



A Review on *Achyranthes Aspera*: A Traditional Medicinal Plant

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ABSTRACT-

Achyranthesaspera is the important medicinal herb found as weed throughout tropical region of Nepal. It belongs to the family *amaranthaceae*. It is known as *dattivan* in nepali, *Apamarg* in Sanskrit, *prickly chaff flower* in English and *Naayuruvi* in tamil. The medicinal plants are used for treatment of various diseases because of their safety and effectiveness. Though almost all of its parts are used in traditional systems of medicines, seeds, roots and shoots are the most important parts which are used medicinally. Plant resources constitute an important natural wealth of Country. They play a significant role in providing primary health care service to rural people in addition large number of economic products. In contain secondary metabolites like alkaloids, glycosides, tannins, terpenoid, flavonoid, phenol, volatiles oils and many more compounds with serve as important therapeutic agents. *Achyranthesaspera L (Amaranthaceae)* is an important medicinal herb found as a weed throughout India. *Achyranthesaspera* is preinal herb belonging to family *Amaranthaceae*. Wide numbers of phytochemical constituents have been isolated from the plant which possesses activities like antiperiodic, diuretic, purgative, laxative antiasthmatic, hepatoprotective, anti-allergic and various other important medicinal properties. Traditionally, the plant is used in pneumonia, diarrhea, dysentery, asthma, cough, dropsy, ulcers, piles, rheumatism, scabies snake bite and other skin diseases. It contains the phytochemicals like oleanolic acid, Saponin A and saponin B

INTRODUCTION:-

Knowledge of herbs has been handed down from generation to generation for thousands of years. Herbal drugs constitute a major part in all traditional systems of medicines. Herbal medicine is a triumph of popular therapeutic diversity. Plants above all other agents have been used for medicine from time immemorial because they have fitted the immediate personal need, are easily accessible and inexpensive. In the recent past there has been a tremendous increase in the use of plant based health products in developing as well as developed countries resulting in an exponential growth of herbal products globally. An upward trend has been observed in the research on herbals. Herbal medicines have a strong traditional or conceptual base and the potential to be useful as drugs in terms of safety and effectiveness leads for treating different diseases. World Health Organization has made an attempt to identify all medicinal plants used globally and listed more than 20,000 species. (SaurabhSrivastav^{et.al.2011})

According to the WHO more than 80 % of the world's population relies on traditional herbal medicine for their primary health care. Plants continue to serve as possible sources for new drugs and chemicals derived from various parts of plants. In recent time the re has been a marked shift towards herbal cures because of the pronounced cumulative and irreversible reactions of modern drugs. However, due to over population, urbanization and continuous exploitation of these herbal reserves, the natural resources along with their related traditional knowledge are depleting day by day. (SaurabhSrivastav^{et.al.2011})

Approximately 36000-68000 herbal variety resources are helpful for treatment of various diseases in the world. *Achyranthesaspera* is a very essential herbal plant. It responsible for treat the various condition of the disease and disorder. It Common name is Bird weed and family *Amaranthaceae*. An herbal remedies is found in India. Herbal medicines are available in very low cost and safe for health system. All part of *Achyranthesaspera* plant are very useful. It is very needful for reduced the depression condition. It is use for the treatment of arthritis, various infectious disease, Polyp, diabetes, anxiety, Parkinson's disease, depression, bronchitis, Eye infections, snake bites and healing the wound. *Achyranthesaspera* is consist chemical constituents like achyranthine, ecdysterone, oleanolic acid, Spinasterol, apigenin, achyrantheric acid, ursolic acid, corrosolic acid, Betain etc. Nitrogen containing, complex form of phenol, Isoprenoids, Flavanoids and steroids are produced activity against microbes. Ursolic acid & Corrosolic acid is responsible for anti - carcinogenic activity. Phenol containing compound and Flavanoids are gives activity against the oxidant. As reported that during ancient times it was used on daily basis home remedies in Tamilnadu. It produced many activities in prevent the liver disease and it is also consist of various activities like antimalarial and as immune system stimulant. *Achyranthesaspera* having activates against asthma, Allergy, Anal bleeding, Joint pain and dermal disease. The leaves and seeds of *Achyranthesaspera* provide the protection against the UV-B radiation in Asian catfish *clariasbatrachus*. It is used in form of herbal tea for reduced blood glucose level in albino wistar rat. The seeds of *Achyranthesaspera* contains ethanol, show activity against obesity. It consist some minerals like sodium, potassium, magnesium, calcium, manganese, copper, zinc and iodine which is protect from the heart problem in human and animals.

Scientific Classification :-

- Kingdom: Plantae
- Subkingdom: Tracheobionota
- Super Division: Spermatophyta
- Division: Mangoliophyta
- Class : Mangoliopsida
- Subclass: Caryophyllidae
- Order: Caryophyllales
- Family: Amaranthaceae
- Genus: Achyranthes
- Species: Aspera

Vernacular Names :-

- Latin: Achyranthesaspera
- English: Prickly Chaff flower, Rough chaff tree, Red chaff tree
- Sanskrit: Aghata
- Hindi: Latjira, Chirchira
- Gujarati: SafadAghedo
- Tamil: Shiru-kadaladi
- Telugu: Uttaraene
- Malayalam: Kadalad
- Punjabi: Kutri Unani: Chirchitaa
- Ayurvedic: Apaamaarga, Chirchitaa, Shikhari, Shaikharika

