



A brief analysis of a multipurpose medicinal herb Traditional uses, phytochemistry, and pharmacological actions of *Achyranthes aspera*

Dr. Abhishek Suman¹, Shabi Zehra², Mandeep Yadav³, Dr. A. Akila⁴, Aditya Kumar Dash⁵, Meenu Mathew⁶, Bhavik Sharma⁷, Dr. Suhas Ashok Chaudhary⁸, Prof. Dr. R. M. Bagul⁹

¹ Department of Pharmaceutical Chemistry, Government Pharmacy Institute, Bihar Medical Science University, Patna

² Ankerite College of Pharmacy College, Village Parverpurab, Post Mohanlalganj LKo.226301

³ SGT College of Pharmacy, SGT University, Gurugram

⁴ Department of Chemistry, Sri Eshwar College of Engineering, Coimbatore-641202

⁵ Acoustics & Plant Biochemistry Laboratory, PG Department of Botany and Biotechnology, Ravenshaw University, Cuttack, Odisha 753003, India

⁶ PG and Research Department of Botany, St. Peters College, Kolenchery, Kerala

⁷ Department of Pharmacy, Madhav University

⁸ Annasaheb G.D. Bendale Mahila Mahavidyalaya, Jalgaon

⁹ MGSMs D.S.G.P. Arts, Science and Commerce College Chopda Maharashtra, India, PIN 42517

Corresponding Author Details: Dr. Suhas Ashok Chaudhary, Prof. Dr. R. M. Bagul
suhas.achaudhari@gmail.com, drmbagul@gmail.com

Abstract:

The important medicinal plant *Achyranthes aspera* is native to India. The seeds, roots, and shoots are the most important portions of the plant, yet the bulk of its parts are employed in conventional medicinal systems. The most recent article has updated information on its geographic features, pharmacological features, and phytochemical features. In the review article, it is said that plants have a wide range of phytoconstituents with pharmacological effects, such as antiperiodic, diuretic, purgative, laxative, antiasthmatic, hepatoprotective, anti-allergic, and several other relevant medicinal qualities. The crushed plant is used to cure pneumonia, while the infusion of the root is used as a mild astringent in the treatment of constipation. Only a few of the main chemical classes that the plant is said to contain include fatty acids, bisdesmosidic oleanic acid, saponins based on triterpenoids, ecdysterone, oleanic acid, triacontanol, spin sterol, dihydroxy ketones, spathulenol, alkaloids, D-glucuronic, Betaine, and various amino acids. This strong, bitter plant has been used in many medications and is often recommended by conventional medical professionals to treat a variety of diseases. Although almost all of its parts are utilised in conventional medical systems, the seeds, roots, and shoots are the most important parts that are used medicinally and have pharmacological effects. The present article provides in-depth and current knowledge on the morphology, geographic origins, phytochemical composition, and pharmacological properties of the subject.

The medicinal plant *Achyranthes aspera* L. (family: *Amaranthaceae*), which is often discovered as a weed, rises upright and has several branches in tropical and warm regions.

Keywords: *Achyranthes aspera*, Medicinal properties, Pharmacological activities, Latjeera, chemical constituents, Geographical features

INTRODUCTION

Nature is the source of many medicinal plants and many numbers of medicinal drugs are isolated from these plants and natural sources¹. In India many biodiversity are present around 45000 species of lower and higher plants are found in India. From ancient times plants are the major source of medicines in India.² Herbal Drugs plays an Important role in all traditional systems of medicines. Herbal medicine are the mixture of several pharmacological diversity.⁴ ⁵ Many properties of Plants are investigated like antimicrobial properties ,antiseptic properties ,wound healing properties and anti-inflammatory properties etc. are investigated by the researchers.⁶ and many bioactive compounds are present in the plants. Plants consist of many potent biochemical compounds are the components of many phytomedicines. The medicinal constituents of the plant are extracted from every part of the plant like flowers, fruits, roots, shoots, stem, bark and leaves.⁷

According to WHO about 70-80% of world Population is based on the herbal drugs as a home remedies as a source of primary health treatment. Mostly in the case of developing countries the cost of consulting the doctor and treatment is very so the most the population rely on the treatment of herbal medicines.⁹ World Health Organization has made an initiative to identify all the medicinal plants used globally and they found that more than 20000 species and more than 80% of peoples in the world are depend on herbal and traditional system of medicine for primary health care.^{10,11}

