REVIEW

REVIEW ON *ACHYRANTHES ASPERA* (AMARANTHACEAE).

Fegade S. A*, Kolhe R. C.

SJVPM'S Rasiklal M Dhariwal College of Pharmacy, Chinchwad, Maharashtra, India.

Submitted on: 27.12.17; Revised on: 20.01.18; Accepted on: 30.01.18

ABSTRACT: *Achyranthes aspera* belonging to family Amaranthaceae a small and erect shrub, much branched, half woody plant, reaching one and half meters in height. It founds all over India, Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America. Traditionally plant is used in various ailments like asthma, ulcer, bronchitis, piles. Root is also useful in pulmonary, syphilitic and rheumatism troubles. The seed have flavor; cooling, emetic, expectorant properties and useful in leprosy and constipation. In large doses it produces abortion or labour pains. A decoction of powdered leaves with Leaves is considered emetic, and is useful in hydrophobia. Literature survey shows that plant contains steroids like ecdysterone, ecdysone and β-sitosterol, saponins like saponins A, B, C and saponins D. In this review attempt was made to describe various phytopharmacological aspects of the *Achyranthes aspera* plant.

KEY WORDS: Phytochemistry, Pharmacology, *Achyranthes aspera* , Amaranthaceae.

Corresponding author: Fegade Sachin A
E-mail: fegadesachin@gmail.com
Phone: +91- 9370245937

Indian Research Journal of Pharmacy and Science; 15(2017)1224-1231;
Journal Home Page: https://www.irjps.in
DOI: 10.21276/irjps.2017.4.4.9

INTRODUCTION:

Medicinal plants are of great value in the field of treatment and cure of disease. Over the years, scientific research has expanded our knowledge of the chemical effects and composition of active constituents which determine the medicinal properties of the plants.it has now universally accepted fact that plant drugs remedies are far safer than synthetic medicines, for curing complex diseases. Medicinal plants became one of major object of interest hence it become necessary to explore them phytochemically and pharmacologically as well[1].

Common names[2, 3,4,]:

Sanskrit	:	Apamarga
Hindi	:	Chirchira
English	:	Rough Chaff tree
Marathi	:	Aghada
Bengali	:	Apang
Tamil	:	Nayuruvi
Telagu	:	Antisha
Malayalam	:	Katalati
Arabic	:	Atkumah

Plant Profile[2, 3,4]:

Taxonomical hierarchy

Kingdom	:	Plantae
Subkingdom	:	Tracheobionta
Subdivision	:	Dicotyledons
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Subclass	:	Caryophyllidae
Order	:	Caryophyllales
Family	:	Amaranthaceae
Genus	:	*Achyranthes*
Species	:	*aspera*
Native	:	It is found all over India, Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America [2, 3].

Fig: 1.0 *Achyranthes aspera* plant

Anatomical Features:

A. aspera is a much branched, an erect, half-woody plant. It is velvety, shruby and grayish green in color. It grows up to one and half meters in length[3].

Morphological Characteristics:

Plant is erect, 0.3-0.9 m high with stiff stem which is not much branched, branches are terete or obsolutely quadrangular, striate, pubescent[3].

The leaves are few, usually thick, up to 3.8-6.3 by 2.5-4.5 cm. elliptic or obovate , sometimes nearly orbicular, usually rounded (rarely subacute) at the apex, finely and softly pubescent on both sides, entire; petioles 6-20 mm long[3].

Flowers greenish white, numerous, stiffly deflexed against the wooly-pubescent rachis, in elongate terminal spikes which are at first short but soon lengthen, reaching as much as 50 cm long in fruit; bracts 3 mm long, broadly ovate, acuminate, membranous, aristate, persistent; bracteoles 3 mm long, broadly ovate concave, with a spine as long as the blade, hard in fruit, falling off with the fruiting perianth. Perianth 4-6 mm long, glabrous and shining; sepals subequal, ovate-oblong, finely pointed, with narrow white membranous margins. Stamens 5; staminodes truncate, fimbriate. oblong-cylindric, truncate at the apex, thinely membranous, enclosed in hardened perianth, smooth, brown, rather more than 2.5 mm long[4, 3].

Seeds subcylindric, truncate at the apex, rounded at the base and brown in color[3].