Geographical Distribution :-

It is found on road sides, field boundaries and waste places as a weed throughout India up to an altitude of 2100 m and in South Andaman Islands . The plant is also widespread in Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America. It was reported as an invasive alien species in northern Bangladesh . It was found to be the most prevalent herb in Shivbari sacred grove of Himachal Pradesh, India and an exotic medicinal plant of district Lalitpur, Uttar Pradesh, India (Navjeet Singh *et.al*2019)

THERAPEUTIC USES MENTIONED IN AYURVEDIC PHARMACOPOEIA :-

The dried plant is used in sula (colic), udararoga (diseases of the abdomen), apaci (lymphadenitis-cervical), arsa (haemorrhoids), kandu (itching), medroga (obesity). The dried root of the plant is used in chardi (vomiting), adhmaana (tympanitis), kandu (itching), sula (colic), apaci (lymphadenitis), granthi (tumor), bhagandara (fistula-in- ano), hrdraroga (disease of heart), jwara (pyrexia), switra (leucoderma), vadhira (deafness), udararoga (diseases of the abdomen), yakrtroga (disorders of the liver), dantaroga (disease of tooth) and raktavikara (blood disorders). (Bhoomika R. Goyal^{et.al} 2007)

THERAPEUTIC USES AS DEPICTED BY ETHNOBOTANICAL STUDIES :-

The plant is used in dropsy, piles, skin eruptions, colic, as a diuretic, astringent and purgative (10, 11, 12); as an antidote to snake bite (13); in fractured bones (14, 15, 16); whooping cough, respiratory troubles (17); for asthma (7, 18); as a laxative (4) and in leucoderma (19). The inflorescence is used in cough (20) and in hydrophobia (16). Fruit is used in hydrophobia (4). The seeds are employed as an emetic, purgative, and cathartic, in gonorrhoea, for insect bite and in hydrophobia (7, 10, 11, 18, 21), cough including whooping cough , as an anti-asthmatic . The leaves are used in wounds, injuries (22); in intermittent fever, as an antiasthmatic, for urination, dog bite (14, 16) and in typhoid (23). The root is used in whooping cough, tonsillitis (14, 16), haemorrhage (19), cough and hydrophobia, as an antiasthmatic (21), diuretic, diaphoretic, and antisiphilitic (10). (Bhoomika R. Goyal^{et.al} 2007)

Botanical Description :- Aspera as a Stiff Erect Herb :-

- **Height:** 0.2-2.0 m high. The base is woody, angular or ribbed, simple or branched, nodes are bulged, often tinged with pink color.
- **Root:** Cylindrical root, 0.1-1.0 cm in thickness, slightly ribbed, gradually tapering, yellowish-brown in color, secondary and tertiary roots present.
- **Stem:** Square, yellowish-brown, branched, hairy, erect, cylindrical, solid, and hollow when dry.
- **Leaf:** Simple, subsessile, slightly acuminate estipulate, wavy margin obovate, petiolate or elliptic, ovate or broadly rhombate, opposite, decussate, and pubescent due to the presence of thick coat of long simple hairs. 5-22 cm long with 2-5 cm broad. Occur in various sizes. Type of stomata are present on the lower epidermis is anomocytic.
- **Flower:** Arranged in long spikes form in inflorescences, 8-30 cm long, 3-7 mm wide, bisexual greenish-white, numerous, sessile, bracteate with two bracteoles, one spine lipped, actinomorphic, hypogynous, 5 perianth segments, membranous, 5 stamens, short filament, anther, two celled, 7 gynoecium bicarpellary, syncarpous, ovary superior, single ovule; style, single stigma, white or red flower. Flowers appear during summer.
- **Fruit:** An indehiscent dry utricle enclosed within bracteoles, persistent, and perianth.
- **Seed:** These are round at the base, sub-cylindric, truncate at the apex, endospermic, brown coloured.

Phytochemistry :-

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.

Achyranthesaspera may have many chemical constituents which may responsible for many diseases. Glycosides, saponins, carbohydrates, alkaloids, cardiac glycosides, amino acid, ecdysterone, hentriacontane may present in the plant (5). It may have saponin A and B. Oleonic acid extracted from the roots of the plant. Some of sugars compound also present such as L-rhamnose, D-glucose etc.(43). Amino acid, ecdysterone, 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 dihydroxyketone, 36,37-dihydroxypentacantan-4on and tricontanol, 27-cyclohexylheptacosane-7-ol and 16-hydroxy-26-methyl heptacosane-2-on are extracted from the shoots of the Apamarga44. Yellow semi solid formulation may extract from the petrol extract of shoots by this the aliphatic alcohol that is 17-pentatriacontanol may contain45. Methanol extract of the plant may Ecdysterone and phytoecdysone may contain and show the reaction by its colour.

