Review and literature survey

About Achyranthes aspera L

Achyranthes aspera is a common plant found throughout India this review focuses on the wide pharmacological activities of Achyranthes aspera L. Before the introduction of modern medicines, disease treatment was entirely managed by herbal remedies. It is estimated that about 80% of the world population residing in the vast rural areas of the developing and under developed countries still depends mainly on medicinal plants. It is quite obvious that the plant is widely used in traditional medicinal system of India and has been reported to possess hepatoprotective, anti-inflammatory, antitussive, antifungal and also used to check wounds healing and antibacterial properties. Achyranthes aspera is a very important plant for its large number of medicinal properties as well as medicinally important chemicals like ecdysterone, achyranthine, betaine, pentatriacontane, 6-pentatriacontanone, hexatriacontane and tritriacontane. The plant shows many pharmacological activities like, anti-allergic, cardiovascular, nephroprotective, antiparasitic, hypoglyceamic, analgesic and antipyretic. Many traditional uses are also reported like antiperiodic, purgative and laxative, in various types of gastric disorders and in body pain which are being studied till today and further research has to be done. Achyranthes aspera L., locally known as “Telenge or ambulale” is one of the traditionally used anti-fertility plants in the indigenous health care delivery system of Ethiopia. It is a stiff erect perennial herb of 1–3 feet with simple elliptic leaves. The extracts of leaves, roots, and seeds of the plant have been used for control of fertility, in placental retention, and in postpartum bleeding. The preliminary study on leaves extract of the plant had shown some anti-fertility effect. The present study was investigated the effect of methanolic leaves extract on fetal abortion, uterine and pituitary weights, gonadal horomones, serum lipids and in female rats in attempt to further validate scientifically. The traditional claim a perennial stiff erect herb, 2.0 m high is growing up to 1000 m height. Stems are square, leaves elliptic ovate or broadly rhombate, 5-22 cm long, 2.5 cm broad, and adpressed pubescent. The inflorescences are 8 - 30 cm long, with many single, white or red flowers, 3 - 7mm wide. Flowering time is in summer. The plant is widespread in the world as a weed, in Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America. In the northern part of India it is known as a medicinal plant in different
systems of folk medicine. Achyranthes aspera L, a stiff erect herb, has been reported to possess’s medicinal properties.

**Plant description**

It is an erect herb, 0.3-1 meter high with stiff branches terete or absolutely quadrangular, pubescent, leaves few, usually thick, elliptic-ovate, petiolate, acute and entire flowers are greenish white, numerous in small dense auxiliary heads or spikes, bracts and bracteoles persisting ending in a spine. Main root is long cylindrical thick; secondary and tertiary roots present slightly ribbed, yellowish brown in color; odor is slight, taste is slightly sweet and mucilaginous; stem is yellow brownish, erect branched, cylindrical hairy about 60 cm high. Seeds are sub cylindrical, truncates at apex, rounded at base, black and shining. The plant is distributed throughout India up to an altitude of 3000 ft. Erect or ascending herbs or shrubs; leaves opposite, the blades entire; inflorescences terminal and axillary, spicate, erect, many-flowered; becoming elongate, with only a few flowers open at the same time; flowers hermaphrodite, solitary in axils of acute, membranous, persistent bracts, subtended by 2 bracteoles, deflexed after anthesis, the bracteoles consisting of a long spine and bearing on each side of base a shorter, membranous, nerveless wing; tepals 5, spreading during anthesis, before and after anthesis erect, membranous or herbaceous, 1- or more-nerved, acute, sometimes pungent in fruit; stamens 5, much shorter than perianth, the filaments proximally connate into a short cup, the free
parts alternating with short, broad pseudostaminodes, the anthers oblong, 2-celled (4-loculed); ovary glabrous, the ovule 1, pendent from a long funicle, the style filiform, short, the stigma capitates, utricle falling off together with perianth and bracteoles, ellipsoid, indehiscent, 1-seeded, with truncate or depressed apex, thin-walled, the seed erect Species a coarse, ligneous herb or shrub 0.8-4 m high, sometimes almost tree like. The tepals are white to pale lavender; the filaments while too rich pink, and the fruit orange to reddish purple or brown. A coarse, rambling or erect widely branched annual or short-lived perennial with a semi woody base; taproot long with lateral branches throughout; stem 0.5 to 2 m tall, angularly ribbed, generally square, more or less densely hairy and thickened above the nodes; leaves opposite, oblong-obovate to elliptic or obovate from an acute or obtuse base; tip acuminate, acute, obtuse or rounded; blade entire, flat or somewhat wavy, more or less pubescent, 2 to 10 cm long, 0.7 to 5 cm wide; petiole 0.5 to 1.5 cm long; inflorescence terminal spikes, rigid, 10 to 50 cm long excluding the peduncle, with paired branches below; rachis robust, angularly-ribbed, more or less hairy; flowers small, green, perfect, densely arranged at top of spike, less clustered in the center, scattered and often in pairs near the base; subtended by long-acuminate bracts or bracteoles, 2 to 3.5 mm long, stiff and spiny, erect before anthesis reflexes later, persistent; sepals 5, green with pale margins, ovate-lanceolate, acuminate, 3.5 to 5.5 mm long during anthesis, five filaments 2.2 to 3.5 mm long; pseudo-staminodia with or without dorsal, truncate, long-fringed scales; ovary top-shaped with 1- to 2-mm style; fruit and utricle (a small prickly bur), 2.5 to 2.8 mm long, rounded at the base; enclosed by persistent perianth and bracts, 4 to 5 mm long, detaching easily from rachis; seed 2 to 3 mm long, 1 to 1.5 mm wide, truncate above, reddish to dark brown and shiny, enclosed in chaffy calyx parts that remain attached. This species is readily distinguished by the opposite leaves, branched stem and spiny bracts that are erect before flowering but then become reflexes and readily adhere to animals and clotting.

