

Preliminary phytochemical screening and antibacterial activity of *Parthenocissus quinquefolia* (L.) Planch

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ABSTRACT

The screening and study of selected Indian medicinal plant *Parthenocissus quinquefolia* (L.) Planch, were selected for phytochemical screening and antibacterial studies. The solvents used for the extraction of plant roots were ethanol, benzene, chloroform, acetone, petroleum ether and distilled water. The Gram-Positive and Gram-negative bacteria *Yeast candida*, *Aspergillus niger*, *Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhi*, *Bacillus subtilis*, *Pseudomonas fluorescence*, *Klebsiella pneumonia* and *Streptococcus pyogenes* were tested. The results obtained in the present study suggest that preliminary phytochemical analysis detected the presence of Alkaloids, Flavonoids, Terpenoids, Steroids, Coumarins, Carbohydrates and Tanins. The *Parthenocissus quinquefolia* (L.) Planch. Could be used in treating diseases caused by the test organisms.

Keywords: Phytochemicals, *Parthenocissus quinquefolia* (L.) Planch. , Antibacterial activity and Pathogens.

INTRODUCTION

Medicinal plants have a long-standing history in many indigenous communities and continue to provide useful tools for treating various diseases. A large number of the country's rural population depends on medicinal plants for treating various illnesses. These plants played a significant role in various ancient traditional system of medication in India. Phytochemical, Antibacterial Screening and Spectroscopic Analysis of the Crude Samples of Stem Bark Extract of *Lonchocarpus cyanescens* (Nwokonkwo et al., 2017).

Preliminary phytochemical and Fourier Transform Infrared Spectral analysis and Antimicrobial Studies of solvents extracts of *Urginea indica* (Roxb.) Kunth (Liliaceae) and *Cyclea peltata* Arn. ex Wight (Menispermaceae), results were clearly revealed that the plant contained different bioactive compounds such as of Alkaloids, Anthoquinones, Coumarins, Steroids and Flavonoids compounds were rich in the extracts of *Urginea indica* (Liliaceae) and *Cyclea peltata* (Menispermaceae) are connected with defense mechanism against many microorganisms (*Patil*

et al., 2015). Plants are a source of large amount of drugs comprising to different groups such as antispasmodics, emetics, anti-cancer, antimicrobials etc (Tiwari *et al.*, 2011). Preliminary Phytochemical Screening and Evaluation of Anti-Inflammatory Activity of Methanolic Extract of *Barleria cristata* Linn. Roots in Experimental Animals (Banu *et al.*, 2017).

Antimicrobial activity and phytochemical analysis of selected Indian folk medicinal plants. Kirby-Bauer method was followed for disc diffusion assay (Shihabudeen *et al.*, 2010). Preliminary studies on phytochemicals and antimicrobial activity of solvent Extracts of *Eichhornia crassipes* (Mart.) Solms. They had study the fresh plant contain alkaloids, flavonoids, phenols, sterols, terpenoids, anthoquinones and protein (Thamaraiselvi *et al.*, 2012). Studies on the phytochemistry, spectroscopic characterization and antibacterial efficacy of *Salicornia brachiata* (Krishnan *et al.*, 2014). Preliminary phytochemical screening of different solvent extracts of stem Bark and roots of *Dennetia tripetala* G. Baker (Solomon *et al.*, 2013).

Seed ethanolic extract showed high content of phytochemicals, highest antimicrobial and antioxidant activity and results supported the usage of *Vernonia anthelmintica* in folk and traditional medicine (Santosh *et al.*, 2013) Phytochemical screening and antimicrobial activity of medicinal plant *Pergularia daemia* From Chandrapur Forest Region (Jogi *et al.*, 2012). Phytochemical screening, functional groups and element analysis of *Tylophora pauciflorawight* and Arn. They had concluded that traditional use of *Tylophora pauciflora* for human ailments and partly explained its use in herbal medicine as rich source of phytochemicals with the presence of tanins, phenol, saponins, steroids, flavonoids, and terpenoid (Sarlin *et al.*, 2012). Preliminary phytochemical screening of different solvent extracts of stem Bark and roots of *Dennetia tripetala* G. Baker (Ugochukwu *et al.*, 2013). The most essential of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds. Many of the indigenous medicinal plants are used as spices and food (Amin *et al.*, 2013). Medicinal plants are moving from fringe to main stream use with a greater number of people seeking remedies and health approach (Saha *et al.*, 2010).