Ethnomedical Claim:

In large doses it produces abortion or labour pains. A decoction of powdered leaves with Leaves is considered emetic, and is useful in hydrophobia. The juice of leaves is taken for dysentery in Ceylon. The leaf juice is also useful in stomach ache and bowel complaints, piles, boils, skin eruptions or sugar candy is useful in the early stages of diarrhea and dysentery. Fresh leaves ground into paste with jaggery or mixed with black pepper and garlic and made into pills are used as antiperiodic especially in quartan fevers; leaves rubbed into paste with water are applied with much benefit to bites of poisonous insects, wasps, bees etc. Fresh juice of the leaves thickened into an

extract by exposure to the sun and mixed with little opium is an efficacious application to primary syphilitic sore [2, 3, 4].

The seed have flavor; cooling, emetic, expectorant properties and useful in leprosy and constipation. Seed rubbed with rice water is given in bleeding piles. Pasayam or kheer made of seeds in milk is a good remedy for diseased brain. seed soaked in butter-milk during the night and ground into an emulsion is a cure for biliousness.

An infusion of the root is given as a mild astringent in bowel complaints. A pinch of the root powder with a pinch of pepper powder and honey is a nice remedy for cough. Root is also useful in pulmonary, syphilitic and rheumatism troubles [3, 4].

Chemical constituents:

The phyto constituents present in *Achyranthes aspera* plant are Oleanolic acid,steroids like ecdysterone, ecdysone and β-sitosterol, saponins like saponins A, B, C and saponins D.

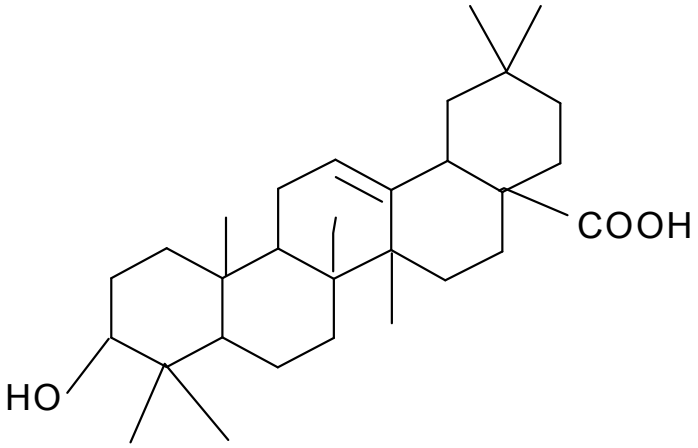

Fig: 2.0 Oleanolic acid.

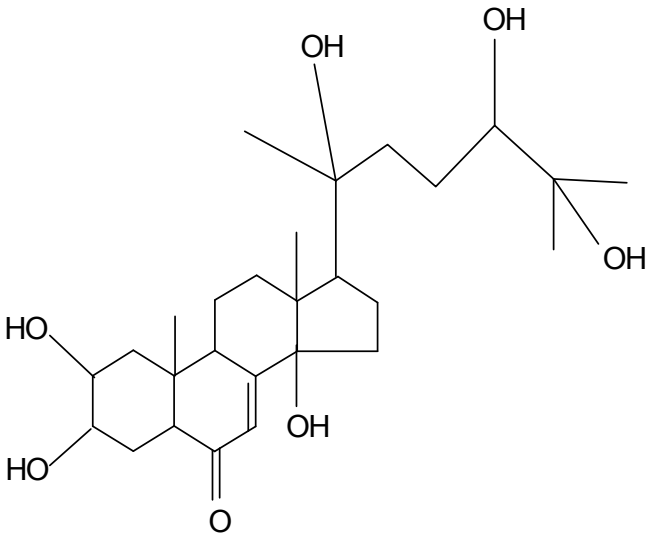

Fig: 3.0 Ecdysterone

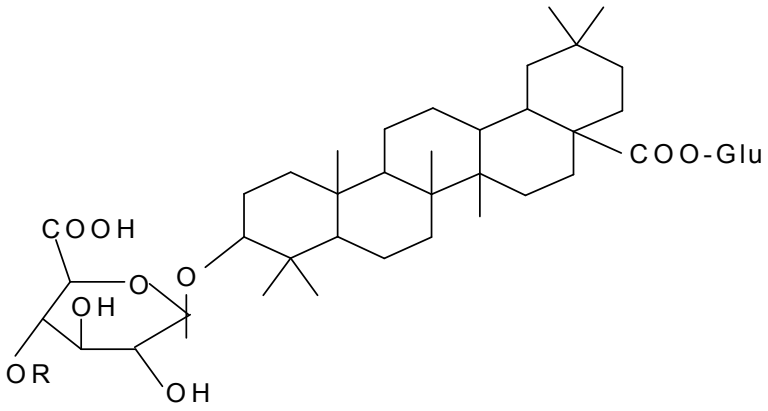

Fig: 4.0 Saponin C R = Rhamnose
Saponin DR = Glu. (4-2) Rhamnose.

