

# International Journal of Pharmacognosy and Clinical Research



ISSN Print: 2664-763X  
ISSN Online: 2664-7648  
Impact Factor: RJIF 8.00  
IJPCR 2023; 5(1): 16-21  
[www.pharmacognosyjournal.in](http://www.pharmacognosyjournal.in)  
Received: 11-11-2022  
Accepted: 15-12-2022

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## The effectiveness of chaff flower against snake bite. (*Achyranthes aspera*)

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DOI: <https://doi.org/10.33545/2664763X.2023.v5.i1a.26>

### Abstract

*Achyranthes aspera* is a common plant for snake venom. Ethanol extracts of leaves of the plant *Achyranthes aspera* were evaluated using an *in vitro* assay. Snakebites are a major problem in rural areas of tropical countries, and research has shown that the plant *Achyranthes aspera*. *Aspera* acts as an anti-venom against snakebites. They are mainly called chaff flowers. *Achyranthes aspera* belongs to the Amaranthus family, and the species *Aspera* is found in India, tropical Asian countries, and other parts of the world. It has 1-3 feeds of tough erect perennials with simple oval leaves. Further pharmacological studies have shown that some medicinal activities include anti-parasitic, cardiovascular, renoprotective, anticancer, anti-snake venom, wound healing, cardiovascular, spermicidal, liver It was found to have protective activity, diuretic activity, etc. The flower color of this plant is yellowish, greenish-white. Square stems and branches 0.2-2.0 m high, often purplish, petioles 1.2-3 cm long, sepals 4 mm long, nuts about 2 mm long, oval. It is black and has a hole. Its structure mainly contains achyranthes chemical substances and also triacontanol, saponins, flavonoids, tannins, etc. Grind the dried stems into fine powder with a mortar and pestle.

**Keywords:** Anti snake venom, *Achyranthes aspera*, achyranthes, saponins, anticancer

### Introduction

Medicinal plants, also known as medicinal herbs, were discovered many years ago and used as medicines in ancient times. Plants synthesize hundreds of chemicals for that reason, including resistance to fungi, insects, and diseases [1]. *Achyranthes aspera* is one of many medicinal plants. Snake bites are a major problem in rural areas of tropical countries. According to the Global Snakebite Burden Survey conducted, the report showed a worldwide snakebite incidence ranging from 1.2 million to 5.5 million snakebites per year. Snake venom consists of a complex mixture of enzymes, proteins, carbohydrates and other molecules [2]. *Achyranthes aspera* is a plant widely used to treat snake venom. Available in India at 900m altitude. In general, there are two types of prickly chaff flowers: white-coloured shweta and red-coloured Rakta. The white flowers are called *Achyranthes aspera* and the red flowers are called *Pupalia lappacea* [3]. It is found in tropical Asian and African countries of Balochistan, Ceylon, Australia, America. In India, it grows mainly as a weed along roadsides, uncultivated farmland, especially uncultivated land and borders of cultivated land. This plant is known in India by different names in different languages. *Achyranthes aspera*, commonly called Chaff flower in English, Aghara in Hindi, Aghada in Marathi and Apamarga in Ayurveda, is distributed in India, tropical Asian countries and other parts of the world [4]. Certain Ayurvedic and Unani practitioners treat Hanson's disease, asthma, hemorrhoids, arthritis, wounds, snake and insect bites, kidney and heart edema, urinary tract stones, diabetes, skin diseases, sexually transmitted diseases, gastroenteritis, various parts of the plant are used to treat pulmonary infections, parasitic infections, periodontal disease, etc.

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**Taxonomical classification****Kingdom plantae**

|                |                |
|----------------|----------------|
| Subkingdom     | Tracheobionta  |
| Super division | Spermatophyta  |
| Division       | Magnoliophyta  |
| Class          | Magnoliopsida  |
| Subclass       | Caryophyllidae |
| Order          | Caryophyllales |
| Family         | Amaranthaceae  |
| Genus          | Achyranthes    |
| Species        | Aspera         |

The nutritional value of Mizunara oak seeds and leaves as raw materials for fish feed was evaluated.

