A Review on Caralluma Adscendens: A Potential Medicinal Herb.

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ABSTRACT: *With an adding number of people seeking remedies and health approaches free of synthetic chemicals' side goods, medicinal sauces are moving from the borderline to the mainstream. Over 3000 medicinal shops are officially recognized in India. In India, it is believed that over 6000 businesses sell traditional, folk, and herbal medicines. This composition aims to give a comprehensive review on the phytochemical and pharmacological aspects of Caralluma fimbriata. It's attained from timbers throughout lesser corridor of India, it's extensively used in traditional medicinal system of India has been reported to retainanti-obesity, antioxidant, and anticancer exertion. It's known as a rich source of tannins, flavonoids, phenols, glycosides. Traditional drug uses the Caralluma rubric. The current composition covered the taxonomy of Caralluma into subgenera, the number of species, their distribution in different corridor of the world, and the pharmacological conduct of distinct Caralluma species. The antifungal and anthelmintic exertion of ethyl acetate and n-butanol excerpts from the stem of Caralluma fimbriata through, ascendens, a member of the Asclepiadaceae family, was delved in this work. Antifungal and anthelmintic parcels were delved against Aspergillusniger and Candida albicans, as well as earthworms Pheritimaposthuma. It's discovered in India and is used as a carminative, anthelmintic, anti-diabetic, ant hyperglycemic, appetite suppressant, and other traditional drugs. Carallumaadscendens var. adscendens and Carallumaadscendens var. fimbriata are two comestible species plant in Maharashtra.*

KEYWORDS:
CarallumaAdscendens, Medicinal herbs, Phytochemicals, Pharmacognosy, Pharmacological activities.

INTRODUCTION : Caralluma fimbriata, also known as Carallumaadscendens, is a member of the Asclepiadaceae family. Indian tribes used caralluma, a succulent edible shrub, to satisfy hunger and boost endurance. It's a relative of the succulent plant family that's gaining popularity for its appetite suppressant and weight-loss properties, as well as its ability to lower blood sugar levels. It is classified as a vegetable in The Wealth of India and the Indian Health Ministry's comprehensive compendium on therapeutic plants. The members of the Caralluma genus are plump and erect. They have a quadrangular stalk with no leaves and little dark-colored flowers in a variety of colors. Caralluma species found in India are edible and are used in the country's traditional medical system. (A.D.Russeland Al Harbi etal.1977) In India, C.fimbriata has been used for millennia. In certain parts of India, it is commonly consumed as a vegetable.It can be eaten raw or cooked with spices, and it's also used to make pickles on hunt days. In South India, the cactus is utilized by the labor class to appetite and increase endurance.(Sofawara et al.1993)Interestingly it is estimated that more than 25 percent of the modern medicines are directly or indirectly derived from plants. Assays of bioactivity, identification of probable mechanisms of action, and target sites for active phytomedicinal chemicals have all been part of medicinal plant Pharmacognosy research. The goal of medicinal plant horticultural research has been to increase the potential for optimal growth in cultivation. Plant-based antimicrobials represent a vast untapped genetic reservoir of resistance mechanisms, and greater research and investigation of plants to generate novel medications, synthetic or natural, is needed. Antimicrobials must be present. The ultimate goal of plant antimicrobials is to provide appropriate and efficient origins, which have significant therapeutic potential. Caralluma species found in India are edible and are utilized in traditional medicine in our country. People in Pakistan's semi-arid areas have used Caralluma species as emergency

foods for ages.(Anon P,F Kavanagh et al.2005)

Figure 1.CarallumaAdscendens Var, Fimbriata

a. Plant description:

CarallumaAdscendens is a medicinally important succulent cactus plant. It belongs to theApocynaceae family and is a flowering plant genus. Carallumaadscendens, synonym caralluma fimbriata, was illustrated in 1832. There are 2500 species in 200 genera. Caralluma (family Asclepiadaceae) is a genus of succulent plants with 50 different species. 30–60(–100) cm tall; stem basally up to 2 cm in diameter, concavely 4-angled, at apex tapering to a pointy tip, reddish spotted; tubercles blunt, projecting, spreading horizontally or vertically; latex present. Simple, tiny, and primitive leaves. Flowers 1–2 together, axillary, scattered, bisexual, 5-merous, regular, drooping, with foetidodour; pedicel 1–4 mm long; sepals triangular, 2–3 mm long, acute.(Bader A , Bingtao Li etal.2003)

