

**PRELIMINARY PHYTOCHEMICAL INVESTIGATION ON *TYLOPHORA SUBRAMANII* HENRY
(APOCYNACEAE) – AN ENDEMIC MEDICINAL PLANT SPECIES OF SOUTHERN INDIA**

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ABSTRACT

Tylophora subramanii is used as traditional and folklore medicines for treating various diseases like fever, cold, cough, diarrhea, ulcer, external tumor, cut wounds and headache among the tribal belts of southern Western Ghats. In the present investigation carried out the ethnobotanical uses among the hill inhabitants of Western Ghats and preliminary screening of phytochemicals from various parts of the plant with different solvent extracts. The study revealed that various traditional uses of plant species for local ailments and the presence of various secondary metabolites such as alkaloids, flavonoids, phenols, terpenoids, tannins, glycosides and these components may have supported the medicinal properties of the plant species.

Keywords: *Tylophora subramanii*, endemic medicinal plant, ethnobotanical, alkaloids, flavonoids.

1. INTRODUCTION

Tylophora R.Br. is a pantropical genus distributed in tropical and subtropical Asia, Africa, India to Australia about 60 species (Tseng and Chao, 2011). In India, it is represented by 21 species and two varieties (Jagtap and Singh, 1999). *Tylophora subramanii* is a native plant of southern India commonly found in evergreen forest areas of Theni, Tirunelveli and Kanyakumari districts of Tamilnadu up to 1200 m elevation. It is a slender branched climber with smooth pubescent bark. Leaves, watery latex and root part of the plant has been used for treating various local health care systems. The gens *Tylophora* have been used for treating various diseases like asthma, leucorrhea, dysentery, fever and headache. Root of this genus is acrid and is said to be emetic (Karuppusamy, 2007). The plant is used to cure nervous disorders among Kani tribe community of Agastiyamalai hills in Tamilnadu. The plant is having watery latex in all over the body to have a number of secondary metabolites and high hydrocarbon content. The fruits and leaves of the plant have possessed the antioxidant capacity due to the presence of secondary metabolites. There are no phytochemical reports available so far this endemic medicinal plant species. Hence the present study aimed to carry out the preliminary phytochemical screening of various parts of *T. subramanii*.

2. MATERIALS AND METHODS

2.1. Collection, identification and preparation of plant material

Fresh leaves, stem bark and young fruits of *T. subramanii* were collected from Megamalai Wildlife Sanctuary of Theni district, Tamilnadu (Fig.1). Preliminary identification was done with the help of local Flora (Gamble, 1957) and confirmation of the identification was compared with authentic specimen deposited in the Botanical Survey of India, Southern Circle, Coimbatore, Tamilnadu. The voucher specimen (Karuppusamy, 852) is deposited in the herbarium of the Department of Botany, The Madura College Madurai, Tamilnadu. The fresh plant parts separately air-dried, powdered and then stored in dry sealed glass bottles until use.

2.2. Extraction of plant material

Plant powders were separately subjected to extraction with various solvents such as Ethanol, Chloroform, Hexane and water using Soxhlet's apparatus with continuous reflux for 8 hours at 70°C temperature. Further extracts were distilled off and concentrate to a syrupy consistency and then evaporated to dryness. The dried extract were weighed and prepared the 1% sample solution with respective solvents.

2.3. Phytochemical screening

Preliminary qualitative phytochemical screening was carried out with the following methods.

Alkaloids: 2 ml of test solution added with 2 N hydrochloric acid, aqueous layer formed was decanted and to that added few drops of Mayer's reagent. The creamy precipitate obtained in the bottom indicates the presence of alkaloids (Harborne, 1973).

Flavonoids: 2 ml of test solution, added alcohol and a bit of magnesium salt. Then a few drops of concentrated hydrochloric acid was added and boiled gently for 5 minutes (Edeoga *et al.*, 2005).

Steroids: 1 ml of the extract was dissolved in 10 ml of chloroform and equal volume of concentrated sulphuric acid was added by the sides of the test tube. The upper layer turns red and sulphuric acid layer showed yellow with green fluorescence. This indicated the presence of steroids (Trease and Evans, 1996).

Terpenoids: 2 ml of extract was added to 2 ml of acetic anhydride and concentration of H₂SO₄. Formation of blue, green rings indicates the presence of terpenoids (Kolawole *et al.*, 2006).

Triterpenoids: 2 ml of test solution, added a piece of tin and 2 drops of thionyl chloride. The result was observed (Kolawole *et al.*, 2006).

Tannins: 2 ml of extract was added to few drops of 1% lead acetate. A yellowish precipitate indicated the presence of tannins (Boham and Kocipal-Abyazan, 1974).

Saponins: 5 ml of extract was mixed with 20 ml of distilled water and then agitated in a graduated cylinder for 15 minutes. Formation of foam indicates the presence of saponins (Smolenski *et al.*, 1974)

Phenols: 2 ml of aqueous extract is added to 2 ml of 2N HCl and ammonia. The appearance of

pink-red turns blue-violet indicates the presence of phenols (Harborne, 1973).

Coumarins: 3 ml of 10% NaOH was added to 2 ml of aqueous extract formation of yellow colour indicates the presence of coumarins (Harborne, 1973).

