

A Comprehensive Review on Phytomedicinal Activity of Chirchita (*Achyranthes aspera*): An Indian Rural Medicinal Plant

Mohd. Wasiullah^{1*}, Piyush Yadav², Abhishek Maurya³

Abstract

Because it is used to treat many types of diseases. Native to India, *Achyranthes aspera* (Chirchita) has been used in rural medicine for generations. This review explores the phytomedicinal significance of *Achyranthes aspera*, focusing on its bioactive compounds and the pharmacological activities that support its use in treating various ailments. This plant is a useful tool in traditional and alternative medicine. Because it has anti-inflammatory properties Antioxidants Antibacterial, anticancer and liver protection. The review also highlights the safety, clinical applications, and challenges in incorporating *Achyranthes aspera* into mainstream healthcare. Historically used in traditional systems of medicine like Ayurveda and folk medicine, it has been valued for its broad range of therapeutic effects. This review highlights its phytochemical composition, medicinal properties, and clinical significance. The plant's anti-inflammatory, antioxidant, antibacterial, analgesic, and hepatoprotective properties are attributed to its active ingredients, which include alkaloids, flavonoids, saponins, glycosides, tannins, and phenolic compounds, contributing to its efficacy. Emerging research underscores its potential in managing chronic conditions, such as diabetes, cardiovascular diseases, and neurodegenerative disorders, making it a promising candidate for future pharmacological developments and integrative medicine applications. This traditional use has been confirmed by recent pharmaceutical research. This creates new opportunities for pharmaceutical formulations. This article examines its ethnopharmacology, scientific validation, and the safety profile of *Achyranthes aspera*.

Keywords: *Achyranthes aspera*, Chirchita, phytochemistry, pharmacological activity, traditional medicine

INTRODUCTION

Achyranthes aspera, also known as chirchita, is widely used in traditional medicine systems in India. Southeast Asia and other parts of the world are known for their many medical uses. and belongs to the Amaranthes family. This plant has been used for centuries in Ayurveda, Unani, and Traditional Chinese

Medicine to treat a wide range of ailments, including respiratory disorders, arthritis, gastrointestinal issues, skin infections, and fever [1].

The plant is rich in bioactive compounds, like alkaloids, flavonoids, saponins, and terpenoids, which contribute to its wide range of pharmacological activities. Many traditional uses have been confirmed by contemporary research. which emphasizes the properties of protecting the liver anti-inflammatory Antioxidants antibacterial and anti-diabetes. Despite its long-standing use, there is still a need for more clinical studies to validate its therapeutic potential and ensure its safety and efficacy for widespread use in modern medicine [2].

*Author for Correspondence

Mohd. Wasiullah
E-mail: drwasipharma@gmail.com

¹Principal, Department of Pharmacy, Prasad Institute of Technology, Jaunpur, Uttar Pradesh, India.

²Academic Head, Department of Pharmacy, Prasad Institute of Technology, Jaunpur, Uttar Pradesh, India.

³Scholar, Department of Pharmacy, Prasad Institute of Technology, Jaunpur, Uttar Pradesh, India.

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The review explores the botanical properties, phytochemical composition, pharmacological activities, clinical applications, and the challenges related to the use of *Achyranthes aspera* as a phytomedicine in the contemporary medical landscape [3].

Traditionally, *Achyranthes aspera* has been employed for its medicinal properties to treat a variety of ailments, including respiratory disorders, pain management, skin diseases, digestive problems, fevers, inflammatory conditions, and wounds. Its medicinal uses span across various cultures, with it being a component of Ayurveda, Unani medicine, and traditional Chinese medicine.

Traditional Chinese Medicine (TCM) Botanical Classification

- *Kingdom*: Plantae.
- *Phylum*: Angiosperms.
- *Class*: Eudicots.
- *Order*: Caryophyllales.
- *Family*: Amaranthaceae.
- *Genus*: *Achyranthes*.
- *Species*: *A. aspera*.

