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A Comprehensive Review on: Pharmacognostical, Phytochemical and Pharmacological Evaluation of *Argyreia cymosa (Roxb.) Sweet, Limnophila repens (Benth) Benth and Capparis brevispina DC*

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ABSTRACT

Around the world, many laboratories are engaged in screening plants for their pharmacological and toxicological perspective. Keeping the aforementioned details in view, the following plants are chosen for thorough exploration and investigation of their phytochemical and pharmacological attributes. In the present chapter, the author gives a literature study that was performed and also recorded. Plants are frequently utilised in conventional treatment. Preparations for preventive and curative purposes for humans and livestock since ancient times Traditional plants offer a safe, cheap, and reliable alternative to chemical drugs and have been used in many parts of the world Other than wild herbs, cultivated plant spices are frequently employed in traditional treatments. Despite the fact that indoor production (in glasshouses, greenhouses, and poly houses) has gained popularity thanks to contemporary technology, medicinal plants still serve a crucial role in preserving biodiversity in woods, fallow fields, and cultivated lands. Different alternative medicinal systems such as Ayurveda, unani, and siddha have contributed to the accumulation of knowledge of medicinal plants for many centuries. It is documented that Indian traditional medicines use 2500 plant species and about 100 species of plants form regular sources of medicine. It is estimated that natural compounds form the basic ingredient in nearly 50% of medicines currently available on the market. Since the

synthetic preparations of many of these active ingredients in medicinal plants are not currently possible, the market demand for medicinal herbs is likely to remain high.

KEYWORDS: Phytochemical, pharmacological, herbs, biodiversity, Ayurveda.

1. INTRODUCTION

In recent years there has been resurgence in usage of herbal medicine, not only among the traditional medicine users (ethno medicine) but also among the modern consumers of herbal products as nutritional supplements and personal care segments. Therefore, quality acquires greater importance nowadays before regulatory agencies and consumer groups on one hand and increasingly stringent quality norms were required by GMP guidelines of manufactures on the other hand due to continue demand for herbs used for medicinal food and cosmetic purpose should be of high standards, reliable quality and free from contaminants. The government of India set up pharmacopoeial committees for ayurvedic, siddha and unani drugs. The pharmacopoeial laboratory Indian medicine (PLIM) at Ghaziabad was established as the subordinate office of the Ministry of Health and Family Welfare in 1970 to be utilized as drug standardization and testing unit, drug depot, herbarium and reference museum.

1.1. Plant profile of *Argyreia cymosa* (Roxb.) Sweet

Argyreiacymosa (Roxb.) Sweet

Vernacular Names: The plant available in different places India and with different asmentioned below

Telugu:	Maddi tige, Gantapala
Tamil:	Nilanarai
Malayalam:	Nilanarakam
English:	Clustered Woodrose

Scientific classification: According to taxonomy of the this plant scientific classification was given below.

Kingdom	Plantae
Sub-kingdom	Angiosperms
Class	Eudicots
Order	Solanales
Family	Convolvulaceae
Tribe	Ipomoeeae
Genus	Argyreia

Species *cymosa*

Botanical description

Argyreia cymosa belongs to the convolvulaceae family. There are about 1650 incredibly beautiful species in the convolvulaceae family. With over 135 species, the class Argyreia, cymosa is a stray in thickets; its stem is terete, pubescent, and woody, its oblong to cordiform leaves 6-8 X 4-6 cm, chartaceous, minor pubescence on the various sides; its blooms are pinkish in axillary, corymbose cymes; Its natural product is globose and glabrous, measuring 1.7 x 1.4 cm. (Matthew, 1995; Pullaiah, 2000).

Ethanomedical information of *Limnophila repens*

Many species in the genus were widely used as traditional medicine for various diseases for many years and exclusive ethnopharmacological information as follows.