Synonym: Caralluma fimbriata,
Common Name: Ranshbar, MakedShenguli, ShindalaMakadi,
Vernacular Name: Q Kulleemoofiyan, Kallimudayan (Tamil), Karallamu (Telugu),Yugmaphallottatna (Sanskrit),

Taxonomy	Carallumaadscendens
Domain	Eukaryota
Kingdom	Plantae
Sub kingdom	Viridiplantae
Phylum	Magnoliophyta
Subphylum	Spermatophytina
Infraphylum	Angiospermae
Class	Magnoliopsida
Subclass	Lamiidae
Super order	Gentiananae
Order	Gentianales
Family	Asclepiadaceae
Genus	Caralluma
Specific epithet	adscendens
Variety	Gracilis
Botanical name	Carallumaadscendens var. gracilis

shindalamakadi (Marathi).

Table 1. Taxonomic Classification of Carallumaadscendens.(Bingtao Li etal.2003)

b. Phytochemical composition:

Throughout India, this plant can be found in deciduous and hilly areas. Latex cells commonly contain triterpene-rich latex, as well as Indole alkaloids, Phenanthrene, Indozolidine, Glycosides, Saponin, and Tannins. Several of the members are used in folk medicine in their respective countries. Pregnane glycosides, flavonoid glycosides, flavones, megastigmane glycosides, pregnane steroids, steroidal glycosides, saturated and unsaturated hydrocarbons, aromatic and nonaromatic volatile chemicals, and -sit sterol are some of the substances found in the genus. (Deepak Prashar,D.S.Srivastav et al.1997)

Sr. No.	Phytochemical Constituents	Inference
1	Steroids	Present
2	Anthocynin	Absent
3	Caumarin	Present
4	Protein	Present
5	Amino acid	Absent
6	Carbohydrates	Present
7	Diterpenes	Present
8	Phytosterol	Present
9	Phenol	Absent
10	Flavonoids	Present

11	Tannins	Absent
12	Phobatannin	Absent
13	Cardinal glycosides	Absent
14	Saponins	Present
15	Alkaloids	Present

Table 2. Phytochemical Constituents of CarallumaAdscendens(Deepak Prashar, Kunert O et al.2008)

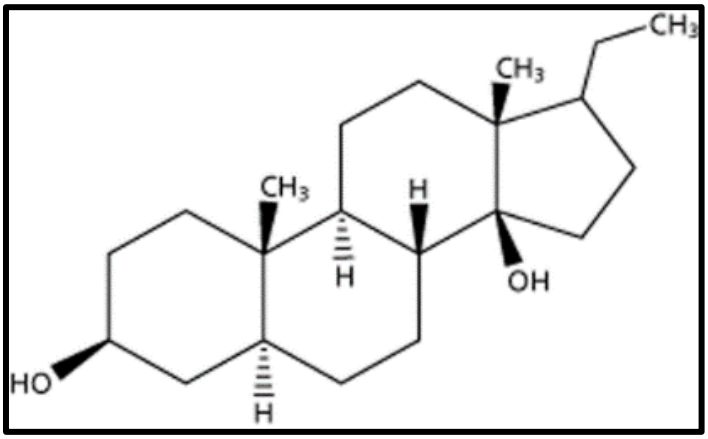


Figure 2.Basic skeleton of Pregnane glycoside (Kunert O et al.2008)