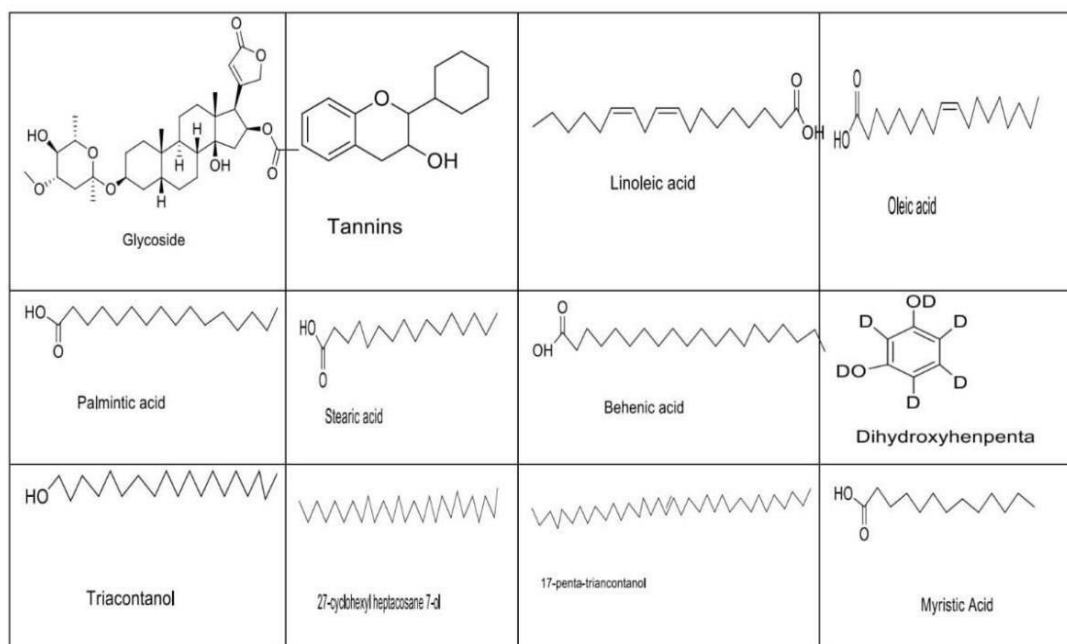
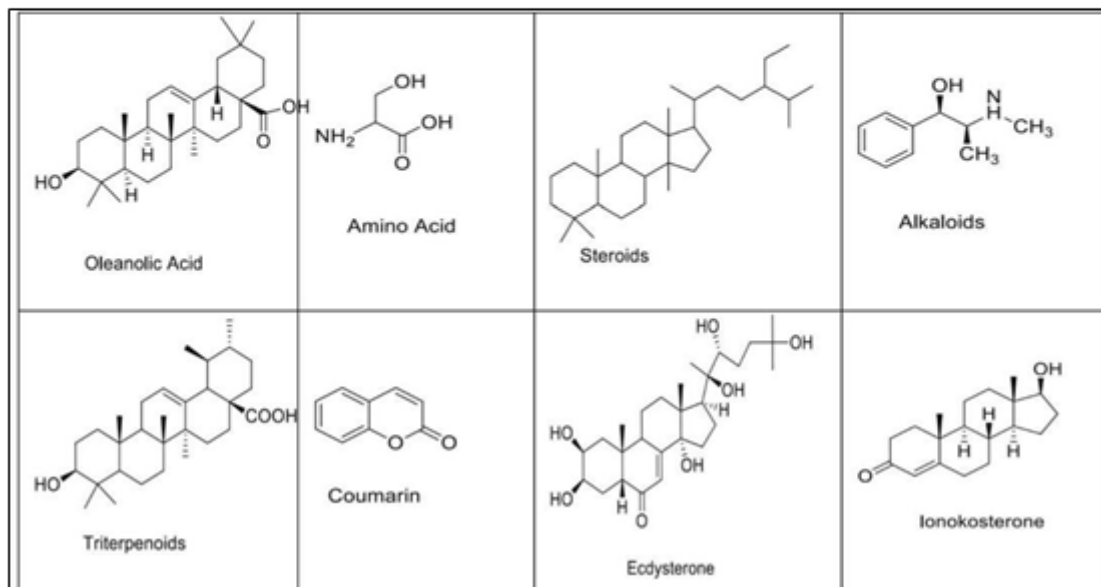
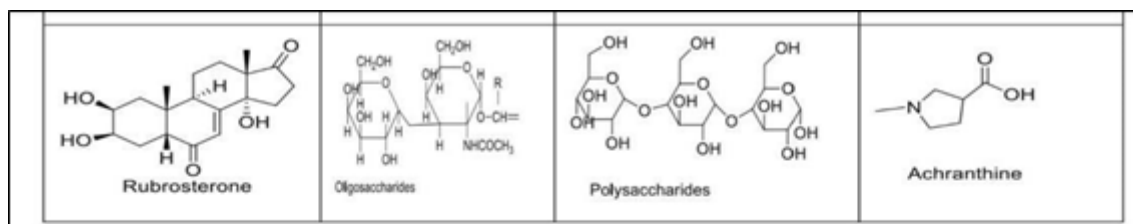
Plant Parts	Chemical Constituents
Roots	Oleanolic Acid, Amino acid, Steroids, Alkaloids, Triterpenoids, Coumarins, Ecdysterone, Ionokosterone, Rubrosterone, Oligosaccharides, Polysaccharides, Achyranthine, Glycosides, Tannins
Seeds	Linoleic acid, Oleic acid, Palmitic acid, Stearic acid, Behenic
Shoots	Dihydroxyhenpenta Triacontanol, 27-cyclohexyl heptacosane 7-ol 17-penta-triancontanol, 16-hydroxy-26-Methyl heptacosane-2-1. ²¹

Achyranthesaspera plant is very rich in phytochemicals. Seeds contain Saponin A and B. Saponin A was identified as D-Glucuronic Acid and saponins B was identified as

