

Phytochemical Screening of *Achyranthes aspera* Linn

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1. Introduction

Botanical Description

Plants are small, much branched, monoecious perennial subshrub up to 0.8–1×0.8 m. Rootstock stout, woody. Stems somewhat succulent at first, ribbed, becoming basally woody with age, densely covered in velutinous, appressed hairs. Leaves opposite, densely clustered toward branch tips 40–50×25–30 mm, spreading to decurved, mostly broadly ovate, ovate-orbicular or elliptic; apex blunt to abruptly sub acute, sometimes very shortly apiculate; base attenuate; lamina somewhat fleshy, purple-grey, veins often purple, abaxial and adaxial surfaces silky canescent, margins crenulate to crenate. Petioles 5–10mm long, pink, fleshy, velutinous, basal abscission zone present. Inflorescence a terminal erect spike, 150–200mm long; peduncle 15mm long, fleshy, white-villous; spike rachis fleshy, white-villous to purple-villous; flowers bisexual, retrorse, sessile, 180–200 per spike, these spaced initially at 10-mm intervals along rachis, diminishing rapidly to <1-mm intervals toward inflorescence apex. Bract persistent on rachis, ovate to lanceolate 3–3.5×0.5–1mm, strongly retrorse, chartaceous, weakly keeled near apex only, pale white, margins entire, apex acute, sometimes with a small, 0.1–0.2-mm-long pale yellow mucro. Bracteoles 2; abscising with senescent flowers; broadly ovate, 0.2–1mm long, chartaceous hyaline, lustrous, pale caramel; margins entire; strongly keeled, keel lustrous, caramel brown, extending well beyond bract as a hardened, channelled, strongly recurved, falcate spine 4–5mm long. Perianth segments (sepals) 5, lanceolate, central portion pale caramel-brown but distinctly pink-tinged, margins pale yellow or off-white opaque, hyaline; segments sub equal, 4.5–6mm, channelled. Stamens 4, connate at base, the filaments 0.5–1mm, alternating with 4 narrowly spatulate, 0.4×0.6 mm, white-hyaline, petaloid, fimbriate-argined pseudo staminodes; anthers 0.4–0.6mm, yellow, bilocular, dehiscing via longitudinal slits; pollen yellow. Style 0.6–1mm, pink to pale orange, arising from a fleshy papillate style base 0.8mm diam.; stigma brown, truncate. Utricle 2–2.5mm long, dark brown, turbinate, chartaceous, surmounted by the dry, somewhat woody, style base. Seed 1.2–1.8×0.9–1.2mm, ovoid to ellipsoid, dark chestnut brown.

Preliminary phytochemical investigations

Preliminary phytochemical investigation of the selected plant materials were done using various phytochemical tests including Dragendorff and Mayer's tests for alkaloids, alkaline reagent test for flavonoids and Kellar-Killiani test, Froth formation test, Salkowski test for cardiac glycosides, glycosides saponins, and steroid-terpenoid, respectively. Alkaloids, flavonoids, saponin glycosides, steroids and terpenoids were found strong positive in *Achyranthus aspera*.

Showing preliminary phytochemical screening of selected plant materials

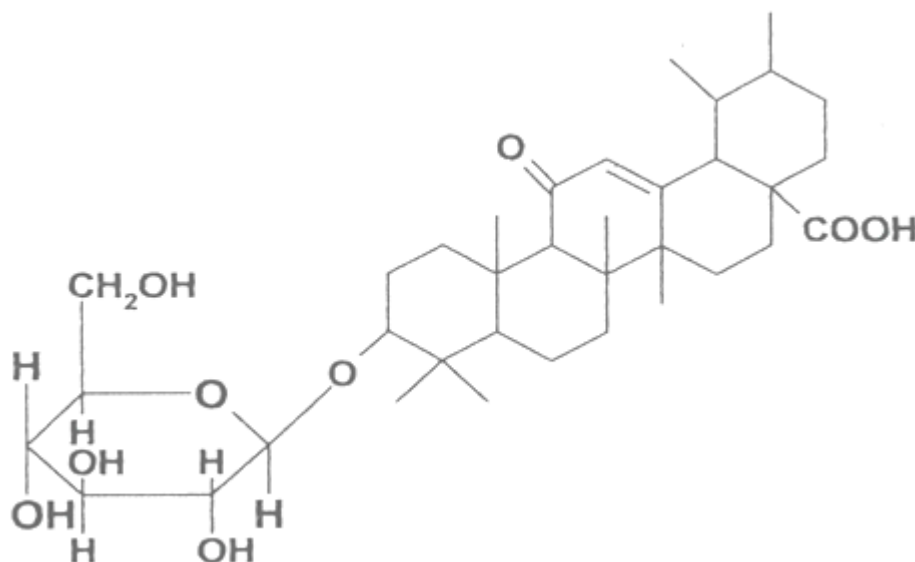
S. No.	Presence of Components		Name of the test performed	<i>Achyranthus aspera</i>
1	Alkaloids		Dragendorff's reaction	++
			Mayer's reaction	-
2	Flavonoids		Alkaline reagent test	++
3	Glycosides	Cardiac Glycosides	Keller-Killiani test	-
		Saponin Glycosides	Froth formation test	++
		Steroids and triterpenoids	Salkowski test	++