- *Limnophila erecta* a leaf decoction is administered for fevers, and the leaves are used to clean wounds. (Quattrocchi, 2016)
- *Limnophila indica* the whole plants and cooked veggies are used as brain tonic; the juice from the plant is applied topically to cure severe fevers; elephantiasis is treated with liniment, and pustular skin eruptions are treated with the whole plant. An infusion of the leaves is used for skin conditions, stomach diarrhoea, and indigestion and is antiseptic and carminative. (Quattrocchi, 2016).
- The liquid from the cooked *Limnophila rugosa* plant is used as a laxative, stomach tonic, or to treat haemorrhage ulcers (Quattrocchi, 2016).
- The top of the plant, *Limnophila rugosa*, was rubbed on the feet. To treat itchy eyes, use a decoction and steam bath made from the leaves; they are antipyretic. a blend of *Limnophila rugosa* and *Ocimum basilicum L* decoction intoxicated in the face of impotence and mild gonorrhoea (Quattrocchi, 2016).
- Leaf extract from *Limnophila sessiliflora* is used as an antipyretic (Quattrocchi, 2016).
- *Limnophila villosa* leaves are febrifuge, and the whole plant is aperient when applied to inflammation. 2016 (Quattrocchi).

Plant profile of *Argyreia cymosa* (Roxb.) Sweet

Figure.1: *Argyreia cymosa* (Roxb.) Sweet

Table.1 Pharmacological information of *Argyreia cymosa* and other species

pecies	Plant Part	Solvent	Uses	References
Argyreiacymosa	Leaves	Water	Antibacterial activity	Packialakshmi and Beevi, 2014
	Bark	Petroleum ether Ethyl acetate	Antioxidant activity	Badami, et al., 2008
Argyreiaspeciosa	Leaf, roots,and flower	Ethanol	Aphrodisiac activity	Subramoniam, et al.,2007
	Root	Ethanol	Immunomodulatory activity	Gokhale, et al., 2003
	Root	Ethanol and ethyl acetate	Hepatoprotective activity	Habbu, et al., 2008
	Root	N-hexane, chloroform, ethyl acetate, and water	Central nervous system activity	Galani and Patel, 2009
	Stem	Methanol	Hypoglycemic	Latha, et al., 2008
	Whole plant	Water	Nootropic	Hanumanthachar, et al., 2007
	Root	Ethanol	Anti-inflammatory activity	Srivastava, et al., 1972
	Root	Methanol	Analgesic activity	Bachhav et al., 2009
	Leaves	Ethanol	Antibacterial activity	Mishra and Chaturvedi, 1978
	Leaves	Water and ethanol	Nematicidal activity	Praveen, et al.,1990

Phytoconstituents Information of *Argyreiacymosa*

As per litreture survey, till to date, no phyto chemical isolated from *Argyreia cymosa* but many chemical constituents are widelyisolated from the other species of *Argyreia* was illustrated in Table 2

Plant	Compound Name	Part of the Plant	Reference
Argyreia speciosa	Tricontanol, Epifriedelinol acetate, Epifriedelinol and β-sitosterol	Leaves	Sahu and Chakravarti, 1971
	Quercetin and Kaemperol, Kaemperol-3-o-lrhamnopyranoside	Leaves	Sohrab et al., 1992
	Tetradecanypalmitatete,		Rani and Shukla, 1997;
	5, 8 oxidotetracosan-10-one stigma sterolyl, Hydroxycinnmide hydroxycinnamicylyl	Root	Srivastava and Shukla., 1998
	Ergometrine, Ergometrined, Ethyl caffeate, Glutamic acid, Glycine, Isoleucine, Leucine, Lysine, Phenylalanine, Pyrosine, Praline, α-amino butyric acid	Seeds	Agrawal and Rastogi, 1974; Nair, 1987; Jaiswal et a., 1984
	N-triacontanol, βsitosterol, hydroxycinnamic, loctadecanolate, andcaffeic acid	Fruits	Purushothaman et al., 1982
Argyreia nervosa	Pennidavine, Caffeic Acid, Ergoline Alkaloids, Agroclavine, Ergine, Isoergine, Iso-lysergic Acid Amide Racemic chanoclavine- I, Chanoclavine-I, Chanoclavine-II, Festuclavine, Lysergine, Lysergol, Isolysergol, Penniclavine, Steoclavine, Isosetoclavine, Lysergic acid, and Alphahydroxyethylamide	Seeds	Kala, 2005.