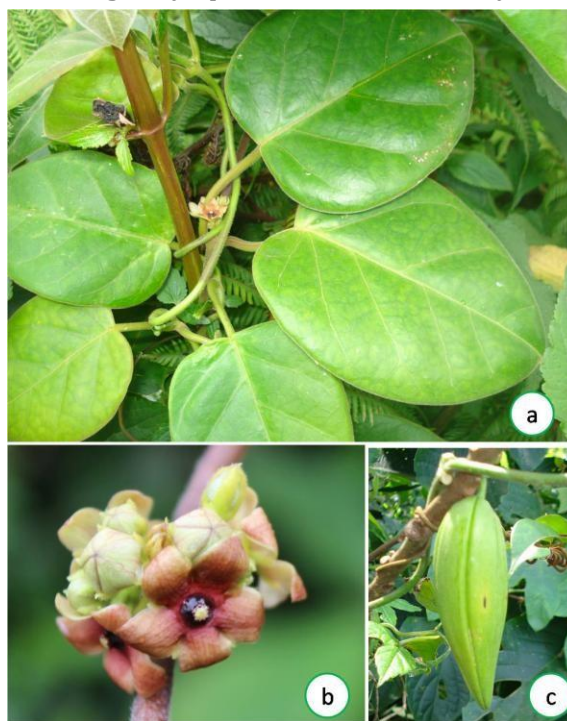
Glycosides: 5ml of diluted sulphuric acid was added in extracts in a test tube and boiled for fifteen minutes in a water bath. It was then cooled and neutralized with 20% potassium hydroxides solution. A mixture of 10ml of equal parts of

Fehling's solution were added and boiled for five minutes. A more dense red precipitate indicates the presence of glycosides (Harborne, 1973).

3. RESULTS AND DISCUSSION

The present investigation on the preliminary phytochemical screening of *T. subramanii* with various extracts of different parts summarized in table 1. Stem bark (Fig. 1) and leaves are having more number of secondary metabolites such as alkaloids, flavonoids, phenols, terpenoids and glycosides. Steroids, saponins and coumarins are obtained negative results in this plant species. Fruit extracts showed the less number of secondary metabolites in all four kinds of extracts. Among the phytochemicals, alkaloids, flavonoids, phenols and glycosides are abundant in stem bark and leaves which are showing strong results in ethanol extracts. Terpenoids and triterpenoids are weakly present in hexane extracts of leaves and stem bark. Aqueous extracts showed the less number of metabolites and very weak results (Table 1). Ethanol is a good solvent system for extraction of secondary metabolites, the present result is also proved that many metabolites extracted and resulted in ethanol extracts. Chloroform extracts have shown a moderate number of phytochemicals from selected plant parts of *T. subramanii*.

Fig. 1. *Tylophora subramanii* Henry



a) Flowering twig; b) Inflorescence; c) Follicle

Table 1. Qualitative phytochemical screening of different parts of *Tylophora subramanii* with various solvents extracts.

Phytochemical	Solvent extracts											
	Ethanol			Chloroform			Hexane			Aqueous		
	L	SB	F	L	SB	F	L	SB	F	L	SB	F
Alkaloids	+++	+++	++	+	++	+	-	-	-	+	+	-
Flavonoids	++	+++	+	-	+	+	-	-	-	-	-	-
Phenols	+++	++	+	++	+	-	-	-	-	+	+	+
Steroids	-	+	+	-	-	-	-	-	-	-	-	-
Terpenoids	+	-	-	-	-	-	+	++	+	-	-	-
Triterpenoids	-	-	-	-	-	-	+	+	+	-	-	-
Tannins	+	++	+	+	+	-	-	-	-	-	+	-
Saponins	-	-	-	-	-	-	-	-	-	-	-	-
Coumarins	-	-	-	-	-	-	-	-	-	-	-	-
Glycosides	+++	+++	++	++	+++	+	+	+	-	+	+	+

+++ abundant; ++ moderately present; + weakly present; ----absent
L- Leaf; SB - Stem bark; F- Flower.

The medicinal value of the plant lies in some chemical substances that have a definite physiological action on the human body. The most important bioactive compounds of the plant are alkaloids, flavonoids, phenols and glycosides. The leaves and stem bark showed a good supply of useful compounds of alkaloids, flavonoids and glycosides. The strong presence of flavonoids in leaves and stem barks may have supported the antioxidant potential of the plant species. The pharmacological properties of the *T. indica*, a closely related species were already reviewed its potential for curing asthma and allergic reactions (Rani *et al.*, 2015). Possible detection of alkaloids, glycosides, terpenoids, flavonoids, steroids, tannins and reducing sugars in related species such as *Tylophora indica* (Kumar, 2011) and *Tylophora pauciflora* (Starlin *et al.*, 2012).

The pharmacological activities of a given plant are associated with the type and nature of secondary metabolites present in them. The need for phytochemical screening has become imperative, since many plants accumulate biologically active substances in various parts and tissues. Phytochemical screening of *T. subramanii* revealed the possible presence of alkaloids, flavonoids and glycosides. Typical alkaloids often have marked pharmacological effects, when administered to man and other animals. The plant has potential source of flavonoids and glycosides would be chance of exploration of anti-inflammatory and antioxidant properties.

The plant species studied here can be used as a potential source of useful drugs. It also justifies the folklore medicinal use and the claims about the therapeutic values of this plant as a curative agent.

Therefore, further study needed for isolation, identification, purification, characterization, and structural elucidation of bioactive compounds of *T. subramanii* that would be obtained with pharmacological and clinical trials, the compounds leads a promising therapeutic agent.

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