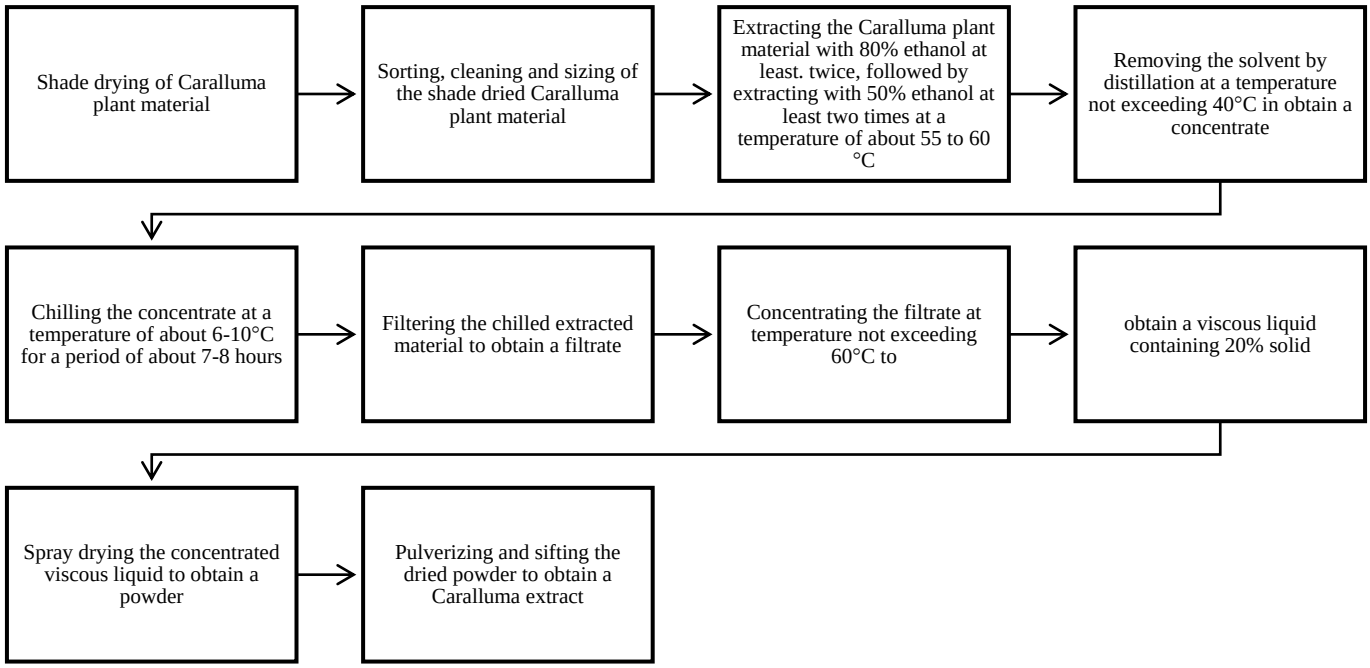
MATERIALS AND METHODS:

Preparation of plant extract of CarallumaAdscendens:

Extraction Method 1:

The entire CarallumaAdscendens plant was cleaned, dried in the shade, and ground to powder in a mechanical grinder. Separately, the required number of powder samples were weighed and transferred to a stoppered flask. This is soaked in ethanol until the powder is completely dissolved. The flask was shaken every hour for the first 6 hours, then set aside for 24 hours before being shaken again. The extracts were then filtered after three days of this process. Vacuum distillation devices were used to collect the extracts and evaporate them to dryness.(Archana R.,DeepakPrashar and Thorat Sheela et.al.2019)

Figure 3.Carallumaadscendens dry extract.



Extraction Method 2:

Extraction process for Carallumaadscendens

Chromatography technique:

Phytochemical analysis of the extracts.

- **Detection by TLC:**

TLC plates were created using a homogeneous silica gel dispersion obtained by combining 40 g of 200 mesh silica gel G in around 85 ml distilled water. The suspension was then poured into a TLC spreader with a thickness of 0.25 mm. Carrier plates of the same thickness (20 cm x 5 cm) were arranged in a row on a template and coated with a single pass of the spreader. These plates were left on the template for air drying until the layer's transparency was lost, then dried at 110°C for 30 minutes and stored in a desiccator. All of the extracts have been prepared.The extracts of toluene, chloroform, ethyl acetate, and n-butanol were spotted on a TLC plate 2 cm from the edge. The chromatogram was created using a variety of solvents and dried at room temperature.UV light at 365 nm was used to see the spots. Methanol Sulphuric acid reagent was then sprinkled on the dried TLC plates.(Rupa Bhattacharya,Trease and Evans et.al.2002)

- **Test for Alkaloids:**

TLC was used to determine whether or not alkaloids were present in all of the extracts. Dragendorff's reagent was employed as the spray solution, and the solvent system was Toluene: ethyl acetate: diethyl amine (70:20:10); Chloroform: diethylamine (90:10). The presence of alkaloids is indicated by a bright yellow precipitate.(Ramesh M, Y.N.Rao et al. 1999)

Pharmacology:

Different forms of caralluma are used to treat rheumatism, diabetes, leprosy, antipyretic and anthelmintic action, tumors, fungal infections, snake bites, scorpion bites, and ant nociceptive activity. In India's traditional medicinal system, antibacterial, antifungal, analgesic, anti-inflammatory, ant mutagenic, hyperpolipidemic, hyperglycemic, antioxidant, antibacterial, and antifungal properties have been proven.(Anon P, Bader A et.al.2005)

a) Ant-obesity activities:

