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Review Article

Ethnobotanical uses and pharmacological activities of *Argyreia cuneata* (Willd.) Ker Gawl. (Convolvulaceae) – A review.

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ABSTRACT

Argyreia cuneata (Willd.) Ker Gawl. is a sub-erect silky shrub and belongs to the family Convolvulaceae. An updated information on ethnobotanical uses and pharmacological activities of *A. cuneata* is presented in this review. The plant finds traditional uses as a remedy for human and veterinary ailments. The plant is used to treat diabetes, helminthic infections, skin cuts, to initiate labor pain and to ease delivery. As an ethnoveterinary practice, the plant is used against retention of fetal membrane, anorexia and swelling of throat. The plant is reported to contain phytochemicals such as alkaloids and flavonoids. The plant is shown to exhibit some pharmacological activities viz. analgesic, antibacterial, antifungal, antioxidant, wound healing, antipyretic, anthelmintic and antidiabetic activities.

Keywords: *Argyreia cuneata* (Willd.) Ker Gawl., Ethnobotanical, Traditional uses, Phytochemistry, Pharmacological activities

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INTRODUCTION

Ethnobotany is the study of interaction between humans and surrounding flora. Since ancient time, plants are helpful to mankind as an important sources of food, medicine, construction tools, spices and dyes. Indigenous practitioners and traditional medicinal systems of various parts of the world utilize various parts of plants in certain formulations for healthcare benefits. Many plant secondary metabolites are being used as therapeutic agents in modern medicinal systems¹⁻⁹. The plant genus *Argyreia* Lour. belongs to the family Convolvulaceae and represents over 125 species distributed worldwide. The genus is taxonomically complex and difficult of the Asian genera of Convolvulaceae. The members of the genus are medicinally important and are large twining or prostrate shrubs that are rarely erect. Leaves are usually silky or pubescent beneath. Flowers are large, in axillary cymes and usually purple, red or rose colored with funnel shaped corolla. Ovary is 2-4 celled. Fruit is a leathery, dry or fleshy indehiscent berry with 4 or less seeds^{10,11,12}.

Argyreia cuneata (Willd.) Ker Gawl. (Figure 1) belonging to the family Convolvulaceae is a suberect silky shrub with showy red flowers. The plant is popularly known by the name Purple morning glory and purple convolvulus in English and Achee gida, Aachari gida, Kallana hambu in Kannada. The plant is found distributed in South India and common across the plains along the hedges. In Karnataka, the plant is found distributed in various localities such as Bangalore, Shivamogga, Chitradurga, Chikmagalur, Hassan, Davanagere, Kodagu and Uttara Kannada¹³⁻¹⁸. The plant is often cultivated in garden due to its showy flowers that draw attention and the leaves are reported to be effective in diabetes¹⁹. The plant is shown to be one of the host plants for tortoise beetles²⁰. The study by Pimpodkar et al.²¹ revealed the potential application of flower extract of *A. cuneata* as natural indicator in acid base titration. In this review, details on various aspects viz. phytochemistry, ethnomedicinal uses and pharmacological activities of *Argyreia cuneata* (Willd.) Ker Gawl., obtained by referring standard flora, journals and search engines (ScienceDirect, PubMed, Google Scholar), is presented.



Figure 1: *Argyreia cuneata*

PLANT DESCRIPTION

A. cuneata is a suberect shrub with a climbing tendency and grows to a height of 1.5m. The leaves are obovate-lanceolate, 4-7 x 2-4 cm, emarginate, broadly cuneate at base, prominently nerved, glabrous above and pale below. Peduncle is 1-2cm with 3 or more flowers. Flowers are bright red and occur in axillary cymes. Sepals ovate, to 0.5cm long. Corolla is funnel shaped, bright red in color and 3-4cm long, tube narrow at base, widening towards tip and lobes spreading. Stamens included, unequal. Ovary is 4-locular and fruit is a 4-seeded, leathery, dry ellipsoid berry with yellow-brown color on ripening^{13,18,19,22}.

PHYTOCHEMISTRY OF *A. CUNEATA*

Alkaloids such as lysergene, chanoclavine, setoclavine, agroclavine, and isosetoclavine are identified in *A. cuneata* using 2-D TLC protocol²³. Quercetin, kaempferol and/or luteolin-glycosides are found in *A. cuneata*²⁴. Phytochemicals such as indole, isoquinoline, pyrrolidine, tropane alkaloids have been detected in the plant²⁵.

Phytochemical groups viz. tannins, steroids, alkaloids, phenolic compounds, flavonoids, glycosides and triterpenoids have been detected in leaves²⁶.

ETHNOBOTANICAL USES OF *A. CUNEATA*

Argyreia cuneata is used traditionally as a remedy against certain human and veterinary ailments. *A. cuneata* is used for the treatment of arthritis, diabetes, bone fracture, scabies. The root extract is administered to initiate labor pain, to ease delivery and to expel placenta. As a veterinary medicine, the extract from leaves is given to cattle in order to treat swelling of throat and anorexia^{15,27}. The leaves are used for treatment of diabetes²⁸. The leaves of *A. cuneata* are pounded with leaves of *Lantana camara* and the paste obtained is used to massage painful joints by Jenukurubas in Karnataka. Paste made from leaves is also applied for curing intermittent fever^{29,30}. More information on ethnomedicinal uses of *A. cuneata* is presented in Table 1.