β Dgalactopyranosyl ester of D Glucuronic Acid⁴. Achyranthes seeds contain Oleanolic cosides present in three forms α -Lrhamnopyranosyl-(1-4)-

(β Dglucopyranosyluronicacid)(1-3)-oleanolicacid, α -Lrhamnopyranosyl-(1-4)-(β

Dglucopyranosyluronicacid)-(1-3)oleanolicacid-28-O- β -D-glucopyranosidean α Lrhamnopyranosyl-(1-4)-(β Dglucopyranosyluronicacid)-(1-3)-oleanolicacid-28-O- β -D glucopyranosyl-(1-4) β glucopyranoside). Saponin was indentified from the fruits and from stem Pentatriaontane, 6-pentatriacontanone, Hexatriacontane and Tritriacontane were isolated. Ecdysterone isolated from the methanolic extract of roots of Achyranthesaspera. Achyranthine a water-soluble alkaloid isolated from Achyranthesaspera which possess pharmacological actions like dilation of the blood vessels, lowering of the blood pressure, depression of the heart and increase the rate.



Pharmacological Activities :-

Blood pressure :-

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

Antimicrobial & Antifungal Activity :-

Several works have been carried out to evaluate the plant's antimicrobial and antifungal potential. The plant has been reported as a potent antibacterial agent. Antibacterial activity of seeds, ethyl acetate extract of the stem leaf extract ethanol and methanol extracts of the leaf and stem, ethanolic extract of the leaves and stem, aqueous flower extract. Antifungal essential oil has been found.

Both antibacterial and antifungal activity of petroleum ether, chloroform and methanol extracts of dried leaves have been reported. The plant was found to have antibacterial property against hospital origin gram positive bacteria. It is used as herbal antimicrobial finish for cotton fabric in healthcare textiles. The plant was evaluated against dental pathogens. Antibacterial activity of the plant could be due to tannins, saponins, flavonoids and alkaloids.

The extracts of *Achyranthesaspera* for antibacterial activity against various pathogenic strains such as *Eschericia coli*, *Pseudomonas aeruginosa*, *Citrobacter* species, *Bacillus subtilis* and *Micrococcus* species using disk diffusion and well plate method. Phytochemical characterization of *Achyranthesaspera* extracts was done by thin layer chromatography (TLC) techniques and other phytochemical analysis. It was found that extracts of *Achyranthesaspera* shows the maximum inhibition of *E.coli* (17 mm) followed by *Pseudomonas* species (14 mm), *Citrobacter* species (12 mm), *Bacillus* species (12 mm) and *Micrococcus* species (12 mm). (Navjeet Singh et.al 2019)

Anti viral :-

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. (Navjeet Singh et.al 2019)

Larvicidal Activity :-

Root extract was found to have pronounced insect molting hormonal activity. Ethanol crude extract showed high larvicidal activity on the tick larvae against *Boophilismicroplusl*. Larvicidalsaponins from leaf extracts have been tested against *Aedesaegypti* and *Culexquinquefasciatus*. Ethyl acetate leaf extract was found to be active against *Aedessubpictus*mosquitolarvae. The plant was mentioned to have activity in controlling mosquito larvae. Bioactivity of essential oils of leaf and stem extracted by steam distillation were found to be active larvicidal against *Aedesaegypti* and *Culexquinquefasciatus*. Leaf extracts of the plant have been reported to be active against *Aedesaegypti*. (Navjeet Singh et.al 2019)

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 arthritics effect. Constituents which may use for this are tannins and flavonoids. (Navjeet Singh et.al 2019)

Antifertility Activity :-

The plant has been reported extensively as an antifertility agent whole plant extracts have shown abortifacient effect in mice with maximal activity was in the benzene extract. The aerial parts of the plant were reported to prevent pregnancy in adult female rats. 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 benzene extract of the stem bark shows abortifacient activity in the rat. The ethanol extract of the root was found to be reproductively toxic and had spermicidal action in vitro and in vivo studies.

The ethanolic extract of the root of *Achyranthesaspera* shows post coital anti-fertility activity in female albino rats. The said extract exhibited 83.3% anti-implantation activity when given orally at 200 mg/kg body weight. (Navjeet Singh et.al 2019)

Anti- Cancerous Activity :-

The plant has been reported to have cancer activity and antitumor property. Non- alkaloid fractions of the plant were found to be valuable antitumor promoters. Leaves extracted in methanol were found to have inhibitory activity against human pancreatic cancer cells indicating its anti-proliferative and anti-cancer properties. Swiss albino mice induced by intraperitoneal injection of mineral oil was used to screen anti- cancerous efficacy of *A. aspera*. In vitro assay the non-alkaloid fraction containing only non-polar compounds showed themost significant inhibitor activity but in vivo stage mouse skin carcinogenesis tests the total methanolic extract possessed a pronounced anticarcinogenic effect.

(Navjeet Singh et.al 2019)

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. (Navjeet Singh et.al 2019)

Immunostimulant Property :-

Immunomodulatory activity of the plant on elicitation of antigen-specific murine antibody response has been reported. Same activity of the roots and potentiating antibody production in the fish, Labeorohita. Enhanced anti proteases in Labeorohita was found when aqueous root extract of *A. aspera* was incorporated. The seed of the plant was reported to enhance immunity of *Cyprinus carpio*. The plant has been an Immunostimulant and enhancer of the antigen clearance in Catla. Immunostimulatory compounds in seed were found to increase immunity and survival of Labeorohita infected with *Aeromonas hydrophila*. The hydroalcoholic extract of *A. aspera* was reported to stimulate cell mediated immune system by increasing phagocytic function. (Navjeet Singh et.al 2019) *Achyranthes* has significantly ($P < 0.05$) enhanced the BSA specific antibody titers than the untreated control group throughout the study period. The efficiency of antigen clearance was also enhanced studied.

