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PRELIMINARY PHYTOCHEMICAL SCREENING OF DIFFERENT SOLVENT EXTRACTS OF LEAVES of *Pyrostegia venusta*

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Abstract
Pyrostegia venusta or orange trumpet or flame vine is a creeper, belonging to family Bignoniaceae has potential antibacterial & wound healing, antiviral, antitussive, anthelminthic, anti-inflammatory and antioxidative action. The present study was aimed to investigate the preliminary phytochemical analysis of leaves of *Pyrostegia venusta* by preparing extract with different solvents like chloroform, ethyl acetate, methanol and water (non-polar to polar). The preliminary phytochemical analysis helps us to investigate the different phytoconstituents present in the plant for further findings like analytical, biological and pharmacological evaluation.
Keywords: Phytochemical screening, maceration, successive extraction, phytoconstituents

INTRODUCTION

Medicinal plants and herbal preparations are gaining renowned interest in scientific communities nowadays due to their reliable pharmacological actions and affordability to common people which make them effective in control of various diseases. Use of medicinal plant to cure specific ailments has been invoked from ancient times. Nature has bestowed mankind with several plants which contains natural substances which cure diseases & promote health. Such medicinal plants are also rich sources to develop secondary metabolites which are also potential in curing different ailments. In the past decades there is increased attention and interest in use of herbal medicines globally. The World Health Organization reported that 80% of the world population relies chiefly on traditional medicines involving the use of plant extracts or their active constituent (WHO guidelines 2007). Most of these traditional, ethno-medicinal herbs are utilized without any scientific validations. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids, and phenolic compounds (Hill A.F(1952). Traditional knowledge of medicinal plants has always guided the search for new-cures. Inspite of the advent of modern high throughout drug discovery and screening techniques. Traditional knowledge systems have given clues to the discovery of valuable drugs (Buenz EJ *et al*. (2004)). Traditional medicinal plants are often cheaper, locally available and easily consumable, raw or as simple medicinal practices form an integral part of complementary or alternative medicines. Plant produce chemical compounds or phytochemicals like alkaloids, glycosides, flavonoids, volatile oils, tannins, resins, phenols, carbohydrates have been used in a wide range of commercial and industrial applications such as flavors, aromas and fragrances, enzymes, preservatives, cosmetics, bio-based fuels and plastics, natural pigments and bioactive compounds. The research on phytochemicals and use of phytochemicals is increasing more because of the harmful side effects of the synthetic compounds.

MATERIAL & METHOD

1. Collection of plant material

Leaves of *Pyrostegia venusta* were collected from local area of Bhopal in the month of June, 2022. Drying of fresh plant parts was carried out in sun but under the shade.

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Figure 1: Collection of leaves of *Pyrostegia venusta*

2. Extraction procedure

Following procedure was adopted for the preparation of extract from the shade dried and powdered leaves part (Khandelwal KR (2005)).

2.1 Defatting of plant material

78gm of shade dried leaves of *Pyrostegia venusta* were extracted with petroleum ether using maceration method. The extraction was continued till the defatting of the material had taken place.

2.2 Extraction by maceration Method

Defatted plant material was extracted in four solvents of different polarity viz water, methanol, ethyl acetate and chloroform by maceration method. The resultant content was filtered with Whatman filter paper no.1 and kept for evaporation of solvent to get the dry concentrated extract. The dried crude concentrated extract was weighed to calculate the extractive yield then transferred to glass vials (6 ×2 cm) and stored in a refrigerator (4°C), till used for analysis (Mukherjee PK (2007)).

2.3 Determination of percentage yield

The percentage yield of yield of each extract was calculated by using formula:

$$\text{Percentage yield} = \frac{\text{Weight of extract}}{\text{Weight of powdered drug taken}} \times 100$$

2.4 Phytochemical screening

Phytochemical examinations were carried out extracts as per the following standard methods (Kokate C K (1994)).

2.5 Thin layer chromatography

Thin layer chromatography is based on the adsorption phenomenon. In this type of chromatography mobile phase containing the dissolved solutes passes over the surface of stationary phase. Each solvent extract was subjected to Thin Layer Chromatography (TLC) as per conventional one-dimensional ascending method using silica gel 60F254, 7X6 cm (Merck) were cut with ordinary household scissors. Plate markings were made with soft pencil. Glass capillaries were used to spot the sample for TLC applied sample volume 1-micro liter by using capillary at distance of 1 cm at 5 tracks. In the twin trough chamber with different solvent system toluene: ethyl acetate: formic acid (5:4:1) for Quercetin and toluene: ethyl acetate: formic acid (7:5:1) for gallic acid solvent system used. After pre-saturation with mobile phase for 20 min for development were used. After the run plates are dried and sprayed freshly prepared iodine reagents were used to detect the bands on the TLC plates. The movement of the active compound was expressed by its retention factor (Rf), values were calculated for different extracts.

