



## Review Article

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## An Overview of *Achyranthes aspera* Linn.

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### Abstract

A lot of literature reviews about *Achyranthes aspera* Linn. has been published previously. Researchers are critically involved in the research to extract out the potential medicinal value which is present in this plant. It has a broad pharmacological value. The plant has many potential compounds but the major activities are because of the presence of few bioactive compounds. From the review of the literature on this plant we found that this plant is known for diuretic and hepatoprotective properties and used to cure several diseases viz., malarial fever, dysentery, asthma, hypertension and diabetics. Most recently, *A. aspera* is widely studied for its medicinal properties and reported to have immunostimulatory properties wound healing activity, antioxidant activity, hemolytic activity, anti-inflammatory, antibacterial activity and antifungal activity. The present study was designed to investigate the *A. aspera* leaves ethanolic extract for its antioxidant potential by using in vitro assays such as DPPH radical scavenging, Hydroxyl radical scavenging and Reducing power assays.

**Keywords:** *Achyranthes aspera*, Pharmacological activities, Bioactive molecules.

### 1. INTRODUCTION

Nature has been a source of medicinal agents for thousands of years and since the beginning of mankind. Medicinal plant is an integral part of human life to combat the sufferings from the dawn of civilization. It is estimated that more than 80,000 of total plant species have been identified and used as medicinal plants around the world [1]. Over the past twenty years, interest in medicinal plants has grown enormously from the use of herbal products as natural cosmetics and for self-medication by the general public to the scientific investigations of plants for their biological effects in human beings [2]. Therefore, people are encouraging indigenous production and processing of these medicinal plants to use in different cultures and religion for the treatment of various diseases [3]. The demand for plant-based medicines, health products, pharmaceuticals, food supplement, cosmetics etc. are increasing in both developing and developed countries, due to the growing recognition that the natural products are non-toxic, have less side effects and easily available at affordable prices [4]. Nowadays, there is a revival of interest with herbal-based medicine due to the increasing realization of the health hazards associated with the indiscriminate use of modern medicine and the herbal drug industries is now very fast-growing sector in the international market [5]. There is great demand for herbal medicine in the developed as well as developing countries like India, because of their wide biological activities, higher safety of margin than the synthetic drugs and lesser costs [6, 7].

*Achyranthes aspera* Linn. belongs to family Amaranthaceae, commonly known Rough chaff flower in English, is an annual herb that grows throughout India, consists of 160 genera and approximately 2400 species of shrubs, herbs, climbers. Different parts of the plant are ingredients in many native prescriptions in combination with more active remedies. In traditional medicinal system, *A. aspera* is known for diuretic and hepatoprotective properties and used to cure several diseases viz., malarial fever, dysentery, asthma, hypertension and diabetics. Most recently, *A. aspera* is widely studied for its medicinal properties and reported to have immunostimulatory properties [8], wound healing activity [9], antioxidant activity, hemolytic activity [10], anti-inflammatory [11], antibacterial activity [12] and antifungal activity [13]. The present study was designed to investigate the *A. aspera* leaves ethanolic extract for its antioxidant potential by using in vitro assays such as DPPH radical scavenging, Hydroxyl radical scavenging and Reducing power assays. Though it has been used all the parts in traditional systems of medicines. Seeds, roots and shoots are the most important parts which are used medicinally. The present article gives an account of updated information on its phytochemical and pharmacological properties. The review reveals that wide numbers of phytochemical constituents have been isolated from

the plant which possesses activities like antiperiodic, diuretic, purgative, laxative, antiasthmatic.



Figure 1: *Achyranthes aspera*

### VERNACULAR NAMES

Latin	<i>Achyranthes aspera</i>
Sanskrit	Aghata
Hindi	Latjira, Chirchira
Gujarati	Safad Aghedo
Punjabi	Kutri
Unani	Chirchitaa
Ayurvedic	Apaamaarga, Chirchitaa, Shikhari, Shaikharika

### TAXONOMICAL CLASSIFICATION

Kingdom	Plantae
Subclass	Caryophyllidae
Order	Caryophyllales
Family	Amaranthaceae
Genus	<i>Achyranthes</i>
Species	<i>Aspera</i>

## 2. MEDICINAL USES

The dried leaf powder (2-5gms) is taken with honey for diarrhoea. Leaf juice is useful remedy for skin diseases like pruritis and scabies. Leaf paste is applied externally for toxic bites. Whole plant ash is a good remedy for bleeding piles and abdominal problems. Root is used as tooth brush to clean the mouth and to cure halitosis. Infusion of the twig is also used as a wash for toothache. Root extract is used as an eye drop at bed time for night blindness.