In the DIO rat model, the extract of C. fimbriata (CFE) was evaluated for appetite suppressing and antiobesogenic activities. In this model, the results show that CFE has potent appetite suppressant and antiobesogenic effects in a dose - dependent manner. The feed consumption, body weight, liver weight, fat pad mass, and serum lipid profiles of the rats in our various treatment groups reflected these results. CFE eliminated obesity's hyper-leptinemia and implicit leptin resistance features. The best dose of CFE for avoiding CA diet-induced alterations in body weight, hormones, fat pads, and liver appears to be 50 mg/kg/day. At each probe point, data on kidney and liver function was collected. The cafeteria diet caused slight unfavorable alterations in liver and renal function, which were reduced by CFE in dose-dependent manner and returned to normal at the intermediate dose level.(Lawrence RM ,Choudhary S et al.2004)

b) Anti- inflammatory activity:

The extract of Caralluma fimbriata has been studied for its anti-inflammatory properties. The anti-inflammatory action was tested using the Carageenan induced paw edoema paradigm, which showed that mice treated with the testing drug plus standard indomethacin had considerably less inflammation than those in the carageenan induced inflammatory positive control group. Paw edoema caused by incarrageenanin a dose-dependent way, Carallumafimbriata greatly reduced edoema. On the second hour, the paw volume in normal control group rats was found to be 0.2148 0.0122 ml (Donald P**,**Joshi DR et al.2009)

c) Analgesic activity:

The extract of Caralluma fimbriata is tested for its analgesic properties. The model used to assess analgesic activity was Eddy's hot plate method, which showed that animals treated with Caralluma fimbriata and standard Pentazocin had significantly longer latency periods for jumping and paw licking than control group animals. The maximal analgesic activity of Caralluma fimbriata was measured at 60, 90, and 120 minutes for 100 and 200 mg/kg doses, respectively.(Tambe DA et al.2010)

d) Antibacterial Activity:

C. adscendens, as well as 15 other medicinal plants, were studied for antibacterial properties and physicochemical parameters. The antimicrobial properties of the methanol extract of C. adscendens were evaluated against four pathogenic bacteria, including E. coli, Proteus vulgaris, Klebsiella pneumoniae, and Staphylococcus aureus, and MIC values were determined. C. Adscendens possesses antibacterial activity against K. pneumoniae and S. aureus that is comparable to that of other bacteria. The aqueous and ethanolic extracts of C. adscendens were tested against five bacterial strains (E. coli, P. vulgaris, Pseudomonas aeroginosa, S. aureus, and Salmonella typhi) and found to have antibacterial and antifungal properties.(Gowri S,K.Dash et al.2003)

e) Antifungal activity:

The antifungal activity was tested using the conventional cup-plate method10-12 after the extract was produced with the appropriate solvent system. The activity of Aspergillus Niger and Cladosporium was compared to that of normal miconazole nitrate.(M.Mcown, et al.1999)

f) Antioxidant activity:

C. adscendens var. fimbriata extracts were tested for antioxidant activity or radical scavenging activity against a variety of synthetic and natural free radicals (trolox equivalent antioxidant capacity, ferric reducing antioxidant power, total antioxidant activity, 2,2-diphenyl-1-picrylhydrazyl, OH, and NO). Antioxidant activity was linked to total phenolic and flavonoids. Because of the high flavonoids and total phenol content in methanol and water extracts, theywere found to have higher antioxidant capacity than other extracts. These extracts were suggested as an alternative to synthetic antioxidants in nutraceuticals and food preparations based on their research. Tatiya et al. investigated the antioxidant and hypolipidemic activities of different extracts of C. adscendensRoxb.(MaheshuV,et al.2014)

g) Hypolipidemic activity:

Various animal models were used to investigate the hypolipidemic activity of the aqueous extract of C. Adscendens var. fimbriata in hyperlipidemia rats (caused by triton as well as methimazole). Noorulhuda et al. investigated the in vitro anthelmintic activity of different extracts of C. Adscendens var.fimbriata against Pheretimaposthuma (Annelida) and Ascaridiagalli (nematode), and found that the aqueous extract of C. adscendens var. fimbriata had significant activity when compared to other extracts. Gowri and Chinawaremy found that the ethanol extract of C. Adscendens had significant ant mutagenicity against the tested strains.(TatiyaAU,Thorat Sheela S,et al.2019)

