

Pharmacognostical Study of *Dioscorea oppositifolia* L.

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ABSTRACT

Extraction of bioactive compounds from medicinal plants permits demonstration of their physiological activity. It also facilitates pharmacology studies leading to discovery of synthesis of more potent drugs. The plant selected in the present study is *Dioscorea oppositifolia* L. (Dioscoreaceae) which is used traditionally for antiseptics, ulcers and abscesses. The root is chewed to cure toothache and aphthae. The whole plant extract is used for secondary syphilis and Psoriasis. The present investigation was intended to evaluate the preliminary phytochemical characters and fluorescence analysis of this species.

Keywords: *Dioscorea oppositifolia*, Preliminary Phytochemical Screening, Fluorescence analysis.

INTRODUCTION

Nature has provided a complete storehouse of remedies to cure ailments of mankind. The knowledge of drugs has accumulated over thousands of years as a result of man's inquisitive nature so that we possess many effective means of ensuring health-care. Today, a vast store of knowledge concerning therapeutic properties of different plants has been accumulated. All classes of plants viz. Thallophyta, Bryophyta, Pteridophyta and Spermatophyta contain species that yield primary and secondary products of medicinal importance. Herbal medicine has been practiced worldwide and is now recognized by WHO as an essential building block for primary healthcare (Onayade *et al.*, 1990). Different people in different areas named their systems of medicine according to their experience, wisdom and knowledge. In India, we have three major traditional systems of medicine known as Ayurveda, Siddha and Unani. Ayurveda, the Indian indigenous system of medicine, dating back to the Vedic Age (1500-1800 BC) has been an integral part of the Indian culture and tradition. The origin of siddha system of medicine can be traced back from the days of sangam period. This system is as ancient as Ayurveda.

In the nineteenth century, the term "Materia Medica" was used for the subject now called as "Pharmacognosy". It was Seydler, a German who coined the term "Pharmacognosy" in 1815 used in the title of his work "Analecta Pharmacognostica". Pharmacognosy is derived from two Greek words viz. pharmakon means a drug and Gignosco means to acquire the knowledge. The leaves, flowers, tender shoots and tubers of *Dioscorea oppositifolia* L. are used for cooling and demulcent; they are used in the form of decoction for leprosy and cancerous lesions. The leaves are antiseptic; the paste is applied on ulcers and abscesses. The root is chewed to cure toothache and aphthae. The whole plant is used in application for oedematous tumours and the ash extract of flowering twigs along with tender leaves cure cancer and leprosy. The whole plant extract is used for secondary syphilis and Psoriasis. Pharamacognosy study

deals with the drug plants, their history, selection, collection, identification and preservation. Anatomical characters of powdered drugs proved to be of great significance especially at a period when adulteration of both in drugs and food articles is common. Quality control of a crude drug and its pharmaceuticals can be attempted by different methods of evaluation depending upon the morphological and microscopical studies of the crude drugs and their physical, chemical and biological behaviour. The systematic identification of crude drugs and their quality assurance form an integral part of drug-description.

MATERIALS AND METHODS

Dioscorea oppositifolia L. (Dioscoreaceae) was collected from Karaiyar hills in Tirunelveli district. Taxonomic features collected from the species have been checked with the Flora of Presidency of Madras (Gamble, 1915-1921) and the Flora of TamilNadu Carnatic (Matthew, 1983-88). Later it was confirmed with the voucher specimens of **Arinathan** (2006), **Nirmal Kumar** (2008).

MACROSCOPIC STUDIES

The observation was made using a student dissection microscope and the morphological and taxonomical characters were described in technical terms

PHYTOCHEMICAL STUDIES

The collected plants were dried and powdered. About 10gms of the powdered sample of the species was separately extracted with benzene, methanol, chloroform, petroleum ether and distilled water. These extracts were concentrated and used for preliminary phytochemical screening following the methods of **Brindha et al.**, (1990).

RESULTS AND DISCUSSION

Taxonomic Studies

Morphological characters were studied in *Dioscorea oppositifolia* and their variations were presented. It is a small climber. Stem woody, clothed with minute gland tipped hairs. Branchlets viscid. Leaves sub-opposite, 4 cm; leaflets 7-9 pairs, opposite, oblong-elliptic, 1 - 15 x 0.4- 0.6 cm, pubescent, base and apex obtuse, margin entire, petiole 1.5 cm; stipules setaceous, 4 mm; stipules minute. Inflorescence racemes or panicles, axillary to 7 cm; peduncle to 7 cm; bracts linear, 4 mm; pedicel 1mm. Flowers 4mm, across, base narrow, claw O; wings oblong 3.5 mm; keels obovate, 4.5 mm; spur to 0.5 mm. Staminal sheath 3 mm, ovary 3 mm, hispid, style 1 mm. Pod spreading, straight, 2.5 cm, hirsute, torulose. Seeds 10 - 12, cuboids, pitted, rotted and round tubers. It is usually distributed in hilly regions. Flowering period is November to February.