The Superoxide anion production, serum bactericidal activity, lysozyme, ALP, serum protein. Albumin, globulin ratio was enhanced in *Achyranthes* treated groups. Higher cumulative mortalities were observed in the control group this gradually decreased with increasing dose of *Achyranthes* indicating that *Achyranthes aspera* stimulates immunity and increases resistance to infection in Labeorohita. (Navjeet Singh et.al 2019)

Hypoglycaemic Activity :-

Powdered whole plant and certain aqueous and methanolic extracts, when orally administered showed hypoglycemic in normal and alloxan-diabetic rabbits. The plant could act by providing some necessary elements like calcium, zinc, magnesium, manganese and copper to the beta-cells Redox and oxidative status in plasma and other tissues of rats fed with high doses of fructose were studied after applying seeds of the plant.

Diabetes mellitus was induced in a batch of normoglycemic albino rats, starved for 12h. 150 mg/kg body weight of alloxan monohydrate was dissolved in physiological saline and injected intra-peritoneal (IP). This dose of alloxan produced persistent hyperglycemia after four days as revealed by the determination of glucose levels by the analysis of blood and urine sample. Aqueous extract of *A. aspera* (500 mg/kg) showed the significant reduction in blood glucose and HbA1C level as compare to control group. (Navjeet Singh et.al 2019)

Six adult Wistar rats weighting 250-300 grams (75-90 days old) were used for inducing diabetes. The animals were injected by streptozotocin at the dose of 60 mg/kg of the bodyweight intravenously. Streptozotocin induces diabetes within 3 days by destroying the β cell. Ethanolic extract of *A. aspera* (600mg/kg) showed significant reduction of blood glucose level.

Hypolipidemic Activity :-

The alcoholic extract of *A. aspera* was found to lower 100 mg/kg serum cholesterol (TC), phospholipid (PL), triglyceride (TG) and total lipids (TL) in triton induced hyperlipidemic rats. In sesame oil feed rats, hypolipidemic efficacy of the plant was tested. The plant's activity on sesame oil induced lipid peroxidation has been reported.

The chronic administration of this drug at the same doses to normal rats for 30 days, lowered serum TC, PL, TG and TL by 56, 62, 68 and 67% respectively followed by significant reduction in the levels of hepatic lipids. The faecal excretion of cholic acid and deoxycholic acid increased by 24 and 40% respectively under the action of this drug. The possible mechanism of action of cholesterol lowering activity of *A. aspera* may be due to rapid excretion of bile acids causing low absorption of cholesterol. (Navjeet Singh et.al 2019)

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.

Analgesic and Antipyretic Activity :-

The methanol extract of leaves for analgesic and antipyretic activities by using hot plate and brewer's yeast induced methods using aspirin as a standard drug studied. The leaves and seeds of *Achyranthes aspera* which shows analgesic activity studied. Both leaves and seeds show analgesic.

activity in mice using acetic acid induced writhing response and hot plate method. The hydro alcoholic extract of the roots and leaves of *Achyranthes aspera* shows centrally acting analgesic activity in adult male albino rats using tail flick, hot plate and acetic acid induced writhing method for peripherally acting analgesic activity using aspirin as standard drug.

The doses administered were 200 mg/kg and 400 mg/kg. The animal that administered a dose of 400 mg/kg leaf extract has shown the maximum analgesic activity reported that achyranthine water -soluble alkaloid had a slight antipyretic activity in rats. (Navjeet Singh et.al 2019)

Anti-Inflammatory Activity :-

Anti-inflammatory activity of *A. aspera* has been reported. Alcoholic plant extract was found to be the most active in most of the Wistar rats using carrageenan-induced paw edema method and cotton pellet granuloma test reported. The alcoholic extracts of leaves and seeds show anti-inflammatory activity in rats using induced paw edema method and formalin model.

The alcohol extract of *Achyranthesaspera* was tested on carrageenin-induced hind paw oedema and cotton pellet granuloma models in albino male rats. The paw volume was measured plethysmometrically at 0, 1, 2, 3, 4 and 5 h and diclofenac sodium was used as a standard drug. The alcohol extract (375 and 500 mg/kg) showed the maximum inhibition of oedema of 65.38% and 72.37% respectively, at the end of 3h with carrageenan-induced rat paw oedema. Using a chronic test, the extract exhibited a 40.03% and 45.32% reduction in granuloma weight. (Navjeet Singh et.al 2019)

Antioxidant Activity :-

The plant has shown antioxidant activity in different investigations. Antioxidant potential of the methanol extract of the leaves and roots of the plant was evaluated by using in vitro 1, 1-diphenyl-2-picrylhydrazyl (DPPH) scavenging assay.

Both extracts were assessed using two methods, DPPH radical scavenging activity, and superoxide scavenging activity. The plant exhibited good antioxidant effect by preventing the formation of free radicals in the two models studied.