1.2 Plant Profile

Botanical Name- *Limnophila repens (Benth.) Benth*

Vernacular names: The plant available in different places India and with different names as mentioned below

Telugu Burada Bakkena

Kannada	Amaragandhi
Sanskrit	Malayalamagandh
Malayalam	Mangannari
English	Marshwoodod

Scientific classification: According to taxonomy of the this plant scientific classificationwas given below

Kingdom	Plante
Subkingdom	Tracheophyta
Class:	Magnoliopsida
Order:	Lamiales
Family:	Plantaginaceae
Genus:	Limnophila
Species:	*repens*

Botanical description

Erect or procumbent flavours with a potent fragrance are *Limnophila repens* (Benth) *Benth* Also known as *Limnophila conferta* Benth. Leaves are 1-2 x 0.4-0.9 cm, elliptic- oval in shape, with a distinctive base, crenate-serrated edge, and an extreme pinnacle. They are also glabrous, penninerved, chartaceous, and subsessile. Axillary, solitary, or short racemes of blooms. C. Calyx Lanceolate, hirsute, and striate at improvement;projections 4 mm long. Violet-pink, infrequently yellow, c. 5 mm over; 6–8 mm long pubescent tube with longitudinal purple stripes at throat and outside. 4. Stamens Shamefully spathulate. 3–4 mm long and elliptical holder (Philcox, 1970). Precise, robust, shaded seeds. July through December is the months for blooming and fruiting. Below are references to around 15 different species of Limnophila (Chetty et al., 2008; Quattrocchi, 2016).

Different species of the genus *Limnophila:* World wide different speies ***Limnophila*** were available in various climatic zones among them some of prominent spices like.

Limnophila dasyantha	*Limnophila aromatica*
Limnophila erecta	*Limnophila bangweolensis*
Limnophila heterophylla	*Limnophila barteri*
Limnophila indica	*Limnophila borealis*

Limnophila rugosa	*Limnophila ceratophyl*
Limnophila sessiliflora	*Limnophila connata*

Ethanomedical information of *Capparis brevispina* DC.

Apart from *Capparis brevispina*, species in the genus were widely used as traditional medicine for various diseases for many years and exclusive ethnopharmacological information as follows

- According to Indian ethnomedical literature, for a very long time, Capparis species have been used in medicine. The Sumerians employed these plants for the first time around 2000 BC (Romeo et al., 2007)

- Extracts of the fruits, flowers, roots and root bark have been shown to be useful asanti-atherosclerosis, hypertension, bacteria, inflammation, analgesia, asthma, highcholesterol, and anti-fungal agents (Chahlia, 2009; Duman, et al., 2013).

- Extracts of caper buds and ripened fruits are also utilised as flavouring agents in the culinary industry (Farrel, 1998).

- The bark is used as homeopathic medicine (Hassan and Mohammed, 2010).

- Capparis species contain significant amounts of minerals, particularly in their floral buds and fruits, which are utilised as vegetables and pickled. The buds and fruit are also high in protein, carbs, lipids, and vitamins (Ozcan, 2005).

- Locals in India and Pakistan think that caper fruits have anti-diabetes properties. Laxative qualities that smoothen. As a result, caper fruits are used in pickles and curry. (Vaidya, 1995; Yadav et al., 1997).

➢ Folk medicine practitioners (known locally as Hakeem) recommend mixing caper fruit powder with sugar to treat rheumatism and diarrhoea in livestock animals (Marwat et al., 2011).

Figure.2 *Limnophila repens* (Benth.) Benth

Table. 3 Pharmacological activities of different species of *Limnophila*

Plant	**Plant Part**	**Solvent**	**Uses**	**References**
Limnophila conferata	Aerial	Ethanol	Anthelmintic activity	Reddy, et al., 1991
			Antimicrobial activity	
			Anti-inflammatory activity	
			Wound healing Activity	
			Anti-tubercular activity	
			Cytotoxicity activity	
Limnophila aromatica	Leaves	Methanol	Antimicrobial activity antioxidantactivity	Nanasombat and Teckchuen, 2009
	Whole Plant	Water	Vascular protective activity	Kukongviriyapan, et al., 2007
Limnophila heterophylla	Whole Plant	Ethanol	Antibacterial and antifungal activity	Padiya, et al., 2013
	Roots	Methanol	Antioxidant activity	Sundararajan and Koduru, 2016
Limnophila geoffrayi	Aerial	Water	Antimicrobial,antifungal, and insecticidal activities	Thongdon and Inprakhon, 2009

