

REVIEW ON PHARMACOGNOSTICAL & PHARMACOLOGICAL PROPERTIES OF *PYROSTEGIA VENUSTA*: AN ORNAMENTAL PLANT

Abstract

Herbal and natural folk remedies have been used in all cultures of the world for centuries. Plants are undoubtedly a reservoir of potentially useful chemical compounds that act as medicines and provide new clues and clues for modern synthetic design. The flowering plant species *Pyrostegia venusta*, often known as flaming vine or orange trumpet vine, is a member of the Bignoniaceae genus and is indigenous to southern Brazil, Bolivia, northeastern Argentina, and Paraguay. Today, it is a well-liked garden species. In traditional Brazilian medicine, it has been widely used as a tonic to treat certain skin infections such as leukoderma, vitiligo, etc., as well as to treat diarrhea, coughing, and common respiratory conditions including bronchitis, colds, and the flu that are brought on by infections. Sterols, triterpenes, flavonoids, fatty acids, n-alkanes, nitrogen compounds including allantoin, and carbohydrates were discovered in *Pyrostegia venusta* phytochemical research. *Pyrostegia venusta* crude extracts exhibit a variety of pharmacological actions, including anti-inflammatory, analgesic, antinociceptive, wound healing, and antibacterial effects. They are also effective in the treatment of pathological illnesses including the common cold and flu. Additionally used to boost melanogenesis and reduce menopausal symptoms.

Keywords: *Pyrostegia venusta*, Flamevine, orange trumpet vine.

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I. INTRODUCTION

The flowering plant species *Pyrostegia venusta*, often known as flaming vine or orange trumpet vine, is a member of the Bignoniaceae genus and is indigenous to southern Brazil, Bolivia, northeastern Argentina, and Paraguay. Today, it is a well-liked garden species. John Miers first described this species in 1863. This evergreen, vigorous climber is a fast grower and can spread like wildfire if left unattended. The height can be up to 5 meters. Foliage consists of two or three opposite leaflets, 4–8 cm across, pinnate leaves and a three-pronged tendril protruding from the end of the petiole. The orange flowers are 5–9 cm long and densely clustered and appear from winter through spring. Hummingbirds pollinate plants. The fruits are brown capsules that are smooth and 3 cm long. The plant is sensitive to cold winds and prefers sun and shelter. It tolerates the salinity of the soil. The plant's branching tentacles will cling to any hard surface, including brick walls. Bignoniaceae is a dicotyledon family that has between 100 and 125 genera and 700 and 800 species. Lapacol-type naphthoquinones, iridoid glycosides, flavones, triterpenes, alkaloids, polyphenols, tannins, and fixed oils from seeds are a few of the chemical substances connected to this species. *Pyrostegia venusta*'s aerial parts and flowers have both been isolated for their oleanolic acid content. A lot of biological significance for oleanolic acid has been demonstrated. It has properties that are anti-cancer, anti-tumor, antioxidant, anti-inflammatory, acetylcholinesterase, alpha-glucosidase, antimicrobial, hepatoprotective, anti-inflammatory, antipruritic, antispasmodic, and anti-allergic.

II. PLANT DESCRIPTION

Biological Source: *Pyrostegia venusta*, also known as flame vine or orange trumpet vine, is a plant species in the Bignoniaceae family *Pyrostegia*.



Figure 1: Whole Plant of *Pyrostegia Venusta*



Figure 2: Flower of the Plant

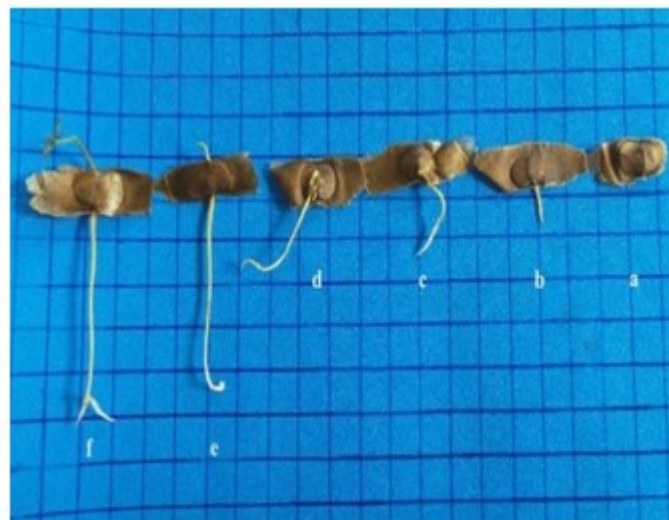


Figure 3: Different Seeding Phases of *Pyrostegia Venusta*

1. Taxonomy of *Pyrostegia venusta*

Class: Equisetopsida
Subclass: Magnoliidae
Superorder: Asteranae
Order: Lamiales
Family: Bignoniaceae
Genus: *Pyrostegia*

