International Journal of Botany Studies
ISSN: 2455-541X; Impact Factor: RJIF 5.12
Received: 15-11-2020; Accepted: 02-12-2020: Published: 11-12-2020
www.botanyjournals.com
Volume 5; Issue 6; 2020; Page No. 638-641

Physicochemical and phytochemical investigation of flowers of *Tecoma stans* (L.) Juss. Ex Kunth

Nilesh R Sisode[1]*, Rakesh Patel[2], VA Jagtap[3]
[1, 2] Faculty of Pharmacy, Dr. APJ Abdul Kalam University, Indore, Madhya Pradesh, India
[3] DCS's ARA College of Pharmacy, Dhule, Maharashtra, India

Abstract
Tecoma stans (L.) Juss. Ex Kunth. Commonly known as Piliya (H), Yellow trumpet busy, Yello bell (E) belongs to family Bignoniaceae is an evergreen ornamental garden and street plant present in wild state. Almost every part of the plant is used medicinally for the treatment of various diseases. The flowers of the plant are used in the treatment of fungal infection, inflammations, stomach pain, diabetes and many others disorders of human being. The present paper deals with the physicochemical and phytochemical investigation of flowers of the selected plant. In this study various standardization parameters of dried flowered were evaluated in order to set the quality aspect of the plant.

Keywords: flowers, *Tecoma stans*, standardization parameters

Introduction
In Indian systems of medicine most practitioners formulate and dispense their own recipes. The World Health Organization (WHO) has listed 21,000 plants, which are used for medicinal purposes around the world. Among these 2500 species are in India, out of which 150 species are used commercially on a fairly large scale. India is the largest producer of medicinal and aromatic herbs and is called as botanical garden of the world [1-2]. The present work was aimed on development of pharmacognostical and standardization parameters of selected herbs used in the treatment of fungal infections.
Tecoma stans (L.) Juss. Ex Kunth. Family. Bignoniaceae present in wild throughout India is an ornamental medicinal plant commonly known as Piliya (H), Yellow trumpetbusy, Yello bell (E). Traditionally all parts of the plant is used as medicine for the cure of the treatment of various diseases. Leaves, barks and roots have been used for a variety of purposes in the field of herbal medicine. Bark shows smooth muscle relaxant, mild cardio tonic and chlorotic activity. Applications include the experimental treatment of diabetes, digestive problems, control of yeast infections and other medicinal applications. It contains several compounds that are known for their catnip like effects on felines. The root of the plant is reported to be a powerful diuretic, vermifuge and tonic. A grinding of the root of *Tecoma stans* and lemon juice is reportedly used as an external application and also taken internally in small quantities as a remedy for snake and rat bites [3-4].

Material and Methods
Collection of herbs and their authentication
The plant parts viz., TSF: *Tecoma stans* (Flowers), was collected in the months of September-December 2018 from the various local sites of Malwa region of Madhya Pradesh and identified & authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.) and was deposited in our Laboratory. Voucher specimen no. P/TS-F/1210 was allotted.

Physicochemical evaluation
The dried flowers of *Tecoma stans* was subjected to standard procedure for the determination of various physicochemical parameters [5-8].

Determination of Foreign Organic Matter (FOM)
Accurately weighed 100 g of the drug sample and spread it out in a thin layer. The foreign matter should be detected by inspection with the unaided eye or by the use of a lens (6X). Separate and weigh it and the percentage present was calculate.

Determination of Moisture content (LOD)
Place about 10 g of drug (without preliminary drying) after accurately weighing in a tared evaporating dish and kept in oven at 105 ^{0}C for 5 hours and weigh. The percentage loss on drying with reference to the air dried drug was calculated.

Determination of Ash Value
The determination of ash values is meant for detecting low-grade products, exhausted drugs and sandy or earthy matter. It can also be utilized as a mean of detecting the chemical constituents by making use of water-soluble ash and acid insoluble ash.

Total Ash
Accurately about 3 gms of air dried powder was weighed in a tared silica crucible and incinerated at a temperature not exceeding 450 ^{0}C until free from carbon, cooled and weighed and then the percentage of total ash with reference to the air dried powdered drug was calculated. The percentage of total ash with reference to the air-dried drug was calculated.

Acid Insoluble Ash
The ash obtained in the above method was boiled for 5 minutes with 25ml of dilute HCl. The residue was collected on ash less filter paper and washed with hot water, ignited

and weighed. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

Water Soluble Ash
The ash obtained in total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited to constant weight at a low temperature. The weight of insoluble matter was subtracted from the weight of the ash. The difference in weights represents the water soluble ash. The percentage of water soluble ash with reference to the air dried drug was calculated.