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Detection and Calculation of R_f Value (Relative front)

$$R_f = \frac{\text{Distance traveled by solute}}{\text{Distance traveled by solvent}}$$

RESULT

1. Results of Percentage yield

Table No. 1: % Yield of extracts of *Pyrostegia venusta*

S. No.	Extracts	% Yield (W/W)
1.	Pet. Ether	1.2%
2.	Chloroform	3.1%
3.	Ethyl acetate	5.2%
4.	Methanol	8.6%
5.	Aqueous	10.5%

2. Result of phytochemical screening

Table No. 2: Result of phytochemical screening of extracts of *Pyrostegia venusta*

S. No.	Constituents	Chloroform extract	Ethyl acetate extract	Methanol Extract	Aqueous extract
1.	**Alkaloids** Wagner's Test:	 -ve	 -ve	 -ve	 -ve
2.	**Glycosides** Legal's Test:	 -ve	 -ve	 -ve	 -ve
3.	**Flavonoids** Alkaline Reagent Test: Lead acetate Test:	 -ve -ve	 -ve -ve	 +ve +ve	 +ve +ve
4.	**Diterpenes** Copper acetate Test:	 -ve	 -ve	 +ve	 +ve
5.	**Phenol** Ferric Chloride Test: Folin-ciocalteu Test: Lead acetate Test:	 -ve +ve -ve	 -ve +ve +ve	 -ve +ve +ve	 -ve -ve -ve
6.	**Proteins** Xanthoproteic Test:	 -ve	 -ve	 +ve	 +ve
7.	**Carbohydrate** Fehling's Test: Benedict Test:	 -ve -ve	 -ve -ve	 -ve -ve	 -ve -ve
8.	**Saponins** Froth Test:	 -ve	 -ve	 +ve	 +ve
9.	**Tannins** Gelatin test:	 -ve	 -ve	 -ve	 -ve

+ve = presence
-ve = presence

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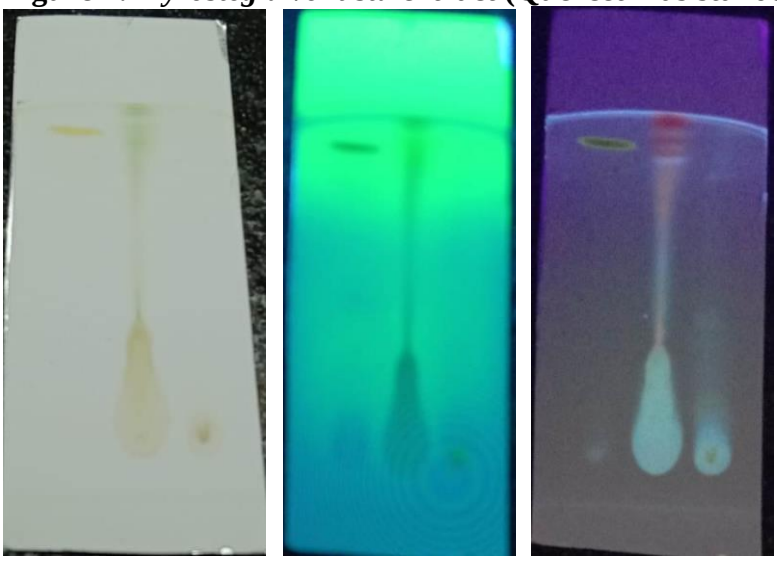
3. Results of Thin Layer chromatography

Table No. 3: Calculation of R_f value of extracts of *Pyrostegia venusta* (Quercetin as standard)

***Pyrostegia venusta* extract**		
S. No.	**Mobile phase** Toluene: Ethyl acetate Formic acid (5:4:1)	***Rf* value**
1.	**(Quercetin)** Distance travelled by mobile phase= 6cm No. of spot at long UV= 1 No. of spot at short UV = 1 No. of spot at normal light= 1	 Long- 0.73 Short- 0.73 Normal- 0.73
2.	**(Methanol extract)** Distance travelled by mobile phase= 6cm No. of spot at long UV= 4 No. of spot at short UV=4 No. of spot at normal light =3	 Long –0.71, 0.75, 0.76, 0.78 Short – 0.68,0.73,0.76, 0.78 Normal light –0.6,0.64,0.97
3.	**(Aqueous extract)** Distance travelled by mobile phase= 6cm No. of spot at long UV= 2 No. of spot at short UV=1 No. of spot at normal light =0	 Long – 0.63, 0.68 Short – 0.65 Normal light –0

Figure 2: *Pyrostegia venusta* extract (Quercetin as standard)



