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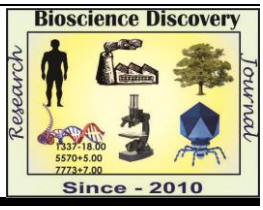

Phytochemical Investigations of *Argyreia cymosa* (Roxb.) Sweet: An Unexplored Medicinally Important Lianas

Bokhad M. N., S. P. Rothe[1], V. W. Patil and V. J. Parsodkar

Department of Botany, Institute of Science, Aurangabad – 431 004
[1]Shrimati Meharbano Science & Commerce College, Akola
Email: mob2551322@gmail.com

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Abstract

India is rich in natural resources and medicinal plants which are being used by local healers to treat many diseases. All over the world, traditional herbal treatments are common and have been under constant investigation, to know and exploit the active constituent of these remedies. *Argyreia cymosa* (Roxb.) Sweet, the member of family Convolvulaceae is been found to be used in many traditional medicinal practices by tribal traditional practitioners. Its leaves are used for healing wounds and cracks and also in ethno-veterinary practices to cure corneal opacity of sheep and goat. Present study deals with the phytochemical investigation of medicinally important liana *Argyreia cymosa* (Roxb.) Sweet. The phytochemical analysis showed the presence of significant level of alkaloids, flavonoids, phenolics and other bioactive components which validates its ethnomedicinal importance.

INTRODUCTION

Herbal medicines are being practiced worldwide and are now recognized by World Health Organization (WHO, 2005) as an essential building block for primary healthcare. The plants have been used through the world as a crude drug in a folk medicine and as a local cure for common ailments.

Argyreia cymosa (Roxb.) Sweet belongs to the family Convolvulaceae. Genus *Argyreia* is a growing woody climber of tropical Asia to Australia having characteristic silvery leaves and showy purple flowers. *Argyreia cymosa* (Roxb.) Sweet is used in folk medicine. The paste of its leaves is applied on crack and wounds (Karuppusamy, 2007) and leaf extract is applied to the eyes of sheep and goats to cure corneal opacity (Ganesan *et al.*, 2008).

Traditional use of *Argyreia cymosa (Roxb.)* has a long history but lacks adequate scientific documentation, hence the purpose of this study is to find out the extractive value , preliminary as well as quantitative phytochemical analysis and TLC study to find out the number of alkaloid and flavonoids from the plant extracts .

MATERIALS AND METHODS

The plant selected for study *Argyreia cymosa* (Roxb.) Sweet was collected during the flowering period and was identified with the help of standard flora (Cook, 1967; Hooker, 1982-85; Naik, 1998; Singh *et al.*, 2001). The collected plant material i.e. the leaves, stems were washed with tap water and shed dried at room temperature for a week. The dried leaves and stem of the plant was powdered and stored in airtight containers for further study.

Preliminary phytochemical analysis was carried out using six solvents according to their polarity i.e, Petroleum ether, Benzene, Chloroform, Acetone, Ethanol and water respectively by Soxhlet Method for 18 hours. Preliminary and quantitative phytochemical analysis was carried out using standard procedures to identify the metabolic constituents, as described by Harborne (1998), Trease and Evans (1979), and Mukharjee (2002) Sadashivan and Manickam, (2005). The chromatographical study was carried out by using the standard procedure described by Harborne, (1998); Mukharjee, (2002); Sadashivan & Manickam, (2005).

RESULTS AND DISCUSSION

The extractive values determined in six solvents. The extraction of crude drug in particular solvent yields a specific phytoconstituents depending upon the nature of crude drug and solvent used.This reflects the extractive value of a crude drug. The maximum extractive value was observed in more polar solvent i.e. water followed by ethanol and acetone; and minimum in petroleum ether (Table-1). Among the parts used for extraction, the leaves showed higher extractive vales than stem.