MATERIALS AND METHODS

Plant collection

The following medicinal plants were selected and collected for the study from the local area of Etawa forest of Betul district. The Medicinal Plants *Parthenocissus quiquefolia* (L) Planch. was collected from follow land in and around Etawa forest brought into the laboratory for further processes. The collected samples were carefully stored in sterile polythene bags and used for the further study.

Sterilization of Plant Materials

The disease free roots were selected for this investigation. About 2gm dried roots were taken. Then, surface sterilized with 0.1% mercuric chloride and alcohol for few seconds. Again the materials were washed thoroughly with distilled water.

Preparation of Plant Extracts

The organic solvent extract was prepared by adding 5 gm powder of ethno veterinary medicinal plants in 250 ml of organic solvent for 6 hrs. By Soxhlet method and filtrate was evaporated in controlled conditions of temperature of active constituents of preparations. Dried extracts were stored in labelled sterile wide mouthed screw capped bottle at 40°C and used for further study.

Preliminary Phytochemical screening

Phytochemical screening were performed to assess the qualitative chemical composition of different crude extracts using commonly employed precipitation and coloration reactions, the methods of Harbone (1973), Trease *et al.* (1983) were used to identify the major secondary metabolites like Alkaloids, Flavonoids, Saponins, Carbohydrate, Protein, Phenols, Steroids, Tannins, Glycosides, Terpenoids, Phlobatannins, Coumarins, Emodins, Anthoquinones, Anthocyanins, Leucoanthocyanins in the extracts.

Antimicrobial screening

All solvent extracts were screened *in vitro* growth inhibitory activity against different microbes *E. coli*, *Pseudomonas fluorescens*, *Salmonella typhi*, *Bacillus subtilis*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus* Yeast *Candida*, *Aspergillus niger*. using disc-diffusion method. The bacteria rejuvenated in Nutrient broth (Hi-media - laboratories, Mumbai, India) at 37°C for 18 hrs. and then stored at 40°C on Nutrient agar subcultures were prepared from the stock for bioassay.

RESULTS AND DISCUSSION

Phytochemical screening: From the above table no. 1 it is clear that,

Alkaloids: It was found that concentration of alkaloids have been extracted in Ethanol and Acetone extracts. This is evident from positive test with Hager's reagent. Benzene, Chloroform, Petroleum ether and Distil water have shown negative test for Alkaloids.

Glycosides : All extracts have shown negative test for Glycosides with Libermann's reagent.

Phenols: All extracts have shown negative test for Phenols.

Saponins: All extracts have shown positive test for Saponins.

Tannins : All extracts have shown negative test for Tannins with Braymer's reagent.

Flavonoids: It is found that concentration of Flavonoids have been extracted in Ethanol and Acetone extract. This is evident from the positive test. Benzene, Chloroform, Petroleum ether and Distil water have shown negative test for Flavonoids.

Terpenoids: All extracts have shown negative test for Terpenoids.

Steroids: All extracts have shown positive test for Steroids with Salkowski reagent.

Phlobatannins : All extracts have shown negative test for Phlobatannins.

Coumarins: It was found that concentration of Coumarins have been extracted in Ethanol and Acetone extract. This is evident from the positive test. Benzene, Chloroform, Petroleum ether and Distil water extract have shown negative test for Coumarins.

Proteins : All extracts have shown negative test for Proteins with Xanthoproteic reagent.

Table 1:-Phytochemical activity of root extracts of *Parthenocissus quiquefolia(L)*Planch.