- **Synonyms:** Flame flower, flame vine, flaming trumpet vine, orange creeper, orange trumpet vine, Flaming trumpet, Golden shower trumpet, Orange Bignonia, flame creeper

- **Distribution:** Argentina Northeast, Bolivia, Brazil North, Brazil Northeast, Brazil South, Brazil Southeast, Brazil West-Central, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico Central, Mexico Gulf, Mexico Northwest, Mexico Southeast, Mexico Southwest, Panamá, Paraguay, Peru, Suriname, Venezuela

2. Macroscopic Description

- **Leaves:** Bipinnate, frequently with an apically trifid terminal tendril (occasionally with bifid or trifid branches again), or trifoliate leaves; thickly hairy, tributary pilose, or glabrous petioles; Leaflets ovate (rarely lanceolate), slightly subinequilateral, chartaceous (rarely membranous), 3 to 5 pairs of lateral veins protruding below, densely pubescent to glabrous, transparent, abaxially often particularly conspicuous, with large axillary glands of the lower lateral veins, base rounded or obtuse (rarely cordate), tip shortly acuminate-slimy or acuminate -mucronulate (blunt-mucronulate or acuminate).
- **Staminode:** Located 1.2-1.6 cm higher than the placement of the anthers.
- **Fruit:** Capsule glabrous; Drying with an olive sheen, central vein visible but not prominent; base acute; Apex Aristate.
- **Inflorescence:** A terminal or axillary panicle that is usually dense or subcorymbose, unbranched, or one, two, or three times (rarely three times) branched; trichomes are initially perpendicular to the surface and are found on the stem, leaf rachis, and bracteoles; glabrous to densely hairy to hairy, ciliated at tip; calyx without teeth at apex; lepidoptera scales sparse; lobes are long, apical, and hairy on the margin; the crown is narrowly tubular-infundibular, orange or reddish-orange (occasionally yellow); the tube is serious within at and below the base of the stamens and staminodes. Stamens are 1.3–3.5 cm away from the corolla tube's base, and stigma lobes can be broadly oval, elliptical, orbicular, or broadly oblong.
- **Flowers:** The flowers of *Pyrostegia venusta* are typical of hummingbird pollinators: odorless and petals mostly bright red-orange, quite thick in structure, with narrow tube and wide opening and more or less naked inside.

III. PHYTOCHEMICAL AND PHARMACOLOGICAL ACTIVITIES

Genus of *Pyrostegia* that belongs to the Bignoniaceae family. There are four native South American species in this family. In Brazil, members of this family of plants are utilized for customary uses. A survey of the literature revealed that the *Pyrostegia* genus has historically been used to treat conditions like diarrhea, cough, vitiligo, jaundice, and respiratory illnesses like colds, coughs, and bronchitis. The phytochemical constituents of the genus *Pyrostegia* include phenolic compounds, triterpenes, phenylpropanoids, phenylethanoid glycosides, and flavonoids. *Pyrostegia* extract has a wide range of pharmacological effects, including anti-inflammatory, wound healing, antinociceptive, analgesic, vascular relaxant, cytotoxic, antitumor, antitussive, anthelmintic, hyperpigmentation, and disease treatment. The

