

ASCLEPIAS FRUTICOSA HERBA

Definition

Asclepias Fruticosa Herba consists of the fresh or dried leaves and smaller stems of *Asclepias fruticosa* L. (Asclepiadaceae).

Synonyms

Vernacular names

Tontelbos, melkbos (A), ulusinga
lwesalukazi (Z), lebeyana, modimolo (S)

Description

Macroscopical¹



Figure 1: Live plant.

Erect perennial, multi-stemmed laticiferous shrub 1-3m in height; **leaves** erect, entire, opposite, linear-lanceolate, glabrous to very finely pubescent, 5-15 × 0.4-2 cm, with revolute margin; **flowers** (Oct-Dec) borne in simple 6-10 flowered umbels, each flower on a pedicel 1.2-2cm long, cream-white with green-purple corona; corolla lobes reflexed; **fruit** an inflated bristly green follicle 5-7.5 cm long, tapering to a beak, containing numerous black seeds bearing long silky hairs.



Figure 2: line drawing

Microscopical

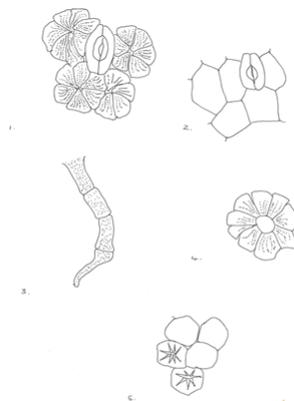


Figure 3: microscopical features

Characteristic features are: the paracytic stomata and cells of the upper leaf epidermis with striated, puckered cuticle and papillae bearing clothing hairs(1), the latter multicellular, uniseriate, thin-walled, warty and with one cell characteristically shrunken (3); the numerous cluster crystals of calcium oxalate, $\pm 20\mu$ in diameter, in cells of the leaf mesophyll (5), the polygonal cells of the lower leaf epidermis (2), the absence of lignified tissue.

Crude drug

Collected as required or available in the marketplace as bundles of leaves and smaller stems; colour light yellow-green, odour faint, taste bitter; if fresh all parts exude white latex from the cut surface.

Geographical distribution

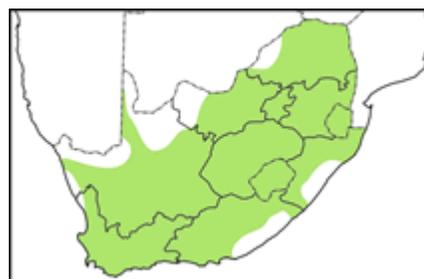


Figure 4: distribution map

Widespread distribution in all provinces of South Africa; also Lesotho, Swaziland,

¹ Flowering plants of Southern Africa 6: 208

Namibia and Botswana, in flat sandy areas, dry river beds and on roadsides.

Quality standards

Identity tests

Thin layer chromatography on silica gel using as solvent a mixture of toluene:diethyl ether:1.75M acetic acid (1:1:1). Reference compound cineole (0,1% in chloroform).

Method according to Appendix 2a.

R_f values of major compounds: 0,32 (light green); 0,40 (grey); 0,47 (grey-brown); 0,59 (purple); 0,63 (brown); 0,87 (purple); cineole: 0,75 (blue-purple)

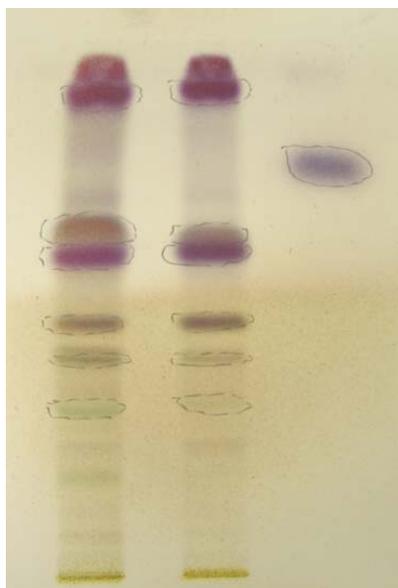


Figure 5: TLC plate.

