



International Journal of Pharmacognosy and Chemistry

Open Access

Review Article-

Pharmacological review of achyranthesasperalinn.

Mani Rupesh Kumar, Umakanth BS*, Nikitha M, Hithesh Gowda H S, Anjali Babu, Syed sagheer Ahmed, Bharathi DR, B Ramesh

Department of Pharmacology, Sri Adhichunchanagiri College of Pharmacy, Adichunchanagiri University, B.G.Nagar, Mandya, Karnataka

Article History

Received on: 24-10-2022

Revised on: 09-11-2022

Accepted on: 27-11-2022

Keywords: *Achyranthesasperalinn.*, pharmacological effects, antioxidants.**DOI:**<https://doi.org/10.46796/ijpc.v3i4.365>**Abstract**

India is home to the annual herb *Achyranthesasperalinn.*, which belongs to the *Amaranthaceae* family and is used medicinally. Numerous antioxidants with different pharmacological effects, including alkaloids, terpenoids, saponins, etc., are present in this plant. Additionally, this plant has been used to isolate numerous chemical components using a variety of methods. The treatment of a wide range of human illnesses is made possible by all chemical components and pharmacological qualities. The pharmacological, phytochemical and ethnobotanical uses of *Achyranthesaspera* are fully discussed in this paper. The details provided here regarding *A. aspera* may be useful to researchers conducting additional research.

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***Corresponding Author**

Umakanth BS

Introduction

India produces a high volume of quality medicinal plants and is the world's second-largest exporter. It is considered one of the world's 12 major biodiversity hotspots, with 16 agro-climatic regions and rich diversity of approximately 45,000 plant species, of which 7000 are medicinally used [1]. Herbal knowledge has been passed down from generation to generation for thousands of years. In 1995, Herbal remedies have a solid traditional or conceptual foundation and the potential to be effective pharmaceuticals for treating a variety of ailments due to their safety and efficacy. The World Health Organization has catalogued more than 20,000 species in an effort to catalogue all medical plants used

worldwide [2]. Ayurveda, Siddha and Unani are three forms of Indian traditional medicine that heavily rely on plant-based remedies. Due to their efficacy, safety and affordability, herbal medications have grown in importance and appeal in recent years. In some circumstances, the interaction of medicinal plants with other plants in their habitat affects the therapeutic potential of those plants [3].

Achyranthesaspera (Aa) is a species of plant in the *Amaranthaceae* family. In Kannada, it is referred to as Uttaranee. In India and the South Andaman Islands, it grows as a weed on road sides, field boundaries, and waste spots. It is an upright, annual or perennial herb that is between one and two metres tall. Phytochemical investigations revealed the presence of bioactive compounds like sterols, alkaloids, saponins, saponogenins and cardiac glycosides in leaves. It is used to cure snake bite by administering a mixture of root powder with hot water oral-

ly. Root is also used as tooth brush [4]. Also the plant is used to cure ringworm, head wounds and tonsillitis in east Africa. Although the entire plant is frequently utilised, various plant parts (root, stem, leaf, inflorescence and seed are used individually to treat various ailments [5].

Morphology

The annual herb *Achyranthesaspera* has medical uses all around the world. Leaves are simple 1-3 feet from stem, Stamens are double in shapes, Stomata are anisotropies, embryology is seen, indorse type of anther, many covering structures. Vascular and medullar bundles also founds and cambium.

- **Root** -Cylindrical Shape 1.0cm in diameter. Secondary and tertiary roots are separated into two groups.
- **Leaves** -Elliptical, opposite, glossy, and simple ovate.
- **Flowers** -Green or crimson bracteolate bracteates in the form of spikes.
- **Petals** -Two petals in spikes green or white coloured.
- **Fruits**-Fruits stored in utricle and dry.
- **Seeds** -Smoothed and curved embryo, Aluminous.
- **Androecium** -Five stamens with corolla lobes.
- **Gynoecium** -Ovary is superior and having two syncarpous.



Fig 1
Achyran-

thesAspera Linn.

Taxonomic Classification [5]

- **Kingdom** – Plantae
- **Subkingdom** - Tracheobinota
- **Super Division** – Spermatophyta

- **Division**-Mangoliophyta
- **Class** – Mangoliophsida
- **Subclass** – Caryophyllidae
- **Order** – Caryophyllales
- **Family** – Amaranthaceae
- **Genus** – *Achyranthes*
- **Species** – *aspera*

Common Names [5]

- **Kannada**- Uttharanee
- **Tamil**: Shiru-kadaladi
- **Latin**: *Achyranthesaspera*
- **English**: Red chaff tree, rough chaff tree, and prickly chaff flower.
- **Sanskrit**: Aghata
- **Hindi**: Latjira, Chirchira
- **Gujarati**: Safad,Aghedo
- **Telugu**: Uttaraene
- **Malayalam**: Kadalad
- **Punjabi**: Kutri
- **Unani**: Chirchitaa
- **Ayurvedic**: Apamarga, Chirchitaa, Shikhari, Shaikharika

