

Pharmacognostic Review Of Medicinal Plant *Aerva lanata*

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Abstract

Recently medicinal plants are used to prepare many medicines. *Aerva lanata* is a medicinal plant used for many purposes. *Aerva lanata* is also known as *knot grass* is prostate herb in family *Amaranthaceae*. It branched and found wild in India. It is a traditional plant in India used for many diseases like anti diuretic, infections, cough, antidote, emollient, skin infections etc... And it has many pharmacological properties like antibacterial, antioxidant, antidiuretic, urolithiasis etc... This review is about the Pharmacognostic study include morphology, microscopy, chemical constituents, pharmacological activity of *Aerva lanata*.

Key words: *Aerva lanata*, *Amaranthaceae*, Diuretic, Urolithiasis,

INTRODUCTION

Aerva lanata (L.) Juss Ex.Schult commonly called as Polphala of *Amaranthaceae* is a perennial shrub which is seen commonly in different waste parts of India. It is also known as *Gorakha Ganga*, belonging to the family *amaranthaceous*, in the genus *Aerva* and the species *lanata*. They are originated in India, Africa, as well as Australia.



It is familiar in the name of *knot grass*. They are branching shrub. It is mainly used for urinary disorder. The plant have different name in different language astmabayda in Sanskrit, gorakbuti in Hindi, cherula in Malayalam, pindi-kura in Telugu.² Other than urinary disorder many pharmacological uses are identified like urolithiasis, diuretic activity, antimicrobial activity etc... It is one of the plant included in dasapushpam, the ten sacred flowers of Kerala.³

Taxonomy

Botanical Name: *Aerva Lanata*

Kingdom: *Plantae*

Class: *Mangoliophyta*

Order: *Caryophyllales*

Family: *Amaranthaceae*

Genus: *Aerva*

Species: *Lanata*³

Cultivation

The cultivation of *Aerva lanata* is by seed propagation. Each plant is planted with the space of 30cm in a row. Sun light is needed for the growth of the plant. These plants are cultivated during september month. First year of cultivation it will flowers.

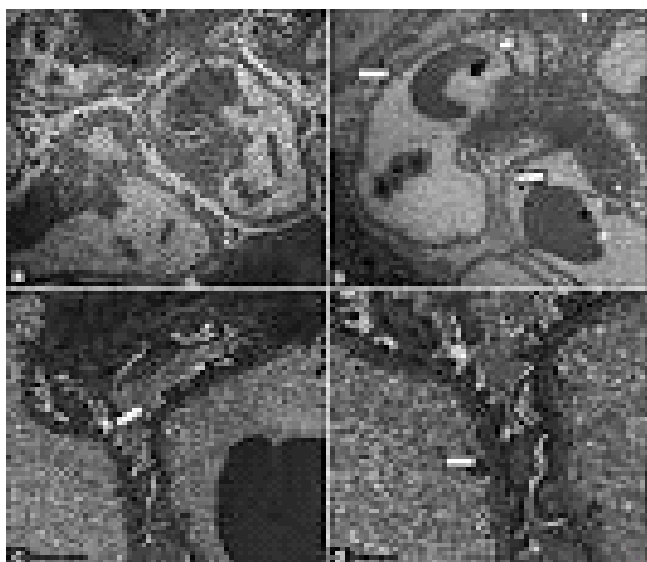
To prevent attacking of foreign substances like microorganism, weed, insect etc... During the cultivation inorganic, organic and synthetic fertilizers are used. Animal waste plant waste (organic fertilizers), cow dung are also used. Peat improve the absorbing properties of the plant other than this have no nutritional value.

Morphology

Aerva lanata is also known as *knot grass* and it is a perennial shrub. These plants are branching shrub, roots are like woody, and flowers are like soft spikes. They flowers in the first year of cultivation. Leaves are oval in shape, they are 0.5-1.5 in length, are alternately arranged. The leaves are present in the main stem. The whitish flowers have two lobes and red bases, grown in leaf axils have 0.1in long, the pink, green, white flowers are also seen. These plants are self pollinated, bisexual and are cultivated in 90 meters above the sea level, and are grown only in tropical climate. The whole plant is useful for many diseases.^{4,5}

