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Ethnobotanical and Pharmacological uses of *Alternanthera Sessilis*

Abhishek Chauhan*, Dr.Arvind negi, Pooja Negi, Vandana pokhriyal.

GRD (PG) IMT, Department of Pharmacognosy, Dehradun-248018, Uttarakhand, India

ABSTRACT

Alternanthera sessilis (L.) R. BR. is an vital medicinal plant and broadly used with inside the remedy of kind of Diseases. The herbs have numerous spreading branches with simple leaves and small white flowers. Present day examine become consequently completed to offer needful ethnobotanical and pharmacological info of the complete plant. According to Ayurveda *A. sessilis* is called as *Mathsyakshi*. The morphological study reveals the leaves are simple, alternate; leaves lamina is rectangular and the bottom is wedge-shaped.The microscopy reveals the dorsiventral type of leaves, with diacytic stomata, covering lower epidermis and presence of calciumoxalate crystals and bunch of spiral vessel ground tissue. The results of the study could be useful in setting some diagnostic indices for the identity and preparation of a monograph of the plant. A. sessilis has anti-microbial, anti-oxidant, antipyretic, nootropic, hepato-protective, hematinic, anti-ulcer, hypoglycemic, anti-diarrhoeal, anti- Inflammatory etc. activities.

Keywords: *Alternanthera sessilis* (L.) R. BR.,Mathsyakshi, Ethnobotanical study.

INTRODUCTION

A.sessilis is known as Matyakshika in Ayurvedic medicine [1]. It has been used in Indian traditional system of medicine since a long time in diseases due to vitiated blood, skin diseases and ulcers [2]. *Alternanthera sessilis* (L.) R. BR. belongs to family *Amaranthaceae*. It is a herbaceous type of plant, much-branched from the root branches 15-50 cm long. Leaves are green simple, alternate in arrangement. Flowers were sessile, white, shining, in small axillary sessile heads. In Ayurveda it is prescribed for the vitiated conditions of kapha and pitta, burning sensation, leprosy, dyspepsia, splenomegaly and fever [3]. In India, five species have been recorded, out of which *Alternanthera sessilis* (L.) R. Br. ex DC and *Alternanthera pungens* Kunth are utilized extensively as raw drug sources worldwide in many traditional systems of medicine.[4] Its active principles, extracted in oil, were

used to treat infected wounds and the herb also proved styptic in colitis; its nutritive values make the herb a potent tonic with a wide range of applications. Its roots can relieve inflamed wounds [5]. The leaves and shoots are boiled and drunk as an antihypertensive remedy [6].The drug is found to be an ingredient of *Rasayana* (Rejuvanation) preparations in *Brihat trayis* (Classical treatise in Ayurveda). It is indicated for the treatment of skin diseases (*Kushtaghna*) and has antimicrobial property (*Krimighna*). Traditional Ayurvedic books in Kerala, refers this plant in the management of many diseases like *Muthrakrichra* (dysuria), *Ashmari* (urinary calculus), *Kamala* (jaundice) and *Vrana* (ulcers).

BOTANICAL DESCRIPTION

Fig 1: *Mathsyakshi Plant*

Botanical Name: *Alternantherasessilis (L.) R.Br.*
Kingdom: *Plantae*
Class: *Magnoliopsida*
Order: *Caryophyllales*
Family: *Amaranthaceae*
Genus: *Alternanthera*
Species: *sessilis (L.)R.Br.*

MORPHOLOGY

Stem of *A. sessilis* is herbaceous, weak, cylindrical, with spreading branches from the base; green in fresh and yellowish-brown to light-brown in lateral. Leaves are sessile, linear-oblong, or ovate, obtuse or sub acute, margins are entire. It has been recorded flowering and fruiting all year in some areas. It having clustered of flowers is carried on distinct peduncles. Flower in small axillary sessile heads, white often tinged with pink, bracteoles about 1 cm long, ovate, scarious. Fruits are Utricle with winged margins, 1.5 mm. long, orbicular, compressed with thickened margins; no characteristic odour and taste; dispersed by both wind and water. Cream to grey, cylindrical, numerous roots arising from the main tap root as lateral rootlets.

Ayurvedic properties [7]

Rasa (Taste) - Madhura(Sweet)Tikta (Bitter) Kashaya(Astringent)

Guna (Property)-Laghu(Light)

Vipaka(Post digestive effect)-Katu(Pungent)

Veerya(Potency)-Sheeta(Cold)

Doshaghnata-Kapha pitta hara (mitigates kapha and pitta)

Table 1: Table showing the organoleptic characters of fresh plant of *Alternanthera sessilis* (Linn.) R.Br

Organoleptic characters	Leaf	Stem	Root
Colour	Greenish or greenish purple	Purplish	Yellowish brown to brow
Feature	Simple, sessile or short petiolate, opposite; 1.3-3.5 cm long	Herbaceous; with distinct nodes and internodes	Numerous rootlets arising from main taproot as lateral rootlets
Shape	Obtuse or sub-acute, tapering towards the base	Cylindrical; occasionally sub quadrangular	Cylindrical
Taste	Bitter- astringent	No characteristic taste	No characteristic taste
Odour	Indistinct	No distinct odour	No distinct odour