HPLC on C₁₈ column, method according to Appendix 2b. (figure 6)

Major compounds:

Methanol extract: Retention times (mins): 6.43; 7.12

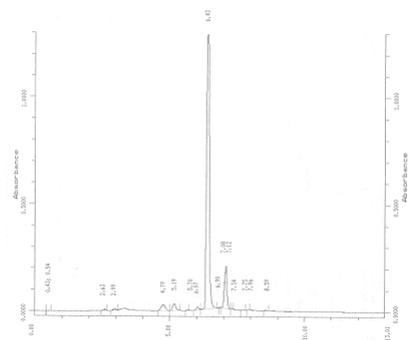


Figure 6: HPLC spectrum

Ethanol (70%) soluble extractive value: not less than 23% (range; 23.40-28.67%)

Purity tests

Assay

Not yet available

Major chemical constituents

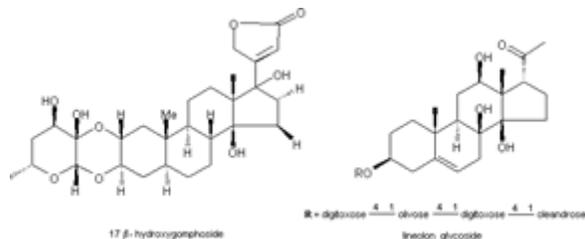


Figure 7: chemical constituents

Whole plant extracts of this species have been shown to contain a number of glycosides of the cardenolide and pregnane type^{2, 3, 4, 5, 6} e.g. 17β-hydroxygomphoside. The sugar moiety includes unusual monosaccharides e.g. digitoxose, olive, cymarose, oleandrose and deoxyallose, some of which are esterified with cinnamic acids e.g. sinapic acid.

Dosage forms

Aqueous leaf infusions are taken orally or used as an enema and dried ground leaf is taken as a snuff^{GR1}.

² Warashina, T. and Noro, T. (1994). Steroidal and cardenolide glycosides from *Asclepias fruticosa*. *Phytochemistry* **37(1)**: 217-226.

³ Warashina, T. and Noro, T. (1994). Cardenolide glycosides from *Asclepias fruticosa*. *Phytochemistry* **37(3)**:801-806.

⁴ Warashina, T. and Noro, T. (1994). Steroidal glycosides from *Asclepias fruticosa*. *Chem. Pharm. Bulletin* **42(2)**: 322-326.

⁵ Abe, F., Mori, Y., Okabe, H. and Yamauchi, T. (1994). Steroidal constituents from the roots and stems of *Asclepias fruticosa*. *Chem. Pharm. Bulletin* **42(9)**: 1777-1783.

⁶ Cheung, H.T.A., Coombe, R.G., Sidwell, W.T.L. and Watson, T.R. (1981). Afroside, a 15-β-hydroxycardenolide. *J. Chem. Soc. Perkin Transactions I*: 64-72.

Medicinal uses

A leaf infusion, taken by mouth, is used to treat intestinal troubles (diarrhoea and stomach pain) in children and, given *per rectum*, as a purgative. Dried powdered leaf is inhaled as a snuff for the relief of headache, coryza and tuberculosis.

Pharmacology/bioactivity

Uterine stimulant effects have been reported for the dried wood of *Asclepias fruticosa*⁷.

Extracts have shown cardiotoxic and antihypertensive^{GR27} but not decongestant nor analgesic activity⁸.

Water, hexane and 100% ethanol extracts of dried leaf, assessed for *in vitro* antibacterial activity against *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Bacillus subtilis* and *Escherichia coli*, were found to be inactive in the concentrations used⁹.

Contraindications

See precautions

Adverse reactions

None are reported for this species as used traditionally. However, the toxicity of cardiac glycosides is well-documented. See precautions

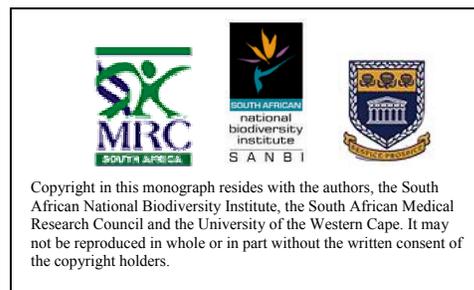
Precautions

In view of the possibility of cardiac, uterotonic and antihypertensive activity,

preparations of this species should be used with caution, on prescription from a competent traditional practitioner.

Dosage

To be determined



⁷ Sewram, V., Raynor, M.W., Raidoo, D.M. and Mulholland, D.A. (1998). Coupling SFE to uterotonic bioassay: an online approach to analysing medicinal plants. *Journal of Pharmaceutical and Biomedical Analysis*. **18(3)**: 305-318.

⁸ Hutchings, A. and van Staden, J. (1994). Plants used for stress-related ailments in traditional Zulu, Xhosa and Sotho medicine. Part I: plants used for headaches. *Journal of Ethnopharmacology* **43**: 89-124.

⁹ Mc Gaw, L.J., Jager, A.K. and van Staden, J. (2000). Antibacterial, anthelmintic and anti-amoebic activity of South African medicinal plants. *Journal of Ethnopharmacology* **72(1/2)**: 247-263.