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Indigenous Anti-Skin Diseased Plants Phytochemical Screening for the Revealing of Impending Secondary Metabolites

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Abstract

Indigenous plants and their knowledge immerged with their potentiality. Secondary metabolites are the fundamental therapeutics. Commonly these found in higher plants are flattering increasingly significant in drug designing. In the present report, 105 different solvent extracts of 21 aboriginal plant species from Hyderabad Karnataka region were screened for their foremost constituents of secondary metabolites. From each of plant species selected part of five successive extracts were selected for the detection of potential metabolites. For the screening of secondary metabolites, the standard tests undertaken i.e., group wise for alkaloids dragendroff's, tannin for ferric chloride, phenolics for lead acetate, glycoside for keller-killiani test, flavonoids for NaOH and saponins for foam test. The clear ranges of secondary metabolites like non-polar to polar have been observed. The maximum detection of alkaloids, tannins found at non-polar range whereas in middle polar flavonoids, tannins have been detected. Glycosides and saponins totally found at high polar. The outcome of the present report will be very much useful for isolation of different group of secondary metabolites in save the time, chemicals, energy consumption in active molecule drug design.

Keywords

Indigenous plants, skin diseases, phytochemical screening, potential secondary metabolites.

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INTRODUCTION

Privileged plants fabricate both primary and secondary chemical metabolites, the earlier being vitally imperative in normal improvement and reproduction of plants (Herbert, 1981; Duke, 1992). On the other hand, secondary metabolites are known to play an important role in plant endurance as protection mechanisms adjacent to adverse biotic and abiotic circumstances. They comprise numerous groups of chemicals with inconsistent biological activities (Whitehead and Bowers, 1983; Schmutterer, 1990); Indigenous therapeutic plants plays a major role in gathering the remedial and wellbeing needs of about 70% of populations in

developed and developing countries, which serve as an important resource for the treatment of various maladies and illnesses In developing countries, there is an increasing attempt to incorporate the traditional medicines, especially herbal preparations in the local healthcare systems and modernized people are increasingly turning to herbal medicine (Ngari *et al*., 2010). Phytochemicals are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further than those attributed to macronutrients and micronutrients. (Hasler CM) They protect plants from disease and damage and contribute to the plant's color, aroma and flavor. In general, the plant chemicals that protect plant cells from environmental hazards such as pollution, stress, drought, UV exposure and pathogenic attack are called as phytochemicals (Gibson EL, Mathai K).

The ethno medicinal plants from Hyderabad Karnataka region have been previously documented by the present author (Shivakumar Singh P and Vidyasagar GM 2012). There are no reports on secondary metabolites occurrence reports. So, in the current report a diminutive part of the plants secondary metabolites incidence broad spectrum has testimonies.

MATERIALS AND METHODS

Collection of plant materials

The plant materials (parts used mentioned in the table) were collected from Hyderabad Karnataka region of Karnataka state, India. The plant species were authenticated, deposited the herbarium specimens in the Botany, Gulbarga University, Karnataka, where voucher numbers were allotted (T Pullaiah et al., 2015).

Preparation of Plant Extracts

Concerned used plant parts of the plant samples were thoroughly washed with running tap water 2-3 times and then finally washed with distilled water followed by shade-dried for seven days and then dried in an oven below 50ºC. The dried plant materials were then powdered using mixer and grinder. 30g of plant powder were extracted with 100ml of pet ether, chloroform, ethyl acetate and Methanol for 72hrs by Soxhlet extractor in successive extraction method. Then the extracts with different solvents were evaporated using rotary evaporator. The extracts were transferred into pre-weighed sample containers and were stored later was used for preliminary phyto-chemicals detection (Harborne, 2000).

Preliminary Screening Tests for Secondary Metabolites:

Preliminary tests, for the detection of secondary metabolites, were carried out for all the extracts of 61 plants by adopting standard methods (Harborne, 2000).

Preparation of Test solution: 500 mg of each extract was dissolved in 100 ml of the respective solvent and filtered through Whatman filter paper No.1. Thus, the filtrates obtained were used as test solutions for the following preliminary screening tests.

Tests for Alkaloids:

The stock solutions of Pet. Ether, CHCI3, Et-OH and Aqueous extracts were further mixed with the required quantity of ammonia solution followed by acidified chloroform (0.1N HCI) and filtered. Thus, the filtered is used as test solution for alkaloid detection using following tests.