Preliminary phytochemical screening of stem shows the presence of alkaloids, carbohydrate, protein, cardiacglycoside, saponins, coumarins, tannins, flavonoids and phenolic compounds in respective solvent. Steroids, anthraquinone glycosides and quinones were completely absent in stem. Leaf showed the presence of alkaloids, carbohydrate protein, cardiacglycoside, saponinecoumarins, tannins, flavonoids and phenolic compounds.The phytosterols, anthraquinone glycosides, quinones, fixed oil and fats were totally absent in all the extracts (Table-2). In animals, most alkaloids produce striking physiological effects and vary greatly. Some alkaloids stimulate the central nervous system, while some modulate the blood pressure (Southon& Buckingham, 2003).Since the saponins possess anti-inflammatory, anti-fungal, anti-parasitic, anti-tumor, anti-viral, anti-bacterial and anti-abortifacient activities, traditional medicinal practitioners confirm its usefulness in the crude therapeutic treatments. The tannins can be used against diarrhea due to their astringent and detergent property (Trease and Evans, 2002). There has been assertion by Trease and Evans that naturally cardiacglycosidescan be used in the treatment of various ailments associated with the heart asin controlling supraventricular cardiac arrhythmias. It also exerts a slowing and strengthening effect of heart failure. Thus, due to presence of all these components in *A. cymosa* (Roxb.) Sweet, these scientific investigations may be utilized to develop drugs for future aspect.

In *Argyreia cymosa* (Roxb.) Sweet the secondary metabolites i.e. alkaloids, phenolics, tannins, saponins in plant found in appreciable concentrations (Table-3)

Concentration of flavonoid was found to be higher in all the plant parts and the alkaloid concentration was lower (figure 1). The highest quantity of flavonoids was recorded in the leaves (27.0±1.0 mg/100g) while stem constituted comparatively less amount (26.0±1.52 mg/100g). The highest quantity of alkaloids was recorded in the leaves (6.18 ±0.06 mg/100g) while stem constituted comparatively less amount (3.83 ±0.03 mg/100g). Tannins and phenolics were higher in stem whereas minimum in leaf. Higher concentration of saponin was present only in leaf (23.14 ±0.30 mg/100g).

TLC profile plays an important role in the standardization of bioactive constituents. The methanolic extract of stem showed total 4 bands with respective R*f* values in both the solvent systems for alkaloids (Table-4); while the extract of leaf gave 8 bands in Toluene: Acetone: Ethanol: Ammonia Solvent (40:40:6:2) and 5 bands in Toluene: Methanol(86:14) solvent system with respective R*f* values (Table-5). For flavonoids methanolic extract of stem showed 4 bands with respective R*f* values in both the solvent systems used (Table-4), whereas the leaf extract showed 3 bands in Chloroform: Ethyl acetate (60:40) solvent system, and 4 bands in Toluene: Ethyl acetate: Formic acid (50:40:10) solvent system with respective Rf values (Table-5). These solventsystems were found more appropriate for extracting the active chemical constituents from the crude plant material under study.

The phytochemical values reported in the study would be used for further research in drug discovery. This work pursuit focusing on the isolation of individual components and subjecting them to the clinical trials, will surely promise to open the new avenues in use of the plant for therapeutic purpose.

Table 1: Table: Extractive values in different solvents

Sr. No.	Solvent	Stem Value (% w/w)	Leaf value (% w/w)
1	Petroleum Ether	6.5±0.3	4.0±0.2
2	Benzene	7.5±0.35	9.46±0.41
3	Chloroform	8.2±0.15	9.5±0.36
4	Acetone	13.4±0.2	30.33±0.50
5	Ethanol	24.8±0.2	34.6±0.15
6	Water	35.4±0.2	40.5±0.3

Table 2: Qualitative Phytochemical screening of *Argyreiacymosa*(Roxb.)Sweet.

