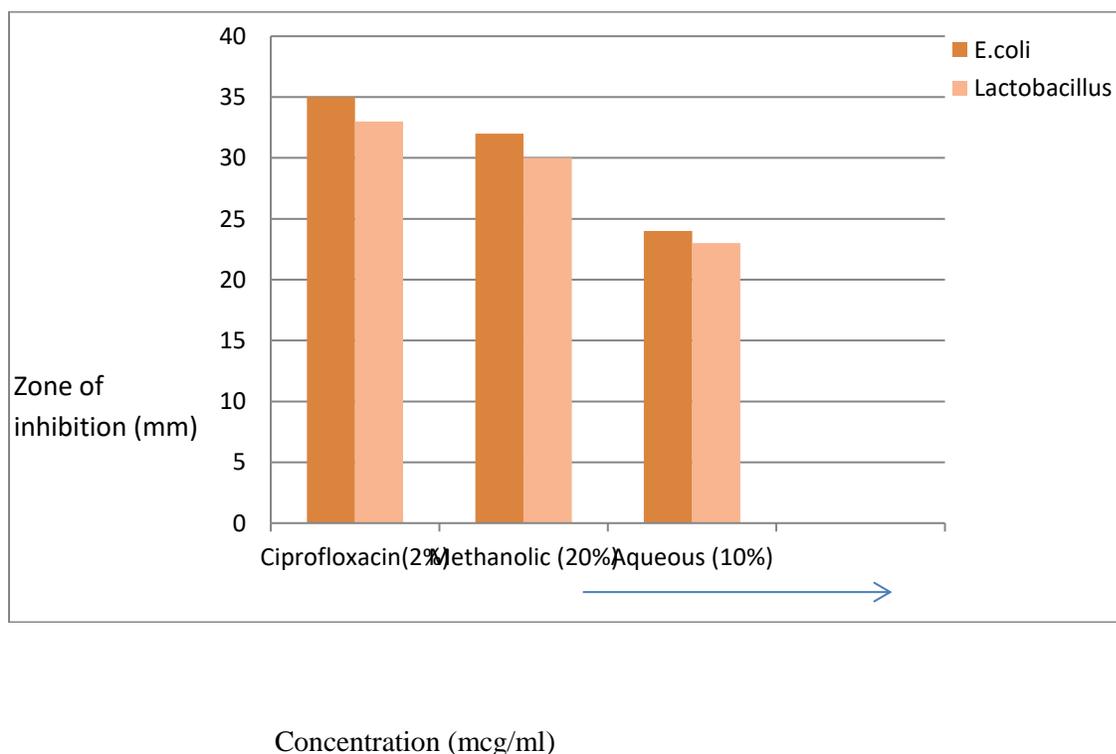
The antibacterial assay performed by agar disc diffusion method and Cup and plate method. Overnight cultures were prepared by inoculating approximately in 2ml nutrient broth with 2–3 colonies of each organism taken from nutrient agar. Broths were incubated overnight at 35°C with shaking. Inocula were prepared by diluting overnight bacterial cultures approximately 10 cells per ml in sterile saline. The suspension of tested bacterial strains (0.1 ml of 10cells per ml) was spread on the agar plates and nutrient agar plates. Filter paper discs (6 mm in diameter) were impregnated in 5µl of the plant extracts and dried aseptically. The discs are placed on the bacterial lawn of agar plates and incubated at 37°C for 24 h. The diameters of the inhibition zones were measured using a scale in millimeters (mm) from the size of clear zone larger than 0.6 mm. A standard results and the maximum zone of inhibition (ZOI) against the pathogens were noted.

2. Results and discussion:

The results of antibacterial activity of Tecomastans leaf extract are given in Table 1 against both gram positive and gram negative bacteria.

Table 1:Antibacterial activity of Tecomastans on different Strains of bacteria using disc diffusion method

Treatment	Concentration (mcg/ml)	Zone of inhibition(mm)	
		E.coli	Lactobacillus
StandardCiprofloxacin	5	35	33
Methanol extract	5	32	30
Water extract	5	24	21



CONCLUSION:

By conducting the above experiment it's was concluded that the tecomastanscrude extract is most effective against gram negative strain of bacteria. And can be used in herbal medicines as it has fewer side effects as compared to those synthetic antibiotics.

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