CHEMICAL CONSTITUENTS

The plant contains an array of chemical constituents viz β sitosterol, stigmasterol, campesterol, α-spinasterol, oleanic acid,rhamnoside,24-methylene cycloartenol,cycloeucalenol,lupeol,5-α-stigasta-7-enol and its palmalitate,nonacosane,16-hentriacontane, handianol. Oxalic acid, saturated aliphatic hydrocarbon, ester and saturated ester [8]. The hydroethanolic extract of *Alternanthera sessilis* showed 50 prominent peaks in GC-MS analysis. The most post prevailing compounds were identified as 2,4 –dihydroxy-2,5-dimethyl-3(2H)-furan-3-one(8.92%), hexadecanoic acid <n-> (7.21%), 2-1,2,4-trioxolane, 3 phenyl-(5.99%) palmitate <ethyl->(5.65%) and L-glutamic acid (5.04%) [9]. Hydrocarbons, alkanes, esters terpenes, flavonoids, organic compounds, steroids and fatty acids among 13 phyto-constituents isolated by GC-MS analysis [10]. The major compounds of essential oil of flower based on the prominent peaks were 1,1,1, 5,5,5,-hexa methyl-3-3-bis [trimethylsilyl)oxy] trisiloxane(17.76%),trans-4-ethyl-5-octyl-2,2-bis (triflurомethyl)-1,3-dioxolane(11.12%) and tetrahydro-2,5-dimethoxy furan(9.10%). The major components of essential oil of leaves were identified as 1,1,1,5,5,5 –hexamethyl-4-N-pentylthiane(11.27%) didodecylphthalate (10.62%) and tetrahydro-2,5,-dimethoxyfuran (10.01%) by GC-MS analysis [11]. The presence 17 secondary phytochemicals among them 5 compounds possessed bioactive properties [12]. The presence ricinoliec acid in the seed oil [13].The leaves of *A.sessilis*

contained good amounts α-tocopherol and β-tocopherol [14]. A mixure of diasteriomers of new ionone derivatives which showed low anti -microbial activity against pseudomonas aeruginosa and Trichophyton mentagrophytes [15].

PHARMACOLOGICAL ACTIVITIES

Anti-diabetic activity

The anti-diabetic activity of *Alternanthera sessilis* R ethyl acetate fraction (ASEAF) in obese type-2 diabetic rats. The results showed that HOMA indexes of ASEAF treated group were significantly lower than the negative control. While, QUICKI values were significantly higher than the control group suggesting that ASEAF improved the insulin resistance conditions in diabetic rats. The study revealed that the plasma TG level and plasma FFA levels of ASEAF treated rats were decreased by 42.04% and 34.38% respectively. The researchers affirmed that ASEAF possess anti-hyperglycaemic effect, anti triglyceridemic effect and pancreatic protective effect in obese type-2 diabetic rats [16].

Anti-microbial and wound healing activity

Antimicrobial and wound healing activity of the chloroform extract of leaves of *Alternanthera sessilis.* The chloroform and acetone extracts showed maximum zone of inhibition against almost all the organism in cupplate method. The significant MIC value in turbidimetric method was shown by chloroform extract. The chloroform extract of *Alternanthera sessilis* leaves at the dose 200mg/kg body weight p.o showed significant wound healing activity compared to the control in excision wound model, incision wound model and granuloma studies [17].

Anti- asthmatic activity

The anti-asthmatic activity of ethanolic extract of *Alternanthera sessilis* in the dose of 500mg/kg p.o in guinea pigs. It was focussed on the bronchial hyperactivity by histamine aerosol induced bronchospasm in gunea pigs and broncho alveolar lavage fluid studies (BALF) in egg albumin sensitized guinea pigs. The result showed that the ethanolic extract significantly increased the PCT and percentage protein protection and the study on BALF showed increased in the number of TC and DC of leucocytes which suggests anti-inflammatory action. In a nutshell, the leaves of ethanolic extracts of *Alternanthera sessilis* exert anti-inflammatory and anti asthamatic activity [18].

Antipyretic activity

The antipyretic activity of ethanolic extract of *Alternanthera sessilis*.The drug was given at a dose of 200mg/kg and 400mg/kg body weight to different groups of in-bread wister albino rats. The result showed the significant reduction of body temperature in the experimental animals [19].

Anticancer activity

The bioactive extract from *Alternanthera sessilis* and to investigate its cytotoxicity potential against colon cancer cells. The cytotoxicity of *Alternanthera sessilis* plant parts on HT29 and 3T3 cell lines was investigated through MTT assay. The result showed the reduction of MTT by mitochondrial dehydrogenase to purple coloured formazan. HT 29 cell line responded to the cytotoxic effects in a dose dependent and time dependent manner. The extracts exhibited selective cytotoxicity against fibroblast cell 3T3.Clonogenic formation assay reconfirms long term anti-proliferative activity of *Alternanthera sessilis* [20].

Haematinic activity

Haematinic activity was investigated by giving the test drug in four different doses to anaemia induced male and female swiss mice and spraugue dawley rats. The results were compared with the standard drug ferrous sulphate which saved as positive control and H2O is negative control. The result showed that *Alternanthera sessilis* was found to be a potential drug for augmentation of haemoglobin and serum ferritin in Iron deficiency anaemia [21].

Formulations [22]

Aindra rasayana
Nyagrodhadya Ghrita
Dhanwantara Ghrita
Grahani mihira taila
Brihat Grahani mihira taila
Trikantaka ghrita

CONCLUSION

Present study supported the traditional uses of A. sessilis and indicated that the plant can be a Potential source of bioactive molecules. The pharmacological studies support its anti-asthmatic, heamatinic activity, anti-cancerous activity, antipyretic, anti- inflammatory, anti- oxidant, hepato protective and wound healing activity. These data provide a sufficient basis to use it as a drug in human ailments. This review, in this direction, helps the researchers to come up with new thoughts on the plant to investigate its efficacy in other disease.

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