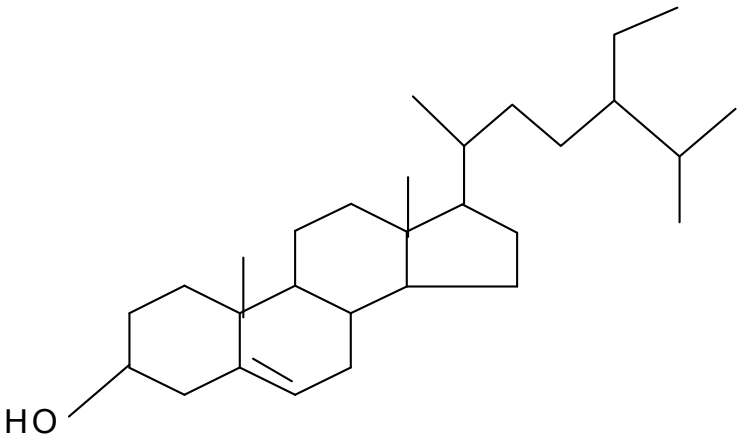

Fig: 5.0 β-Sitosterol

Sr. No.	Part	Chemical constituents
1.	Roots	Oleanolic acid, Ecdysterone[2,4]
2.	Stem	Ecdystrone, 3-Acetoxy-6 benzoyloxyapangamide[2,4]
3.	Leaves	Ecdysteone, Ecdysone[4]
4.	Shoots	36,47-dihydroxyhenpentacosan-4-one; Triacontanol; 27-cyclohexylheptacosan-7-ol; 16-hydroxy-26-methylheptacosan-2-one; 4-methylheptatriacont-1-en-10-ol; tetracontanol-2; betasitosterol.[9,11,12]
5.	Fruits	Saponin C and saponin D[2]
6.	Seeds	Saponin A, Saponin B, Oleanolic acid[4]

Table: 1.0 chemical constituents isolated *Achyranthes aspera* plant

Phytochemical review:

In the phytochemical review, chemical investigations summarized which are made on *Achyranthes aspera.*

Basu *et al*, 1957 studied Biological investigation of *Achyranthes aspera* Linn. and its constituent achyranthine[5,6,7].

Hariharan & Rangaswamy, 1970 isolated Structure of saponins A and B from the seeds of *Achyranthes aspera*[8].

Misra *et al*; 1991 studied 36,47- dihydroxy henpentacontan-4-one and tritriacontanol an Aliphatic dihydroxy ketone from *Achyranthes aspera*[9].

Shu *et al;* 1992 studied Whole extracts of Radix Achyranthis Bidentatae and Radix Cyathulae and determine ecdysone in 6 kinds of radix achyranthis bidentatatae with HPLC[10]

Misra *et al* ; 1993 isolated Two long chain compounds from *A. aspera* were 27-cyclohexylheptacosan – 7 –ol and 16 – hydroxy – 26 – methylheptacosan – 2 one [11]

Misra *et al*; 1996 isolated and characterized 4 – methylhepta – triacont – 1 – en – 10 – ol and tetracontanol – 2 – along with beta sitosterol from *Achyranthes aspera.*[12]

Pharmacological review:

The attempt has been made to compile pharmacological aspects of *Achyranthes aspera* through literature survey.

Singh, 1995 studied *Achyranthes aspera* plant with pharmacological aspect in Traditional remedies to treat asthma in north west and trans himalayan region in J & K state[13, 14].

Rahaman *et al*, 1996 Studies on the antibacterial properties of *Achyranthes aspera*[15].

Tahiliani P. *et al*, 2000 studied Aqueous leaf extract of *Achyranthes aspera* which elevates thyroid hormone levels and decreases hepatic lipid peroxidation in male rats[16].

Sandhyakumari K.S. and Boby; 2002 studied Impact of feeding ethanolic extract of *A. aspera* on reproductive functions in male rats[17].

Gokhale *et al*, 2002 studied Preliminary evaluation of anti-inflammatory and anti arthritic activity of S. *lappa, A. speciosa and A. aspera*[18].

Kayani *et al*, 2008 carried out Callogenic studies of *Achyranthes aspera* leaf explants at different hormonal combination[19].