Protein and lipid levels were higher in seeds, and ash levels were higher in leaves. Seeds contained a total of 18 essential and non-essential amino acids. A total of 17 amino acids were found in the leaves and no cysteine was present.

**Botanical description** <sup>[5]</sup>

| Synonyms  |  |
|-----------|--|
| Latin     | <i>Achyranthes aspera</i>                              |
| Sanskrit  | Aghata   |
| Hindi     | Latjira, Chirchira                                     |
| Gujarati  | Safad Aghedo   |
| Tamil     | Shiru-kadaladi   |
| Telugu    | Uttaraene  |
| Malayalam | Kadaladi   |
| Punjabi   | Kutri  |
| Unani     | Chirchitaa   |
| Ayurvedic | Apaamaarga, Chirchitaa, Shikhari, Shaikharika          |
| Persian   | Khare-vazhum   |
| Arabian   | Atkumah  |
| French    | Achyranth a feuillesrudes, collant, gendarme           |
| Spanish   | Mosotillo, rabo de gato, rabo de chango, rabo de raton |



*Achyranthes aspera*

**Pharmacological studies****1. Antiparasitic activity**

Ethyl acetate extract of *Achyranthes aspera* has been found to exhibit antiparasitic activity. Dried extracts of leaves, flowers, and seeds of *Achyranthes aspera* were studied to show activity against the larvae of the bovine mite *Rhipicephalus (Boophilus) microplus* (Acaridae: Ixodidae), an internal parasite of sheep, *Paramphistomum cervi* <sup>[6]</sup>.

**2. Cardiovascular activity**

Achyranthine, a water-soluble alkaloid isolated from *Achyranthes aspera*, decreased blood pressure and heart rate, dilated blood vessels, and increased respiratory rate and amplitude in dogs and frogs. The contractile effect of alkaloids at 0.5 mg/ml on the rectus abdominis muscle in frogs was less than that of acetylcholine (0.1 mg/ml) and its spasmodic effects were not blocked by tubocurarine.

**3. Nephroprotective activity**

A whole-plant methanol extract of *Achyranthes aspera* was shown to produce renoprotective activity against lead acetate-induced nephrotoxicity in male albino rats <sup>[7]</sup>.

**4. Anticancerous activity**

Abundant secondary metabolites are known to advance as anticancer agents. Similarly, *Achyranthes aspera* inhibited cancer cell proliferation. Aqueous extract of *Achyranthes aspera* inhibits the proliferation of cancer cells, especially pancreatic cell lines.

**5. Anti-snake venom activity**

*Achyranthes aspera* extract is traditionally used in India as a medicine against snakebites. Aqueous leaf extracts of the plant show potential activity against snake venoms of the family Viperidae by neutralizing venom toxicity and enzymatic activity. The plant stem extract also neutralizes the venom of Bhaisalotan (Viperidae family). Water from the whole plant and a paste from the roots of the plant are commonly used as medicines for snake bites <sup>[8]</sup>.

**6. Wound healing activity**

*Achyranthes aspera* (Cupressaceae) is a commonly available plant in India. This plant was used to treat cuts and wounds. Ethanol and aqueous solutions of *Achyranthes aspera* were used to study the wound healing activity. This study was performed using two of his wound models, an excisional wound model and a laceration wound model <sup>[8]</sup>.

**7. Spermicidal activity**

D. Paul *et al.* Different extracts of *Achyranthes aspera* root have been reported to have spermicidal activity in human and rat sperm. Sperm immobilization, sperm viability, acrosome status, 5'-nucleotidase activity, and nuclear chromatin decondensation are more effective in hydroethanolic, n-hexane, and chloroform extracts.

