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PRELIMINARY PHYTOCHEMICAL EVALUATION OF A FEW VITAL RAW DRUGS USED IN SIDDHA MEDICINE

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ABSTRACT

The screening and study of five different plant specimens belonging to different families for phytochemical constituents was performed using generally accepted laboratory technique for qualitative determinations. The constituents screened for were tannins, saponins, phlobotannins, terpenoids, flavonoids, cardiac glycosides, combined anthraquinone, carotenoids, steroids reducing compounds and alkaloids. The distribution of these constituents in the plant specimens were assessed and compared. The plant seeds studied were *Smilax china*, *Alpinia galanga*, *Myristica fragrans*, *Holarrhena antidysentrica* and *Celastrus paniculatu*. All the plant specimens were found to contain flavonoids, steroids and alkaloids but none of them contain phlobatanin, combined anthraquinone, cardiac glycosides and carotenoid.

INTRODUCTION

Siddha system of medicine is one of the ancient medical systems in India which reflects the life style and culture of the people. Siddhars, the founders of Siddha medicine had designed the health practices including seasonal discipline and food regulation. Siddha system relay on the concept of "Food is Medicine". Thus, siddha system prepares therapeutic drugs from green herbals. The herbal formulations serve as both therapeutic drug and nutrient supplements[(1)].

Drug is a substance used as a medicine. They are used in their raw state directly or after they are undergone some processes or modifications. It may be of plant or animal or metal and mineral origin [(2-5)]. They are organic substances and could be obtained in both primary and secondary metabolic process; they also provide a source of medicine since the earliest time. The plant kingdom has proven to be the most useful in the treatment of diseases and they provide an important source of all the world's pharmaceuticals. The most important of these bioactive constituents of plants are steroids, terpenoids, carotenoids, flavanoids, alkaloids, tannins and glycosides. Plants in all facet of life have served a valuable starting material for drug development [(6)]. This study looks into the fundamental scientific bases for the use of some raw drugs by determining the crude phytochemical constituents present in raw drugs.

MATERIALS AND METHODS

Raw drugs of *Smilax china, Alpinia galanga, Myristica fragrans, Holarrhena antidysentrica* and *Celastrus paniculatus* were purchased from authorized raw drugs seller, Madurai, Tamilnadu. Drugs were identified using "The Siddha Formulary of India" [(5)] , Herbarium and floras. The drugs were air dried at room temperature until dried. The specimens were blended using a blender and stored in a clean glass ware container until needed for analysis. The extracts were filtered using Whatmann filtered paper no. 42 (125 mm).

Phytochemical screening: Chemical test were carried out on the aqueous extract and on the powdered specimen using standard procedure to identify the constituents as described by [(7,8,9,10)].

Test for tannins: 1 g of each powdered sample was separately boiled with 20 ml distilled water for five minutes in a water bath and was filtered while hot. 1 ml of cool filtrate was distilled to 5 ml with distilled water and a few drops (2-3) of 10 % ferric chloride were observed for any formation of precipitates and any colour change. A bluish-black or brownish-green precipitate indicated the presence of tannins.

Test for saponins: 1 g of each powdered dried stain was separately boiled with 10ml of distilled water in a bottle bath for 10minutes. The mixture was filtered while hot and allowed to cool. The

following tests were then carried out. 2.5 ml of filtrate was diluted to 10ml with distilled water and shaken vigorously for 2minutes frothing indicated the presence of saponin in the filtrate.

Test for phlobatannins: Deposition of a red precipitate when an aqueous extract of each plant sample was boiled with 1% aqueous hydrochloric acid was taken as evidence for the phlobatannins.

Test for terpenoids: 5 ml of each extract was mixed in 2 ml of chloroform. 3 ml of concentrated H_2SO_4 was then added to form a layer. A reddish-brown precipitate colouration at the interface formed indicated the presence of terpenoids.

Test for flavonoids: 1 g of the powdered dried leaves of each specimen was boiled with 10 ml of distilled water for 5 minutes and filtered while hot. Few drops of 20 % sodium hydroxide solution were added to 1 ml of the cooled filtrate. A change to yellow colour which on addition of acid changed to colourless solution depicted the presence of flavonoids.

Test for cardiac glycosides: 5 ml of each extract was treated with 2 ml of glacial acetic acid containing one drop of ferric chloride solution. This was underplayed with 1ml of concentrated sulphuric acid. A brown ring at the interface indicated the deoxysugar characteristics of cardenolides. A violet ring may appear below the ring while in the acetic acid layer, a greenish ring may be formed.

Test for combined anthraquinones: 1 g of powdered sample of each specimen was boiled with 2 ml of 10 % hydrochloric acid for 5 mins. The mixture was filtered while hot and filtrate was allowed to cool. The cooled filtrate was partitioned against equal volume of chloroform and the chloroform layer was transferred into a clean dry test tube using a clean pipette. Equal volume of 10 % ammonia solution was added into the chloroform layer, shaken and allowed to separate. The separated aqueous layer was observed for any colour change; delicate rose pink colour showed the presence of an anthraquinone.