Normal Light **Short U.V** **Long U.V**

Spot-1= Quercetin, Spot-2= Methanol extract, Spot-3= Aqueous extract

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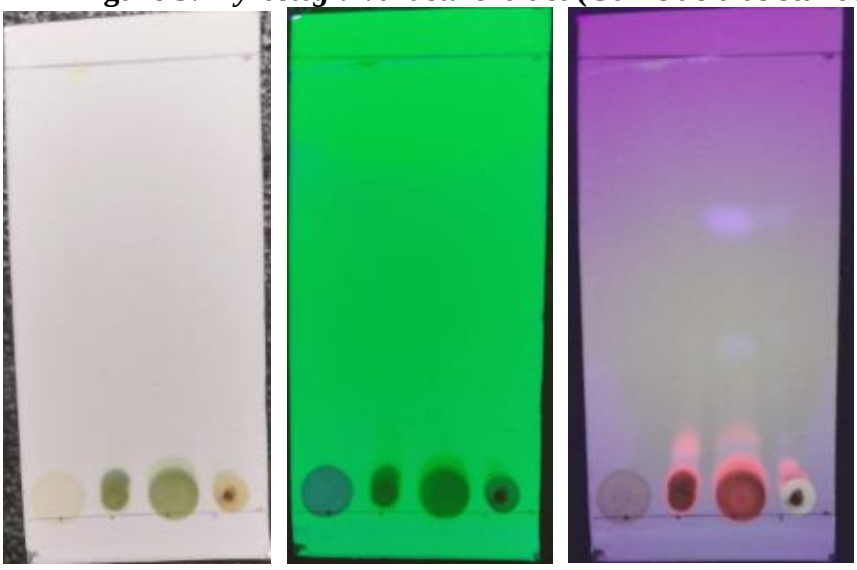
Table No. 4: Calculation of R_f Value of extracts of *Pyrostegia venusta* (Gallic acid as standard)

***Pyrostegia venusta* extract**		
S. No.	**Mobile phase** Toluene: Ethyl acetate Formic acid (7:5:1)	***Rf* value**
1.	**(Gallic acid)** Distance travelled by mobile phase= 5cm No. of spot at long UV = 1 No. of spot at short UV = 1 No. of spot at normal light= 1	 Long- 0.3 Short- 0.3 Normal- 0.3
2.	**(Chloroform extract)** Distance travelled by mobile phase= 5cm No. of spot at long UV= 1 No. of spot at short UV=1 No. of spot at normal light =0	 Long-0.1 Short – 0.2 Normal light –0
3.	**(Ethyl acetate extract)** Dis. Travelled by mobile phase= 5cm No. of spot at long UV= 2 No. of spot at short UV=1 No. of spot at normal light =0	 Long-0.36,0.62 Short – 0.1 Normal light –0
4.	**(Methanol extract)** Distance travelled by mobile phase= 5cm No. of spot at long UV= 2 No. of spot at short UV=1 No. of spot at normal light =0	 Long – 0.08, 0.58 Short – 0.08 Normal light –0

Figure 3: *Pyrostegia venusta* extract (Gallic acid as standard)



Normal Light **Short U.V** **Long U.V**

Spot-1= Gallic acid, Spot-2= Chloroform extract, Spot-3= Ethyl acetate extract, Spot-4= Methanol extract

CONCLUSION

The leaves of Pyrostegia venusta dried, defatted and extracted through different solvents (non-polar to polar). The percentage yield of methanolic and aqueous extract were high as compared to other

extracts. The methanolic extract showed the presence of saponin, phenol, protein and flavonoid and absence of tannin, carbohydrate, glycoside and alkaloid. The water extract showed the presence of saponin, protein and flavonoid and absence of tannin, carbohydrate, glycoside and alkaloid. Also, the Chloroform and ethyl acetate extracts showed positive test for phenol and produced negative results for saponin tannin, protein, diterpenes, flavonoid, carbohydrate and alkaloids. The Thin Layer Chromatography of the extracts were performed by taking quercetin and gallic acid as standard for the Rf calculation as for further quantitative estimation of the bioactive compounds.

References

1. Buenz E J, Schenepple D J, Motley T J, Baver B A, Elkin P L, Riddle J M (2004), Techniques: Bioprospecting historical herbal texts by hunting for new leads in old tomes. Trends in Pharmacological Sciences,25 edition, Volume 9, pp 494-498.
2. Hill A F (1952), Economic Botany. A text book of useful plants and plant products, Mc Graw-Hill book company lnc, New York, pp 440-445.
3. Khandelwal K R (2005), Practical Pharmacognosy: Technique and Experiments, 23rd Edition, pp- 15.
4. Kokate C K (1994), Practical Pharmacognosy, Vallabh Prakashan, 4th Edn., pp 112-120.
5. Mukherjee P K (2007), Quality control of Herbal Drugs, Business Horizons, 2nd Edition, pp 2-14.
6. World Health Organization. Summary of WHO guidelines for the assessment of herbal medicines. Herbal Gram (2007), pp 4-14.