There are various chemicals which are derived from the different part of the plants and are the sources of the new drugs.¹² in the modern era the people want to sift with a herbal drugs due to side effects and hypersensitive reactions of the modern drugs.¹³ Indian folk medicines are used in prescription for many therapeutic purpose such as ulcers, snakebite, diarrhea, wounds, inflammation, scabies etc.¹⁴

A medicinal plant is defined as any plant whose one or more part of the plant are used for the therapeutic purpose or which are used for the synthesis for precursors for the direct therapeutic agents. In pharmacopoeia approx. 25% of drugs are derived from the plants and several of them are synthetic analogues based on prototype which are isolated from the plants. Infections are major cause of premature death across the world. So it is required to develop the new antimicrobial drugs which contain novel pharmacological action of mechanism. Many medicinal plants have rich source of antimicrobial agents and used in many countries as a source of potent and powerful drugs.^{15, 16}

In the present era of drug development and discovery of new drug molecules many plant products are evaluated on the basis of their traditional uses. One of the many plants which are being evaluated for their therapeutic efficacies is *Achyranthes aspera* which is commonly known as Latjeera (Hindi) & Rough Chaff tree (English). It is an erect or procumbent, annual

or perennial herb and 1- 2 m in height, often with a woody base, commonly found as a weed of waysides, on roadsides^{15, 16, 17}. Although it has many medicinal properties, it is particularly used spermicidal¹⁸, antipyretic¹⁹ & as a cardiovascular agent²⁰. The ethnic and rural people of India have preserved a significant portion of traditional knowledge on the nearby flora' therapeutic properties. This information is widely utilized to cure common illnesses and disorders and is passed down through generations through oral tradition. Chirchira has played a significant role in Indian culture and traditional medicine. It has been employed in virtually every traditional medical system, including Ayurveda, Unani, and siddha.²⁰

The tribal, rural, and indigenous inhabitants of our nation have used this plant for a variety of ailments since ancient times. Chirchira, also known as *Achyranthes aspera*, is a plant in the Amaranthaceae family that includes the species *A. canescens* R. Br., *A. argentea* Decne, *A. grandifolia* Moz, *A. obovata* Peter, and *A. repens* L. Numerous names, including Chirchira (Hindi), apamarga (Sanskrit), aghedi (Gujarati), apang (Bengali), nayurivi (Tamil), and kalalat, are used in the nation (Malyalam). It is a wasteland plant that grows everywhere. It has been used as a traditional remedy for ages. It has a well-known place as a therapeutic plant in several Indian medical systems. The tribal, rural, and indigenous inhabitants of our nation have used this plant for a variety of ailments since ancient times. It holds a reputed position as medicinal plant used in several Indian medical systems. It is bitter, pungent, warming, laxative, stomachic, carminative, and good for treating vomiting, bronchitis, heart illness, piles, itchy abdominal aches, ascites, dyspepsia, dysentery, blood disorders, etc., according to Ayurveda (Bhandari, 1990; Dwivedi et. al., 2007). The plant has been referenced in texts relating to Chinese and Ayurvedic medicine. Red and white variants are referenced in Ayurveda. This is known as a rough flowered stem in Sanskrit. Purgative, pungent, and digestive, it is indicated in "Nighantas" as a treatment for internal organ inflammation, piles, itch, belly enlargements, and swollen cervical glands. Ash was a key ingredient in Hindu caustic alkaline remedies. Both Indian indigenous and European physicians are familiar with the plant's diuretic qualities. Different plant components are used as ingredients in several traditional medicines, sometimes in conjunction with more potent treatments.²⁰

TAXONOMICAL CLASSIFICATION

- Species *Aspera*²⁰
- Genus *Achyranthes*²⁰
- Family *Amaranthaceae*²⁰
- Order *Caryophyllales*²⁰
- Subclass *Caryophyllidae*²⁰
- Kingdom *Plantae*²⁰
- Subkingdom *Tracheobionta*
- Division *Mangoliophyta*²⁰
- Super Division *Spermatophyta*
- Class *Mangoliopsid*²⁰