Determination of Swelling Index
Swelling index is determined for the presence of mucilage in the seeds. Accurately weigh 1 g of the seed and placed in 150 ml measuring cylinder, add 50 ml of distilled water and kept aside for 24 hours with occasional shaking. The volume occupied by the seeds after 24 hours of wetting was measured.

Determination of Extractive value
This method determines the amount of active constituents extracted with solvents from a given amount of medicinal plant material. It is employed for materials for which as yet no suitable chemical or biological assay exists.

Cold Maceration
Place about 4.0g of coarsely powdered air-dried material, accurately weighed, in a glass-stoppered conical flask. Macerate with 100ml of the solvent specified for the plant material concerned for 6 hours, shaking frequently, then allow to stand for 18 hours. Filter rapidly taking care not to lose any solvent, transfer 25 ml of the filtrate to a tared flat-bottomed dish and evaporate to dryness on a water bath. Dry at 105°C for 6 hours, cool in a desiccator for 30 minutes and weigh without delay. Calculate the content of extractable matter in mg per g of air dried material. For ethanol-soluble extractable matter, use the concentration of solvent specified in the test procedure for the plant material concerned; for water-soluble extractable matter, use water as the solvent.

Successive extraction of selected herbs
Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant material (250 gms) were loaded in Soxhlet apparatus and was extracted with petroleum ether (60-62 °C), Chloroform, ethanol and water until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. The residue was then stored in dessicator and percentage yield were determined.

Preliminary phytochemical screening of extracts
The various extracts obtained after extraction were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedures were adopted to perform the study [5-8].

Tests for Carbohydrates
Molisch's Test
To the Sample 2-3 drops of 1% alcoholic - napthol solution and 2 ml of conc. Sulphuric acid was added along the sides of the test tube. Appearance of purple to violet ring at the junction of two liquids shows the presence of carbohydrates.

Fehling Test
To the sample add fehling reagent, appearance of brick red precipitate shows presence of carbohydrates.

Test for Glycosides
Legal's Test
To the sample add 1 ml of pyridine and few drops of sodium nitropruside solutions and then it was made alkaline with sodium hydroxide solution. Appearance of pink to red colour shows the presence of glycosides.

Borntrager's Test
Sample was treated with chloroform and then the chloroform layer was separated. To this equal quantity of dilute ammonia solution was added. Ammonia layer acquires pink color, showing the presence of glycosides.

Baljet's Test
To the sample add picric acid, orange color shows presence of glycosides.

Test for Alkaloids
A small portion of the sample was stirred separately with few drops of dilute hydrochloric acid and was tested with various reagents for the presence of alkaloids. The reagents are

- Dragendroff's Reagent - Reddish brown precipitates
- Wagner;s Reagent - Reddish brown precipitates
- Mayer's Reagent - Cream color precipitates
- Hager's Reagent - Yellow color precipitates

Test for Proteins and Free Amino Acids
Small quantities of the sample was dissolved in few ml of water and treated with following reagents.

- Million's reagent: Appearance of red color shows the Presence of protein and free amino acid.
- Ninhydrin reagent: Appearance of purple color shows the Presence of Proteins and free amino acids.
- Biuret's test: Equal volumes of 5% sodium hydroxide solution & 1% copper sulphate solution was added. Appearance of pink or purple color shows the presence of proteins and amino acids.

Test for Tannins and Phenolic compounds
A small quantity of the sample was taken separately in water and test for the presence of phenol compounds and tannins was carried out with the following reagents.

- Dilute Ferric Chloride Solution (5%) - Blue color or green color
- 10% Lead Acetate Solution - White precipitates

Test for Flavonoids
Alkaline Reagent Test
To the test solution add few drops of magnesium hydroxide solution, intense yellow colour is formed which turns to colour less on addition of few drops of dilute acid indicates presence of flavonoids.

Shinoda's Test
Small quantities of the sample was dissolved in alcohol, to them piece of magnesium followed by conc. hydrochloric

acid drop wise added and heated. Appearance of pink, crimson red, green to blue color shows the presence of flavonoids**.**

Tests for Fixed Oils and Fats

Spot Test

A small quantity of sample was separately pressed between two filter papers. Appearance of oil stain on the paper indicates the presence of fixed oil.

Saponification Test

Few drops of 0.5 N alcoholic potassium hydroxide were added to a small quantity of sample along with a drop of phenolpthlein, the mixture was heated on a water bath for 1-2 hours, formation of soap or partial neutralization of alkali indicates the presence of fixed oils and fats.

Tests for Steroids and triterpenoids

Libermann-burchard Test

Treat the sample with few drops of acetic anhydride, boil and cool. Then add con. Sulphuric acid from the side of test tube, brown ring is formed at the junction two layers and upper layer turns green which shows presence of steroids and formation of deep red colour indicates presence of triterpenoids.

