A comprehensive review on traditional uses, chemical compositions and pharmacology properties of *Achyranthes aspera* (Amaranthaceae)

Kapil Kumar Verma*, Akanksha Sharma, Hans Raj, Bhopesh Kumar

School of Pharmacy, Abhilashi University, Mandi-175028, Himachal Pradesh, India

**INTRODUCTION**

Ayurveda is most used system from ancient time, as a medicinal purpose. Ayurveda is maximum known throughout the worldwide for cure and treatment of various diseases of human beings. It may provide a healthy and safest life. Nature gives many of medicinal plants which may be used in higher scale and most effective against any of diseases. There are many medicinal agents in nature which may be used from thousands of years. Natural medicinal plant may isolate and new property of the plant has been used for further medicinal investigation. From Ayurveda medicine was got achievements of ancient Indian civilization. Ayurveda may give importance to medicinal drugs and secondly to the physician which may give treatment to humans.

In present years, interest in Ayurvedic system of the people increasing day by day because of its good effects and no side effects against the disease. By increasing population the demand of herbal drugs also increasing. All the herbal may formulate according to the Indian Pharmacopeia of Ayurvedic system. Maximum of herbal plants formulations used for their accuracy and efficacy, or easily available throughout the world. Focus on the plant is increasing per day. Green plant may use from the ancient times. These are healthier than that of the synthetic products with less toxic effects. Plants are safe, new and biodegradable drugs.

Herbal plants may use from the ancient time and also used for the antibacterial activity. All plants may have the medicinal properties. Antioxidative properties are involved in *A. aspera* plant. With presence of phenolic and flavonoids constituents it may antioxidative properties in it. Natural antioxidants may protect the human from free radicals, and all the harmful disease like cancer, infections, cardiovascular diseases, and all chronic diseases etc. Natural antioxidants may be good effective and have the less toxic effect than that of other components. Synthetic antioxidants are only effective for the outsource oxidative products and used in pharmaceutical companies. This activity may have the good effect on human than of synthetic antioxidants and cure for all diseases on health care of the human.

*Achyranthes aspera* belonging to family Amaranthaceae is an herb which may grows all over the worldwide. Traditionally known as Apamarga. It is an annually based plant. An erect herb which may have height around 2.0m and 1000m in height. This plant is found in world Ceylon, Tropical Asia, Africa, Australia, America, and India. *Achyranthes aspera* is used for its medicinal property throughout the world. Leaves of the plant elliptic ovate and 22 cm long and...
Achyranthes aspera shows different activities of various diseases such as hepatoprotective 11, anticancer 12, anti-inflammatory, anti-arhritic 13, thyroid stimulating, antiperoxidative, abortifacient, anti-laprotric, immunomodulators 14, contraceptives 15etc. Different parts of the plants is used to cure various diseases like leprosy, asthma, arthritis, wound, snake bite, dermatological diseases, cardiac disease, kidney stone, gynecological disorder, malaria, gonorrhea, pneumonia, dysentery, rables, toothache etc. There are many phytochemicals constituents present in Achyranthes aspera which may use to cure various ailments. The constituents are alkaloids, saponins, glycosides, edysterone, cardiac glycosides etc.

MORPHOLOGY

Achyranthes aspera is an annual herb which may use for this medicinal property throughout the world. Leaves are simple 1-3 feet from stem 16. Stamens are double in shapes17. Stomata are anomiosities 18, embryology is seen, indorse type of anther, many covering structures. Vascular and medullar bundles also founds, and cambium 19,20. Root - Cylindrical Shape 1.0cm in diameter. Divided into two parts secondary and tertiary roots. Leaves - Simple and ovate, Opposite, velvety, Elliptical. Flowers - Bracteolate, green or red, bracteates, spikes shape. Petals - 2 petals in spikes green or white coloured. Fruits - fruits stored in utricle and dry. Seeds - smoothmed and curved embryo, Alminous. Androecium - 5 stamens with corolla lobes. Gynoeicium- ovary is superior and having 2 syncarpous 21. 

DISTRIBUTION

Apamarga found in whole world in different regions .Mostly found in tropical and warmer regions of the world 22. This plant is mainly found in world Ceylon, Tropical Asia, Africa, Australia, America, and India 23. It is found in India state Himachal Pradesh as a Shivbari sacred grove 24,25. Medicinal plant used in Ayurveda system. A vegetation of Apamarga also found in Karachi and Pakitan 26.