(Fig.1 Plant of *Achyranthes aspera*)

GEOGRAPHICAL FEATURES

The Plant *Achyranthes aspera* is mainly found in the topical region of Asia, Africa, America, Australia, Ceylon, Baluchistan etc. countries. In India is mainly found on the road sides, field boundaries, waste places and forests as a weed throughout India up to the altitude of 2100m and also found in south Andaman Islands.^{21, 22}

GEOGRAPHICAL SOURCE

Achyranthes aspera, a stiff, upright annual plant, belongs to the Amaranthaceae family. The branches are 1-2 m tall, trite or completely quadrangular, striate, pubescent, and have thick leaves. The stems are angular, ribbed, and solitary or branching from the base. Different regions of the world have different names for the plant. Chaff-flower, also known as prickly chaff flower, In English, achyranth a feuilles rudes, collant, gendarme Spanish terms include molotillo, rabo de gato, rabo de chango, and rabo de raton. In Arabic, these words are known as Naeem, Noeim, Mahoot, Wazer, Hangod in the Philippines, Kharevazhun in Persian, Atkumah in Arabic, and *Achyranthes aspera* in Latin. Sanskrit names for the term include apamargah, puthkanda, Latjira, Chirchira, Lamchichra, Sonpur, Kutri, Bengali names include Apang, Gujarati names include Safad Aghedo, telugu names include uttaraene, and Chirchitaa, Shikhari, shaikharika in Ayurvedic.²²

Plant *Achyranthes aspera* has been classified in the following order;

Kingdom	:	Plantae ²²
Division	:	Mangoliophyta
Class	:	Mangoliophsida ²²
Order	:	Caryophyllales ²²
Family	:	Amaranthaceae ²²
Genus	:	<i>Achyranthes</i> ²²
Species	:	<i>Aspera</i> ²²

The plant thrives in warmer, tropical climates. It may be found in Baluchistan, Ceylon, Australia, and America, as well as tropical Asian and African nations. It mostly grows as a weed in India along the sides of roads, on unused agricultural area, particularly in

uncultivated lands, and along the edges of farmed fields.. It grows up to an altitude of 2100 m *Achyranthes aspera* is found in South Andaman Islands.^{21 22}

NAMES DESCRIPTION²²

Latin	<i>Achyranthes aspera</i>
Hindi	Latjira
Sanskrit	Aghata
Punjabi	Kutri
Unani	Chirchitaa
Arabian	Atkumah
Gujarati	Safead Aghedo
Telugu	Uttaraene

TRADITIONAL USES

Achyranthes aspera is a plant that has been used traditionally to treat a variety of illnesses, including cough, asthma, and COPD. It has a variety of medicinal benefits, including laxative, purgative, diuretic, antiperiodic, and pungent qualities that are beneficial for skin rashes, boils, piles, dropsy, and oedema.^{21 22} Boiled extract of crushed plant is used in the treatment of pneumonia. In constipation the infusion of roots are used in treatment. The external application of seeds and blooming buds combined with water is employed in the treatment of skin illnesses, night blindness, reptile bites, and poisonous snake bites. When a snake bites a victim, plant roots mixed with water are administered in a paste form till the victim throws up while maintaining their consciousness. To stimulate appetite and cure a variety of gastrointestinal problems, *Achyranthes aspera* and *Smilax ovalifolia* fumes are used. It is also used to cure hemorrhoids. The leaves and seeds are used as emetic, carminatives work to reduce swelling, and they aid in digestion and phlegm expulsion.²³ for the external treatment of ulcers, the plant's ash is used. Crushed leaves were applied to sore backs to relieve strain²⁶. The plant's roots are often used to make toothbrushes. Applying a mixture made from fresh leaves might provide pain alleviation for wasp bites.²³ this plant is beneficial for rheumatism, scabies, and other skin conditions. Additionally, it has calming qualities.