The plant is an herbaceous, perennial species that grows up to 1–2 meters tall with spiny stems and opposite leaves. The flowers are in dense clusters, small and green. Its seeds are equipped with spiny hooks, allowing them to attach to animals and spread effectively, contributing to its wide distribution [4]. Roadsides, farms, and areas near populated areas are in disturbed soil where this plant is commonly found (Figure 1).



Figure 1. *Achyranthes aspera* (chirchita).

Botanical Description and Distribution of *Achyranthes aspera*

Botanical Description

Achyranthes aspera, commonly known as Chirchita, Prickly Chaff Flower, or Apamarga, is an herbaceous plant that grows in a wide range of habitats. Classified in the family Amaranthaceae. This includes the genus *Amaranthus* and other plants with related characteristics. This plant is characterized by its spiky architecture, strong growth and unique flowers. A detailed description of the physical and plant characteristics is provided below [5].

Growth Habit

Achyranthes aspera is an annual or perennial herb that can grow up to 1–2 meters (3–6 feet) in height, although it is often found growing as a small shrub in many regions.

The plant is erect and often appears as a bushy shrub, with a branching structure that can spread widely. Its stems are erect with a woody base in mature plants, and they are often covered with fine hairs or spines.

The plant's branches are angular, and the stems have a characteristic rough texture, particularly at the nodes where leaves and branches emerge [6].

Leaves

The leaves of *Achyranthes aspera* are opposite, ovate or lanceolate, with entire or slightly serrated edges.

The leaves have prominent veins, with the upper surface being dark green and the lower surface light green or greyish.

They are typically about 5–10 cm in length and 3–6 cm in width, depending on the growing conditions [7].

Flowers

Achyranthes aspera produces small, greenish flowers that are unattractive in terms of color but are arranged in dense, cylindrical spikes.

Flowers usually have both male and female reproductive organs hermaphrodite. They are wind-pollinated due to the lack of strong floral attractants like color or scent.

Flowering occurs in the rainy season (monsoon) in tropical climates, with the plant blooming primarily in summer to fall [8].

Fruits and Seeds

The plant produces small, hard, spiny fruits known as achenes. These fruits are covered with hooks that allow them to attach to animals or human clothing, aiding in seed dispersal.

Seeds are brownish and angular, typically about 2–3 mm in length. The spiny nature of the seeds helps them adhere to animals and clothing, further promoting their spread [9].

Roots

The root system of *Achyranthes aspera* is fibrous, and it forms a deep taproot. The roots are used in traditional medicine for various ailments, particularly for their anti-inflammatory and analgesic properties.

The roots of *Achyranthes aspera* contain various bioactive compounds, including alkaloids, saponins, and flavonoids, which contribute to its medicinal effects [10].

Color and Texture

The plant has a rough, hairy texture throughout, with some parts of the stem and leaves covered in fine spines or hairs, giving the plant a prickly appearance. This feature has earned it the name “prickly chaff flower.”

The flowers and seeds are relatively inconspicuous, with the most noticeable features being the dense spikes that form at the ends of the branches [11].

Habitat and Distribution

Achyranthes aspera is a wide-ranging plant species that thrives in a variety of environments, from tropical to subtropical and even temperate regions. It is found in areas that are often disturbed by human activity, making it a pioneer species in agricultural fields, roadside habitats, and waste areas [12]. Below is a detailed look at its distribution:

Geographical Distribution

Native Regions

Achyranthes aspera is native to India and Southeast Asia, but it has spread widely across the tropics and subtropical regions of the world.

Found in Bangladesh, Nepal, Pakistan, China, India and Sri Lanka. In addition to its native regions,

Achyranthes aspera has spread to Africa, South America, and Caribbean islands, often through human-mediated transport due to its spiny seeds that hitch rides on clothing, livestock, and vehicles.

In some regions, such as Africa and South America, the plant is considered an invasive species, rapidly colonizing areas disturbed by human activity [13].

Climate Preferences

Although found in warm areas but the plant is most successful in tropical and subtropical climates. It is well-suited to environments with seasonal rainfall and prefers warm temperatures.