2. Spectral Analysis

ISOLATION AND STRUCTURAL STUDY OF THE SAPONIN 11 KETO Δ12:13 URSENE -28-OIC-3-O-β-D-GLUCOPYRANOSIDE FROM ACHYRANTHUS ASPERA ISOLATION OF THE SAPONIN

The air dried, powdered and defatted plant *Achyranthus aspera* (Natural order-Amaranthaceae) was extracted with rectified spirit in round bottomed flask on an electric water bath to which a reflux condenser was attached. The rectified spirit extract was filtered while hot. The extract thus obtained was concentrated under reduced pressure to have a brown viscous mass.

The brown viscous mass was extracted successively with benzene, chloroform, ethyl acetate and then the residue was dissolved in methanol the excess of solvent ether was added in this methanol extract to precipitate the saponin from which the solvent was removed by decantation. The precipitated saponin was again dissolved in methanol.



References

- [1] Lange P. J. de, R. P. Scofield and T. Greene 2004 *Achyranthes aspera* (Amaranthaceae) a new indigenous addition to the flora of the Kermadec Islands group, New Zealand Journal of Botany, 2004, Vol. 42: 167–173
- [2] Agharkar S.P (1991), Medicinal plants of Bombay Presidency, Scientific Publication, Jodhpur (India).
- [3] Jain S. P, Puri H. S. Ethnomedicinal plants of Janusar-Bawar hills Uttar Pradesh, India. J Ethnopharmacol. 1984; 12; 213-222
- [4] John D. One hundred useful raw drugs of the Kani tribes of Trivendrum forest division, Kerala. India, Int J Crude Drug Res. 1984; 22; 17-39
- [5] Singh Y. N. Traditional medicine in Fiji, some herbal folk cures used by Fiji Indians. J Ethnopharmacol. 1986; 15; 57-88
- [6] Reddy M. B, Reddy K. R, Reddy M. N. A survey of plant crude drugs of Anantpur district, Andhra Pradesh, India. Int J Crude Drug Res. 1989; 27; 145-155
- [7] Bhattari M. K. Medical ethno botany in the Rapti zone, Nepal. Fitoterapia. 1993; 64; 483- 489
- [8] Singh V. Traditional remedies to treat asthma in northwest and Trans Himalayan regions in J. & K. State. Fitoterapia. 1995; 56(6); 507-509
- [9] Suresh A, Anandan T, Sivanandam G, Veluchamy G. A pilot study of Naayuruvi Kuzhi Thailam in Eraippunoi (bronchial asthma). J Res Ayur Siddha. 1985; 6; 171-176
- [10] Nadkarni K.M. "Indian Materia Medica", 3rd edition reprinted, Bombay Popular Prakashan, 2009, Vol.1, p. 21.
- [11] Bhatnagar L. S, Singh V. K, Pandey G. Medico-botanical studies on the flora of Ghaigaon forests, Gwalior, Madhya Pradesh. J Res Indian Med. 1973; 8; 67-100
- [12] Raj K. P. S, Patel M. R. Some medicinal plants of Cambay and its immediate vicinity and their uses in Indian indigenous system of medicine. Indian Drugs. 1978; 15; 145-152
- [13] Khanna K. K, Mudgal V, Shukla G, Srivastava P. K. Unreported ethno medicinal uses of plants as aphrodisiac from the folklores of Uttar Pradesh plains, India. Bull Bot Surv India. 1994; 36; 91-94
- [14] Elvanayagum Z. E, Gnavanendham S. G, Balakrishna K, Bhima R. R, Usman S. A. Survey of medicinal plants with anti snake venom activity in Chengalpattu district, Tamil Nadu, India. Fitoterapia. 1995; 66; 488-492
- [15] Singh V. K, Ali Z. A. Folk medicines of Aligarh (Uttar Pradesh), India. Fitoterapia. 1989; 60; 483-490
- [16] Girach R. D, Aminuddin A, Khan S. A. Ethno medicinal uses of *Achyranthes aspera* in Orissa (India). Int J Pharmacog. 1992; 30; 113-115
- [17] Anis M, Iqbal M. Medicinal plantlore of Aligarh, India. Int J Pharmacog. 1994; 32; 59-64
- [18] Husain W, Siddiqui M. B. Ethno-botanical approach of North-western U.P. Acta BotIndica. 1987; 15; 94-97
- [19] Reddy M. B, Reddy K. R, Reddy M. N. A survey of medicinal plants of Chenchu tribes of Andhra Pradesh, India. Int J Crude Drug Res. 1988; 26; 189-196
- [20] Pal D. C, Jain S. K, Notes on Lodha medicine in Midnapur district, W. B., India. Econ Bot. 1989; 43; 464-470
- [21] Sebastnia M. K, Bhandari M. M. Medico ethno botany of Mount Abu, Rajasthan, India. J Ethnopharmacol. 1984; 12; 223-230
- [22] Singh V, Pandey R. P. Medicinal plant-lore of the tribals of eastern Rajasthan (India). J Econ Tax Bot. 1980; 1; 137-147
- [23] Patil D.A.(2003.) Flora of Dhule and Nandurbar District, Bishen Singh Mahendrapal singh, Dehra Dun (India).
- [24] Salisbury, E.J. On the cases & ecological significanc of stomatal frequency with special referances to the wood land flora *Phil Trans.* Roy, Soc. London, 216: 1, 1927.
- [25] Salisbury, E.J. The interpretation of soil climate & the use of stomatale frequency index of water reduction to plant (1932) *Beih. Bot. Zeni-ralb.* 49: 408.
- [26] Annonymous: Indian Pharmacopoeia. vol. 2.3rd Ed. Govt. of India, Ministry of Health, Controller of Publications, New Delhi, India 1966.
- [27] Annonymous: Indian Pharmacopoeia. vol. 2.3rd Ed. Govt. of India, Ministry of Health, Controller of Publications, New Delhi, India.1985; pp. A74 – A75.