Salkowski Test

Treat the sample with few drop of conc. sulphuric acid, red colour at lower layer indicates presence of steroids and formation of yellow coloured lower layer indicates presence of triterpenoids.

Test for Mucilage and Gums

- Small quantities of sample was added separately to 25 ml of absolute alcohol with constant stirring and filtered. The precipitates was dried in oil and examined for its swelling property for the presence of gum and mucilage.
- To the sample add ruthenium red solution, pink color shows presence of mucilage.

Test for Waxes

To the test solution add alcoholic alkali solution, waxes get saponified.

Results and Discussion

The dried flower of *Tecoma stans* was subjected to standard procedure for the determination of various physicochemical parameters. The results were presented in table 1. The shade dried coarsely powdered plant material of TSF was extracted with petroleum ether, Chloroform, ethanol and water. The extracts obtained were evaluated for pH, color and % yield. The results are presented in table 2.

Table 1: Physicochemical Evaluation of Flowers of *Tecoma Stans* (L.) Juss. Ex Kunth

S/No.	Parameters	Values Obtained
1.	Foreign Organic Matter	0.24±0.23
2.	Loss on Drying	2.83±1.02
3.	Total Ash	5.23±0.28
4.	Acid Insoluble Ash	0.98±0.03
5.	Water Soluble Ash	1.89±0.21
6.	Swelling Index	3.47±0.87
7.	Water Soluble Extractive Value	23.84±2.14
8	Ethanol Soluble Extractive Value	10.27±0.33

Note: All values are expressed as Mean±SEM, n=3

Table 2: Estimation of % Yield of Extract of Flowers of *Tecoma Stans* (L.) Juss. Ex Kunth

S/No.	Extract	Parameters			
		Nature of Extract	Color	pH	% Yield
1.	PEETSF	Semi Solid	Yellowish green	6.23	1.23
2.	CETSF	Semi solid	Dark Yellow	7.01	3.29
3.	EETSF	Semi Solid	Light Yellow	7.00	8.87
4.	AETSF	Solid Powder	Yellow	7.02	12.27

The various extract obtained after extraction were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedure was adopted to perform the study.

Table 3: Preliminary Phytochemical Screening of Flowers of *Tecoma Stans* (L.) Juss. Ex Kunth

S/No.	Constituents	Flower Extract			
		PEETSF	CETSF	EETSF	AETSF
1.	Carbohydrates	-	+	+	+
2.	Glycosides	-	-	+	+
3.	Alkaloids	-	-	+	+
4.	Protein & Amino acid	-	-	+	+
5.	Tannins & Phenolic compounds	+	-	+	+
6.	Flavonoids	-	-	+	+
7.	Fixed oil and Fats	-	-	+	+
8.	Steriods & Triterpenoids	+	+	+	+
9.	Waxes	-	-	+	-
10.	Mucilage & Gums	-	-	-	-

+ = Present; - = Absent

Conclusion

Standardization of botanicals is very important in order to ascertain correct identification of the plant and their parts. In the present investigation the flowers of *Tecoma stans* (L.) Juss. Ex Kunth were collected, dried and was further evaluated to revealed the various physicochemical

parameters and further after extracting the material in various solvents evaluated for presence of active phyto-constituents. The results indicate that in ethanolic and aqueous extract maximum phyto-constituents are present.

References

1. Dwivedi S. Status survey of medicinal plants wealth of Malwa region of Madhya Pradesh with special reference to conservation of vulnerable and endangered species, J Econ Taxon Bot. 2009; 33(2):443-452.
2. Shriwas S, Dwivedi S, Shrivastava S. Development of Standardization Parameters of *Plumeria pudica* Linn: A wild species of Central India. Int. J Pharm Life Sci. 2019; 10(11-12):6429-6434.
3. Anburaj G, Marimuthu M, Sobiyana P, Manikandan R. A Review on Tecoma stans; International Journal of Engineering Research and Modern Education. 2016; 1(1):43-49.
4. Verma S, Singh MG. Phytochemical and pharmacological review study on *Tecoma stans* Linn. Journal of Medicinal Plants Studies. 2016; 4(5):162-164.
5. Kokate CK. "Practical Pharmacognosy. 4th ed. Vallabh Prakashan. 2005; 18:112-121.
6. Khandelwal KR. Practical Pharmacognosy, Thirteenth edition, Nirali Prakashan, Pune. 2005, 149-156.
7. The Ayurvedic Pharmacopoeia of India. Part-I. 1st ed. New Delhi: published by Gov. of India ministry of health and family welfare department of Homoeopathy. 1999; 3:225.
8. Quality control method for medicinal plant material, 1st edition, published by World Health Organisation Geneva, Delhi, 2002.