Plant parts	Test / Reagents Used	Ethanol extract	Benzene extract	Chloroform Extract	Acetone extract	Petroleum Ether	Distil Water extract
		E	B	C	A	P	W
Root	Alkaloids (Hager's Test)	+	-	-	+	-	-
	Glycosides (Libermann's Test)	-	-	-	-	-	-
	Phenols	-	-	-	-	-	-
	Saponins (Foam Test)	+	+	+	+	+	+
	Tannis (Braymer's Test)	-	-	-	-	-	-
	Flavonoids	+	-	-	+	-	-
	Terpenoids	-	-	-	-	-	-
	Steroids (Salkowski Test)	+	+	+	+	+	+
	Phobatannins (Precipitate Test)	-	-	-	-	-	-
	Coumarins	+	-	-	+	-	-
	Proteins (Xanthoproteic Test)	-	-	-	-	-	-
	Emodins	-	-	-	-	-	-
	Carbohydrates (Molisch Test)	-	-	-	-	-	-

Present: +ve; Absent: -ve

Table 2 :- Antimicrobial activity of root extracts of *Parthenocissus quiquefolia* by Disc Diffusion Method (Zone of Inhibition in mm at 100 µg/disc)

S. No	Microorganism	Ethanol	Benzene	Chloroform	Acetone	Petroleum ether	Distil water
1	YC	0	0	0	0	0	0
2	AN	0	0	0	0	0	0
3	SA	17	0	0	0	0	0
4	EC	18	0	0	16	0	0
5	ST	7	0	0	0	0	8
6	BS	0	0	0	0	0	0
7	PF	0	0	0	0	0	0
8	KP	0	0	0	0	0	0
9	SP	0	0	0	0	0	0

*Data represented in mean of three replicates.

YC = *Yeast candida*, AN = *Aspergillusniger*, SA = *Staphylococcus aureus*, EC = *Escherichia coli*, ST = *Salmonella typhi*, BS = *Bacillus subtilis*, PF = *Pseudomonas fluorescense*, KP = *Klebsiellapneumoniae*, SP = *Streptococuspnyogenes*

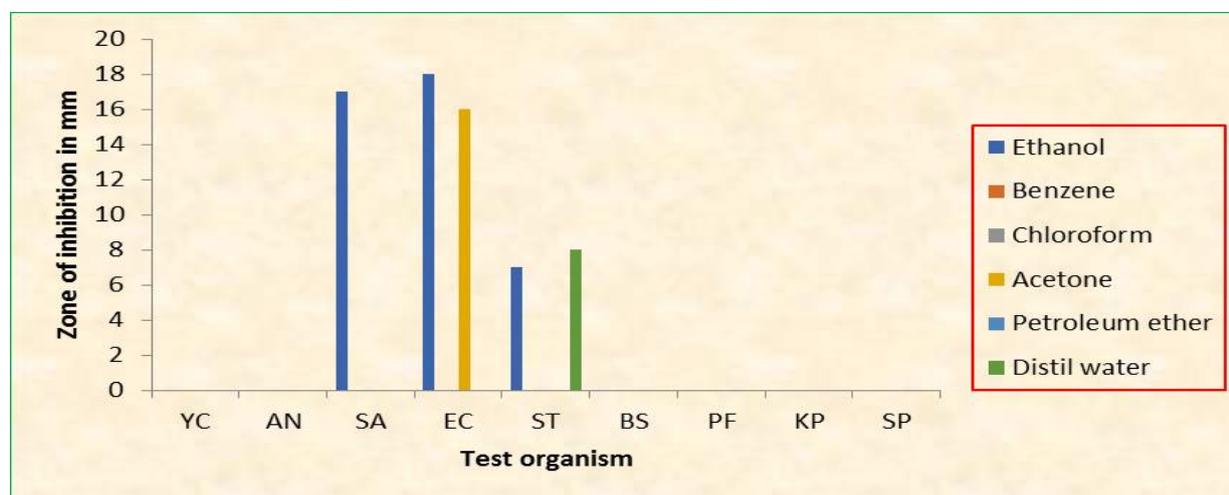


Fig. 1: Analysis of antimicrobial sensitivity of root extracts of *Parthenocissus quiquefolia*(L)