FOLK REMEDIES AND TRADITIONAL USES

The herb is widely used to treat various kinds of ailments. Various traditional uses of the herb are mentioned given below-

- Whole plant is decoction boiled with water for 20-30 min is taken at night shows Diuretic in renal dropsies and general anasarca²³

- Whole plant-Decoction taken two tablespoon three times a day-Beriberi²³
- Whole plant-Decoction boiled with water and taken twice a day-Pneumonia²³
- Whole plant-Infusion in water taken thrice a day-Bronchial infection²³
- Whole plant-Powder with lukewarm water or milk taken twice a day-Blindness in cattle and rheumatism²³
- Whole plant-Ash of plant with honey twice a day-Cough²³
- Whole plant-Juice taken thrice a day- Toothache²³
- Roots- Decoction boiled with water and taken twice a day-Pneumonia²³
- Roots- Two teaspoonful powder taken once at night-Astringent and bowel complaints²³
- Roots- Two teaspoonful powder taken once at night-Stomachic and digestive²³
- Roots- Extraction of roots taken at night-Menstrual disorders²³
- Roots- Powder taken with water daily- Leprosy²³
- Roots- Paste taken with water daily- Antifertility²³
- Roots- Infusion in water taken thrice a day- Mild astringent²³
- Roots- Ashes mixed with water –Cough²³
- Roots- Powder- taken twice a daily Bleeding in delivery²³
- Leaves Juice mixed with opium- taken twice with water Syphilitic sores²³
- Leaves Juice mixed with opium taken twice with water- Gonorrhoea²³
- Leaves Juice taken with water bed time- Bowel complaint, pile, boil, stomach, skin²³
- Leaves Decoction of powdered leaves taken twice day -Early stages of diarrhoea²³
- Leaves- Fresh leaves mixed with jaggery or black peppery and garlic and made pills - taken twice a day²³
- Seeds- Raw seeds taken with water- Expectorants²³
- Seeds- Raw seeds taken thrice a day -Brain Tonic²³
- Seeds- Raw seeds taken twice a day- Bleeding piles²³
- Flowers- Crushed flowers paste taken daily –Menorrhagia²³
- Flowers- Grounded into paste as external use Snakes and reptiles bites²³
- Fruits- Unripe fruits taken thrice daily- Respiratory disease²³

MORPHOLOGY

Achyranthes aspera (Latjeera) is an erect or procumbent, annual or perennial herb of about 12 meter in height, often with a woody base. Stems angular, ribbed, simple or branched from the base, often with tinged purple colour, branches terete or absolutely quadrangular, striate, pubescent, leaves thick [8], 3.8 - 6.3 × 22.5 - 4.5 cm, ovate – elliptic or obovate – rounded, finely and softly pubescent on both sides, entire, petiolate, petiole 6 – 20 mm long, flowers greenish white, numerous in axillary or terminal spikes up to 75 cm long, seeds subcylindric, truncate at the apex, rounded at the base, reddish brown.²⁴

A 0.3–1 meter tall upright plant known as Chirchira has stiff branches that are terete or completely quadrangular, striate, and pubescent. It also has few, often thick leaves that are

