



PHYTOCHEMICAL STUDIES ON THE STEM OF *Toddalia asiatica*.L. var. floribunda

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ABSTRACT

The traditional medicine involves the use of different plant extracts or the bioactive constituents. This type of study provides the health application at affordable cost. India is a home to a variety of traditional medicine systems that rely to a very large extent on native plant species for their raw drug materials. Plants acts as a raw material base for the elaboration of more complex semi-synthetic chemical compounds. Therefore, now there is a need to look back towards the traditional medicine which can serve as novel therapeutics and in searching new economic plants for medicine. *Toddalia asiatica* has been in folklore use in India and China from 18th century. Since, this plant possess many medicinal properties, the present study was designed to evaluate the phytochemicals in the stem of *Toddalia asiatica*.L. The stem was collected and extracted with benzene, chloroform, acetone, methanol and water. Phytochemical screening was carried out according to standard procedures. Sugar, protein, Alkaloids, flavonoids, sterols, coumarins and glycoside were found to be present in the extracts. The results of the above study conclusively validate the phytochemical treasures indulged in *Toddalia asiatica*.L.

Keywords: *Toddalia asiatica*. L Var Floribunda, phytochemicals, alkaloids, flavonoids, sterols, coumarins, antioxidants.

INTRODUCTION

Nature has been a source of medicinal agents for 1000's of years and an impressive number of modern drugs have been isolated from natural sources. Many of these isolations were based on the uses of the agents in traditional medicine. The plants continues to plays a main role in traditional medicine system for health care (Owolobi *et al.*, 2007). Phytochemicals, the non-nutritive plant chemicals that have protective or disease preventive properties. There is a growing interest in correlating phytochemical constituents of a plant with its pharmacological activity (Gupta, 1994). Collection of information and documentation of traditional knowledge plays an important role in scientific research on drug development (Ragupathy *et al.*,2008). *Toddalia asiatica*, is known by the English common name orange climber. This is a liane with woody, corky, thorny stems that climb on trees, reaching up to 10 meters length. *Toddalia asiatica* is collected in the wild, prepared mostly as decoctions or concoctions and administered orally. It is used for the management of a number of disease conditions. The most frequently cited diseases were stomach problems followed by malaria, cough, chest pain, food poisoning, sore throat were also treated. Hence the present study has been made to investigate the phytochemical screening of the *Toddalia asiatica*.L.stem. The bioactive compounds like alkaloids, flavonoids, tannins and phenolic compounds are the reason for the medicinal value of plants that produce a definite physiological action on the body (Hemashenpagam *et.al*, 2009).

MATERIALS AND METHODS

Plant materials

The plant material (stem) of *Toddalia asiatica* was collected at Kolli hills, Namakkal District which is rich in wide variety of medicinal plants. The collected sample was identified and confirmed by BSI, Coimbatore. They were washed with tap water, rinsed with distilled water and blotted gently between the folds of filter paper. The stem part was air dried and powdered.

Preparation of the extracts for phytochemical analysis

10 grams pulverized material were dissolved in 100 ml of solvents like Petroleum ether, Benzene, Chloroform, acetone, methanol and water and kept in a shaker for overnight. The obtained extracts were filtered with Whatmann No.4 filter paper and the

filtrate was collected and used for analysis (Kokate, 1994). These extracts were used for the detection of phytochemical analysis.

Preliminary Screening of Phytochemicals

Detection of Carbohydrates

A minimum amount of extracts were suspended in 5ml of distilled water. The suspension was subjected to the following chemical tests.

Molisch's test

The extracts were treated with 2-3 drops of 1% alcoholic alpha naphthol and 2 ml of concentrated Sulphuric acid was added along the sides of the test tube. The formation of purple ring between two layers, which shows the presence of carbohydrates.

Fehling's test

The extracts were treated with Fehling's A and B solution and heated for few minutes. Formation of brick red precipitate shows the presence of reducing sugar.

Detection of Glycosides

Minimum quantities of the extracts were hydrolyzed with hydrochloric acid for few minutes on a water bath and the hydrolyzate was subjected to the following tests.

Legal's test

To the hydrolyzate 1ml of pyridine and few drops of sodium nitroprusside solution were added and then it was made alkaline with sodium hydroxide. The pink color changes in to red show the presence of glycosides.

Detection of Proteins and Amino acids

A small quantity of extract was dissolved in few ml of water and they were subjected to following tests

Ninhydrin test

The extracts were treated with Ninhydrin reagent. The purple colour was formed with extract, which shows the presence of proteins.