Taxonomical Classification

Botanical Name Achyranthes aspera
Kingdom Plantae
Divisions Mangolipside
Family Amaranthaceae
Genus Achyranthus
Species Aspera

USES

Achyranthes aspera has been used for ayurvedic medicines. Used for diuretics, dermatological disorders, gynecological disorders 27, induce labor pain, genitalia 28, etc. Mainly used for the renal leprosy, cough 29, scrofula, fistula, skin rash, nasal infection 30, chronic malaria, fever, asthma 31, piles, snake bites, diarrhea, cold, menstrual disorders 32, astringent for wound healing, cancer 33, etc. All parts of the plant may useful for the diseases. Leaves, stem, bark, all have medical properties 34. For kidney stone and skin eruptions, allergy 35, snake bite, diabetes, renal failure. Many of the formulations are made for different diseases juices also treat ophthalmic and dysentery 36. Also used for the antifertility, induced the abortion, bleeding, renal complications, scorpion bite, boils, hemorrhoids, rheumatism, itches, toothache, nervous problems, hystery etc. 37 From ancients times it may be used for the temple worship For Ganesh Chathurathi, In Shiva pujan leaves are used and known to be good sign for luck 38. Plant have ash used to treat ulceritis 39. Roots used for vomiting. Also used to cure pneumonia by boiled the leaves of the plant 40. Tranquilizing properties also occurs 41. Used in different formulations like soaps, perfumes, dental products, prepared food and beverages etc. 42.

PHYTOCHEMICAL SCREENING

Medicinal plants may used for various disease which may have different constituents involved. They constituents are responsible for curing the diseases either that is chronic or short term. Some of secondary metabolites present alkaloids, phenols, glycosides, tannins, saponins, terpenoids, flavonoids etc. Some of essential oils which have therapeutic agents. Most of the constituents may present and used for the diuretic, purgative, laxative, hepatoprotective, antiasthmatic, cough, diarrhea, ulcers, piles etc.

Achyranthes aspera may have many chemical constituents which may responsible for many diseases. Glycosides, saponins, carbohydrates, alkaloids, cardiac glycosides, amino acid, edysterone, hemiracintane may present in the plant 43. It may have saponín A and B. Oleonalic acid extracted from the roots of the plant. Some of sugars compound also present such as L-rammose, D-glucose etc. 43. Amino acid, edysterone, hentriacontane etc. may extract or isolated from the seeds of the plant. All the parts of the plant may have many of constituents known as dihydroxycetone, 36,37-dihydroxypentacoten-4’-on and tricotenol,27-cyclohexyleptaocone-7-ol and 16-hydroxy-26-methyl heptaocone-2-on are extracted from the shoots of the Apamarga 44. Yellow semi solid formulation may extract from the petrol extract of shoots by this the aliphatic alcohol that is 17-pentatriacetonol may contain 45. Methanol extract of the plant may Edysterone and phytoedysone may contain and show the reaction by its colour 46.
Apamarga is also a good source of minerals and vitamins. It may also contains magnesium, sodium, phosphorous, potassium, chloride etc. In Vitamins Vitamin-B and Vitamin-C are present in heavy amount. Generally minerals, vitamins, proteins, fibers, carbohydrates etc. may found. Rich source of fibers and flavonoids also present which give antioxidant properties. Anti-cancerous compounds may present and listed in USDA for this cancer activity. Essential oils may found in less amount and harmful for pregnant lady. It may contain volatile oil such as tritrecontane, betane, achyranthene and long chain alcohols. Apamarga seeds may contains oils that shows presence of fatty acids. The essentials which may found in the plant are 3-acetoxy-6 benzoxyapangamide, β-sterol, trans-13-doxynoeic acid, n-hexacos-14-enoic, tetracontanol, strigasta, tricosanone. Bisdesmosidic saponins also present in the plant β-d-glucofuranosyl, 3β-[O-α-l-rhamnopyranosyl(1→3)]-O-β-d-glucofuranosyl, β-D-glucopyranosyl, 3β-[O-β-d-galactopyranosyl(1→2)]-O-β-d-glucofuranosyl, machaerinate, β-D-glucuronosyl ester of α-L-rhamnopyranosyl (1→4)-β-D-glucuronopyranosyl (1→3)-oleanolic acid and β-D-glucuronopyranosyl ester of α-L-rhamnopyranosyl (1→4)-β-D-glucuronopyranosyl (1→4)-β-D-glucuronopyranosyl (1→3)-oleanolic, sapogenin, etc.
PHARMACOLOGICAL ACTIVITIES

Anticancer Activities - Various investigation of Achyranthes aspera show effect against cancerous activities. This investigation may test on Swiss albino mice which may treated with the mineral oils. Flowers and leaves part were tested for antitumor activities. The crude extract of the plant doses may give to the mice at different concentration. The ether extract may give the positive effects against tumors more than other extracts.

Antimicrobial Activities - For antimicrobial activity the plant may extract out from the petroleum ether, methanol etc. and treated with dimethyl sulphoxide at different concentrations. The root extract of the plant may show the less effect on gram positive bacteria and show high effect against the gram negative bacteria. At different concentration or different extracts may give antimicrobial activity and antifungal activity also.