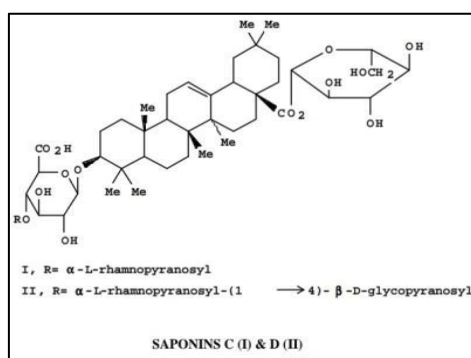
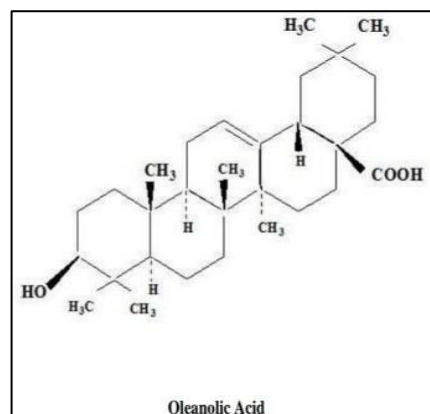
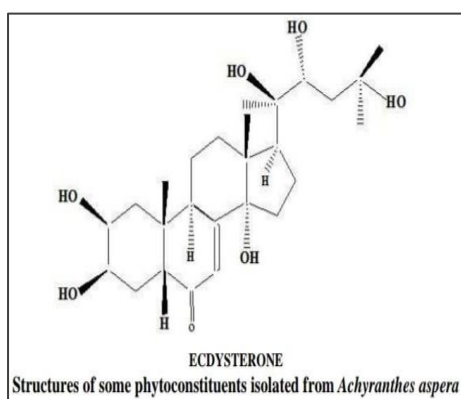
elliptic-obovate, petiolate, acute, and whole. Flowers are many, tiny, thick auxiliary heads or spikes that are greenish white in colour. Bracts and bracteoles are persistent and finish in a spine.²⁵ The main root is long and cylindrically thick; secondary and tertiary roots are present and seem somewhat ribbed and yellowish brown in colour. The stem is yellow brownish, upright branching, cylindrically hairy, and measures around 60 cm high. The sub-cylindrical, rounded-at-the-base, black, and brilliant seeds are truncate at the apex. The plant is found all throughout India, up to an elevation of 3000 feet.²⁶ When Prasad and Bhattacharya (1961) researched the plant pharmacognostically, they found that the stomata index, palisade ratio, vein islet number, and epidermal cell count were all on the average 6.6, 9.2, and 360. When Paliwal et al. (1960) studied the shape and growth of stomata; they discovered that the leaves were amphistomatic. Trichomes were the focus of the studies of Joshi (1931) and Dastur (1935), and the influence of various moon phases on plant development was investigated by Karnick et al. (1976).²⁷ Used in part: entire plant, including the flowers, fruits, seeds, and leaves. *Achyranthes aspera* a stiff, upright annual plant belongs to the Amaranthaceae family. Angled, ribbed, simple or branching from the base, and frequently tinted purple in colour are the characteristics of the stems (1-2 m height) absolute quadrangular or terete, striate, and pubescent and with thick leaves.²⁸

PHYTOCHEMISTRY

- There are many Phytochemicals are present in the plant the major chemical constituents are triterpenoid saponins possessing oleanolic acid as aglycone, vitamin A, B, C and D²⁹
- Other chemical constituents are present in plant are ecdysterone, long alcoholic chain, 17-Penta triacontanol, 16-hydroxyl 26 methyl heptacosan-2one, 27-cyclohexyl heptacosan-7-ol, and 36 47- dihydroxy hen-pentacontanone. It also contains water soluble base and betaine²⁹

CHEMICAL CONSTITUENTS OF ACHYRANTHES ASPERA

- Oleanic acid from seeds³¹
- Saponins A and B³²
- Saponins C and D from unripe fruits³³
- Saponins from alcoholic extract of seeds³⁰
- AA, CHO, protein, Fe, Ca, phosphorous³⁴
- Achyranthine, N-methyl pyrrolidine –3 carboxylic acid³⁵
- Water soluble base, betaine³⁶
- Vitamin C Hasan³⁷
- Ecdysterone³⁸
- Inokosterone ecdysterone³⁸



PHYTOCHEMISTRY

Achyranthes aspera is traditionally valued as a potent medicinal agent. Chemical constituents of various parts of the plant has been isolated and identified.

ROOT

A phytoecdysteroid called 20-Hydroxyecdysone, often known as 20E or ecdysterone, was discovered in a methanolic extract of *Achyranthes aspera* roots.³³ the ethanolic preparations of roots 22 yield an aliphatic acid called n-hexacos-14- enoic acid. Numerous other compounds, including strigmasta-5, 22-dien-3E-ol, trans-13-docasenoic acid, n-hexacosanyl ndecanate, n-hexacos-17-enoic acid, and n-hexacos11- enoic acid, are also extracted from the root. From petroleum ether, phytosterol strigmasta-5, 22-dien-3-E-ol is extracted; benzene (75:25) elutes as a colorless crystalline mass. The Liebermann Burchard test for sterols reveals a good response. Extracts from the roots of *Achyranthes aspera* contain oleanolic acid (0.54%).³⁴