Phytochemistry

Secondary metabolites found in *Achyranthesaspera* include alkaloids, terpenoids, proteins, tannins, saponins, phenolic compounds, phytosterol, cardiac glycosides, carbohydrates, amino acids, anthraquinones, steroids, reducing sugars, fatty acids, glycoproteins, volatile oil, proanthocyanidins, anthocyanidins, anthocyanins, carotenoids, coumarins, anthracenes and some other constituents are reported and they playing a major role in exhibiting greater bioactivity against various diseased conditions [6].

Pharmacological Properties

Antioxidant activity

NayanManandhar *et al.*, (2021) reported the Study on Phytochemical Profile and Antioxidant activity of *Achyranthesaspera* (Aa) whole plant. In the investigation, the hydroxyl radical scavenging activity of the plant extract was found to be 25.12% (100µg/ml). The hydroxyl radical scavenging activity of different concentrations of ascorbic acid used as the standard antioxidant compound. The extraction of dried plant material was carried out by cold maceration with methanol followed by partitioning with ethyl acetate [7].

Anti inflammatory activity

DerejeNigussie *et al.*, (2021) reported the Anti-inflammatory and wound healing activity of methanol extracts of *Azadirachta indica* A. Juss, *Lawsonia inermis* L and *Achyranthesaspera* (Aa) in *in-vitro* models. Plant

extracts or compounds that inhibit enzymatic inflammatory activities may contain potential drivers or templates for the development of effective anti-inflammatory drugs for the management of lymphoedema. While approximate *Achyranthesasperalinn* (91.7%) activity was recorded [8].

Antidepressant activity

Md. Al-Mahdi Talukdaret et al., (2021) reported the activity of the Evaluation of antidepressant effects of the methanolic extract of *Achyranthesaspera* leaves in Swiss albino mice by using methanolic extract of *Achyranthesasperalinn*. MEAA exhibits an antidepressant effect in mice, according to the force swimming, tail suspension and open field tests. The pattern of effects seen in these studies implies that the noradrenergic or serotonergic neurotransmitter system may be involved in the antidepressant effects [9].

Anticancer activity

NafisehsadatOmodiani et al., (2020) reported the Anticancer potentials of leaf, stem and root extracts of *Achyranthesaspera* (*Aa*). By using acetone extract. The LC-MS analysis of its stem, leaf, roots has revealed the presence of a anticancer compounds reported [10].

Anticonvulsant activity

Dinesh Y. Gawandeet et al.,(2017) reported activity of the Anticonvulsant activity and acute neurotoxic profile of *Achyranthesaspera Linn*. Study was carried out using Swiss Albino mice. By using methanolic root extract of *A. aspera* possesses a significant anticonvulsant effect which might be mediated by GABAergic mechanism [11].

Antidiabetic activity

R. Vijayarajet et al., (2017) Demonstrated the Evaluation of *in vivo* antidiabetic and antioxidant activity of *Achyranthesaspera Linn*. Seeds by streptozotocin induced diabetic rats. By using ethanol in Soxhlet apparatus. In STZ-induced hyperglycemic rats, ethanol extracts of *Achyranthesaspera* demonstrated significant anti-hyperglycemic effects without significantly changing body weight; they can also improve the condition of diabetes mellitus as shown by parameters like body weight, blood glucose, plasma insulin, haemoglobin and lipid profile, as well as enzyme and nonenzymatic activity [12].

Anti-helmenthic activity

Kamal Hasan et al.,(2015) reported the Preliminary Phytochemical Analysis and *In vitro* Anti-helmenthic activity of *Achyranthesaspera* Leaf extract. By using 80% Ethanol. The ethanolic leaf extract of *Achyranthesaspera* showed significant anthelmintic activity. The result of anthelmintic activity of alcoholic leaf extract of *A. aspera*

on earthworms (*Phertimaposthuma*). It was concluded from the study that the extract showed marked anthelmintic activity than the standard drug albendazole. Standard drug albendazole is showing moderate activity [13].

Diuretic Activity

Muhammad Asif et al.,(2014) Demonstrated the Diuretic Activity of *AchyranthesasperaLinn* Crude Aqueous Extract in Albino Rats by using hot water. Dose-dependent increase in the excretion of urinary K⁺ was observed after the IP administration of *Aa.Cr*. The saluretic index values also showed a dose-dependent increase in the excretion of Na⁺ and K⁺ in the urine samples of the treated groups. The study indicates that *Aa.Cr*. Has a strong potential as an ideal diuretic [14].