Sr. No.	Constituents	Chemical Tests	Extracts											
			Petroleum ether		Benzene		Chloroform		Acetone		Ethanol		Water	
			L	S	L	S	L	S	L	S	L	S	L	S
1	Alkaloids	Hager's Reagent	-	-	-	+	-	-	-	-	+	-	+	+
		Dragendroff's Reagent	-	+	-	-	-	-	+	-	+	-	+	+
		Mayer's Reagent	-	-	-	-	-	-	+	+	+	+	-	-
		Wagners reagent	-	+	-	-	-	+	-	-	-	-	+	+
2	Carbohydrates & Glycosides	Fehling's Reagent	-	-	-	-	+	+	-	-	-	+	+	-
		Benedict's Reagent	+	+	+	-	-	+	+	+	+	+	-	+
		Molisch's Reagent	-	-	-	-	-	+	-	+	-	+	-	-
3	Steroids	Salkowski Reagent	-	-	-	-	-	-	-	-	-	-	-	-
4	Saponin	Foam	-	+	-	-	+	-	+	-	-	-	+	+
5	Phenolics& Tannin	$FeCl_3$ Sol.	-	-	-	-	+	+	+	+	+	-	-	+
		Lead Acetate	-	-	-	-	-	+	+	+	+	+	+	+
6	Fixed oil & Fats	Spot test	-	-	-	-	-	-	-	-	-	-	-	-
7	Proteins	Biurret Reagent	-	-	-	-	-	-	-	-	-	-	+	-
		Million's Reagent	-	-	-	-	-	-	+	-	+	-	+	+
8	Anthroquinone glycosides	Borntrager's Reagent	-	-	-	-	-	-	-	-	-	-	-	-
9	Cardiac glycosides	Keller-Killiani Reagent	+	+	+	+	+	+	-	+	-	+	+	+
10	Flavonoids	Extract + NH_3	+	+	+	+	-	+	-	+	-	+	-	+
11	Quinone	Extract +Conc. H_2SO_4	-	-	-	-	-	-	-	-	-	-	-	-
12	Coumarins	Extract +10% NaOH	+	-	+	+	-	-	-	+	-	-	-	-

Note: - L = Leaf, S = Stem, '+' = Present , '-' = Absent

Table 3: Quantitative phytochemical screening (w/w)

Sr. No.	Secondary metabolites	Stem	Leaf
1	Alkaloids	3.83±0.03	6.18±0.06
2	Flavonoids	26.0±1.52	27.0±1.0
3	Phenolics	12.10±0.15	9.92±0.31
4	Saponins	18.55±0.25	23.14±0.30
5	Tannins	15.92±0.10	10.95±0.74

Figure 1: Quantitative phytochemical screening of *A. cymosa* (Roxb.)Sweet.