Often found in areas with monsoons or seasonal rain. and grows in environments with medium to high humidity. *Achyranthes aspera* is typically found at lower altitudes, though it can also grow at higher elevations in some tropical and subtropical zones [14].

Soil and Growth Conditions

Achyranthes aspera is a pioneer species, thriving in disturbed soils, roadways, agricultural fields, cultivated lands, and wastelands.

It grows well in well-drained soils, including loamy, sandy, and clayey soils, and is adaptable to a variety of soil types [15].

The plant is drought-resistant and can tolerate dry conditions, although it flourishes best in areas with adequate rainfall or irrigation.

It is easily propagated through seeds, and because of its resilient nature, it can thrive in degraded and poor soils, often outcompeting other plants in these environments [16].

Ecological Role

The ecological role of *Achyranthes aspera* is important in the areas where it is found. Acting as a breed promoter helping to stabilize soil in disturbed areas and prevent erosion by forming a dense ground cover.

It also adds nitrogen to the soil. This helps nearby plants grow and improves soil health [17].

Cultivation and Harvesting

While *Achyranthes aspera* is found growing wild in many regions, it is also cultivated in some areas for medicinal purposes, particularly in India and parts of Southeast Asia. The plant is typically harvested for its roots, leaves, and seeds.

The plant is easy to cultivate, requiring little maintenance. It is often grown in home gardens or medicinal herb farms for local use in herbal medicines (Figure 2).



Figure 2. *Achyranthes aspera* (chirchita) seed.

Conservation Status

Despite its wide distribution and abundant growth in many regions, *Achyranthes aspera* is not considered endangered. However, the uncontrolled harvesting of wild populations for medicinal use may lead to local depletion in certain areas.

Sustainable harvesting and cultivation practices are recommended to ensure that the plant remains readily available for medicinal use and does not suffer from over-exploitation [18].

Phytochemical Constituents of *Achyranthes aspera*

The medicinal efficacy of *Achyranthes aspera* is due to the large array of bioactive compounds found in its roots, leaves, stems, and seeds. These compounds include:

- **Alkaloids:** The primary alkaloid, achyranthine, possesses significant anti-inflammatory, antibacterial, and analgesic effects. Several other alkaloids include cucurbitacin and saponins. It also helps control blood sugar levels and lower cholesterol.
- **Flavonoids:** These compounds include quercetin, kaempferol, and rutin, all of which exhibit antioxidant and anti-inflammatory activities. Its ability to destroy free radicals has been extensively researched as a means of protecting against cancer and cardiovascular disorders caused by oxidative stress.
- **Saponins:** Known for their anti-inflammatory, immunomodulatory, and hypoglycemic properties, saponins play a pivotal role in lowering blood sugar and boosting immune system responses. Saponins also help lower cholesterol by binding to fats in the digestive system.
- **Tannins:** These polyphenolic compounds are essential for their antimicrobial and astringent properties. They help in wound healing, treating gastrointestinal infections, and combating diarrhea.
- **Terpenoids:** β -sitosterol and stigmasterol are the two key terpenoids identified in *Achyranthes aspera*, and both exhibit anti-inflammatory, analgesic, and hepatoprotective effects. These substances also help prevent cancer by preventing tumor formation and cell proliferation.
- **Glycosides:** Some glycosides present in the plant are known to have cardioprotective effects, which help improve heart health, circulation, and blood pressure regulation.

The synergistic action of these phytochemicals enhances the plant's therapeutic efficacy in treating a broad range of ailments (Figure 3).



Figure 3. Plant extract of *Achyranthes aspera* (Chirchita).

Traditional Medicinal Uses of *Achyranthes aspera* (Chirchita)

In traditional medicine, *Achyranthes aspera*, also known as chirchita, has long been used, especially in Africa Southeast Asia and India. It has been valued for its diverse medicinal properties in systems, such as Ayurveda, Unani medicine, and Traditional Chinese Medicine (TCM). Below are the key traditional medicinal uses:

- **Respiratory Disorders:** In Ayurveda and Unani medicine, *Achyranthes aspera* is widely used to treat respiratory conditions like asthma, bronchitis, cough, and wheezing. It is believed to help open the airways due to its bronchodilating and anti-inflammatory properties.
- **Pain and Inflammation:** The plant has significant analgesic and anti-inflammatory properties. Infusions or pastes made from the leaves or roots are applied to relieve joint pain, arthritis, muscle pain, and swelling.