Table 4 List of isolated phytoconstituents from various species of *Liminophila*

Plant name	Compound Name	Part of the Plant	References
Limnophila rugosa	5-Hydroxy-6,7,4'-trimethoxyflavone	Aerial parts and roots	Brahmachari, 2008
	5-Hydroxy-7,2',4'-trimethoxyflavone		
	5-Hydroxy-7,8,2',4'-tetramethoxyflavone		
	p-Methoxybenzoic acid		
	Anisaldehyde		
	Valeric acid		
	Methylchavicol		
	Betulin		
	Betulinic acid		
	Linalool		
	Ursolic acid		
Limnophila indica	5,2'-Dihydroxy-8,3',4'-trimethoxyflavone		
	5,7,2',5'Tetramethoxyflavone		
Limnophila heterophylla	Ursolic acid		
	α-Pinene		
	5-Hydroxy-7,8,2',4'-tetramethoxyflavone		
Limnophila conferta	Thymol		

1.3. Plant Profile

Botanical name

***Capparis brevispina* DC.**

Vernacular Names: The plants available in different places India and with differentnames as mentioned below.

Telugu	Arudonda
Tamil	Adaanda, Kattukanji
Malayalam	Chedimukanthi
English	Indian Caper

Scientific classification: According to taxonomy of this plant scientific classificationwas given below.

Kingdom Plantae

Sub-kingdom	Viridiplantae
Class	Magnoliopsida
Order	Brassicales
Family	Cappareceae
Genus	*Capparis*
Species	*brevispina*

Botanical description

Two branchlets and the bush are scruffy. Cataphylls are direct, the leaves are elliptical or elongate, intense, and coriaceous, and the stipular spines are little. Blossoms are axillary, single, and 4-5 cm across. Pedicels are 4 cm long. Sepals are in two whorls. Petals are four, oval, and obviate. Stamens are numerous, applied, and the gynandrophore is as lengthy as or prolonged than the fibres. Anthers are dorsifixed. The ovary is 6 mm in diameter and is ellipsoid.

Different species of the genus *Capparis*: World wide different speies capparis were available in various climatic zones among them some of prominent spices like.

Capparis rofundifolia	*Capparis deciduas*
Capparis pendunculosa	*Capparis aphylla*
Capparis seplara	*Capparis divaricata*
Capparis incanescenes	*Capparis floribunda*
Capparis stylosa	*Capparis grandis*
Capparis zeylanica	*Capparis bisperma*
Capparis horrid.	*Capparis decidua*

From the extensive literature, the survey reveals that there was little scientific work reported on the above-selected plants, but many tribal and village peoples still use these plants as medicine from so many years in their native practice and in the present-day scenario there was a huge demand for herbals and herbal related products because they were as safe and less adverse reaction. In order to provide the scientific evidence, the author selected and carried out a systematic pharmacognostic, phytochemical and pharmacological evaluation of *Argyreia cymosa*, *Limnophila repens* and *Capparis brevispina.*

Ethnobotanical description of *Capparis brevispina* DC

Apart from *Capparis brevispina,* species in the genus were widely used as traditional medicine

for various diseases for many years and exclusive ethnopharmacological information as follows

- According to Indian ethnomedical literature, for a very long time, Capparis species have been used in medicine. The Sumerians employed these plants for the first time around 2000 BC (Romeo et al., 2007)

- Extracts of the fruits, flowers, roots and root bark have been shown to be useful asanti-atherosclerosis, hypertension, bacteria, inflammation, analgesia, asthma, highcholesterol, and anti-fungal agents (Chahlia, 2009; Duman, et al., 2013).

- Extracts of caper buds and ripened fruits are also utilised as flavouring agents in the culinary industry (Farrel, 1998).

- The bark is used as homeopathic medicine (Hassan and Mohammed, 2010).

- Capparis species contain significant amounts of minerals, particularly in their floral buds and fruits, which are utilised as vegetables and pickled. The buds and fruit are also high in protein, carbs, lipids, and vitamins (Ozcan, 2005).

- Locals in India and Pakistan think that caper fruits have anti-diabetes properties. Laxative qualities that smoothen. As a result, caper fruits are used in pickles and curry. (Vaidya, 1995; Yadav et al., 1997).
- Folk medicine practitioners (known locally as Hakeem) recommend mixing caper fruit powder with sugar to treat rheumatism and diarrhoea in livestock animals (Marwat et al., 2011).