Dragendorff's reagent: 2 ml of Dragendorff's reagent and 2 ml of dilute Hcl were added to the test solution. An orange red coloured precipitate indicates the presence of alkaloids.

Tests for Flavonoids:

Pew test (Zn/HCI): A pinch of zinc powder and about 5 drops of 5N HCI were added to the test solution. It results deep purple red (dihydroquercetin) or cherry red (dihydrokaemferol) colours. Flavonones, dihydrochalcones and other flavonoids get at most pinkish colours (Harborne, 2000).

NaOH test: 1 ml of 1N NaOH solution was added to the 1 ml of test solution, formation of yellow colour indicates the presence of flavonoids.

Testes for Glycosides:

Kellar-killiani test: 1 ml of glacial acetic acid was carefully added to 2 ml of test solution of the extracts and mixed well. Further, 2 drops of ferric chloride solution wad added after cooling. These contents were transferred carefully to a test tube containing 2 ml of conc. H2SO4. A reddish-brown ring was observed at the junction of two layers.

Tests for phenols:

Lead acetate test: The extract (50 mg) was dissolved in 5 mL of distilled water. To this, 3ml of 10% lead acetate were added. A bulky white precipitate indicated the presence of phenol compounds

Testes for Saponins:

Foam test; 0.1 g of crude extract was shaken vigorously in 2 ml of distilled water. Formation of honeycomb like fourth persists for a few minutes indicate the presence of saponins.

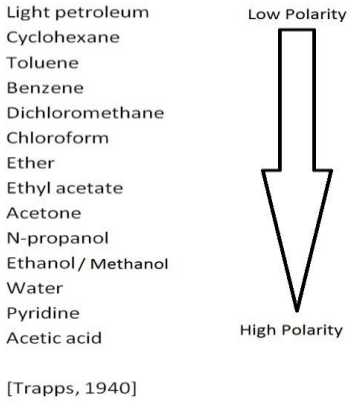

Figure 1: Successive extraction range from low polarity to high polarity of solvents.

RESULTS AND DISCUSSION

Indigenous plants and their knowledge immerged with their potentiality. Secondary metabolites are the fundamental therapeutics. Commonly these found in higher plants are flattering increasingly significant in drug designing. In the present report, 105 different solvent extracts of 21 aboriginal plant species from Hyderabad Karnataka region were screened for their foremost constituents of secondary metabolites. From each of plant species selected part of five successive extracts was selected for the detection of potential metabolites. For the screening of secondary metabolites, the standard tests undertaken i.e., group wise for alkaloids dragendroff's, tannin for ferric chloride, phenolics for lead acetate, glycoside for keller-killiani test, flavonoids for NaOH and saponins for foam test. The clear ranges of secondary metabolites like non-polar to polar have been observed. The maximum detection of alkaloids, tannins found at non-polar range whereas in middle polar flavonoids, tannins have been detected. Glycosides and saponins totally found at high polar. The outcome of the present report will be very much useful for isolation of different group of secondary metabolites in save the time, chemicals, energy consumption in active molecule drug design.

Among the effective anti-skin diseases secondary metabolites found at near the non-polar solvent extracts. Phenols and flavonoids found at non-polar like ethanolic or methanolic extracts, moderately found positive occurrence at aqueous extracts found positive response. While the very much less amount of occurrence found at non-polar extracts (shown at graph 1). The results of the successive extracts contribute accuracy for screening of secondary metabolites and isolations of detecting of active molecule against targeted diseases.

The rudimentary successive extracts of 20 aboriginal medicinal plants were qualitatively screened for the occurrence of diverse secondary metabolites such as phenols (Lead acetate test), flavonoids (NaOH test), tannins (Ferric chloride test), alkaloids (Dragendroff's test), Saponins Foam test), glycosides (Keller-Killiani test). The reactions with these reagents have shown the incidence of metabolites and are recorded in the Table -1. The commencement screening and the number of affirmative responses of secondary metabolites were specified in Figure-1.

The present results give a fundamental idea for occurrence of secondary metabolites broadly. By the direction of the detections the future isolation processes would be convenient for active molecules and in drug designs.