DISCUSSION:

Now a day people are becoming aware of potency and side effects of synthetic drugs, there is an increasing interest in the plant based remedies with a basic approach towards nature. *Achyranthes aspera* constituted a number of phytochemicals, which reveal its uses for various therapeutic purposes. Thus to conclude by considering all the scientific reports from previous researchers, the present review will give an perception about *Achyranthes aspera* because of its various pharmacological functions like analgesic, ant diabetic, wound healing, antioxidant and many more.

REFERENCES:

1. Rangari, V.D., *Pharmacognosy and Phytochemistry*. Career Publications, Nashik, 2002, Part I. 1st ed: 10-11.

2. Nadkarni, A.K., Indian Materia Medica, Popular Book Depot, Bombay, 1987, 1: 21-22

3. Kirtikar, K.R. & Basu, B.D., Indian Medicinal Plants, Lalit M. Basu, Allahabad, 1991, 3: 2066-2068.

4. Anonymous. The Wealth of India, Raw Materials, CSIR, New Delhi. 1985; 1: 21-22.

5. Basu N.K., Singh H.K., Aggarwal O.P. A chemical investigation of *Achyranthes aspera* Linn. *J Proc Inst Chem*. 1957, 29: 55-58.

6. Basu N.K. The chemical constitution of achyranthine. *J Proc Inst Chem*. 1957; 29: 73-76.

7. Basu N.K., Neogi N.C., SrivastavaV.P.. Biological investigation of *Achyranthes aspera* Linn. and its constituent *achyranthine*. *J ProcInst Chem*. 1957; 29: 161-65

8. Hariharan V., Rangaswamy S.. Structure of saponins A and B from the seeds of *Achyranthes aspera*. *Phytochemistry* 1970; 9: 409-14.

9. Misra T.N., Singh R.S., Pandey H.S., Prasad C. An aliphatic dihydroxy ketone from *Achyranthes aspera*. *Phytochemistry*.1991; 30: 2076-78.

10. Xuelin Zhou,Wing-Sum Siu,Chak-Hei Fung, Jacqueline Chor-Wing Tam, Ching-Po Lau,Clara Bik-San Lau,Ping-Chung Leung,Leung-Kim Hung, and Chun-Hay Ko; Whole extracts of Radix AchyranthisBidentatae and Radix Cyathulae promote angiogenesis in human umbilical vein endothelial cells *in vitro*and in zebrafish *in vivo,* Exp Ther Med. 2017 Mar; 13(3): 1032–1038.

11. Misra T.N., Singh R.S., Pandey H.S., Prasad C., Singh B.P. Antifungal essential oil and a long chain alcohol from *Achyranthes aspera*. *Phytochemistry*, 1992; 31: 1811-12.

12. Misra T.N., Singh R.S., Pandey H.S., Prasad C., Singh B.P. Two long chain compounds from *Achyranthes aspera*. *Phytochemistry*, 1993; 33: 221-23.

13. Singh V. Traditional remedies to treat asthma in north west and Trans Himalayan regions in J. & K. state. *Fioterapia*, 1995; 56(6): 507-09.

14. Misra T.N., Singh R.S., Pandey H.S., Prasad C., Singh S.. Isolation and characterization of two new compounds from *Achyranthes aspera* Linn. *Ind J Chem*. 1996; 35B: 637-39.

15. Rahaman M.H., Farooque A.B.M., Islam S.N. Studies on the antibacterial properties of *Achyranthes aspera* stems. *Fitoterapia*, 1996; 67(1) : 92-93.

16. Tahiliani P., Kar A. *Achyranthes aspera* elevates thyroid hormone levels and decreases hepatic lipid peroxidation in male rats. *J. Ethanopharmacol,* 2000 ; 71 (3): 527-32.

17. Sandhya kumary K., Boby R.G., Indira M. Impact of feeding ethanolic extracts of

Achyranthes aspera Linn. on reproductive functions in male rats. *Indian J Exp Biol*. 2002; 40(11):1307-09.

18. Gokhale A.B.,.Damre A.S, Kulkami K.R., SarafM.N.. Preliminary evaluation of anti-inflammatory and anti-arthritic activity of *S. lappa*, *A. speciosa* and *A. aspera*. *Phytomedicine*, 2002 ; 9(5): 433-37.

19. Kayani S, Zia M., Sarwar S., Riaz-ur Rehman., Chaudhary M.F. Callogenic studies of Achyranthes aspera leaf explants at different hormonal combination. *Pak. J. Bio. Sci.*, 2008; 11(6) : 950-952.

CONFLICT OF INTEREST REPORTED: NIL ; SOURCE OF FUNDING: NONE REPORTED