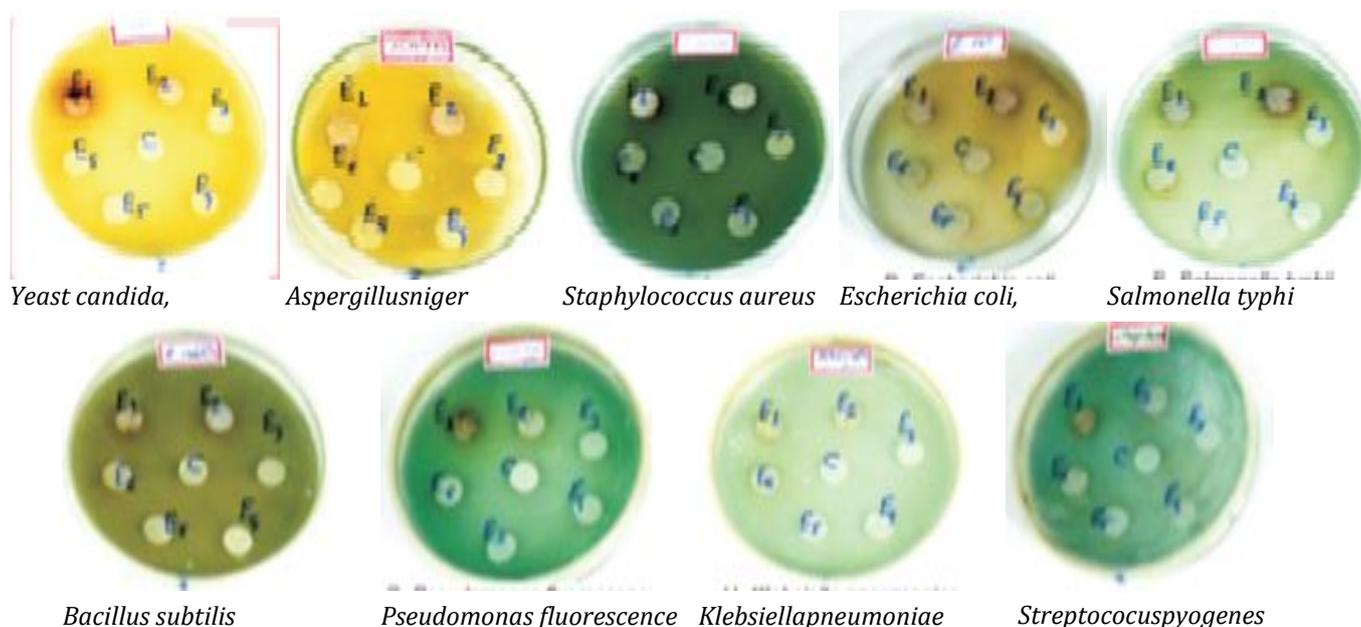


Fig.2 :- Antimicrobial activity of root extracts of *Parthenocissus quiquefolia*(L)Planch.

Emodins : All extracts have shown negative test for Emodins.

Carbohydrates : All extracts have shown negative test for Carbohydrates with Molisch reagent.

Antimicrobial activity

Ethanol extracts showed very promising results against three pathogens like *Staphylococcus aureus*, *Escherichia coli* and *Salmonella typhi*. The maximum zone of inhibition of 18 mm was observed in ethanol extract against pathogen *Escherichia coli*. Ethanol extracts was found nonreactive to other test organisms. Acetone extracts also showed positive results against *Escherichia coli*. The maximum zone of inhibition of 16 mm was found in acetone extracts against pathogen *Escherichia coli*. The acetone extracts were found no reactive to other test organisms. The aqueous extracts also showed microbial zone of inhibition against *Salmonella typhi*. The maximum zone of inhibition of 8 mm was observed in aqueous extracts. The aqueous extracts was found non reactive to other test organisms.

Conflicts of interest: The authors stated that no conflicts of interest.

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