## 3. PHYTOCHEMICAL STUDIES

*A. aspera* contains triterpenoid saponins which possess oleanolic acid as the aglycone. Ecdysterone, an insect moulting hormone, and long chain alcohols are also found in *Achyranthes aspera* [14]. Other chemical constituents such as achyranthine, betaine, pentatriacontane, 6-pentatriacontanone, hexatriacontane, and tritriacontane are also present [15].

## 4. PHARMACOLOGICAL STUDIES

### 4.1 Spermicidal activity

Extracts from roots of *A.aspera* have been reported to possess spermicidal activity in human and rat sperm, as studied [16]. The study was made on hydroethanolic, n-hexane and chloroform extracts, which

were found to be most effective for sperm immobilization, sperm viability. Researchers reported the ethanolic extract of the roots of *A. aspera* showed post coital antifertility activity in female albino rats [17]. According to their study, the extract exhibited 83.3% anti-implantation activity when given orally at 200 mg/kg body weight.

### 4.2 Antiparasitic activity

The ethyl acetate extract of *A.aspera* was found showing antiparasitic activity [18]. It has been studied that dried leaf, flower and seed extract of *A.aspera* which showed activity against the larvae of cattle tick *Rhipicephalus (Boophilus)microplus (Acari:Ixodidae)*, sheep internal parasite *Paramphistomum cervi*.

### 4.3 Hypoglycaemic activity

Aqueous methanolic extract of the whole plant have been shown to possess hypoglycaemic activity [19].

### 4.4 Anticancer activity

Methanolic extract of the leaves of *A.aspera* has shown to have anticancer activity on Epstein- Barr virus early antigen activation induced by tumor promoter 12-O-tetradeca- oylphorbol-13-acetate in Raji cells [20].

### 4.5 Hepatoprotective Activity

The methanolic extract of the aerial parts of *A. aspera* showed hepatoprotective activity on rifampicin induced hepatotoxicity in albino rats. It showed dose dependent decrease in the levels of SGPT, SGOT, ALKP and total bilirubin [21].

### 4.6 Anti-inflammatory

Alcoholic extract of the roots of *A.aspera*, was found to exhibit anti-inflammatory activity in Wistar rats using carrageenan-induced paw edema method and cotton pellet granuloma test [22].

### 4.7 Nephroprotective Activity

Methanolic extract of the whole plant of *A.aspera* was shown to produce nephroprotective activity against lead acetate induced nephrotoxicity in male albino rats, as reported [23].

### 4.8 Anti-depressant Activity

Researcher showed that Methanolic extract of the leaves of *A.aspera* showed anti-depressant effect in mice and rats using forced swimming test in mice and rats and tail suspension test in rats [24].

### 4.9 Cardiovascular Activity

Achyranthine, a water-soluble alkaloid isolated from *Achyranthes aspera*, decreased blood pressure and heart rate, dilated blood vessels, and increased the rate and amplitude of respiration in dogs and frogs. The contractile effect of the alkaloid at 0.5 mg/ml on frog rectus abdominal muscle was less than that of acetylcholine (0.1 mg/ml), and its spasmogenic effect was not blocked by tubocurarine [25].

### 4.10 Bronchoprotective Activity

Ethanolic extract of *A.aspera* showed bronchoprotective effect in toluene diisocyanate (TDI) induced occupational asthma in Wistar rats as reported by Goyal [26]. The total and differential leucocytes were

counted in blood and bronchoalveolar (BAL) fluid. Liver homogenate was utilized for assessment of oxidative stress and lung histological examination was performed to investigate the inflammatory status of airway. The results suggest that *A. aspera* treated rats did not show any airway abnormality.

#### 4.11 Anti-allergic Activity

Researchers reported that the petroleum ether extract (200 mg/kg, i.p.) of the plant shows significant anti-allergic activity in both milk induced leukocytosis and milk induced eosinophilia in mice. Thus the anti-allergic activity of *A. aspera* may be due to the presence of steroids [27].

#### 4.12 Wound Healing Activity

The ethanolic and aqueous extracts of leaves of *Achyranthes aspera* for wound healing activity [28].

#### 4.13 Anti-oxidant activity

Some workers also reported antioxidant activity on leaves and roots [29].

### 5. CONCLUSION

*Achyranthes aspera* is an important source of many therapeutically and pharmacologically active constituents. The plant has been widely studied for its pharmacological activities and finds its position as a versatile plant having a wide spectrum of medicinal activities. Scientists across the world are eyeing plants as a future source of unlimited therapeutic agents and are in a desperate need of isolating compounds. It is seen from the literature that *A. aspera* is a very important plant for its large number of medicinal properties. Thus, *A. aspera* is proved to be a multipurpose medicinal agent, thus instrumental in curing large number of ailments. It's study paves the way for further attention and research to identify the active compounds responsible for the plant biological activity, to characterize the active compounds and to elucidate the exact mechanism of action by which they exert their biological effects.

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