Biuret test

To the extracts equal volume of 5% sodium hydroxide solution and 1% copper sulphate solution was added. A violet colour formation indicates presence of amino acids.

Detection of Alkaloids

A small quantity of the extract was separately treated with few drops of dilute hydrochloric acid and filtered. The filtrate was used for the following tests.

Mayer's test:

The minimum amount of extract was treated with Mayer's reagent. Cream color precipitate indicate the presence of alkaloids.

Dragondroff Test:

The minimum amount of extract was treated with dragondroff's reagent. Reddish brown precipitate, if obtained, will indicate the presence of alkaloids.

Detection of Flavonoids

Shinoda test:

A small quantity of the extracts was dissolved in alcohol to that magnesium metal and concentrated hydrochloric acid were added. Colour change to magenta shows the presence of Flavanoids.

Alkaline reagent test:

Small quantities of the extracts were treated with sodium hydroxide solution. Formation of yellow colour indicates the presence of Flavanoids.

Detection of Phytosterols

Small quantity of the extract was suspended in 5ml of chloroform separately. The above obtained chloroform solution was subjected to following test.

Libermann burchard test

The above prepared chloroform solutions were treated with few drops of concentrated Sulphuric acid followed by 1 ml of acetic anhydride solution.. A bluish green colour solution obtained in chloroform extract shows the presence of phytosterols.

Detection of Tannins- Phenolic compounds

The extract is dissolved or suspended separately in minimum amount of water and filtered. The filtrate was subjected to the

following tests. Water extract was treated with 15 % ferric chloride test solution. The resultant colour was noted. A blue colour indicates condensed tannins, a green colour indicated hydrolysable tannins.

Detection of Saponins

Foam test: Dilute 1 ml of extract with distilled water to 20 ml and shake in a graduated cylinder for 15 minutes. A one centimeter layer of foam indicates the presence of saponins.

Detection of Coumarins

3 ml of 10% NaOH was added to 2 ml of extract formation of yellow colour indicates the presence of coumarins (Rizk, 1982).

Results

The qualitative phytochemical results reveals that the presence of alkaloids, Flavonoids, Saponins, Steroids, Glycosides, Tannins (Table 1) in the stem of *Toddalia asiatica.L* The methanolic extract of the plant contains all the phytoconstituents, with water extract in the second position with more number of phytoconstituents but, the petroleum ether extract contain the least number of them.

Discussion

There is an urge in research on new drugs from natural sources. Therefore, now there is a need to look back towards the traditional medicine which can serve as novel therapeutics. The pharmacological value of secondary metabolites from the plants is increasing as these can act as lead chemicals for new drug development. Plant synthesized many compounds with complex molecular structures, as a result of secondary metabolism. Some of the compounds and their derivatives such as alkaloids, flavonoids, isoflavonoids, tannins, coumarins, glycosides, terpenes and phenolic compounds have antimicrobial properties (Simose, *et al.*, 1999). The importance of alkaloids, saponins and tannins in various antibiotics used in treating common pathogenic strains has recently been reported (Kubmarawa *et al.*, 2007). In an overview of the bioactivity data obtained from the current investigation, it can be highlighted that the tested extracts have many phytoconstituents. Bioactive substances from this plant can therefore be employed in ethnomedicine. Determination of respective antimicrobial potential and toxicological evaluation of these extracts with the view to formulate novel chemotherapeutic agents to be used in future is worth mentioning. As a therapeutic source details, standardised study is warranted in order to exhibit *Toddalia asiatica*. as an effective medicinal plant in near future.

Table 1: Phytochemical (Qualitative) analysis of stem extract of *Toddalia asiatica.L*

COMPOUND	TESTS	PET.ETH	BEN	CHLO	ACE	MET	WATER
Carbohydrates	Molisch test	+	+	+	+	+	+
	Fehlings test	+	+	+	+	+	+
	Ninhydrin test	-	-	+	-	+	+
Amino Acids	Biuret test	-	+	+	+	+	+
	Dragendroff's test	-	+	+	+	+	+
Alkaloids	Mayer's test	-	+	+	+	+	+
	Alkaline reagent test	-	-	+	-	+	+
Flavonoids	Shinoda test	-	-	+	-	+	+
	Legal test	-	-	-	+	+	+
Glycosides	Ferric chloride test	-	-	+	+	+	+
Tannins	Libermann-buchardt test	-	-	+	-	+	-
Steroids	Foam test	-	-	-	+	+	+
Saponins	Alkalilne test	+	-	+	-	+	-
Coumarins							

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