The DPPH radical scavenging activity was performed according to the method of with few modifications. The plant extracts were diluted in distilled water to make 10, 20, 40, 60, 80 and 100 µg/ml dilutions. Two milliliters of each dilution were mixed with 1ml of DPPH solution (0.2Mm/ml in menthol) and mixed thoroughly. The mixture was incubated in dark at 20°C for 40min. Absorbance was measured at 517nm using UV is spectrophotometer with menthol as blank. Gallic acid was used as positive control. The percentage scavenging of DPPH by the extracts was calculated according to the following formula:

$$\% \text{ DPPH Radical scavenging} = [(Ac - At) \div Ac] \times 100$$

Here

Ac is the absorbance of the control (DPPH) At is the absorbance of test sample.

Phytochemical screening of the *A. aspera* presence of major phytochemicals in the methanol extract; carbohydrates, phenolic compounds, oil and fats, saponins, flavonoids, alkaloids and tannins, whereas, aqueous extract contained phenolic compounds, saponins, flavonoids and tannins as major phytochemicals. The presence of polysaccharides, ecdysterone, achyranthine, betaine (Alkaloids), vanillic acid, syringic acid, p coumaric acid (phenolic acids), saponin A, saponin B (saponins), protein and carbohydrates in *A. aspera*. Presence of phenolic compounds in the plant suggests the potential use of *A. aspera* as a source of antioxidant compounds.

Wound Healing Activity :-

The plant has shown wound healing activity. There has been a report on comparative protein profile of granulation tissues of burn, diabetic and immune compromised wounds treated with 5.0% (w/w) ointment of methanol extract of the plant. Ethanol and aqueous extracts of leaves of *Achyranthesaspera* for wound healing activity. The wound healing activity was studied using two wound models, excision wound model and incision wound model. (Navjeet Singh et.al 2019)

Prothyroic 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

Cardio vascular 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. (Navjeet Singh et.al 2019)

Cardiac Activity :-

Cardiac stimulant activity of the saponin of *A. aspera* seed has been observed when it was found to cause increase in force of contraction of isolated and intact hypodynamic heart. Leaf decoction was reported for cardiovascular toxicity. Achyranthine, the water- soluble alkaloid showed lowering of blood pressure, depression of heart and increase in rate and amplitude of respiration in anaesthetized dogs. Effect of saponin of *A. aspera* on phosphorylase activity of rat heart. In tropical West Africa, the plant was found to have activation cardiovascular system. (Navjeet Singh et.al 2019)

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 (0.1mg/ml), and its spasmogenic effect was not blocked by tubocurarine reported . (Navjeet Singh et.al 2019)

Renal Disorders :-

Mineralization of urinary stone (calculi) like calcium oxalate, calcium carbonate and calcium phosphate were found to be inhibited by *A. aspera*. Methanolic extracts were found to prevent lead induced nephrotoxicity in albumin rats [51]. Efficacy of the roots of the plant was tested on calcium oxalate crystal nucleation and growth in vitro and on oxalate induced injury in NRK-52E (rat renal tubular epithelial) cells. As approach to anti-lithiasis, inhibitory effect of hydroalcoholic extract of the plant on crystallization of calcium oxalate in synthetic urine was studied. (Navjeet Singh et.al 2019)

Diuretic Activity :-

A saponin isolated from the seeds of *Achyranthes aspera* which shows significant diuretic effect in adult male albino rats. The optimum oral dose of saponin was 10mg/kg in rat increase in urine output which was comparable to 10mg/kg oral dose of acetazolamide. (Navjeet Singh et.al 2019)

Anti-Helminthic Activity :-

The ant-helminthic activity was evaluated on adult Indian earthworms. For preliminary evaluation of anthelmintic activity test samples of the aqueous extract of stem was prepared at the concentration of 2.5, 5, 10, 20 mg/ml in Tween 20 (1%) solution diluted with normal saline and 6 worms *Pheretimaphostuma* of 8-10cm were placed in petri dish containing 30 ml of above test solutions of extracts. Albendazole (2.5, 5, 10, 20 mg/ml) was used as reference standard and normal saline with Tween 20 (1%) is used as negative control. All the test solutions and standard solutions were prepared freshly before starting the experiment. Observations are made for the time taken for paralysis when movement was lost or no movement. Worms should not relieve even in normal saline. Time for death of worms were recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water and fading of color of worms . (Navjeet Singh et.al 2019)

Spermicidal Activity :-

Extracts from the roots of *Achyranthes aspera* and reported spermicidal activity in human and rat sperm. The hydroethanolic, n-hexane and chloroform extracts were found to be most effective for sperm immobilization, sperm viability, acrosome status, 5'nucleotidase activity and nuclear chromatin decondensation Studied.

The ethanolic extract of the root of *Achyranthes aspera* shows post coital anti-fertility activity in female albino rats. The ethanolic extract exhibited 83.3% anti-implantation activity when given orally at 200 mg/kg body weight. The methanolic extract of the leaves and reported for antifertility activities such as abortifacient, estrogenicity, pituitary weight, and ovarian hormone level and lipids profile in female rats. The abortifacient effect of the methanolic extract of the leaves of *Achyranthes aspera* was determined by counting the dead fetuses in vivo. Effect on estrogen was assessed by taking the ratio of the uterine weight to body weight. The ratio of the pituitary weight to body weight was also calculated. The effect of the extract on the level of ovarian hormones and lipid profile were evaluated using electrochemi-luminescence immunoassay.