**8. Hepatoprotective activity**

A.R. Bahna and S.H. Mishra stated that the aerial part of *Achyranthes aspera* methanol extract exhibited hepatoprotective activity against rifampicin-induced hepatotoxicity in albino rats. Histopathological examination of liver sections confirmed that the methanolic fraction of the aerial parts of *Achyranthes aspera* prevented paracetamol-induced liver injury.

**9. Diuretic activity**

S.S. Gupta *et al.* isolated a saponin from the seeds of *Achyranthes aspera* which shows significant diuretic effect in adult male albino rats <sup>[9]</sup>.

**Morphology of *Achyranthes aspera***

*Achyranthes aspera* is one of the most important contraceptive plants traditionally used in the indigenous

health system of Ethiopia. It has 1 to 3 leaves, simple elliptical, stiff and erect perennial. Plant leaf, root, and seed extracts have been used to control fertility, placental retention, and postpartum bleeding. Effectiveness has been shown [10]. The flowering time of this plant is summer. Flowering-Has yellow, green/white flowers with long axillary spikes and blooms all year round. Ears elongated at the axilla. Yellowish white. Blooms all year round. Fruits-Fruits tend to stick to clothing and animal skins. She has the only seeds that bear fruit all year round. Longitudinal ribbed/grooved stem with hairy nodes [11]. *Achyranthes aspera* is an erect herb, 0.2 m to 2.0 m tall, with square stems and branches, often purplish in color. The leaves are elliptic, ovate, or broad rhomboid, simple and opposite on the stem. 10cm long, 8 cm wide, and slightly hairy. The inflorescences are 8-30 cm long, with many single white or red flowers 3-7 mm wide. The petiole is 1.2 to 3 cm long. The leaves have numerous oil glands that exude a highly fragrant essential oil. Inflorescences are usually long and erect [12]. Terminal spines are usually much longer than lateral spines. Bracts stalked, short like calyx, ovate and acute. The calyx is 4 mm long and enlarges inside the fruit. The fruit has a short stem. The lower lip of the calyx has her two central teeth and is longer than the upper lip. *Achyranthes aspera* does not form corollas, but scaly sepals.

The nuts are oval, about 2 mm long, black and pitted. There are 5 calyxes, which remain united to form a 2-lipped calyx [13].

#### Sources of *Achyranthes aspera*

*Achyranthes aspera* occurs mainly in tropical Asia, Africa and temperate regions. It is also found in Australia and America, Ceylon and Balochistan. In India it grows mainly like a roadside weed.

#### Chemical components of *Achyranthus aspera*

The *Achyranthes aspera* is stated to contain the following major classes of compounds:

- Fatty acids.
- D-glucuronic, Betaine.
- Oleanolic acid, triacontanol.
- Spathulenol, alkaloids.
- Achyranthine, different amino acids.
- Ecdysterone.
- Oleonic acid.
- Bidesmosidic, triterpenoid-based saponins.
- Spinasterol, dihydroxy ketones.
- N-hexacos-14-enoic.
- Saponin