STEM

Dihydroxy ketones-36, 37dihydroxyhenpentacontan-4-one, and Triacontanol, aliphatic alcohol, 17-pentatriacontanol, pentatriacontane, 6-pentatriacontanone, Hexatriacontane, Tritriacontane, tetracontanol-2 (C₄₀H₈₂O), 4methoxyheptatriacont-1-en-10-ol (C₃₃H₇₆O), Esitosterol and spinasterol are isolated from the shoots of the plant .³⁵

Triacontanol was also isolated along with 36, 47dihydroxyhenpentacontan-4-one 21. Two long chain compounds, extracted from the shoots, have been identified as 16-hydroxy-26-methyleheptacosan-2-one and 27-cyclohexylheptacosan-7-ol 28. In the methanol extract of the

aerial parts of *Achyranthes aspera*, Kunert, 2000²⁹ reported the presence of three bisdesmosidic saponins (I-III), 20hydroxyecdysone, and quercetin-3-O-D galactoside. The compounds' structures were determined using NMR spectroscopic analysis, and their full ¹H and ¹³C assignments were obtained using 2D NMR studies. From an ethyl acetate preparation of the stem of *Achyranthes aspera*, 3Acetoxy-6 benzoyloxyapangamide was discovered by Aziz et al. in 2005. With regard to *Bacillus cereus*, the extract has modest antibacterial activity.³⁶

LEAVES

The volatile oil from the leaves of *Achyranthes aspera* contains thirty different chemical components. The main component is hydroquinone (57.7%), while p-benzoquinone, Asarone, spathulenol, nerol, -ionone, and eugenol. The leaves include phenolic chemicals, alkaloids, flavonoids, saponins, tannins, and flavonoids.³⁷

SEED

Triterpenoid Saponins A and B are present in the seeds, according to phytochemical analyses. Unripe fruits have been observed to contain saponins C and D-glucose, L-rhamnose, and D-glucuronic acid are the sugars that make up its carbohydrate content (Saponins A). D-galactopyranosyl ester of D-glucuronic acid is known as saponins B. Additionally; the seeds have a water-soluble base called betaine and an alkaloid called achyranthine, 10-tricosanone, 10-octacosanone, and 4-tritriacontanone. A-L-rhamnopyranosyl (1-4) is one of three oleanolic acid glycosides. (Glucopyranosyl uronic acid) -L-rhamnopyranosyl-(1-4)- (Dglucopyranosyluronic acid), -(1-3)oleanolic acid -(1→3) L- rhamno-pyranosyl(14)-(-D-glucopyranosyluronic acid)-(13)oleanolic acid and -oleanolic acid-28O-D-glucopyranoside Isolated from the seeds is -28-O-D-glucopyranosyl-(1-4)-Dglucopyranoside.^{38,39}

PHARMACOLOGICAL ACTIVITIES

- a. **Wound Healing Activity-** Ethanolic and aqueous extract of *Achyranthes aspera* consists of wound healing activity which was investigated by S.Edwin in 2008. This activity was studied in two modals excision and incision wound models.⁴⁰
- b. **Anti-allergic Activity-** *Achyranthes aspera* consist of wound healing activity the petroleum ether extract of plant have anti allergic activity investigated by S.B. Datir in 2009. The steroids like B-sitosterol , ecdysone and ecdysterone are responsible for activity.⁴¹
- c. **Cardiovascular Activity-** The water soluble alkaloid which was isolated from the extract of *Achyranthes aspera* named **Achyranthine** have activity on the heart if Dogs and Frogs. It decrease blood pressure and Heart rate, dilated blood vessels and increase the rate of respiration.⁴²
- d. **Bronchoprotective Activity-** The ethanolic extract of *Achyranthes aspera* shows the bronchoprotective action in TDI induced occupational asthma in rats it was studied by the scientist B.R. Goyal in 2007. The total and differential leucocytes were counted in Blood and Bronchoalveolar fluid. Liver homogenate was utilized for assessment of oxidative stress and lung histological examination was performed to investigate the inflammatory status

of air way. The rats were treated by *Achyranthes aspera* did not show any abnormality.⁴³