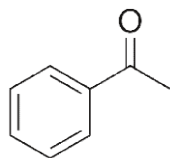
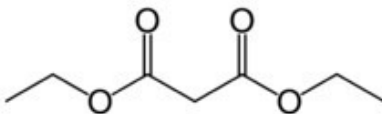
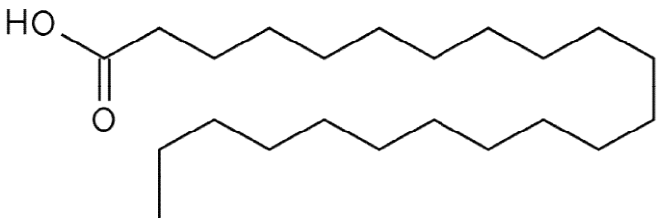
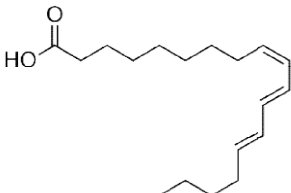
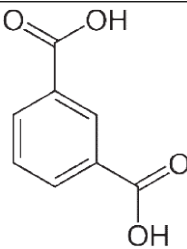
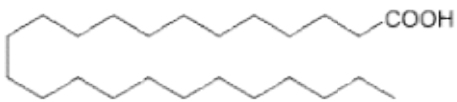
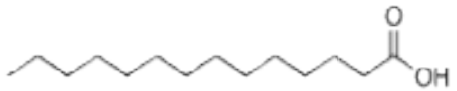
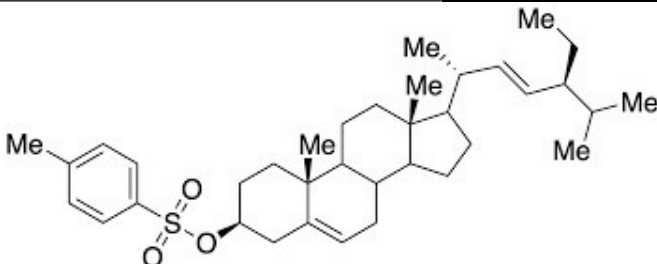
Pyrostegia genus is extensively utilized in conventional medicine and demonstrates a broad spectrum of pharmacological effects. The majority of *Pyrostegia* species, nevertheless, However, most *Pyrostegia* species require further research on their chemical components and pharmacological effects. *Pyrostegia venusta* is a plant that contains phytochemicals such as terpenoids, alkaloids, tannins, steroids, and saponins found in flower and root extracts.

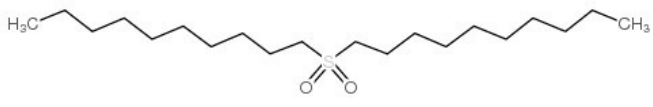
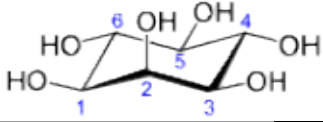
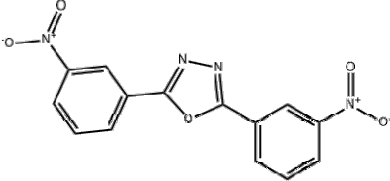
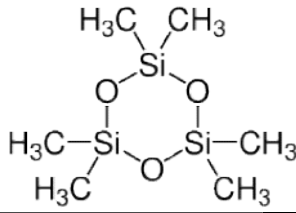
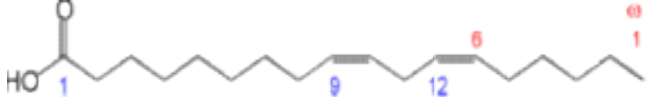
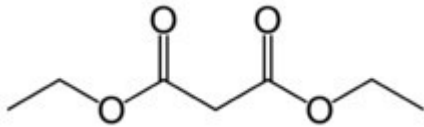
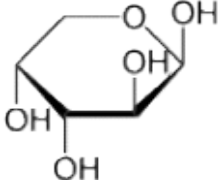
According to the literature review, flowers of *Pyrostegia venusta*, from which the compounds β -sitosterol, n-hentriacontane, acacetin-7-O- β -glucopyranoside and mesoinositol have been isolated. Other studies have indicated the presence of carotenoids in the flowers and rutin in the leaves. Gas Chromatography Mass spectrometry (Gc-MS) analysis of flower extract has showed the presence of Acetophenone; α -l-Mannopyranoside, methyl 6-deoxy-2,3,4- tris-O-(trimethylsilyl)-;3H-3a,7-Methanoazulene, 2,4,5,6,7,8- hexahydro-1,4,9,9-tetramethyl-, (3aR (3a.alpha.,4.beta.,7.alpha.))- (Synonym Cyperene); trans-3-Hexenedioic acid, bis(trimethylsilyl) ester; beta.-DL-Arabino pyranose, 1,2,3,4-tetrakis- O-(trimethylsilyl)- (Synonym- B Arabipyranos); Ethyl malonate, ethyl trimethylsilyl ester; Propionic acid, pentamethyldidilanyl ester; Glycoside, .alpha.-methyl-trtrakis-O-(trimethylsilyl);Hexadecenoic acid, methyl ester (Synonym-Palmitic Acid; D-Xylose, tetrakis(trimethylsilyl)-;Glycoside,. Alpha.-methyl-trtrakis-O- (trimethylsilyl)-;Gluconic acid, 2-methoxime, tetra(trimethylsilyl)-, trimethylsilyl ester; 12-Octadecadienoic acid, methyl ester (Synonym Linoleic acid); 9-Octadecenoic acid (Z)-, methyl ester (Synonym Oleic Acid);Myo-Inositol, 1, 2, 3, 4, 5, 6-hexakis-O- (trimethylsilyl)-; Docosanoic acid, methyl ester; 1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester; Methyl 10-methyl-undecanoate; (1,2,4)Triazolo(1,5-a)pyrimidine-6carboxylic acid, 4, 7-dihydro-7- imino-, ethyl ester; Dotriacontane; Silicic acid, diethyl bis(trimethylsilyl) ester; Tetracosanoic acid, methyl ester; Di-ndecylsulfone; Dodecahydropyrido(1,2-b)isoquinolin-6-one; Heptacosane; Tetra siloxane, decamethyl-; Tetra decanoic acid, 12- methyl-, methyl ester; Stigmasteryltoylate; 2-p-Nitrophenyloxadiazol-1, 3, 4-one-5; 2-Methyl-6-(5-methyl-2-thiazolin-2- ylamino)pyridine; Diazo progesterone; 1, 6-Dibromo-2- cyclohexyl pentane; Cyclotrisiloxane, hexamethyl-; cis2-Hexen-1- ol, trimethylsilyl ether.