The benzene extract of the whole plant shows abortifacient activity in mice. The 50% ethanolic extract of the root of *Achyranthes aspera* shows effect on sperm motility and function in a ratio of 1:3 by weight at different concentrations. The n-butanol fraction of aerial parts also shows contraceptive and hormonal properties.

Anti-Dandruff Activity :-

The methanolic leaf extract of *A. aspera* as a constituent of a polyherbal hair oil (PHO) showed anti-dandruff activity. The crude extracts of *Achyranthes aspera* contain coumarin which is responsible for the inhibition of the growth of *Pityrosorumovale* and reduces the dandruff scales in clinical trials. (Navjeet Singh et.al 2019)

Anti-Depressant Activity :-

The methanolic extract of *A. aspera* (200, 400 & 600mg/kg) was administered to the rats and immobility time was determined. The methanolic extract (600 mg/kg) of *Achyranthes aspera* when administered orally was effective in reducing the immobility time revealing its significant antidepressant-like effects. (Navjeet Singh et.al 2019)

Estrogenic Activity :-

The invitro 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 uterotrophic potency, than ethinylestradiol. The potency of uterotrophic 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.

Miscellaneous pharmacological activities :-

Achyranthesaspera is used traditionally for medicinal uses all over the world. This plant may treat many disorders like fever, malarial, asthma, dysentery, asthma, diabetes etc (30). It may used for many pharmacological activities. All the parts of the plant may used to treat various diseases (31). Many of Phytoconstituents may present in the leaf, root, leaves, flower extract of the plant (32). All the extracts may give effects on the different activities such as, antioxidants, anthelmintic, antiviral, antifertility, blood pressure, cardiac, diuretics etc (27). This medicinal plant may used to food and beverages, perfumes, soap preparation etc (33). Many of constituents responsible for these activities. Tannins, Saponins, Flavonoids, proteins, sugars, triterpenoidsetc (34) used for antioxidants (35). This antioxidant activity is affected through the methanolic extract of the A. aspera (36). DPPH assay may use to investigate the antioxidant property (37). Phenolic compounds give the antioxidant properties for the plant . Ovulation may block through the estrogenic property which may affects pituitary by FH and LSH (. Ant estrogenic activity may takes place which is responsible formation of ovum. A. aspera may also use in gynecological disorders . Also used in leprosy, bronchial infections, cough etc. For carcinogenic diseases it may give better effects. It may helps to decrease the thyroid hormones.

5] CLINICAL STUDIES :-

The plant was subjected to wide clinical evaluation with special reference to its use in leprosy, bronchial asthma and fistula-in-ano. Diuretic activity could not be confirmed.

Leprosy :-

The effect of oral decoction of A. aspera in the treatment of leprosy was studied (uncontrolled) in 19 patients who were found to have positive stain smears at the S. S. Hospital, Varanasi. Fourteen patients were in stage of reaction and rest of them had active lesions but none of them was in quiescent stage. The study revealed encouraging results in both lepra reaction as well as the quiescent stage of lepromatous leprosy. In an attempt to get additional data on the efficacy of the decoction of A.aspera, it was observed that the decoction was useful in the treatment of reaction in leprosy particularly in subacute and mild type. When administered in conjunction with the antileprosy drug diaminodiphenylsulphone (DDS), it was found that the chance of reaction became less and rate of improvement was faster. No toxic manifestation, which could be attributed to A. aspera was noted during the trial

Fistula-in-ano :-

The studies revealed that the longterm use of 'Kshaarasootra' (a medical thread prepared by coating the latex of Euphorbia nerifolia, alkaline powder of A. aspera and Curcuma longa) was quite effective in treatment of various fistulous tracks (65,66,67,68,69,70,71).

The Indian Council of Medical Research has carried out a multicentric randomized controlled trial to evaluate the efficacy of 'Kshaarasootra' in the management of fistula-in-ano (265 patients) in comparison with the conventional surgery (237 patients). The results have revealed that the long-term outcome with 'kshaarasootra' (recurrence 4 percent) was better than with the surgery (recurrence 11 percent), although the initial healing time was longer (8 wk with thread and 4 wk with surgery). 'Kshaarasootra' offered an effective, ambulatory and safe alternative treatment for patient with fistula-in-ano. 'Kshaarasootra' has also been found to give encouraging results in 5 patients of chronic non healing milk-fistula 'stannadi-vrana' with additional local application of 'jatyadi taila' and oral administration of ' shigruggulu' (two tablets t.i.d.) during the course of treatment (72).

Bronchial Asthma :-

A pilot study was carried out at the Central Research Institute for Siddha in Madras on 15 cases of bronchial asthma. The oil obtained from the root of A. aspera soaked in cow urine was smeared on betel leaf and administered thrice a day to these patients. In most of the cases symptoms like wheezing, gasping, dyspnoea, sneezing and cough disappeared. A fall in total WBC, eosinophil counts and ESR was observed 9.