It Is Applied Topically to Hemorrhoids, Inflammation, and Painful Swelling

- **Fever and Malaria:** *Achyranthes aspera* has been traditionally used as an antipyretic to treat fevers. In some areas, it is used as a treatment for malaria and other fevers.
- **Wound Healing:** The leaves and stems are applied topically to wounds, cuts, and burns for their antibacterial and healing properties. The plant is also used in treating skin infections and abscesses.
- **Digestive Disorders:** *Achyranthes aspera* is used as a digestive aid to treat conditions like dyspepsia, constipation, and gastritis. It is believed to promote digestion and relieve bloating and stomach discomfort. The seeds and roots are used to manage intestinal parasites.
- **Diabetes:** The plant is considered beneficial in controlling blood sugar levels and is used in traditional medicine as an anti-diabetic remedy.
- **Urinary Disorders:** In Unani medicine, *Achyranthes aspera* is used to treat dysuria, urinary tract infections (UTIs), and edema due to its diuretic effects.
- **Anti-inflammatory and Antioxidant:** The plant is considered to balance the Vata and Kapha doshas in Ayurveda and is used to reduce inflammation in conditions, such as rheumatism and arthritis.
- **Menstrual Disorders:** It has been used in treating menstrual irregularities, dysmenorrhea (painful menstruation), and postpartum care in various traditional systems [19].

Pharmacological and Phytomedicinal Activities of *Achyranthes aspera* (Chirchita)

Achyranthes aspera (Chirchita) exhibits a wide range of pharmacological and phytomedicinal activities that have been validated by modern scientific research. These activities support its traditional use in herbal medicine for various health conditions. Some of the key pharmacological and phytomedicinal properties include.

Anti-inflammatory Activity

Achyranthes aspera shows significant anti-inflammatory effects, primarily due to the presence of bioactive compounds like saponins, flavonoids, and alkaloids. These substances reduce pain, inflammation, and swelling in diseases, such as rheumatoid arthritis, arthritis, and stomach ulcers.

Antioxidant Activity

The plant's abundant flavonoid and phenolic chemicals are known for their antioxidant properties. These substances reduce oxidative stress. Helps fight free radicals and can prevent chronic conditions, such as diabetes, cancer, and heart disease.

Antimicrobial Properties

Due to its antibacterial and antifungal properties, *Achyranthes aspera* can be used to treat urinary tract infections (UTIs), skin conditions, and wound infections. Plant extracts inhibit the growth of harmful bacteria and fungi, such as *Candida* species, *Escherichia coli* and *Staphylococcus aureus*.

Antidiabetic Activity

Studies have shown that *Achyranthes aspera* has anti-diabetic properties. It helps in lowering blood glucose levels, likely due to the presence of bioactive compounds that enhance insulin sensitivity and reduce insulin resistance. It has been traditionally used in managing diabetes mellitus.

Analgesic Effects

The plant exhibits analgesic (pain-relieving) effects, often used in treating conditions like headache, muscle pain, and joint pain. It works by inhibiting pain-signaling pathways, possibly via the opioid receptors or by reducing inflammation at the site of pain.

Anticancer Potential

Preliminary studies have suggested that extracts of *Achyranthes aspera* may possess anticancer properties. Many types of cancer cells Especially cells related to lung and breast cancer. May be affected by cytotoxic effects. Cell cycle regulation and induction of apoptosis are believed to mediate these effects.

Hepatoprotective Effects

The plant is believed to have hepatoprotective effects, helping to protect the liver from damage due to toxins or diseases. It may promote liver regeneration and detoxification processes.