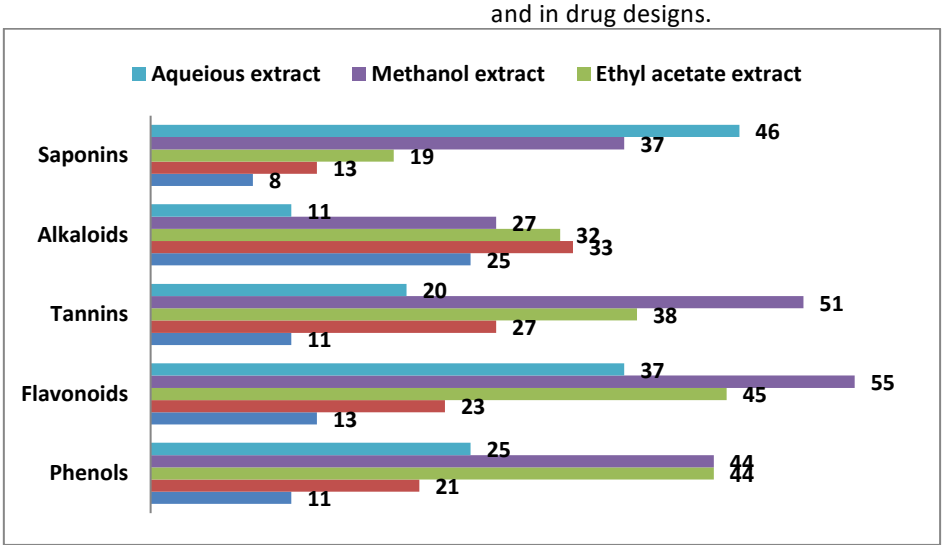

Figure-1: Preliminary phytochemical screening, positive response of secondary metabolites of 21 indigenous medicinal plant drugs of Hyderabad Karnataka region.

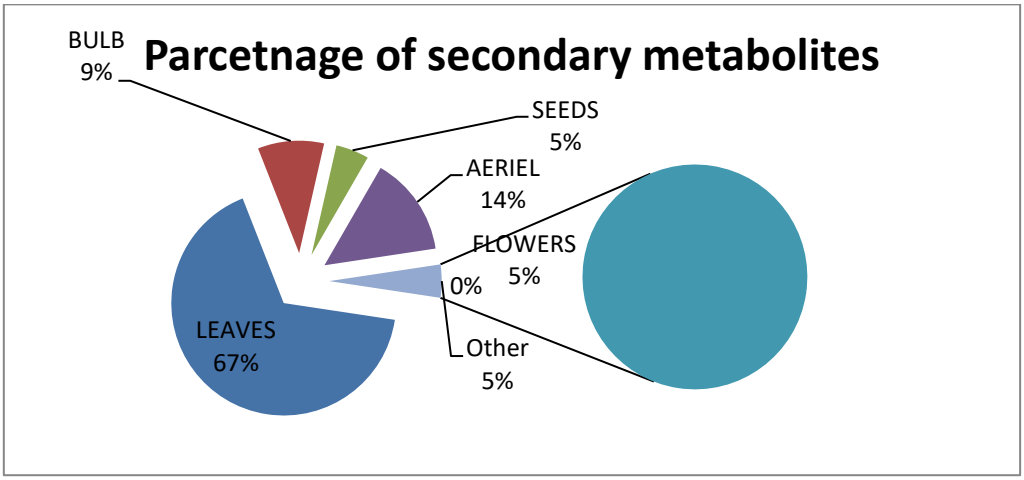

Figure-2: Preliminary screening of secondary metabolites of 21 indigenous medicinal plant drugs used in the treatment of skin diseases.

Table- 1: Preliminary phytochemical screening for secondary metabolites of 21 traditional medicinal plants species