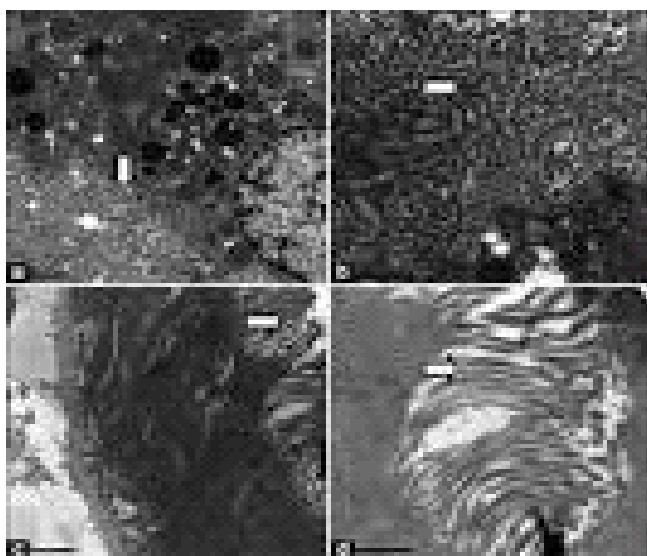
Microscopically Examination

Microscopically examined the *Aerva lanata* it contain outer layer with 2-3 layers of cork cell. They are flattened. Below the cork cell 6-7 layers of parenchymatous cortex cells are present. The vascular bundles i.e; xylem and phloem are seen, the phloem cells are externally present in the parenchymatous cells and the xylem vessels are observed in rows. Protoxylem and metaxylem is also present, protoxylem in the centre and the metaxylem is away from centre. In the microscopy the xylem vessels and pith are seen in the intercellular spaces.^{5,6}



Powder Microscopy

In powder microscopy parenchyma cell, phloem are identified. The cork cells are also present and they are isodiametric.



Chemical Constituents

The plant contains many constituents like alkaloids, arebiological active canthin-6-one alkaloids,¹⁰ methoxy canthin-6-one, beta-D-glucopyranosyloxycanthin-6-one, aervoside, 6-methoxy beta-carboline-1-propionic acid, 6-methoxy beta-carboline, ervolanine and propionic acid. And it also contains sugar, minerals, and saponins.

It contains flavanoid such as kaempferol, quercetin, isohamnetin, galactoside, flavanoneglucoside, persin, persin A and B. The miscellaneous chemical constituents are lupeol acetate, benzoic acid, methyl grevullate, beta-sitosterol acetate, different 24 types of tannic acid and 27 types of terpenoids are present.^{3,4,5,6}

Physiological properties

• Urolithiasis activity

Urolithiasis is the stone formation in the urinary bladder or in urinary tract. It is common in age of 20-40 in both male and female. The suspension used to reduce oxalate synthesizing enzyme. The aerial part of aqueous extract of *Aerva lanata* shows urolithiasis activity. The dose usually 2g/kg. Different *invivo* and *invitro* methods are used. *Invitro* used to study the renal stone formation and prophylactic management and *invivo* used to detect the pathological effect. Calcium oxalate stone is detected by 0.75% of ethylene glycol in water for 28 days. On 29th day for 28 days the suspension of *Aerva lanata* is treated with calcium oxalate rat. At the end of the experiment, found that the *Aerva lanata* suspension will not form free radical and the rat is protected from the renal cell injury.^{7,8}

• Diuretic activity

IN *Aerva lanata* alcoholic extract shows diuretic activity. The alcoholic extract which increases the urine output. The dose range is 800mg/kg⁸

• Acute renal failure

It is the loss of kidney function. The ethanolic extract of *aerva lanata* which is used for kidney failure.⁹

• Antimicrobial activity

The plant which shows antimicrobial activity against different bacteria. The chloroform extract of *Aerva lanata* which shows moderate inhibition against *bacillus subtilis*, *pseudomonas aureginosa* and *Escherichia coli*. The whole plant is responsible for antimicrobial activity.

Method of evaluation: The antimicrobial activity screened by agar well diffusion method using both gram positive and gram negative bacteria. 50ml of nutrient broth was prepared and sterilized for one day, bacterial strain was added on next day the chloroform extract of *Aerva lanata* shows antimicrobial activity against *vibrio mimicus*, *v.alginolyticus*, *v.cholerae* etc...^{8,9}

• Antifertility

The aerial part of the *Aerva lanata* ethanolic extract which shows antifertility activity and anti-implantation. The dose range from 200-400mg/kg.¹⁰

• Antihyperglycemic activity

The leaf extract of *Aerva lanata* shows antihyperglycemic activity. In the dose of 100/200/400mg which reduces the blood sugar level and promotes the blood glucose level.