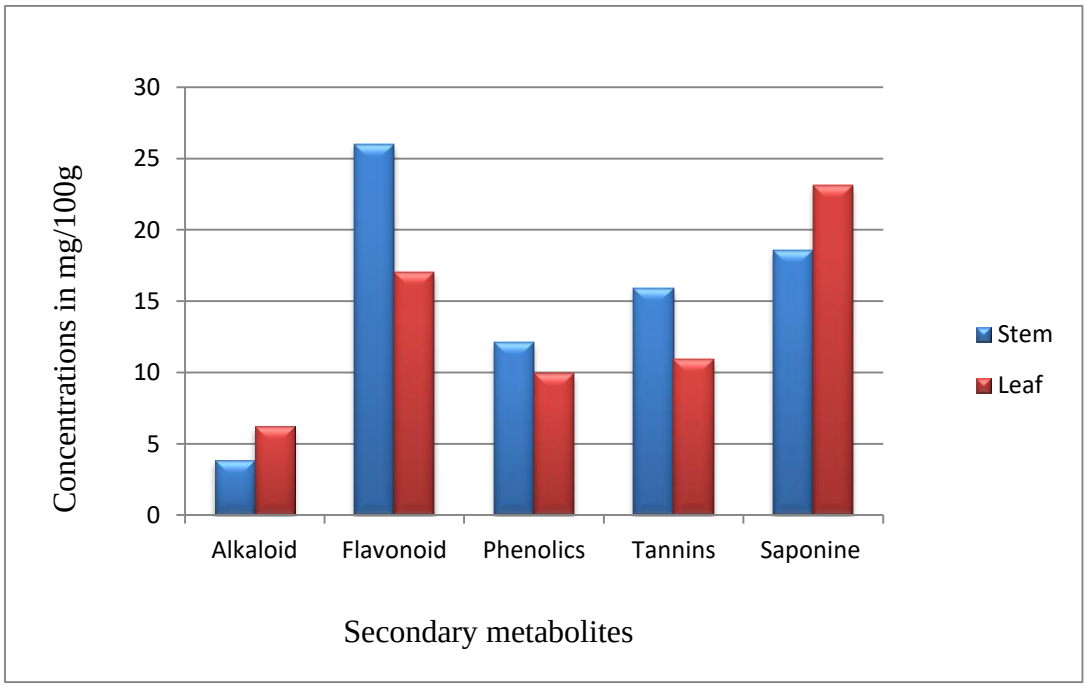

Table 4.TLC study of methanolic stem extract of *Argyreiacymosa*(Roxb.)Sweet

Sr.No.	Chemical constituents	Solvent system	R*f* Values	Total Bands	Spray reagents
1	Alkaloids	Toluene : Acetone : Ethanol : Ammonia Solution (40:40:6:2)	0.10, 0.15,0.35, 0.45,	4	Dragendroff's
		Toluene: Methanol (86:14)	0.26, 0.31, 0.73, 0.86	4	Dragendroff's
2	Flavonoids	Chloroform : Ethyl acetate (60:40)	0.14, 0.18, 0.25,0.28	4	5% $FeCl_3$
		Toluene : Ethyl acetate: Formic acid (50:40:10)	0.66, 0.71, 0.78, 0.81	4	5% $FeCl_3$

Table 5: TLC study of methanolic leaf extract of *Argyreiacymosa*(Roxb.)Sweet Leaf

Sr.No.	Chemical constituents	Solvent system	Rf Values	Total Bands	Spray reagents
1	Alkaloids	Toluene : Acetone : Ethanol : Ammonia Solution (40:40:6:2)	0.10, 0.26, 0.40, 0.43, 0.56, 0.75, 0.87, 0.92.	8	Dragendroff's reagent
		Toluene: Methanol (86:14)	0.22, 0.31, 0.66, 0.75, 0.91	5	Dragendroff's reagent
2	Flavonoids	Chloroform : Ethyl acetate (60:40)	0.14, 0.23, 0.28	3	5% $FeCl_3$
		Toluene : Ethyl acetate: Formic acid (50:40:10)	0.68, 0.73, 0.80, 0.86	4	5% $FeCl_3$

Chemoprofiling justifies the potential ethno-medicinal capacity of *Argyreia cymosa* (Roxb.) Sweet and also revealed the isolation of promising natural compounds for treating various ailments. The quantitative phytochemical analysis showed the presence of significant level of alkaloids, flavonoids, phenolics, tannins and saponins in the plant parts.Chromatographic investigations of crude extract revealed the presence of various types of alkaloids and flavonoids corresponding to preliminary phytochemical screening. The diverse biologically bioactive chemical phytoconstituents obtain in this plant also lend credent to its ethno-medicine and ethno- veterinary uses.

REFERENCES

Ganesan S, Ponnuchamy M, Kesavan L and Selvaraj A, 2009. Floristic composition and Practices on the selected scared groves of Pallapattyvillege (Reserve forest) Tamil Nadu. *Indian journal of traditional Knowledge*, **8**(2):154-162.

Karuppusamy S, 2007. Medicinal plant used by Paliyan tribes of Sirumalai hills of southern India. *Natural product Radiance*, 6(5), p.p.436-442.

Cook T, 1967. *Flora of presidency of Bombay* Volume I & II. Botanical Survey of India

Hooker JD, 1982. *The flora of British India Volume II* published by M/s Bishansingh, Mahendrapalsingh, Deharadun p.p.452-459.

Hooker JD, 1985. *The flora of British India Volume IV* published by L. Reeve& Co. Henrietta street, convent garden 184-191.

Naik VN, 1998. *Flora of Marathwada.*Vol. I & II, Amrut Prakashan, Aurangabad.

Harborne JB, 1998. *Phytochemical Methods*.III[rd]Edn., Chapman & Hall Publication, London.

Mukharjee PK, 2002. *Quality control of herbal drugs: An approach to evaluation of Botanicals*.Business horizon pharmaceuticals Publishers.

Singh NP, Lakshminarasimhan P, Kartikeyan S and Prasanna PV, 2001. *Flora of Maharashtra State.*Vol. II, Botanical Survey of India, Calcutta.

Sadashivan S and Manickam A, 2005. *Biochemical Methods.* 2nd Edn., New Age International (P) Ltd., Publisher, New Delhi.

Southon IW and Buckingham J, 2003. Angewandte chemie international edition in English, 561-562.

Trease GE and Evans WE, 2002. Phamacognosy, 15th Edition, W. B. Saunders Company Limited, London, p.585.

WHO, 2005. WHO Global atlas of traditional, complementary and alternative medicine World Heath Organization Geneva 1&2.

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