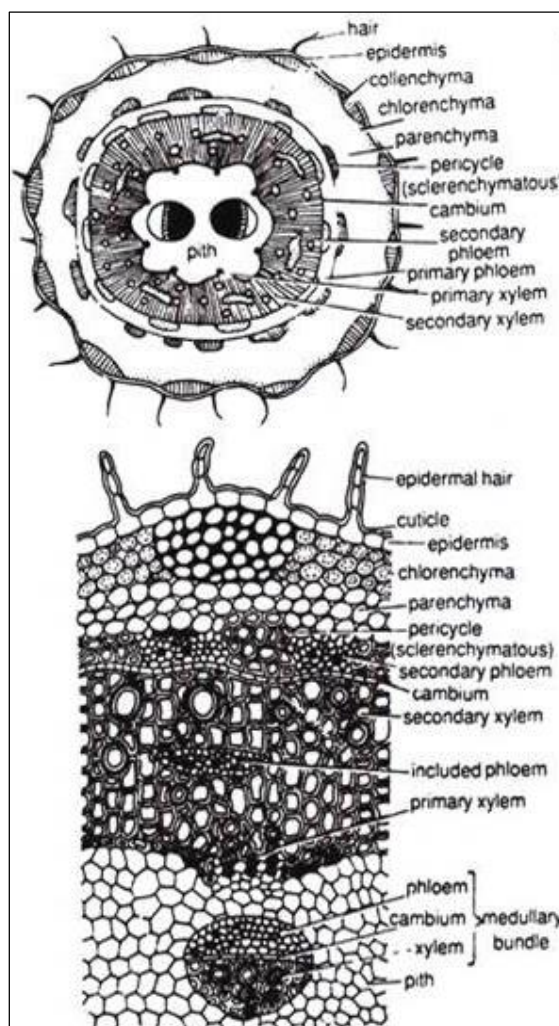
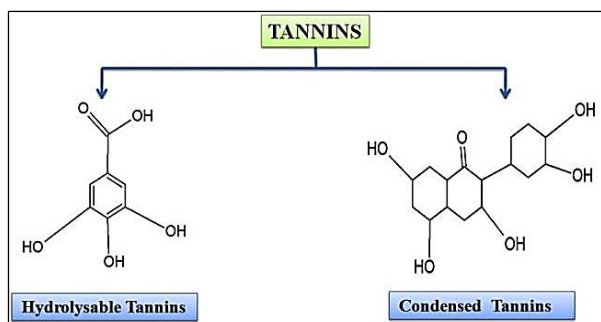
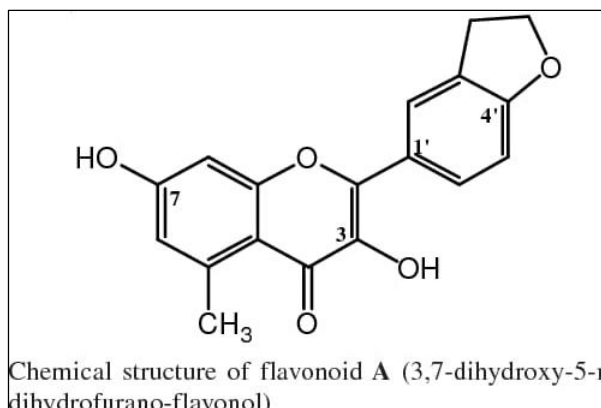
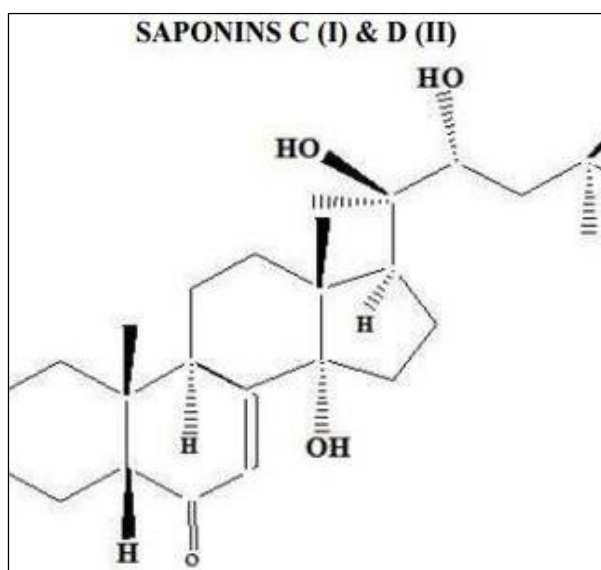
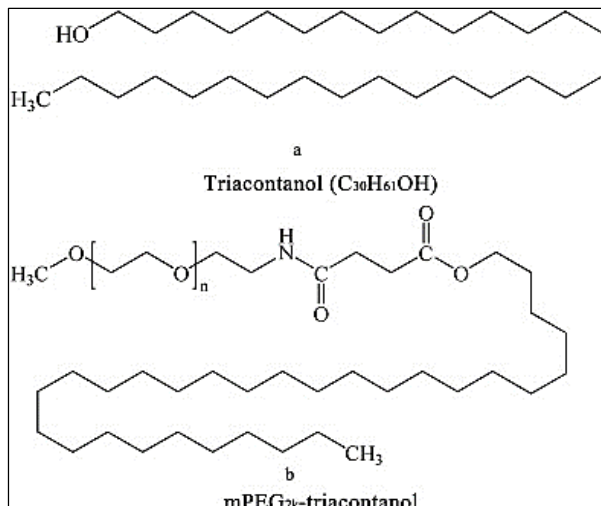