Anti-diabetic Activities - Ethanolic extract may formed to check the diabetes mellitus and tested on albino ice which may have diabetes. By checking random sugar it may have the high glucose level of the albino rat. The ethanol extract may give to mice and it may show effect against the diabetes.

Diuretic Activities - Albino rats may used for this activity, they treated with the extract at different doses 10,30 and 50mg by Intraperitoneal routes. And the results found that extract of the plant may give the effects against the diuretic and also increase the flow of the urine.

Hepatoprotective activity - Ethanolic extract of the seed of the plant may test in rats. Carbon tetrachloride doses may induce the liver administered to rats. Serum level may test of rats and some of inhibition takes place then the ethanolic extract administered to rats with standard drug silymerin. This may results the good effects hepatoprotective activity.

Antioxidant activities - Apamarga may have many of constituents which may have antioxidants properties. By all these constituents the plant may have antioxidant effects. It may investigate by methanolic extract of the plant including DPPH methods for antioxidant. Some of flavonoids may present in constituents of the flower and leaves part of the Apamarga which gives effect of antioxidants.

Anti-inflammatory activities - This plant may also have the inflammation inhibiting properties by presence of some constituents in it. In this ethanolic extract of the plant may induced to the rats model at different concentrations which have inflammation. After some days the inflammation of rats may decreases then the results may shows that the plant may have also anti-inflammatory effects.

Antiarthritic activity - Ethanolic extract of the plant with standard drug diclofenac sodium may use in this investigation. The flower part may use. Different concentration of ethanolic extract and standard drug of diclofenac may induce the arthritis effect. Constituents which may use for this are tannins and flavonoids.

Cardiovascular activities - This plant may also investigate the cardiac diseases. By presence of the Achyranthine, saponins, alkaloids may leads to cure the heart rate, lowering Blood pressure, depression of heart, increasing rate of respiration in dogs. Hence the results may show the cardiovascular activities of Achyranthesaspera.

Prothyrodic activity - Rats may used to investigation for this activity. The plant extract of the plant may decrease the thyroid in rats due to tannins and saponins. It also decreases lipid peroxidation.

Immuno Modulatory activity - From many investigation Immuno Modulatory activities may found in Apamarga. Increase of induction of OVA-specific antibody response in a dose. An hydro alcoholic extract reported to stimulate the immune system and increase the phagocytic. Then its shows the Immuno Modulatory effects.
Antihelminthic Activity—This study may test on earthworm. By using ethyl acetate, ethanol and crude extract of the plant at various concentration. Albendazole may be used as a standard. Ethanolic extract may show the good effects against the antihelminthic activity 61.

Antiviral Activities—Invitro methods investigated for antiviral activities. Methanolic extract of leaves may inhibits the virus Epstein-Barr by antigen which may induced the tumor. Non polar compounds may exist in this which may leads inhibitory activity 12.

Antiamoebic and Anti fertility—Decoction procedure may lead to test the antifertility activity. Root part of the plant may use to these activities, buttermilk as antifertility drug 62. And it also shows anti-spermicidal activity 63.

Blood Pressure—Root part of the plant may leads to decrease B.P. while the higher B.P. takes place due to chloroform extract 44.

Post Coital antifertility activity—This investigation may test on rats, ethanolic extract of the drug may be used which may showed the implantation and didn’t deliver litters. Anlaparotomy may apply on rat at 25th day which may show the implantation and reabsorption. It proved that ethanolic extract of the plant may have antifertility activity 7.

Estrogenic Activity—The invito method on immature rats was investigated by the ethanol extract of the plant. It may increase the effect uterine weight in rats. The weight of uterus is high checked by the urotrophic potency, than ethinylestradiol. The potency of urotrophic may increase and decrease of uterus in control rats. Uteri may inflated in estrous uterus. Rats which may treat with the extract may open vagina 7.

Larvicidal Activity—Root extract may used to show more larvicidal activity on Boophilus microplus. Saponins may tested against Aedesegypti. The ethyl extraction may be show positive against Aedespictusmosquitoolarvae. Essential oil of leaf of A.aspera may extract out were showed the larvicidal activity and the extract of the plant may positive effect against Aedesegypti 85.

Hypolipidemic Activity—Extract of aspera may shows effects against rats. Diseases lower cholesterol, phospholipids, Serum cholesterol, triglycerides, total lipids etc. may cure by the alcoholic extraction of the plant. Rats which may have the hyperlipidemia was tested for this procedure. Sesame oil which may present may show the lipid peroxidation. Rats may be used for this till 30 days by TC, PL, and CG etc. Extract administered to rats at different concentration and show the effect against the lipids. Excretion from faces and choric acid increases by these doses. By low absorption it may show the action against cholesterol 86.