Preliminary Phytochemical Analysis

Preliminary phytochemical screening of the *Dioscorea oppositifolia* L. plant powder was done as per standard methods and results are presented in the Table 1. Petroleum ether extract shows the presence of steroids, triterpene, sugar, tannin and amino acid. Methanol extracts shows the presence of sugar, alkaloid, phenolic group, flavone,

catachin, tannin and amino acid. Benzene and chloroform extracts show the presence of steroid, sugar and steroid, triterpene, sugar respectively. In distilled water extract shows the presence of steroid, triterpene, sugar and tannin. In all the extract saponin is absent. The medicinal properties exhibited by this species are due to the presence of alkaloids, triterpenes and flavones.

Fluorescence Analysis

***Dioscorea oppositifolia* L** leaf powder treated with 1 N aqueous NaOH, 50% HNO₃ and 1 N HCL for the fluorescent analysis using UV and visible light. Leaf powder treated with 1 N NaOH shows green colour in both visible and UV light. In 1 N HCL it is yellowish green in visible and green in UV light. 50% HNO₃ treated leaf powder shows yellowish green in visible and green in UV light.

Solvent extracts of the leaf powder have also been analyzed in the fluorescent chamber. The petroleum ether extract of leaf powder is dark yellow in visible and yellowish green in UV light. The benzene extract of the leaf powder is brown and greenish brown in visible and UV light. The chloroform extract of ***Dioscorea oppositifolia* L** is dark brown in visible and brown in UV light. The methanol extract shows yellow and pale green in visible and UV light. The water extract of the leaf powder shows brown in visible and green in UV light. The result of fluorescence analysis is shown in the Table 2.

QUANTITATIVE DETERMINATION

Ash Analysis

The percentage of loss of weight on drying, total ash, acid insoluble ash, water soluble ash and sulphate ash are obtained by employing standard method of analysis and described in Table 3 and 4. The loss of weight on drying is 40.2% and it is found to be maximum. The total ash content is 7.7%, the acid insoluble ash content is 1.9 and it is found to be minimum. The water insoluble ash content is (23.2%). The sulphate ash content is 24 %. This method is used to check the adulterants present in the species.

CONCLUSION

The comparative and multidisciplinary approach to the study of ***Dioscorea oppositifolia* L** does help in understanding their identification taxonomical determination, and medicinal importance in depth. The adulterants in drugs obtain from ***Dioscorea oppositifolia* L** can be identified by this investigation. Adulterants if any can be easily identified using these parameters.

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Table 1. Phytochemical analysis of various extracts of *Dioscorea oppositifolia*. L.

Phytochemicals	Petroleum ether Extract	Methanol Extract	Benzene Extract	Chloroform Extract	Water Extract
Steroid	+	-	+	+	+
Triterpene	+	-	-	+	+
Sugar	+	+	+	+	+
Alkaloid	-	+	-	-	-
Phenolic group	-	+	-	-	-
Flavone	-	+	-	-	-
Catachin	-	-	-	-	-
Saponin	+	+	-	-	+
Tannin	+	+	-	-	+
Amino acid	+	-	-	-	-

(+ present, - absent)

Table 2. Fluorescence characters of leaf powder and their extract in different solvents of *Dioscorea oppositifolia*. L

S.No	Particulars of the treatment	Under ordinary light	Under U - V light (366nm)
1	Powder + 1 N aqueous NaOH	Green	Green
2	Powder + 1 N HCL	Yellowish green	Green
3	Powder + 50% HN03	Yellowish green	Green
Extract			
4	Petroleum ether extract	Dark yellow	Yellowish green
5	Benzene extract	Brown	Greenish brown
6	Chloroform extract	Dark brown	Brown
7	Extract methanol	Yellow	Pale green
8	Water extract	Brown	Green

Table 3. Physiochemical characteristics of leaf in *Dioscorea oppositifolia*. L.

S.No	Particulars	Percent Value
1.	Loss of weight on drying	40.2
2.	Total ash	7.7
3.	Acid insoluble ash	1.9
4.	Water insoluble ash	23.2
5.	Sulphate ash	24.0

Table 4. Ash for mineral constituents.

S.No	Plant Part	Chlorine	Sulphur	Phosphorous	Iron	Calcium
1	Leaf	-	-	+	+	-
2	Stem	+	+	+	+	-

(+ present, - absent)