It has been demonstrated that the compounds acacetin-7-O- β glucopyranoside and β sitosterol showed anti-inflammatory activity. The Dr. Dukes phytochemical and ethnobotanical database has mentioned some of these compounds to be useful in various medicinal complications. Database has mentioned that Acetophenone are useful Antibacterial, fungicide, pesticide, hypnotic, perfumery, soporific; 3H-3a,7-Methanoazulene, 2, 4, 5, 6, 7, 8hexahydro-1, 4, 9, 9-tetramethyl-, (3aR-(3a.alpha.,4.beta., 7.alpha.))-Cyperene) is an Antimalarial and Anti-plasmodial; Hexadecenoic acid, methyl ester (Synonym-Palmitic Acid) is an Antioxidant, hypo-cholesterolemic-nematicide, pesticide, antiandrogenic flavour, haemolytic, 5- Alpha reductase inhibitor; 9, 12- Octadecadienoic acid, methyl ester (Synonym - Linoleic acid) is an Anti-inflammatory, hypo-cholesterolemic cancer preventive, hepatoprotective, nematicide, insectifuge, anti-histaminic antieczemic, anti-acne, 5-Alpha reductase inhibitor, anti-androgenic, anti-arthritis, anti-coronary, insectifuge; 1,2-Benzenedicarboxylic acid, mono (2-ethylhexyl) ester (Phthalic acid) is useful in preparation of perfumes and cosmetics, and as plasticized vinyl seats on furniture and in cars, and clothing including jackets, raincoats and boots, as well as in textiles, as dye stuffs, cosmetics and glass making; Myo-Inositol, 1, 2, 3, 4, 5, 6-hexakis-O- (trimethylsilyl)- is useful in anti-depression, liver problems, panic disorders and diabetes; 9-Octadecenoic acid (Z)-, methyl ester is a 5-alpha-reductase-inhibitor, allergenic, alpha-reductase-inhibitor, anemiagenic, anti-

alopecic, anti-androgenic, anti-inflammatory, anti-leukotriene-D4 (antiplatelet activating factor), dermatitigenic, insectifuge, perfumery, propepic cancer-preventive, choleric, flavour, hypocholesterolaemia, irritant, percutaneostimulant; Stigmasteryl tosylate is used as anti-hepatotoxic, anti-inflammatory, anti-ophidic, anti-oxidant, estrogenic, sedative.

Table 1: Structures of *Pyrostegia Venusta* Phytoconstituents

Acetophenone; alpha.-Mannopyranoside	
Diethyl malonate	
Docosanoic acid	
octadecadienoic acid	
Benzenedicarboxylic acid	
Tetracosanoic acid	
Tetra decanoic acid	
Stigmasteryl Tosylate	

Di-n decylsulfone	
<i>myo</i> -inositol	
Nitrophenyloxadiazol	
Cyclotrisiloxane	
Linoleic acid	
Ethyl malonate	
DL-Arabinose pyranose	