TOXICITY :-

A 7 day acute toxicity study of whole plant powder did not reveal any adverse or side effect upto a dosage of 8g/kg, orally (73). The alkaloid isolated from the plant was tested for its acute, subacute and chronic toxicity in rats. During acute toxicity test, there was a slight increase in sedation and slight loss in righting region at 6.0mg/kg dose level, which became prominent at 7.0mg/kg dose level. At higher doses, significant depletion in righting region, depression in respiration, remarkable increase in sedation and diarrhea was observed. Subacute toxicity test revealed (5.0 and 6.0 mg/kg) a significant increase in sedation and hypnosis, depletion in respiration and loss of righting reflexes. At 6.0 mg/kg dose, it also caused remarkable increase in salivation and diarrhoea. Chronic toxicity showed (3.0 mg/kg) an increase in sedation, hypnosis, salivation and diarrhoea. There was a significant depression of respiration and loss of body weight (74)

CHEMICAL ENTITIES

- Phenol and flavone elements
- Metabolomics: Achyranthesaspera forms many metabolomics like azelaic acid, Lauric acid, linolenic acid, salicylic acid, protocatechuic acid, Caffeic acid, quinic acid and ferulic acid etc.
- Fatty acid: Some saturated and monounsaturated fatty acid is present in Achyranthesaspera.
- Alcoholic entities: Ethyl alcohol and Methyl alcohol are the alcoholic entities obtained from Achyranthesaspera Medicinal plant.
- Foam producing agent (Saponins)
- Chloroform containing entities
- Saponins
- Tannins

Cardiac glycosides.

DRUG PROFILE :-

- 1) Apamarga Powder :- Product name :

Apamarga Powder

Composition : Apamarga-3g

Uses : Promotes Healthy Urination Supports

Healthy Digestion & Appetite Promotes Healthy Urination.



- 2) ApamargaChurna :- Product name : Apamarga Churna

Composition : Apamarga powder (250g)

Uses : Relieve dysuria, ascites, liver and spleen disorders, ear diseases and leukoderma, cold, cough other respiratory diseases treatment of abscess and fistula.



- 3) Apamarga Powder :- Product name : Apamarga Powder

Composition :- Apamarga\ Latjira\ Chirchita herbal powder(200g)

Uses : No side effects are known of apamarga powder's regular use. Natural and effective herbal product. No harmful preservatives added hence no side effects.



- 4) Neeri :

Product name : Neeri

Composition : Pashanbhed, Punernava, Palash, Varun, Sahdevi, Apamarga, Gorkhru, Shilajeet, Mooli, Kultha.

Uses : Normalize the urine Ph. Relieves pain & inflammation by inhibiting release of their mediators, soothes irritated bladder.



5) Fifatrol :-

Product name : Fifatrol

Composition : Guduchi, Daruharidra, Apamarga , Chirayata, Karanja, Kutaki, Tulsi, Motha, Godanti.

Uses : Body ache &Headache,Rhinitis, Running nose, PUO (pyrexia of unknown origin), Chronic fever, Viral fever, Typhoid fever, Malaria, Dengue, Upper respiratory tract infections, Cold.



6) Jufex Forte :-

Product name : Jufex Forte

Composition : Amla, Draksh, Tulsi, Vasa, Apamarg, Haritaki, Baheda, SheetalChini, Pippali, Sunthi, Alsi, Dalchini, Tejpatra, Guduchi, kalimirch, kalaunji, kaddipatta, saunf, Amlatas, Naushadar.

Uses : Respiratory tract infections of viral origin, Recurrent sore throat, Smoker's cough, Allergic cough, Cough associated with chronic bronchitis, pharyngitis, laryngitis, Childhood bronchitis.



7) MutrakrichantakChurna :

Product name : MutrakrichantakChurna

Composition : Varun, Punamava, Gokshur, Kaasni, Bhumi Amla, Shirish, Shigru, Apamarg

Uses : Used For treatment of heart diseases, Urticaria, haemroids, prostate enlargemen



8) Livol :

Product name : Livol

Composition : Rohish, Apamarg, Saunfmool, Kasnimool,

Mulethi, Punamava, Karfasmool, Sanaya, Amlika, Draksha, Anjir

Uses : Corrects digestion by promoting normal secretions of liver, Loss of appetite, Hepatitis, Cirrhosis of liver.



9) Apamarga:

Product name : Apamarga

Composition : Apamarga -500mg

Uses : Benefits in skin diseases. Good source of potassium Works well in heart problems It alleviates nausea and vomiting Useful in digestive system disorders



10) Stonhills :

Product name : Stonhills

Composition : Pashanbhed, Punamava, Palash

Pushpa, ShwetParpati, Varun Ghana, Sahadev, Apamarg, Gokshur

Uses : Shows Diuretic and antibacterial property.



8) Conclusion :-

It is seen from that Achrynanthes Aspera is very important for plant for its large number of medicinal properties as well as medicinally important chemical. Herbal plants are the natura drugs used to regain the alterations made in normal physiological system by foreign organisms or by any malfunctioning of

the body. *Achyranthesaspera* L. is very important folk herbal medicinal plant as it is widely used by the ethnic communities for the remedy of numbers of diseases. The whole plant and its parts has been widely studied for its pharmacological activities and finds its position as aversatile plant having a wide spectrum of medicinal activities. The plant possesses many therapeutic and pharmacological activities, such as spermicidal, antiallergic, cardiovascular, nephroprotective, abortifacient, cancer antiparasitic, hypoglycemic, analgesic, antipyretic. It is used in treatment of many diseases like, boils, bronchitis, cold, cough, boils, colic, debility, dropsy, dysentery, ear complications, and headache. The pharmacological experiments performed on the plant must be extended to the next level of clinical trial to generate novel drugs. This might prove helpful to use its immense therapeutic efficacy as a potent phytomedicine.

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