Hepatoprotective effects

Naveed Khanet et al.,(2014) carried out the Antiobesity, hypolipidemic, antioxidant and hepatoprotective effects of *Achyranthesaspera* seed saponins in high cholesterol fed albino rats. By using extracted with 50 ml of hot water. The hepatic status of rats treated with HCD and also any alteration due to oral administration of saponins from *Achyranthesaspera* for 28 days and then tested their AST and ALT levels. Our findings suggested that the saponins from *Achyranthesaspera* have a modest ability to protect the liver from HCD [15].

Anti-herpes virus activity

HemantaMukherjeeet et al.(2012) reported the activity of the Anti-herpes virus activities of *Achyranthesaspera*: An Indian ethnomedicine and its triterpene acid by using methanolic extract of *Achyranthesaspera* demonstrated that OA and ME of *Achyranthesaspera* prevent the earliest the regulation of some HSV replication stages and the infected host cell's early immunological characteristics and consequently, could be a candidate for the creation of substitute a natural Anti-HSV substance [16].

Antiobesity Activity

Neerja Rani et al.,(2012) studied the Antiobesity Potential of *Achyranthesasperalinn(Aa)*. Seed by using petroleum ether and ethanol extract. Inhibiting pancreatic lipase activity and preventing or delaying lipid absorption activity were both found to be effective in treating obesity, which is brought on by an excessive consumption of calories [17].

Antibacterial activity

M.S.I Khan et al.,(2009) reported the study on Antibacterial activity of *Achyranthesaspera(Aa)* as *invitro* study. by using Chloroform, ethanol, petroleum ether extract of *Achyranthesaspera*. The growth of *B subtilis*, *S lutea* and *K.pneumoniae*. The highest zone of inhibition of chloro-

form extract was found 9.10mm against *B.megaterium*. Among the three extractions, ethanol extract of *A. asperadisplayed* the highest zone of inhibition was 12.17mm against *S.aureus* and 11.7mm against *S.dysenteriae* respectively [18].

Woundhealingactivity

Edwin et al., (2009) investigated the Wound healing activity of *Achyranthesaspera(Aa)* of leaf, by using ethanol and aqueous extracts of leaves of *Achyranthesaspera* were prepared and its wound healing The wound healing activity was studied using two wound models, excision wound model and incision wound model [19].

Antifungal activity

Elumalai et al.,(2009) carried out the antifungal activity of the aqueous ,ethanol, methanol leaves extract of *Achyranthesaspera(Aa)* by Ethanol leaves extract of *Achyranthesaspera Linn*, showed high antifungal activity against *C.kefyr*, *Cryptococcus neoformans*, *Aspergillus niger* and *Aspergillus flavus*. The methanol leaves extracts showed high antifungal activity against *Cryptococcus neoformans* and *Aspergillus flavu*[20].

Antiallergic Activity

S. B. Datiret al.,(2009)reported the evaluation of Antiallergic activity of the various extracts of the aerial part of *Achyranthesaspera var. porphyristachya* extraction by using petroleum ether, chloroform, ethyl acetate and ethanol. Mice pre-treated with petroleum ether, chloroform, ethyl acetate, ethanol and aqueous extract of *A. aspera* have exhibited significant difference in total leukocytes before and after drug treatment. Petroleum ether extract of *A. aspera* has inhibited the milk induced leukocytosis ($p < 0.05$) with dose of 200 mg/kg, (i.p), Mice pretreated with petroleum ether, chloroform, ethyl acetate, ethanol and aqueous extract of *A. aspera* have exhibited significant difference in eosinophil count before and after drug treatment. Petroleum ether extract of *A. aspera* has inhibited the milk induced eosinophilia ($p < 0.05$) with dose of 200 mg/kg, (i.p.) [21].

Antimicrobial activity

P.V. Lakshmi Naiduet al.,(2006) investigated the Antimicrobial activity of *Achyranthesaspera* by using Chloroform extract and methanol extract of *Achyranthesasperalinn* .It reveals that the inhibition zones for *Bacillus subtilis*, *Staphylococcus aureus*, and *Salmonella typhi*were 6 mm in the stem, 8 mm in the inflorescence, and 6 mm in the entire plant, respectively.. Methanol extract showed against *Staphylococcus aureus*, *Salmonella typhi* and *Bacillus subtilis* and zone diameters were 9 mm, 7 mm and 9 mm respectively [22].

Conclusion

In Conclusion According to the review, numerous phytochemical components have been extracted from the plant. Along with other significant medicinal properties, *Achyranthesaspera* shows the Anti inflammatory, Antibacterial activity, Antioxidant activity, Anticancer activity, Antiobesity Activity, Woundhealingactivity, Antifungal activity, Anticonvulsant activity, Antimicrobial activity, Antidepressant activity, Anti-herpes virus activity, Antidiabetic activity,Hepatoprotective effects, Anti-helmenthic activity, Diuretic Activity, Antiallergic Activity.

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