Plant part used	Plant name and Family	Plant constituents																													
		Phenols					Flavonoids					Tannins					Alkaloids					Saponins					Glycosides				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Leaf	*Achyranthes aspera* L. (Amarathaceae)	-	-	+	+	+	-	-	+	+	+	-	-	+	+	+	-	-	+	+	+	-	-	+	+	+	-	-	+	+	+
Leaf	*Aegle marmelos* (L) Corr. (Rutaceae)	-	-	+	-	+	-	-	+	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	+	-	-	+	-	+
Bulb	*Allium sativam* Linn. (Liliaceae)	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	+	+	+	+	+	+
Bulb	*Allium cepa* L. (Liliaceae)	-	-	+	-	-	-	+	-	+	-	-	+	+	+	-	-	+	-	+	-	-	-	-	-	+	-	-	+	+	-
Leaf	*Carica papaya* L. (Caricaceae)	-	+	-	+	-	-	-	+	+	-	-	+	+	+	-	+	+	+	+	-	+	+	+	+	+	-	-	+	+	+
Flower	*Cassia auriculata* L. (Ceasalpiniaceae)	-	-	-	+	-	-	-	+	+	+	-	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	+	-
Leaf	*Cassia tora* L. (Fabaceae)	-	-	+	+	-	-	-	-	+	+	+	-	-	+	-	-	-	-	+	+	-	-	-	+	+	-	-	+	+	+
Seed	*Ceasalpinia bonducella* (L.) Flem. (Ceasalpiniaceae)	-	-	-	+	+	+	-	+	+	+	-	+	+	+	+	-	-	+	-	+	-	-	-	-	+	-	-	-	+	+
Leaf	*Euphorbia tirucalli* L. (Euphorbiaceae)	+	-	+	+	+	+	-	-	+	+	+	-	+	+	+	+	-	+	+	+	-	-	-	-	-	-	+	+	+	+
Leaf	*Ficus racemosa* L.(Moraceae)	+	-	+	+	-	-	+	+	+	+	-	-	-	+	+	+	+	+	-	-	-	-	-	+	+	-	-	-	+	-
Leaf	*Gymnosporia montana* (Roth)Benth (Celastraceae)	-	+	+	+	-	-	+	+	+	-	-	-	+	+	-	+	+	+	-	-	-	-	+	+	+	-	-	-	+	-
Leaf	*Hyptis suoveolens* (L.) Poit. (Lamiaceae)	-	-	-	-	-	-	-	+	+	-	-	-	+	+	-	-	+	-	+	-	-	-	-	-	+	-	-	-	+	-
Leaf	*Momordica charantia* L.	-	-	-	+	-	-	-	+	+	+	-	+	+	+	-	-	-	-	+	+	-	-	-	+	+	-	+	+	+	+

Plant part used	Plant name and Family	Plant constituents																													
		Phenols					Flavonoids					Tannins					Alkaloids					Saponins					Glycosides				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
	(Cucurbitaceae)																														
Aerial part	*Ocimum sanctum* L. (Lamiaceae)	-	+	+	+	+	-	+	+	+	+	-	+	-	+	-	+	-	+	-	-	-	+	-	+	+	-	+	+	+	+
Leaf	*Santalum album* L. (Santalaceae)	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	+	+	-
Leaf	*Solanum nigrum* L. (Solanaceae)	-	-	+	-	-	-	+	+	+	+	-	+	-	-	-	+	+	+	-	-	-	-	+	+	+	-	+	+	+	+
Leaf	*Tinospora cordifolia* (Willd.) J.Hook&Thoms. (Menispermaceae)	-	-	+	+	-	+	-	+	+	+	-	+	+	+	-	-	+	+	-	-	-	-	-	+	+	+	-	+	+	-
Leaf	*Tephrosia purpurea* (*L.*) Pers. (Fabaceae)	-	-	-	-	-	+	+	-	+	+	-	+	-	+	+	-	+	-	-	-	-	-	-	+	+	-	+	-	+	-
Leaf	*Thevetia nerrifolia* Juss. (Apocynaceae)	+	+	-	+	-	+	+	-	+	+	+	+	-	+	-	-	+	-	+	-	+	+	+	+	+	-	+	+	+	+
Aerial	*Tribulus terrestris* L (Zygophyllaceae)	-	-	-	+	-	-	-	-	+	-	-	-	+	+	-	-	+	+	-	+	-	-	-	+	+	-	-	-	+	-
Aerial part	*Tridax procumbens* Linn. (Asteraceae)	-	-	+	-	+	+	+	+	+	+	-	+	+	+	+	-	-	-	+	+	-	-	-	-	-	-	-	-	+	-

A-Petroleum ether extract, B-Chloroform extract, C-Ethyalacetate extract, D-Methanol extract, E-Aqueous extract, --absent, +-Present.

Preliminary screening of secondary metabolites test names: Alkaloids: Dragendroff's, Tannin: Ferric chloride, Phenolic: lead acetate, Glycoside: Keller-Killiani test, Flavonoids: NaOH, Saponins: Foam test.

CONCLUSION

Secondary metabolites are the source of therapeutics, the wisdom on medicinal properties centralised at ethnic societies. A very few of the indigenous remedial medicinal plants are available in the treating of skin diseases. So, efforts must be affianced to safeguard ethno medicinal plants and also the rustic brainpower for prospect health care systems. The present results give a fundamental idea for occurrence of secondary metabolites broadly. By the direction of the detections the future isolation processes would be convenient for active molecules and in drug designs to the future researchers.

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