Cardioprotective Activity

Achyranthes aspera shows potential for cardioprotective effects by improving blood circulation, reducing blood pressure, and possibly preventing atherosclerosis. This activity may be attributed to its anti-inflammatory, antioxidant, and diuretic properties.

Anti-anxiety and Sedative Effects

The plant has been used traditionally to alleviate symptoms of stress and anxiety. Certain compounds in the plant have shown sedative effects, helping in the management of nervous disorders and improving sleep.

Diuretic Activity

Achyranthes aspera exhibits diuretic effects, helping to promote urine production, thus supporting the kidneys and aiding in the management of edema and high blood pressure [20].

Cultivation of *Achyranthes aspera* (Chirchita)

Achyranthes aspera (Chirchita) is a hardy, fast-growing plant that thrives in a wide range of environments, making it relatively easy to cultivate. Here are the main features in detail

Cultivation

Climate and Soil Requirements

- **Climate:** *Achyranthes aspera* is a tropical and subtropical plant, but it can also grow in temperate regions. It prefers warm temperatures, typically between 25–35°C (77–95°F), and is best suited for areas with moderate to high humidity. The plant can tolerate seasonal rainfall and is commonly found in regions with monsoon rainfall patterns.
- **Soil:** The plant can grow in different types of soil, such as clay, sand, and loam, although it can survive in poor soil. But it grows best in well-drained soil. *Achyranthes aspera* is also tolerant of slightly alkaline and acidic soils, with an optimal pH range of 6.0 to 7.5. It prefers loose, fertile soil with good moisture retention.

Propagation

Cuttings or seeds can be used to propagate *Achyranthes aspera*, however, due to its high germination and easy storage. Seeds are therefore the most commonly used propagation strategy.

Seed Propagation

Harvest the seeds when the plant's thorny fruit has grown brown and begun to dry. However, germination can be improved by soaking seeds in water for a day before planting. However, seed treatment is generally not required.

It is best to plant seeds in prepared soil with adequate drainage. Planting depth should be between one and two centimeters.

Seeds should be sown at the beginning of the rainy season to provide sufficient moisture for good plant growth.

Cuttings

Cuttings can be taken from mature, strong plants. Although this method is rarely used. To promote root development These cuttings, which are generally 10 to 15 cm long, should be planted in moist, fertile soil. Keep the cuttings in the shade and water frequently until the roots grow.

Planting and Spacing

- *Spacing*: If growing *Achyranthes aspera* in a garden or farm, it is essential to maintain adequate spacing between the plants to allow for proper air circulation and growth. Typically, a spacing of about 30–50 cm between plants is recommended.
- *Rows*: In field cultivation, the plants are often grown in rows. Rows should be spaced about 50–75 cm apart to allow the plants to spread and grow without overcrowding.

Watering and Irrigation

Achyranthes aspera needs to be watered regularly, especially during the germination and early stages of development. This is because the plant does not tolerate flooding and adapts to wet soil. Adequate drainage is therefore important.

During the dry season, more watering may be needed to maintain constant humidity. Once planted, it can tolerate drought well.

Fertilization

Achyranthes aspera does not require much fertilizer and requires less care, however growth can be boosted by using a balanced compost or organic fertilizer early in the growing season.

Periodic use of nitrogen, phosphorus and potassium. against poor soil, can improve plant growth and healing properties.

Pest and Disease Management

Although *Achyranthes aspera* is generally resistant to insect pests, but mealybugs, caterpillars, aphids and other pests, it can cause problems sometimes. They can be managed using organic insecticides or natural predators, such as ladybugs.

In addition, the plant is vulnerable to fungal diseases, such as powdery mildew when exposed to excessive humidity, particularly in places with inadequate ventilation. The danger of these illnesses can be decreased with proper ventilation and separation [21].

Harvesting

- *Roots*: The roots of *Achyranthes aspera* are the most commonly harvested part of the plant, particularly for medicinal purposes. Roots should be harvested after the plant matures, generally around 4–6 months after planting. Mature plants have thicker, woody roots.
- *Leaves and Flowers*: The leaves and flowers of *Achyranthes aspera* can be harvested throughout the growing season as needed. These parts are typically used for herbal teas, topical applications, or infusions.
- *Seed Collection*: Mature seeds can be collected after flowering, after the pods have dried. These seeds are often used for propagation, medicinal preparations, or in herbal formulations.