Standardization of CarallumaAdscendens:

a. Determination of ash Content:

10g of each sample was weighed in a silica crucible to assess the ash content. The crucible was first heated over a low flame until all of the material was fully charred, then heated for 3 to 5 hours at 600oC in a muffle furnace. To guarantee that the ash generation was complete, it was cooled in desiccators and weighed. It was also reheated in the furnace for 30 minutes before being cooled and weighed. The process was continued until the weight remained consistent (ash turned white or greyish white). The ash content was determined by the weight of the ash.(Borget,Deepak,Delzar A et.al 2012)

b. Determination of moisture Content:

Fresh sample, materials, and powder sample materials were placed in a flat bottomed dish and stored in an air oven at 60^{oC} for six hours before being weighed to determine moisture content (AOAC, 1990). The weight loss was used to determine the moisture content of the food.(Priya D,R.Jasmine et.al.2015)

c. Determination of plant nutritive values:

Various characteristics were investigated utilizing crushed plant material to determine nutritional values. To evaluate the quantities of ash, moisture, fat, fibre, protein, and carbohydrate, as well as macronutrients and micronutrients. Standardized techniques (Indrayan et al., 2005; Krishnamurthy and P. Sarala 2010) were used. Part I of the Ayurveda Pharmacopoeia of India, published in 1919.(FAO fruit et al.2005)

d. Determination of crude fat:

Crude fat was evaluated by extracting 2 g moisture-free samples in a soxhlet extractor with petroleum ether and heating the flask on a sand–bath for about 6 hours, until a drop of drippings on the filter paper left no oily stain. The leftover petroleum ether was filtered using Whitman No. 40 filter paper after boiling with petroleum ether, and the filtrate was evaporated in a pre-weighed beaker. Crude fat was produced by increasing the weight of the beaker(Priya D et al.2011)

e. Determination of crude protein:

To determine the crude protein, the micro Kjeldahl method was utilized. In a Kjeldahl flask, two grammes of oven-dried material were added to 30 ml conc. H2 SO4, followed by 10 g potassiumsulphate and 1 g copper sulphate. Once the frothing stopped, the fluid was gently heated before being heated more vigorously. The solution was diluted with distilled water and transferred to an 800 mL Kjeldahl flask, washing the digestion flask in the process. Three or four pieces of powdered zinc were added, along with 100 mL of 40% caustic soda, and the flask was attached to the distillation apparatus's splash heads. After that, 25 mL of 0.1 N sulphuric acid was distilled in the receiving flask. It was examined for reaction completion after two–thirds of the liquid had been distilled.(R.D.Vidyarthi et al.1977)

f. Determination of crude fiber:

The estimation of crude fiber was based on treating moisture and fat-free material with 1.25 percent dilute acid, then 1.25 percent alkali, simulating the gastric and intestinal action in the digestive process. Then 200ml of 1.25 percent H2 SO4 was used to treat 2g of moisture and fat-free material.The residue was treated with 1.25 percent NaOH after filtration and washing. It was filtered, then washed with hot water, 1 percent HNO3, and then washed again with hot water. The ash was weighed after the residue was torched. The weight of crude fiber was determined by weight loss.(Sheela,Shikha Srivastav et al.2009)

Sr.No	Parameters	CarallumaAdscendens
1	Moisture Content (%)	95.10
2	Ash Content (%)	15.81
3	Crude Fat (%)	3.90
4	Crude Protein (%)	10.82
5	Crude Fiber (%)	16.82
6	Nutritive Value (cal/100gm)	356.26

Table 3. Parameters CarallumaAdscendens(Priya D,Sheela et al.2004)

CONCLUSION:

The Caralluma genus is a potential source of therapeutic phytochemicals. A thorough review of the literature reveals that just a few species have been investigated for pharmacological activity thus far. Herbal treatments were used exclusively to treat diseases prior to the arrival of modern medications. Around 80% of the world's population still relies on medicinal plants in large rural areas of developing and underdeveloped countries, according to estimates. It is evident that the plant is widely utilized in India's traditional medicinal system, and it has been claimed to have hepatoprotective, anti-inflammatory, anticancer, antioxidant, antifungal, and wound-healing qualities. Caralluma fimbriata is noted for being a high source of tannins, flavonoids, and glycosides, which may be medicinally and nutritionally useful. The current study delves into the phytochemical and nutritional properties of the plant, indicating that it might be used as a food alternative and cultivated on a wide scale.

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