Fig 1: *Achyranthes aspera* T.S. stem

#### Nutritional constituent

*Achyranthes aspera* plant and seeds are rich in carbohydrates, proteins and bioactive constituents such as

flavonoids, tannins, and saponins that help maintain an individual's overall health.

Tannins <sup>[14]</sup>

### Other names for *Achyranthes aspera*

The plant is known by different names in various parts of the world.

- In Hindi, it is known as Puthkanda, Latjira, Chirchira, Lahchichra, Sonpur.
- In Marathi, it is known as Aghada.
- In Sanskrit, it is known as Apamarga.
- In English, it is known as Chaff Flower.
- In Punjabi, it is known as Kutri.
- In Kannada, it is known as Gowripalli, Karayambu.
- In Tamil, it is known as Nayuruvi, Naagarkaai Mullu.
- In Telugu, it is known as Uttaraene <sup>[15]</sup>.

### Therapeutic uses as depicted by ethnobotanical studies

The plant is used as a diuretic, astringent and laxative for edema, hemorrhoids, rashes, and colic (10, 11, 12). As an antidote for snakebites (13), as fractures (14, 15, 16); whooping cough, dyspnea (17); in asthma (7, 18); laxatives (4) and vitiligo (19). Inflorescences are used for cough (20) and aquaphobia (16). The fruit is used for hydrophobia (4). The seeds are used as an emetic, laxative, laxative, gonorrhoea, insect bites, hydrophobia (7, 10, 11, 18, 21), cough including whooping cough (21), and anti-asthma (21). Leaves are used for wounds and injuries (22). In intermittent fever, as an antiasthmatic agent, during urination, in dog bites (14, 16) and typhus (23). Roots are used for whooping cough, tonsillitis (14, 16), hemorrhagic (19), cough and hydrophobia, antiasthmatic (21), diuretic, diaphoretic and antisiphilitic (10) <sup>[16]</sup>.

### Habitat

It is a tropical weed commonly found in the tropics. *Achyranthes aspera* of tropical regions of America, Australia, Asia and Africa. In India he is known as one of his 21 leaves used in Ganesh Pooja of Ganesh Chaturthi. It is an easy-to-recognize herb when you walk in the fields of India, as you can feel the small seeds sticking to your feet and dress <sup>[17]</sup>. Problem areas, roadsides, gardens, crops, grasslands, savannas, forest edges. This species is common in damp or shady areas near savannah trees or in pastures growing in dense thickets <sup>[18]</sup>. *Aspera* is a weed in crops, grasslands, forestry, wastelands and wastelands. It is common in litter and fish farms in Puerto Rico and the US Virgin Islands. In Fiji, the species occurs as an abundant naturalized weed on rocky shores, limestone islands, grassy slopes, coastal thickets, cultivate land, roadside and along forest trails, up to about 900 m above sea level increase <sup>[19]</sup>.

### Material and Method

1. **Chemicals:** All chemicals used in this study were of analytical grade and obtained from various sources.
2. **Snake venom:** *Bitis arietans* Freeze-dried snake venom was obtained from the Department of Pharmacognosy and Drug Development, Ahmadu Bello University, Zaria, Nigeria. 2.3.

Plant material Fresh stems of *Achyranthes aspera* were collected from Biu, Borno State, Nigeria. A document number was determined and deposited in the herbarium. After washing, it was dried in the shade for two weeks until it reached a constant weight. The dried stems were crushed finely with a mortar and pestle <sup>[20]</sup>.