Analgesic and Antipyretic Activity—This may be investigate by brewers induced methods by using aspirin as a standard drug. Ethanolic extract of A. aspera may study. Leaves and Seeds extract may have analgesic activities. Roots also have the analgesic activities which may show in the albino rats by using the aspirin as a standard drug. The different doses may administer to the rats which showed the more effect of analgesics 67.

Wound Healing Activity—Some of wounds may treat with methanol extract ointment. Ethanolic extract of A. aspera may also have the wound healing activity. Excision and incision wound model may was studied for effect of the drug against Wound Healing Activity 68.

Cardiac Activity—Saponin may present into the plant which give cardiac activity. When the heart may increase the contraction and intact hypodynamic, then the leaf part of the plant may investigate to cardiac activity. Achyranthine may show the increasing and decreasing the rate of the heart rate, contraction of the heart, depression of heart etc. Saponins present in the plant may show the effect against the cardiac diseases 69.

Renal Disorders—Calcium oxalate, calcium carbonate, calcium phosphate may found in urinary stones. Methanolic extract of the plant may use for inhibit this and prevent nephrotoxicity in rats. Roots of the plant may used for the urine stones and it may show the good effects against calcium oxalate, calcium carbonate, calcium phosphate etc 70.

Spermicidal Activity—Roots of the plant may used to report activity of spermicidal in humans and rats too. Chloroform extracts, hydroethanolic extracts show effect against the spermicidal. Sperm vitality, sperm immobilization, acrosome status, nuclear chromatin may involved into this studied 71.

Antidandruff Activity—Coumarins a constituent may present into this plant may give the property of antidandruff. It may have polyherbal oil by the methanolic extract of the plant. Constituent also acts against the growth of Pityrosorumovale and reduce the dandruff 68.

Antidepressants Activity—Rats administered by the various dose concentrations of Methanolic extract of the plant. Oral dose of the extract may effective to reduce the depression and immobility time 72.

Miscellaneous pharmacological activities—

Achyranthes aspera is used traditionally for medicinal uses all over the world. This plant may treat many disorders like fever, malarial, asthma, dysentery, asthma, diabetes etc 73. It may used for many pharmacological activities. All the parts of the plant may used to treat various diseases 74. Many of Phytoconstituents may present in the leaf, root, leaves, flower extract of the plant 75. All the extracts may give effects on the different activities such as, antioxidants, anthelmintic, antiviral, antifertility, blood pressure, cardiac, diuretics etc 86. This medicinal plant may used to food and beverages, perfumes, soap preparation etc 76. Many of constituents responsible for these activities. Tannins, Saponins, Flavonoids, proteins, sugars, triterpenoid etc 77 used for antioxidants 78. This antioxidant activity is affected through the methanolic extract of the A. aspera 79. DPPH assay may use to investigate the antioxidant property 80. Phenolic compounds give the antioxidant properties for the plant 81. Ovalulation may block through the estrogenic property which may affects pituitary by FSH and LH 82. Ant estrogenic activity may takes place which is responsible formation of ovum. A. aspera may also use in gynecological disorders 83. Also used in leprosy, bronchial infections, cough etc. For carcinogenic diseases it may give better effects. It may helps to decrease the thyroid hormones 84,85.

CONCLUSION

Ayurveda may give importance to medicinal drugs and secondly to the physician which may give treatment to humans. Achyranthes aspera belonging to family Amaranthaceae is an herb which may grows all over the worldwide. Traditionally known as Apamarga. Complete parts of the A. aspera may study thoroughly and found that drug used widely as a medicinal plant. This plant is found in world Ceylon, Tropical Asia, Africa, Australia, America, and India. Achyranthes aspera shows different activities of various diseases such as hepatoprotective, anticcancer, ant
inflammatory, arthritic, thyroid stimulating, antiperoxidative, abortifacient, anti lactic, immunomodulators, contraceptives, Larvicidal, spermicidal, antidiarrheic, analgesic, hypolipidemic, hypoglycemic, cardiovascular, nephrotoxicity. Different parts of the plants is used to cure various diseases like leprosy, asthma, arthritis, wound, snake bite, dermatological diseases, cardiac disease, kidney stone, gynecological disorder, malaria, gonorrhoea, pneumonia, dysentery, rabies, toothache etc. There are many phytochemicals constituents present in Achyranthes aspera which may used to cure various ailments. The constituents are alkaloids, saponins, glycosides, ecodystereon, cardiac glycosides, fatty acids like Myristic acid, palmitic acid, stearic acid, arachidic acid, oleic acid, linoleic acid. All investigation of the plant may have clinical trials and research more things about this. This plant may be investigated on the next level for a novel drug system.

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