Harvesting Methods

Harvesting should be done carefully to avoid damaging the plant. Use a sharp knife or pruning shears to cut the roots or leaves. Ensure that the roots are harvested by digging gently around the plant to avoid damaging the surrounding soil and other roots.

Post Harvest Handling and Storage

After harvest, the roots should be washed, cleaned, and dried under shade or in a well-ventilated area. Drying ensures the preservation of active compounds and prevents microbial contamination.

To preserve its healing properties in the long term You can store dried roots, leaves and flowers in an airtight container in a cool, dry place.

Potential for Commercial Cultivation

Due to its medicinal value, *Achyranthes aspera* holds significant potential for commercial cultivation, especially in regions where there is high demand for herbal medicines.

Its low maintenance, adaptability, and ability to grow in marginal soils make it a viable crop for small-scale farmers in rural areas, especially in countries like India, Nepal, and Sri Lanka.

Organic cultivation methods are encouraged for those growing the plant for medicinal purposes, as it helps maintain the integrity and purity of the plant's medicinal components (Figure 4).

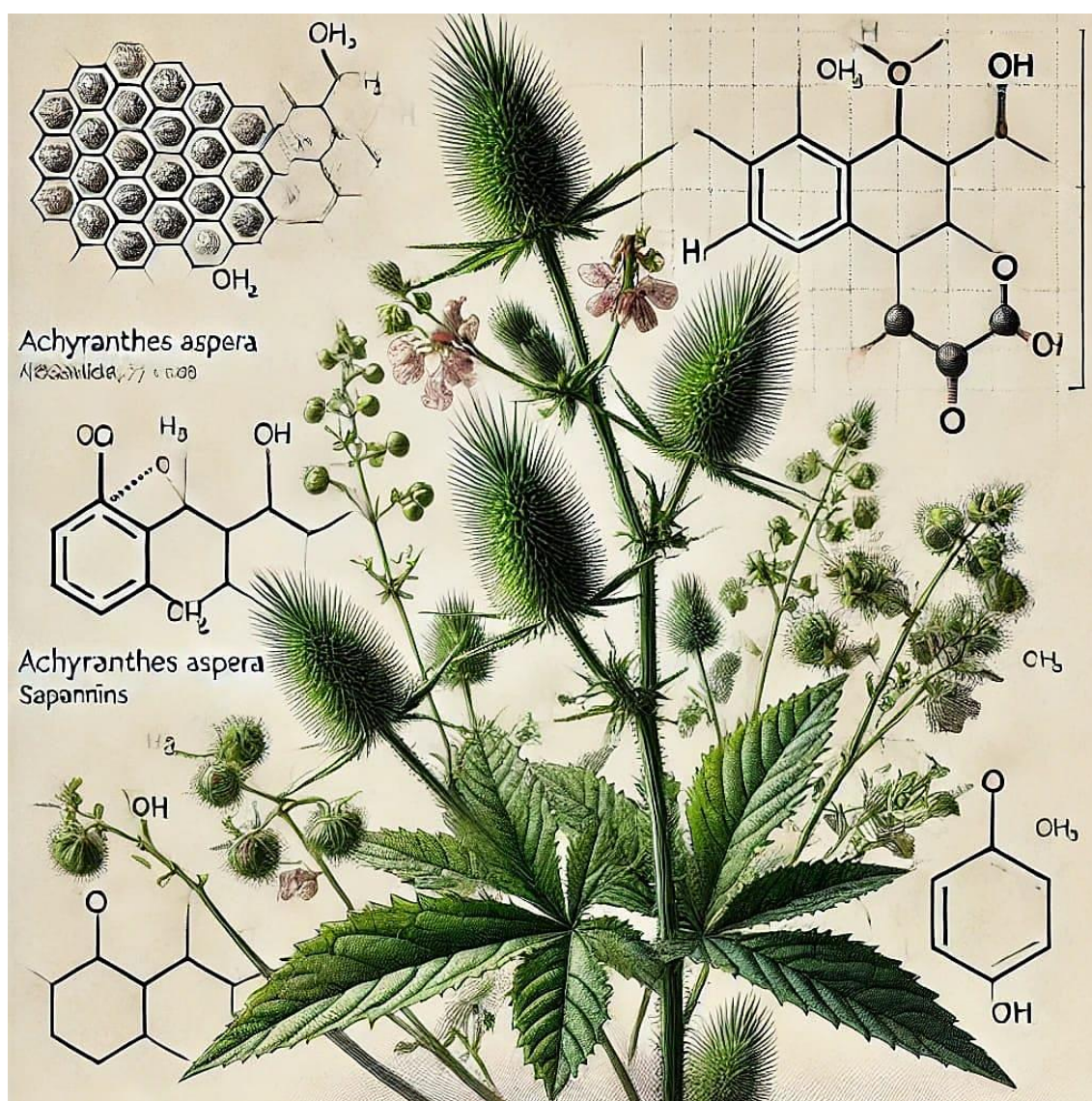


Figure 4. Chemical structure of *Achyranthes aspera* (Chirchita).

Modern Research and Clinical Applications of *Achyranthes aspera* (Chirchita)

Achyranthes aspera (Chirchita) has been the subject of numerous scientific studies in recent years, exploring its pharmacological properties and clinical applications. The growing body of modern research has helped substantiate the traditional uses of the plant, revealing its potential for treating a

wide range of health conditions. Below are some of the key findings and applications of *Achyranthes aspera* based on contemporary studies [22].

Anti-inflammatory and Analgesic Effects