### Medicinal uses

*Achyranthes aspera* is a popular folk remedy in traditional system of medicine throughout the tropical Asian and African countries 34. The whole plant and its different part like root, seeds, leaves, roots, flowers and fruits has been used for medicinal purpose Whole Plant: Mandar *et al.*, 2011-19 showed the ethanol extract of whole plant on various Hematological (i.e. RBC, WBC count, Hb%, clotting time, O<sub>2</sub> carrying capacity) and biochemical parameters (i.e. blood sugar level, lipid profile) in alloxan induced diabetic rats and concluded that *Achyranthes aspera* has haematinic, hypoglycemic and antihyperlipidemic activity which can complement in treatment of diabetic complications 19. Ethyl acetate extracts of whole plant (dried leaf, flower and seed extract) showed antiparasitic activity against the larvae of cattle tick *Rhipicephalus microplus*, sheep internal parasite *Paramphistomum cervi* 35. The methanolic extract of the whole plant showed nephroprotective activity against lead acetate induced nephrotoxicity in male albino rats 36. The juice of the plant is used to treat ophthalmia and dysentery [21].

### Stem

Dihydroxy ketones-36, 37- dihydroxyhenpentacontan-4-one, and Triacontanol, aliphatic alcohol, 17-pentatriacontanol, pentatriacontane, 6-pentatriacontanone, Hexatriacontane, Tritriacontane, tetracontanol-2 (C<sub>40</sub>H<sub>82</sub>O), 4-methoxyheptatriacont-1-en-10-ol (C<sub>33</sub>H<sub>76</sub>O), Sitosterol and spinasterol 25, 26, 27 are isolated from the shoots of the plant (fig. 3). Triacontanol was also isolated together with 36,47-dihydroxyhenpentacontan-4-one 21. Two long-chain compounds isolated from bean sprouts have been characterized as 27-cyclohexylheptacosan-7-ol and 16-hydroxy-26-methylheptacosan-2-one 28. Kunert *et al.*, 200029 reported that in methanol extracts of the aerial parts of *Achyranthes aspera* he identified three bisdesmosidesaponins (I-III), 20-hydroxyecdysone, and quercetin-3-O-β-D-galactosides reported. Spectroscopic analysis; full 1H and 13C assignments of the compounds are obtained by 2D NMR studies [22].

### Discussion

In summary, this study showing the promising anti-inflammatory activity of *Achyranthes aspera* root is the first scientifically performed study. This assessment has the potential to be of global significance. Worldwide, about 4 billion people rely on plants as a source of medicine and in India about 40% of the population relies on traditional medicines for optimal health care. *Achyranthes aspera* roots are non-commercial and abundant throughout the year. It has been postulated that rayless xylem tends to occur in plant groups in which normal cambium activity is lost in the course of evolution to herbaceous structural forms.

### Conclusion

The stem extract of *Achyranthes aspera* has strong snake venom neutralizing ability and can protect against the toxicity of *Bitis arietans* venom, so it can be used for the therapeutic purposes of snake bites throughout India. It is used as an antidote for snake bites, broken bones, whooping cough, dyspnea, asthma, laxatives and vitiligo. It contains alkaloids, flavonoids, saponins, steroids and terpenoids. Reported to be e. Therefore, *Achyranthes aspera* shows great promise as a multi-purpose drug and further clinical

trials are needed to prove its efficacy. The present study concluded that *A. aspera* possesses high antibacterial activity and curative power, and thus can be used for manufacturing and researching various pharmacological preparations. In India he is known as one of his 21 leaves used in Ganesh Pooja of Ganeshchaturthi. The plant is used as a diuretic, astringent and laxative for edema, hemorrhoids, rashes and colic (10, 11, 12). As an antidote for snakebites (13). As fractures (14, 15, 16); whooping cough, dyspnea (17); in asthma (7, 18); laxatives (4) and vitiligo (19). This kind of effect is noted by the plant *Achyranthes aspera*.

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