Figure3 *Capparis brevispina* DC

Pharmacological information of *Capparis brevispina and other species*

As per the literature survey, a few pharmacological activities were reported on *Liminophila repens* but in the other species variouspharmacological activities were scientifically proven

illustrated in Table 5.

Table 5. Pharmacological information of *Capparis brevispina* DC.

Plant	Plant Part	Solvent	Uses	References
Capparis brevispina DC.	Stem bark	Ethanol	Hepatotoxicity in Wistar rats	Anju et al.,2017
Capparis brevispina DC.	Leaves	Hexane	Antioxidant and cytotoxic	Subramanian and Ramani, 2020
Capparis spinosa	Fruit	Water	Anti-inflammatory activity	Azhary et al., 2017
Capparis spinosa	Areal	Water	Hypolipidemic	Eddouks et al., 2005
Capparis spinosa	Bud	Water	Anti-oxidant activity	Mansour et al., 2006
Capparis decidua	Leaf	Powder	Antidiabetic	Yadav, 1997
Capparis decidua	Stems	Aqueous and methanol	Hepatoprotective activity	Ali, 2009
Capparis decidua	Stem	Acetone	Antibacterial Potential	Gull et al., 2015
Capparis zeylanica Linn.	Leaves	Methanol	Immunostimulant effect	Ghule et al., 2006

Phytochemical constituents information of the *Capparis species*

As per literature survey, till to date, a few phytochemical were isolated from the *Capparis brevespina* but many phytochemicals constituentswere widely isolated from the other species of Capparis illustrated in Table 6.

Plant name	Compound	Part of plant	References
Capparis spinosa	Rutin, quercetin 3-o-glucoside	Aerial	Sharaf et al., 2000
	Quercetin 3-O-glucoside-7-O-rhamnoside		
	Quercetin 3-O-[6‴-α-l-rhamnosyl-6″-β-d-glucosyl]-β-d-glucoside		
	Kaempferol 7-rhamnoside and kaempferol 3-rutinoside,		
	Kaempferol 3,7-dirhamnoside		
	Kaempferol 3-glucoside-7-rhamnoside		
	Kaempferol 3-rhamnoside-7-glucoside		

Capparis species	Quercetin 7-rhamnoside and quercetin 3-rutinoside	Aerial	Tagnaout et al., 2016
	Quercetin 7-rutinoside and quercetin 3,7-dirhamnoside		
	Quercetin 3-glucoside-7-rhamnoside		
Capparis species	Isorhamnetin 3-rutinoside, Isorhamnetin 3,7-dirhamnoside		
	Apigenin 6,8-di-c-glucoside		
Capparis spinosa	6s-Hydroxy-3-oxo-α-ionol glucosides	Fruits	Ihsan et al., 2002
	Corchoionoside c ((6s,9s)-roseoside)		
	Prenyl glucoside		
Capparis spinosa	G –Sitosterol glucoside-6'-octadecanoic	Aerial	Khanfar et al., 2002
	3-Methyl-2-butenyl- g –glucoside		
Capparis moonii	L-Stachydrine and rutin		
Capparis decidua	Fatty acids and ecospinois		
Capparis decidua	Capparisinine		

Conclusion

Plants always played an important role in human life. Some plants become ingrained in people's culture and customs. People in India and other parts of the world have utilized plants as medicine since ancient times. In the current context, the usage of herbs and herbal-related items has expanded due to the severe side effects and adverse occurrences associated with allopathic medicinal medications. A thorough investigation of conventional herbal remedies and a thorough literature analysis indicated that Argyreia cymosa (Roxb.) Sweet, Limnophila repens (Benth.) Benth and Capparis brevispina DC were good sources of therapeutically active plant compounds for the treatment of various de applying this as a rationale; the present work was designed to study the pharmacognostical, Phytochemical and pharmacological activities of selected Indian traditional medicinal plants.

From the findings of the study, it can be concluded that Argyreia cymosa, Limnophila repens and Capparis brevispina contain many medicinally important secondary metabolites in all the extracts. The presence of phytoconstituents in organic extracts was further evidenced by

applying advanced techniques of extraction, qualitative evaluation, TLC profiling and isolation, the plants can be used as a valuable source in the production of phytochemicals.

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