- *Inflammatory Diseases:* Recent studies have examined the anti-inflammatory properties of *Achyranthes aspera* in detail, showing that it can reduce inflammation in diseases, such as inflammatory bowel disease (IBD), osteoarthritis, arthritis, etc. Flavonoids Al. Plant caloids and saponins inhibit cytokines that cause inflammation. and enzymes that are important for the inflammatory response including lipoxygenase (LOX) and COX-2.
- *Clinical Relevance:* Based on these findings, *Achyranthes aspera* is being investigated for treating pain and inflammation associated with joint problems and other chronic inflammatory diseases. Plant extracts have shown efficacy comparable to traditional NSAIDs (non-steroidal anti-inflammatory drugs) in clinical trials. But the side effects are very few.

Antidiabetic Effects

- *Blood Sugar Regulation:* *Achyranthes aspera* has the potential to regulate blood sugar levels. Research indicates that its extracts help improve insulin sensitivity, reduce
- insulin resistance, and enhance pancreatic beta-cell function, thus supporting the management of type 2 diabetes.
- *Clinical Trials:* Clinical studies have examined the plant's potential as an adjunct therapy for diabetic patients, where it has demonstrated hypoglycemic effects. The use of *Achyranthes aspera* in controlling blood sugar levels has been attributed to its ability to modulate carbohydrate metabolism and reduce oxidative stress, which is commonly associated with diabetes.
- *Anti-hyperlipidemic Activity:* Additionally, the plant has shown potential in lowering cholesterol levels and improving lipid profiles in diabetic individuals, which helps prevent complications, like cardiovascular diseases, often associated with diabetes [23].

Anticancer Potential

- *Cancer Cell Growth Inhibition:* Recent studies have revealed that *Achyranthes aspera* exhibits anticancer properties. The plant induces apoptosis (programmed cell death) and inhibits cell proliferation by modulating key cancer pathways, such as p53, NF- κ B, and Bcl-2 family proteins.
- *Clinical Studies:* Clinical and preclinical studies are exploring the potential of *Achyranthes aspera* as a chemo preventive agent or in combination therapy for cancer. It is also being studied for its ability to sensitize cancer cells to chemotherapeutic agents [24].