- e. **Diuretic Activity-** Diuretic activity was investigated by the S.S. Gupta in 1972 according to him saponins present in isolated extract of *Achyranthes aspera* shows diuretic activity in adult male rat. Achyranthine 5mg/kg is act as diuretic.³⁴
- f. **Anti-depressant activity-** Methanolic extract of *Achyranthes aspera* leaves shows anti- depressant action on mice and rats using forced swimming test this activity was investigated by C.C. Barua.⁴⁴
- g. **Nephroprotective activity-** Methanolic extract of *Achyranthes aspera* show Nephroprotective activity against lead acetate induced nephrotoxicity in male albino rat. This activity was investigated by T.Jayakumar in 2009.⁴⁵
- h. **Anti-inflammatory Activity-**Alcoholic extract of roots of *Achyranthes aspera* shows anti-inflammatory activity on wistar rats using carrageenan-induced oedema and cotton pellet granuloma test it was studied by S. Vijaya kumar on 2009.⁴⁶
The alcoholic extracts of leaves and seeds show anti-inflammatory activity in rats using carrageenan-induced paw edema method and formalin model⁴⁷
- i. **Hepatoprotective Activity-** The methanolic extract of aerial part of *Achyranthes aspera* shows hepatoprotective activity on toxicity which was induced by rifampicin in albino rats this activity was reported by A.R. Bafna S.H Mishra in 2004. The extract decreases the levels of SGPT, SGOT, ALKP and total bilirubin⁴⁸.
- j. **Hypoglycemic Activity-** M.S. Akhtar & J.K Iqbal in 1991 studied that the aqueous and methanolic extract of powder whole plant shows the Hypoglycemic activity it was seen by normal and diabetic induced in rats after the administration of various doses forms.⁴⁹

MEDICINAL USE OF DIFFERENT PARTS OF ACHYRANTHES ASPERA

In the traditional medical systems of tropical Asian and African nations, *Achyranthes aspera* is a well-known folk remedy. The entire plant as well as its various parts, including the root, seeds, leaves, roots, flowers, and fruits, has been used for medicinal purposes.⁵⁰

WHOLE PLANT:

In alloxan-induced diabetic rats, Mandar et al. (2011)¹⁹ demonstrated the effects of an ethanol extract of the whole plant on a variety of haematological (RBC, WBC count, Hb%, clotting time, O₂ carrying capacity) and biochemical (blood sugar level, lipid profile) parameters. They came to the conclusion that *Achyranthes aspera* has haematinic, hypoglycemic, and antihyperlipidemic activity that can.⁵⁰ Sheep internal parasite *Rhipicephalus microplus* larvae were resistant to the antiparasitic effects of entire plant ethyl acetate extracts (dry leaf, flower, and seed extract). paramphistomum cervi Male albino rats were exposed to lead acetate-induced nephrotoxicity, and the methanolic extract of the whole plant demonstrated nephroprotective action .

Ophthalmia and dysentery are both treated with the plant's juice. Uma and others, 2010 examined the antinociceptive properties of *A. aspera*'s ethanolic extract (EEAA) and sought the phytochemicals that could be behind this activity, as well as potential mechanisms of action. The whole plant's aqueous extract has hepatoprotective properties. By enhancing phagocytic activity, the Hydroalcoholic extract activates the cell-mediated immune system. In experimental rats fed a diet including sesame oil, Krishnakumari and Priya (2006) examined the antihyperlipidemic efficacy of an aqueous extract of *Achyranthes aspera*.

According to Sandhyakumari, et al., 2002 41, an ethanolic extract of *A. aspera* induced male rats to induce reproduction. Extracts from *A. aspera* have antioxidant capabilities and may operate as primary antioxidants, free radical scavengers, or both. Hepatoprotective qualities against chemically caused hepatocellular cancer are demonstrated by the reduction in the hepatic marker.⁵¹ Using larval and adult feeding, Prasad and Pathak (2011) investigated the effects of *Achyranthes aspera* (Ash) on the reproductive fitness of *Drosophila melanogaster*. When toluene diisocyanate (TDI) was used to generate occupational asthma in wistar rats, Goyal et al. (2008) examined the bronchoprotective impact of ethanolic extract. Aside from this overall additionally, the plant is used to cure bronchial infections, blindness, rheumatism, cough, renal dropsy, beriberi, and pneumonia.⁵²