According to World Health Organization, medicinal plants are the best source to obtain a variety of newer herbal drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants. Therefore, such plants should be investigated to better understand their properties, safety and efficacy. The use of plant extracts and phytochemicals, both with known antimicrobial properties, can be of great significance in therapeutic treatments. In the last few years, a number of studies have been conducted in
different countries to prove such efficiency. Many plants have been used because of their antimicrobial traits, which are chiefly due to synthesized during secondary metabolism of the plant.

Achyranthes aspera L. (Family Amaranthaceae) is a common plant of the study area abundantly found in wastelands. It is known as “Prickly chaff flower” in English and “Chirchita”, “Onga”, “Latjeera” or “Apamarga” in local language and dialects. The plant is highly esteemed by traditional healers and used in treatment of asthma, bleeding, in facilitating delivery, boils, cold, cough, colic, debility, dropsy, dog bite, dysentery, ear complications, headache, leucoderma, pneumonia, renal complications, scorpion bite, snake bite and skin diseases etc…Traditional healers claim that addition of Achyranthes aspera would enhance the efficacy of any drug of plant origin.

Geographical source

Easily found anywhere in India on road sides or on the edges of field and waste places as a weed throughout up to an altitude of 2100 m and also in South Andaman Islands Some other places in the world also we can found this plant like in Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America.

Morphology

Achyranthes aspera L locally is one of the most important traditionally used antifertility plants in the indigenous health care delivery system of Ethiopia. It is a stiff erect perennial herb of 1 to 3 feet with simple elliptic leaves. The ex-tracts of leaves, roots, and seeds of the plant have been used for control of fertility, in placental retention, and in postpartum bleeding. The preliminary study on leaves extract of the plant had shown some antifertility effect. Flowering time of this plant is in summer. The stems are square, leaves elliptic ovate or broadly rhombate. The inflorescences are 8 - 30 cm long, with many single, white or red flowers,3 - 7mm wide .The plants is widespread in the world as a weed, in Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America. In the northern part of India it is known as a medicinal plant in different systems of folk medicine. Achyranthes aspera L, a stiff erect herb, has been reported to possess medicinal properties.
Miscellaneous pharmacological activity of Achyranthes aspera.