Test for carotenoids: 1 g of each specimen sample was extracted with 10 ml of chloroform in a test tube with vigorous shaking. The resulting mixture was filtered and 85 % sulphuric acid was added. A blue colour at the interface showed the presence of carotenoids.

Test for reducing compounds: To about 1 g of each sample in the test tube was added 10 ml distilled water and the mixture boiled for 5 mins. The mixture was filtered while hot and the cooled filtrate made alkaline to litmus paper with 20 % sodium hydroxide solution. The resulting solution was boiled with an equal volume of Benedict qualitative solution on a water bath. The formation of a brick red precipitate depicted the presence of reducing compound.

Test for steroids: 1 g of each specimen sample was extracted with 5 ml of chloroform in a test

tube with vigorous shaking and adds few drops of acetic acid, acetic anhydride, 2 drops of Con. H_2S0_4 and heated gently. A Blue or green colour developed showed the presence of steroids.

Test for alkaloids: 1 g of powdered sample of each specimen was separately boiled with water and 10 ml hydrochloric acid on a water bath and filtered. The pH of the filtrate was adjusted with ammonia to about 6-7. A very small quantity of the following reagents was added separately to about 0.5 ml of the filtrate in a different test tube and observed.

Picric acid solution.

10% tannic solution.

Mayer's reagent (Potassium mercuric iodide solution).

The test tubes were observed for coloured precipitates or turbidity.

RESULTS AND DISCUSSION

Table (1) shows the botanical name, family, Tamil name and parts used of the selected specimens that were screened for phytochemical constituents.

The screening of five different plant drugs namely *Smilax china, Alpinia galanga, Myristica fragrans, Holarrhena antidysentrica* and *Celastrus paniculatus* for phytochemical constituent was performed using generally accepted laboratory technique for qualitative determinations. The study indicated that flavonoids, steroids and alkaloids were present in all the aqueous extract of these plants but none contain phlobatannins, combined anthraquinones, cardiac glycosides and carotenoids (Table 2). It should be noted that steroidal compounds are of importance and interest in pharmacy due to their relationship with such compounds as sex hormones [(7)]. Terpenoids were present in all the drugs except *M. fragrans.* Reducing compounds were present in *S. china, A. galanga* and *H. antidysentrica*. Tannins were present in *S. china, H. antidysentrica*. and *C. paniculatus.* Among the five drugs saponins present only in the *C. paniculatus.*

The importance of alkaloids, saponins and tannins in various antibiotics used in treating common pathogenic strains has recently been reported by [(11,12)] reports alkaloids in 12 leafy vegetables studied. [(13)] had earlier recorded that bitter leaf contains an alkaloid which is capable of reducing headaches associated with hypertension.

The medicinal importance of tannins and saponins which are some of the components of traditional herbal preparations used in managing various common ailments has been reported by Addae-Mensah [(14)], Okoegwale and Olumese [(15)] and Okoegwale and Omofezi [(16)]. Banso and Adeyemo [(17)] have reported the antibacterial properties of tannins.

This study concludes that the raw drugs screened for phytochemical constituents seemed to have potential as source of medicine and also to improve the health status of its users as a result of the

presence of various compounds that are vital for good health. Many Siddha medicines manufactures are used these raw drugs as one of the main ingredients of our products. Quantitative analysis of the phytochemicals of these raw drugs and also the anti-fungal and anti-microbial activities should be investigated.

Table: 1 Scientific, Family, Tamil names and parts used of the raw drugs

S.No	Botanical Name	Family	Tamil Name	Parts used
1	*Smilax china*	Smilacaceae	Parangi pattai	Rhizome
2	*Alpinia galanga*	Zingiberaceae	Chittrarathai	Rhizome
3	*Myristica fragrans*	Myristicaceae	Jathikkai	Seed
4	*Holarrhena antidysentrica*	Apocynaceae	Kudasapalai	Bark
5	*Celastrus paniculatus*	Celastraceae	Valuluvai	Seeds

Table: 2 Qualitative screening of phytochemicals

Botanical Name	Tannins	Saponins	Phlobatannins	Terpenoids	Flavonoids	Cardiac glycoside	Anthroquinones	Carotenoids	Reducing compounds	Steroids	Alkaloids
S. china	+	-	-	+	+	-	-	-	+	+	+
A. galangal	-	-	-	+	+	-	-	-	+	+	+
M. fragrans	-	-	-	-	+	-	-	-	-	+	+
H. antidysentrica	+	-	-	+	+	-	-	-	+	+	+
C. paniculatus	+	+	-	-	+	-	-	-	-	+	+

(+) = Present, (-) = Absent

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