Hepatoprotective Effects

- *Liver Health:* Recent studies have shown remarkable liver-protective benefits of *Achyranthes aspera*. Extracts from this plant have been shown to protect the liver from the toxicity of alcohol and chemotherapy drugs. Glutathione also aids in liver regeneration and detoxification processes by increasing the activity of antioxidant enzymes, such as S-transferase (GST) and catalase.
- *Clinical Relevance:* These findings have led to the investigation of *Achyranthes aspera* as a potential remedy for liver disorders, such as hepatitis, cirrhosis, and fatty liver disease. Clinical studies are ongoing to determine its efficacy as a complementary therapy for liver protection [25].

Antimicrobial and Antiviral Activity

- *Antibacterial and Antifungal:* Staphylococcus aureus, Salmonella species, Escherichia coli, and Candida albicans are some of the bacteria and fungi against which *Achyranthes aspera* has antibacterial effects. The plant's bioactive compounds, such as phenolic compounds, tannins, and saponins, are believed to have antibacterial properties.
- *Antiviral Properties:* Modern studies also suggest that *Achyranthes aspera* may have antiviral properties, particularly against herpes simplex virus (HSV) and hepatitis C virus (HCV), though more research is needed in this area.

- *Clinical Applications:* *Achyranthes aspera* is being explored as a natural antimicrobial agent for treating wound infections, urinary tract infections (UTIs), and respiratory infections. It has potential as a topical antimicrobial or oral remedy for infectious diseases.

Neuroprotective Effects

- *Cognitive Function:* *Achyranthes aspera* has shown neuroprotective effects in experimental models of neurodegenerative diseases, including Alzheimer's disease and Parkinson's disease. It is thought that plants achieve these effects by reducing inflammation. Reduce oxidative stress and promotes the recovery of the nervous system.
- *Clinical Implications:* The plant is being studied for its potential in the management of cognitive decline, memory loss, and other neurodegenerative conditions. It may offer a natural alternative for supporting brain health and mental well-being.

Cardioprotective Effects

- *Heart Health:* *Achyranthes aspera* has demonstrated cardioprotective effects in laboratory models, including reducing blood pressure, cholesterol levels, and improving blood circulation. The plant is believed to reduce the risk of atherosclerosis and hypertension by promoting diuresis, enhancing antioxidant defences, and reducing inflammation.
- *Clinical Applications:* Clinical trials are investigating the plant's ability to treat hypertension, high cholesterol, and cardiovascular diseases by improving heart function and reducing atherosclerotic plaques.

Antistress and Adaptogenic Effects

- *Stress Management:* Modern research has highlighted the adaptogenic properties of *Achyranthes aspera*, which help the body adapt to stress. Studies suggest that the plant can help reduce anxiety, stress, and fatigue by modulating neurotransmitter levels and enhancing mental resilience.
- *Clinical Use:* This property is particularly valuable in the management of chronic stress and anxiety disorders, and *Achyranthes aspera* may be explored as a natural anxiolytic or stress-reducing agent in clinical practice [26].

CONCLUSIONS

An important and beloved plant, *Achyranthes aspera* (Chirchita) has a long history of use in traditional Indian and Asian medicine. The growing body of scientific evidence further supports its wide range of phytomedicinal properties, confirming the therapeutic benefits that have been utilized in rural and indigenous practices for centuries. Modern research has revealed that *Achyranthes aspera* contains various bioactive compounds, such as saponins, alkaloids, flavonoids, and tannins, which contribute to its broad spectrum of pharmacological activities. The plant has demonstrated anti-inflammatory, antioxidant, antidiabetic, anticancer, antimicrobial, hepatoprotective, and neuroprotective effects in both preclinical and clinical settings. These properties make it a potential candidate for the treatment and management of numerous health conditions, including chronic diseases, infectious diseases, metabolic disorders, and neurodegenerative diseases.

In Indian rural settings, *Achyranthes aspera* continues to play a significant role in herbal medicine, and its low cost, easy cultivation, and availability make it an accessible remedy for rural populations. The plant is increasingly recognized for its therapeutic value in modern medicine, particularly as a natural alternative or complementary therapy to conventional treatments.

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