Numerous aliphatic compounds have been reported from the seeds and the shoots of A. aspera [1, 2]. Asia, South America and Africa and is commonly used by traditional healers for the treatment of fever, especially malarial fever, dysentery, asthma, hypertension and diabetes. The dried herb is used to treat children for colic and also as an astringent in gonorrhea treatment. Leaf extracts are reported to posses’ hypoglycemic thyroid stimulating and antiperoxidative properties. A Saponins isolated from the seeds of the plant was observed by us to cause increase in force of contraction of isolated and intact hypo dynamic heart [3]. The saponins in general are known to cause diuresis on intravenous administration it was of interest to investigate the effect of the Saponins of A. aspera on urinary ecretion in normal animals on intramuscular and oral administration [4]. Several studies on medicinal plants, foods and beverages rich in Phenolic compounds, flavonoids and triterpenoid with antioxidant activity have been described, addition of synthetic antioxidants restricted because of their health risks and toxicity [5]. Literature survey revealed that chemical constituents like flavonoids, triterpenoid, polyphenolic compounds and steroids are responsible for antioxidant activity and these chemical constituents were reported in the methanolic extract of aerial parts of Achyranthes aspera [6, 7]. DPPH antioxidant assay is based on the ability of 1,1-diphenyl-2-pirclylhydrazyl (DPPH), a stable free radical, to decolorize in the presence of antioxidants. The antioxidative effect is mainly due to Phenolic components, such as Phenolic acids, Phenolic diterpenes and flavonoids [8, 9]. The chromatographic fractions were all tested on Day 6 of pregnancy, and laparotomy was performed under ether anesthesia, usually on Day 10 but sometimes earlier [10]. Plants with estrogenic property can directly influence pituitary action by peripheral modulation of LH and FSH, decreasing secretion of these hormones and blocking ovulation [11]. On the other hand, plants with anti-estrogenic activities intercept in the process of synchronized development of ovum and endometrium, still others have abortifacient or anti-progestational effects [12]. It is well established that plants action on ovarian uterine axis can provoke change in the pattern of reproductive cycles [13]. Several studies on medicinal plants, foods and beverages rich in Phenolic compounds, flavonoids and triterpenoid with antioxidant activity have been described [14, 15]. Present communication, dealing with medico botanical uses of A.aspera in treatment of gynaecological disorders, is part of an extensive study conducted in five districts of western Uttar Prades viz., Aligarh, Badaun, Bulandshahar, Farrukhabad and Hatharas [16, 17, 18, and 19]. In indigenous system of
medicine, whole plant exploited for the treatment of renal dropsy, bronchial affections and leprosy [20]. Some pharmacological properties as diuretic, anti-inflammatory, antifungal, abortifacient, larvicidal, hypoglycemic, antifertility and anticancer were reported [21,22]. Literature survey revealed that chemical constituents like flavonoids, triterpenoids, polyphenolic compounds and steroids are responsible for antioxidant activity and these chemical constituents were reported in the methanolic extract of aerial parts of Achyranthes aspera. [23,24]. Acute lead poisoning occurs at high levels of exposure, causing symptoms of blindness, brain damage, kidney disease, convulsion and cancer[25]. A. aspera leaves have been assessed for cancer chemopreventive activity[26]. A.aspera extract induced changes in thyroid hormone concentration[27]. Aspera contain immuno stimulatory compounds in root extract[28]. A. aspera used for Biological control. The present study describes the potential of a mealy bug species in controlling the two wasteland weeds viz. Aspera and X.strumarium under natural field conditions. Mealy bug on Achyranthes aspera[29] found a lot of pharmacological activity. It shows 100% postcoital antifertility activity. No toxic effects were observed. Oral administration of the ethanol extract at 200 mg/kg body weight caused a significant increase in uterine weight in immature rat. It appears that the ethanol extract has significant estrogenic activity when given alone. However, the ethanol extract did not show any antiestrogenic activity when given along with ethanol estradiol at the tested dose. Mobile phases of different composition were tested for HPTLC analysis of Achyranthes aspera samples and oleanolic acid in high resolution and reproducible results. The desired objective was achieved by use of toluene: ethyl acetate: formic acid (4.5:0.5:0.1 v/v) as mobile phase, which gave a peak at RF 0.20 for oleanolic acid. Shows the HPTLC profiles obtained from the methanol extracts of Achyranthes aspera roots and leaves. The present study reveals that this species alone has the potential to be used as a biocontrol agent against X.strumarium.

Toxicity

Toxicity is the fundamental science of poisons. The organization for Economic and Development (OECD) mentioned acute toxicity as the advance effect occurring within a short time of oral administration of a simple dose of a substance or a multiple doses given within 24 hours. Phytochemical interactions of poisons lead to injury or death of living tissues. Toxicology is like science and an art like medicine. It includes observational data gathering and data utilization to
predict outcome of exposure in human and animals. The ancient humans categorized some plants as harmful and some as safe.

All organisms are always exposed constantly and unavoidably to foreign chemicals or xenobiotics, which include both manmade chemicals such as drugs industrial chemicals pesticides, pollutants pyrolysis products in cooked foods, alkaloids secondary plant metabolites, and toxins produced by moulds, plants and animals. Poisons are any agent capable of producing a deleterious response in a biological system, seriously injuring function or producing death. Toxicologists usually divide that exposure of animals into four categories which are acute, sub acute, sub chronic and chronic toxicity. The aim of the present work is to study the toxic nature of Achyranthes Aspera L leaves powder as well as methanol extract.

**Hepatoprotection**

Achyranthes aspera is a very important plant for its large number of medicinal properties as well as medicinally important chemicals like ecdysterone, achyranthine, betaine, p entatriaontane, 6-pentatriacontanone, hexatriacontane and tritriacontane. The plant shows many pharmacological activities like spermicidal, anti-allergic, cardiovascular, nephroprotective, antiparasitic, hypoglyceamic, analgesic and antipyretic. Many traditional uses are also reported like antipatriotic, purgative and laxative, in various types of gastric disorders and in body pain which are being studied till today and further research has to be done.

Achyranthes Aspera L is an important medicinal plant, an erect annual herb found throughout in India and other tropical countries. It is a well recognized plant in the traditional medicine and was used by people in rural areas for cold, cough, colic, debility, dropsy, dog bite asthma, bleeding and gynecological disorders. Achyranthes aspera L leaves were collected from Avsari Forest Park (Pune), identified from BSI (Botanical survey of India), Pune. The required quantity of plant material was then carefully segregated, cleaned and dried in shade to constant weight, sieved through a BSS Mesh No. 85 sieve, stored in an air tight container and used for acute toxicity study.

Liver disorders constitute a major health problem in India. There is dearth of effective modern drugs for the treatment of liver disorder, like Jaundice. Many herbal preparations have been marketed for the same.
The current investigation on Achyranthes Aspera L as to the hepatoprotective activity was undertaken as an extension of my earlier work on Argemone Mexicana, centella asiatica, ricinus communis and tonospora cordifolia.