Table 1: Ethnobotanical uses of *A. cuneata*

| Region/area | Uses | Reference |
|--|---|---|
| Karnataka, India | The tribal communities of Kodagu District use root mixed with lemon juice to expel intestinal worms. The milk extract of leaves in water is taken internally for treating diabetes. | Lingaraju et al. ⁵ |
| Karnataka, India | The leaf juice together with coffee seeds and rice are used in ethnoveterinary practices against retention of fetal membrane in Mallenahalli village of Chikmagalur taluk. | Raveesha and Sudhama ³¹ |
| Tamil Nadu, India | The decoction prepared from leaves is used to manage diabetes by Irula tribes of Tamil Nadu, India. | Dhivya and Kalaichelvi ³² |
| Tamil Nadu, India | Malayali tribe of Tamil Nadu uses the fibre from the leaves for home construction purpose | Prabakaran et al. ³³ |
| Karnataka, India | Leaf paste is applied externally to treat skin cuts in Mysore and Coorg districts. | Kshirsagar and Singh ³⁴ |
| Karnataka, India | The plant is used in the management of diabetes in Hassan district. | Kumar and Shiddamallayya ³⁵ |
| Southern Eastern Ghats, India | The plant is used by ethnic communities to manage diabetes. | Sivaraj et al. ²⁷ |
| Southern western ghats Coimbatore, India | Leaves are used as fodder for goats | Sarvalingam and Rajendran ³⁶ |

PHARMACOLOGICAL ACTIVITIES OF *A. CUNEATA*

Studies have shown that *A. cuneata* exhibit some pharmacological activities such as antidiabetic activity, antimicrobial activity, antioxidant activity, analgesic activity, antipyretic activity and wound healing activity. A brief description on pharmacological potential of *A. cuneata* is described below.

Antidiabetic activity

Ethanol extract of leaves of *A. cuneata* was shown to display significant antidiabetic activity in terms of reduction in the serum glucose level, improving body weight, normalizing the altered lipid profile and increasing the high density lipoprotein and total protein level³⁷. The study of Malathi et al.³⁸ also revealed the antidiabetic potential of methanolic extract of leaves of *A. cuneata* in male Wistar rats induced with diabetes by streptozotocin. Vankudri²⁶ evaluated antidiabetic activity of petroleum ether and alcohol extract of leaves by alloxan induced diabetes in rats. Treatment of animals with extracts revealed considerable reduction in blood sugar level. A reduction in the level of blood urea, total triglycerides, cholesterol and an increase in the body weight was observed.

Analgesic activity

Malathi et al.³⁹ evaluated analgesic potential of *A. cuneata* by hot plate method and heat conduction method. The leaf extract showed a significant dose dependent analgesic potential.

Antipyretic activity

In a study, ethanol-water extract of leaves was shown to display concentration dependent anti-pyretic activity against brewer's yeast induced pyrexia in rats. Extract administration revealed by dose dependent reduction in rectal temperature⁴⁰.

Wound healing activity

Ethanol-water extract of leaves was also shown to display wound healing activity as studied by excision wound model in Wistar rats. The hydroalcoholic extract and leaf juice showed 91.29% and 96.07% wound healing, respectively⁴⁰.

Anthelmintic activity

Jadhav et al.⁴¹ evaluated anthelmintic activity of methanol and aqueous extracts of *A. cuneata* in earthworm model. It was observed that extracts were found to exhibit concentration dependent paralysis and death of earthworms. Methanol extract showed marked anthelmintic potential when compared to aqueous extract.

Antibacterial activity

Kekuda et al.⁴² investigated antibacterial potential of leaf, stem and flower extracts of *A. cuneata* by agar well diffusion method. Extracts displayed varied inhibitory activity against gram positive and gram negative bacteria with marked activity being exhibited by leaf extract followed by flower and stem extracts. Among bacteria, *Bacillus cereus* displayed highest susceptibility to extracts.

Antifungal activity

The leaf, stem and flower extracts of *A. cuneata* were screened for antifungal activity by poisoned food technique. The extracts were effective in causing suppression of mycelial growth of two seed-borne fungi viz. *Bipolaris* sp. and *Aspergillus niger*. Among extracts, marked antifungal activity was shown by leaf extract⁴².

Various extracts, viz. leaf, stem and flower extracts, of *A. cuneata* were effective against seed-borne *Penicillium* species. Inhibitory activity observed was in the order: leaf extract > flower extract > stem extract⁴³.

Antioxidant activity

Kekuda et al.⁴² determined antioxidant activity of methanol extract of leaf, stem and flower of *A. cuneata* by DPPH scavenging, ABTS scavenging and ferric reducing assays. Extracts displayed scavenging and reducing potential in a dose dependent manner. The antioxidant activity of extracts observed was in the order: leaf extract > flower extract > stem extract.

CONCLUSIONS

An extensive literature survey on the plant *A. cuneata* revealed its potential utilization as traditional medicine for treating human and veterinary ailments. Various phytochemicals have been identified in the plant. Pharmacological activities such as wound healing, anthelmintic, analgesic, antipyretic, antimicrobial, antioxidant and antidiabetic activity of the plant are investigated. The results obtained from biological activity determinations justify the traditional utilization of the plant and provide an opportunity for future studies concerning recovery of phytochemicals from the plant which may have some therapeutic significance.

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CONFLICTS OF INTEREST

None declared

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