- [28] Vogel Al.(1988). In: Elementary practical organic chemistry (second edition),Orient Longman Limited, pp.45-168.
- [29] Harborne JB. 1984. Phytochemical Methods, Chapman Hall, London ,pp 100-101.
- [30] Trease E and Evans WC. (1987).Pharmacognosy, Billiare Tindall, London.
- [31] Ajaiyeoba EO.(2000) Phytochemical and antimicrobial studies of G gynandra and B coriaceae extracts.Afr. J. Biomed.Res.3(3):161-165.
- [32] Edeoga HO, Okwu DE and Mbaebie BO (2005). Phytochemical constituents of some Nigerian medicinal Plant. *African J. Biotechnology*, **4**(7): 685-688.
- [33] Anonymous. *Indian Pharmacopoeia*. vol. 2.3rd Ed. Govt. of India, Ministry of Health, Controller of Publications, New Delhi, India 1966.
- [34] Anonymous. *Indian Pharmacopoeia*. vol. 2.3rd Ed. Govt. of India, Ministry of Health, Controller of Publications, New Delhi, India. pp. A74 – A75 1985.
- [35] Thomas S., Patil D.A, Patil A.G, Naresh Chandra: Pharmacognostic evaluation and physicochemical Analysis of *Averrhoa carambola* L. Fruit Journal of Herbal Medicine and Toxicology 2009; 2(2): 51-54.
- [36] Usha Kuamari J., Navas M, Mathew Dan, Rajasekharan S: Pharmacognostic studies on *Acrotrema arnottianum* Wight – A promising ethnomedicinal plant. Indian Journal of Traditional Knowledge 2009; 8(3): 334-337.
- [37] Wink, M: A short history of alkaloids. In: Roberts, M.F., Wink, M. (Eds), Alkaloids: Biochemistry, Ecology and Medicinal Applications. Plenum, New York,1998; pp. 11-44.