IV. TRADITIONAL USE

Traditional Brazilian medicine uses *Pyrostegia venusta*'s flowers, leaves, and seeds as an infusion or decoction as a tonic and to cure conditions including diarrhea, leukoderma, coughing, and common respiratory infections like bronchitis. Traditional Brazilian medicine uses the aerial portions of *Pyrostegia venusta* as an infusion or decoction as a tonic and to cure a variety of ailments, including diarrhea, vitiligo, coughing, and common respiratory infections including bronchitis, the flu, and colds. *Pyrostegia venusta*'s aerial parts and flowers have been used to isolate oleanolic acid, according to published research. Oleanolic acid is demonstrated to be crucial to biology. It possesses actions that are antibacterial, hepatoprotective, anti-inflammatory, anti-pruritic, anti-spasmodic, antiangiogenic, antiallergic, antiviral, and immunomodulatory. From the flowers, acetin7-glucopyranoside and -sitosterol were extracted.

V. BIOLOGICAL STUDIES

- 1. Antioxidant Activity:** Utilizing the 1,1-diphenyl-2-picrylhydrazyl (DPPH), 2,2'-azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS), and Ferric reducing antioxidant capacity (FRAP) assays, the antioxidant capacity of *Pyrostegia venusta* flowers, seeds, leaves, and roots was examined.
- 2. Treatment of Unhealthy/ Sickness Behavior:** The study investigated the effects of a hydroalcoholic extract of *Pyrostegia venusta* flowers on lipopolysaccharide-induced sick behavior in mice. *Pyrostegia venusta* extract reduced lipopolysaccharide-induced depression-like and exploratory behaviours. These findings support previous claims about the usefulness of these plants in traditional medicine and suggest that they may be useful in the treatment of sick behavior disorders such as the flu and the common cold.
- 3. Estrogen Activity:** A tea derived from the *Pyrostegia venusta* plant has recently been used to ease menopause symptoms. The concentrations of the extract's active components are, however, somewhat low. For the generation of plant extracts with greater metabolite concentrations, plant tissue culture is an alternative.
- 4. Genotoxic Activity:** Mice were used to test *Pyrostegia venusta* extracts for genotoxicity using the chromosomal aberration assay and the micronucleus assay. The test groups were given oral doses of 50, 100, and 200 mg/kg body weight, respectively. The frequency of micronucleated polychromatic erythrocytes in the experimental controls was significantly and statistically lower than in the positive control group that received cyclophosphamide compared to the negative control group that got water. No genotoxic activity was detected in *Pyrostegia venusta*.
- 5. Antimicrobial Activity:** *Pyrostegia venusta* leaves and flowers were used in this study to examine the hydroalcoholic extracts' melanogenic activity on B16F10 murine melanoma cells. After a 4-day incubation period, both extracts—leaves (0.1; 0.3; 1 and 3 g/ml) and flowers (0.03 and 0.1 g/ml)—increased the melanin content in a concentration-dependent manner. Using the MTT assay (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide), cell viability was also examined in murine B16F10 cells, and it was found that neither extract caused any cell death at the measured doses. The *in vitro* activity of fungal tyrosinase was also examined in both extracts. In actuality, tyrosinase activity was unaffected by neither extract.
- 6. Melanogenic Activity:** The melanogenic activity of hydroalcoholic extracts from leaves and flowers of *Pyrostegia venusta* on B16F10 murine melanoma cells was recently studied; Both extracts, leaves (0.1; 0.3; 1 and 3 g/ml) and flowers (0.03 and 0.1 g/ml) increased the melanin content in a concentration-dependent manner after 4-day incubation on melanoma cells. Cell viability was also tested in murine B16F10 cells using the MTT assay (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) which revealed that no cell death was detected at the same tested concentrations of both extracts. Both extracts were also tested for fungal tyrosinase activity *in vitro*. In fact, neither extract was able to alter tyrosinase activity.

7. Antitumor Activity: Significant anticancer activity and moderate cytotoxicity are both present in *Pyrostegia venusta* hydroalcoholic extract.

8. Hyperpigmentant Activity: Low concentration of hydroalcoholic extracts of leaves and flower of *Pyrostegia venusta* indicated anti vitiligo (hyperpigmentant) activity

VI. CONCLUSION

For millennia, traditional medicine has made extensive use of plant-based arts. *Pyrostegia venusta* has great pharmacological potential and a favorable effect, particularly in the areas of tropical disorders, skin conditions, and respiratory illnesses. Therefore, the *Pyrostegia venusta* described in this review may be a significant source of naturally occurring, bioactive medications, and it has the potential to be of great interest for further study.

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