STEM/AERIAL PART

Bhattarai, 1994 noted the rat's receptiveness to the stem bark extract's abortifacient effects. *Bacillus subtilis* and *Staphylococcus aureus* bacterial strain 49 were both inhibited by the ethanolic extract of stem. From an ethyl acetate extract of the stem of *Achyranthes aspera*, 3-Acetoxy-6-benzoyloxyapangamide was obtained by Aziz et al. in 2005. It was discovered that the extract has antibacterial properties against *Bacillus cereus*.⁵³

On rifampicin-induced hepatotoxicity in albino rats, Bafna and Mishra, 2004 50 reported hepatoprotective activity of the methanolic extract of the aerial parts, which reduced levels of serum glutamic pyruvic transaminase (SGPT), serum glutamic oxaloacetic transaminase (SGOT), Alkaline phosphatase (ALP), and total bilirubin. According to Misra et al, 1992, the antifungal action of shoots against *Aspergillus carneus* is caused in large part by 17-pentatriacontanol. Identified substance from the plant 51's shoots' essential oil. Dry stem extracts' in vitro antibacterial activity against dental caries-causing microorganisms was investigated by Patil et al. in 2012.^{52 53}

Escherichia coli was resistant to the antibacterial effects of the stem's ethanol and methanol extract, which also revealed secondary metabolites such flavonoid and glucoside.⁵³ By using chemicals, Shendkar et al. (2012) synthesised activated carbon from the stem of *Achyranthes aspera* (by X-ray fluorescence spectroscopy). Many different uses for activated carbon include gas purification, gold purification, metal extraction, water purification, sewage treatment, air filters, and efficient catalysts.⁵⁴⁻⁷⁹

LEAF

The leaves are used for the treatment of ophthalmic and other eye infections; it also has nephroprotective, post-coital antifertility, nephroprotective and immunomodulatory activities.⁵⁵ Shendkar et al, 2012 showed the presence of total thirteen amino acids in different

mobile phases. Elumalai et al, 2009 2 evaluated antifungal activities from aqueous, ethanol and methanol extracts. The methanolic extract of the leaves showed antifertility activities such as abortifacient, estrogenicity, pituitary weight, ovarian hormone level and lipids profile in female rats, hypoglycaemic effect, analgesic antipyretic and diuretic activities, antidepressant effects and anti-tumor activity.⁵⁶

SEED

The leaves also include nephroprotective, post-coital antifertility, nephroprotective, and immunomodulatory properties that are used to treat ophthalmic and other eye infections. The existence of thirteen amino acids in total was demonstrated by Shendkar et al. (2012) in various mobile phases. Elumalai et al., 2009 2 assessed the antifungal properties of extracts in water, ethanol, and methanol.⁵⁷ The methanolic extract of the leaves demonstrated antifertility effects on female rats, including abortifacient, estrogenicity, pituitary weight, ovarian hormone level, and lipid profile, as well as hypoglycemic, analgesic, antipyretic, and diuretic effects. Antidepressant effects and tumor-fighting capacity.^{58 59}

FLOWER AND FRUIT:

Achyranthes aspera's flowers and fruits are used to treat menorrhagia, respiratory conditions, and snake and reptile bites.⁶⁰

CONCLUSION

Herbs are naturally occurring, pharmacologically active medications that are used to reverse changes brought about by microorganisms, foreign particles, or other bodily functions in the normal physiological system. Every ethnic group has a traditional healthcare system that is ingrained in its culture. Health care seems to be the first and most crucial line of defence in rural areas. The WHO has previously recognised the value of conventional medical practises in multicultural settings. To enhance health and cleanliness using a traditional medical system, it is crucial to have accurate documentation of medicinal plants and to be aware of their potential and pharmacological activity. Therefore, it is important to consider the possibilities of ethnomedical research as they may provide a highly efficient method for identifying valuable pharmacologically active individuals. To identify, catalogue, and record plants in a manner that may effectively and reliably advance the traditional knowledge of herbal medicinal plants, a thorough and systematic research is required. The plant *Chirchira* is utilised to cure a number of disorders, according to the current review. It strikes at every component of the plant and draws attention to it, encouraging scientists to work on the creation of diverse formulations that might eventually be helpful for both people and animals.

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