Method of evaluation: It is identified by three different doses of oral glucose tolerance test in alloxan-induced diabetic mice.⁵

• Antihelminthic activity

The leaf and stem extract show antihelminthic activity. The high dose causes death of the patient.⁸

• Antiulcer activity

The alcoholic extract of stem which shows high antiulcer properties compared with standard drug. The dose range from 250-500mg/kg.¹¹

- **Antidiarrhoeal activity**
The plant which shows antidiarrhoeal properties with its alcoholic extract of dose from 400-800mg/kg. Method of evaluation: antidiarrhoeal activity is determined by mainly three methods, they are charcoal meal test, castor oil induced method, PGE2 induced enterpooling. Albino wistar rats are mainly used for this purpose. The standard drug used in castor oil induced method is loperamide and in charcoal meal test atropin is used.⁸
- **Antineurotoxicity**
The dried aerial part of the plant shows antineurotoxicity. The dose ranges from 250 and 500mg/kg.
- **Hepatoprotective activity**
The hydro alcoholic extract of the plant has hepatoprotective activity against carbon tetrachloride.
- **Antioxidant activity**
Oxidative damage causes chronic diseases. So the leaves of *Aerva lanata* show antioxidant activity. Method of evaluation: It is evaluated by different *in vitro* methods. Aqueous extract of *Aerva lanata* screened for presence of carbohydrates, proteins, fat, saponins etc... 2,2-diphenyl-1-picrylhydrazyl radical scavenging activity, metal chelating activity, reducing powder activity is determined for antioxidant activity.⁸
- **Anti nociceptive effect**
The agents which reduce nociception are known as anti-nociceptive agents. The aerial part of the plant shows anti-nociceptive activity. Method of evaluation: Anti-nociceptive activity of acetic acid is screened by using hot plate test and abdominal writhing test on Swiss albino mice.¹²
- **Anti asthmatic activity**
The aerial part of the ethanolic extract of the *Aerva lanata* plant has anti-asthmatic properties, i.e., which reduce asthma. The dose range is from 30-60mg/kg.
- **Anti inflammatory effect**
The alcoholic extract of the plant which is having anti-inflammatory effect which is tested in the carrageenan induced rat.¹³
- **Hypolipidemic activity**
These agents are used to treat high amounts of fat such as cholesterol etc... so the aqueous suspension of the *Aerva lanata* plant has these activities.
- **Anti tumor and Immunomodulator activity**
Due to cancer, many deaths occur in the world. So *Aerva lanata* is a good medicinal plant used for anti-tumor and immunomodulatory effects. The ethanolic extract of the plant is mainly used for this purpose.^{8,13,14}
- **Analgesic activity**
Analgesic activity means which reduce mild and moderate pain, so the flower extract of the plant is responsible for this activity.¹⁴
- **Anti HIV property**
Root extract of the *Aerva lanata* which is having anti-HIV properties.

- **Anti metastatic activity**
The agent which inhibits the metastatic activity is known as anti-metastatic activity. The ethanolic extract of this plant has anti-metastatic properties.
- **Other Uses**
Aerva lanata is used for cough, headache, and also for throat infection.
It is a vermifuge, i.e., used as an anthelmintic drug.
It has an astringent property.
Used against cholera, gonorrhoea, it is a sexually transmitted disease.
Antidote
Favourable for pregnant women as on 7th month onwards taken will the delivery.
It enhances the delivery.
Counteracting all types of haemorrhages.
Used for diabetes, regulating the blood sugar level.
Used for skin treatment.
Emollients
Encountering bleeding piles.
Antidote helps to counter poison.
Digestion
Wounds
Urinary stone.^{15,16,17}

ADULTERANTS

The adulterant of *Aerva lanata* is *Aerva javanica* Juss...^{19,20} and no of plant such as rhizome of *Bergenia ciliata* Sternb, root of *Didymocarpus benth*^{21,22}

CONCLUSION

The *Aerva lanata* is a perennial plant, it has many medicinal uses, seen wild in India. It contains many chemical constituents like flavanoids, tannins, glycosides, alkaloids like 10-methoxy canthin-6-one, canthin-6-one alkaloids etc... They show antimicrobial properties, urolithiasis, anthelmintic activity, antifertility, antihyperglycemic activity, and they show other various pharmacological activities. It is an important medicinal plant used in various purposes in medicinal preparation and in pharmacy related areas.

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