

LEONOTIS HERBA

Definition

Leonotis herba consists of the dried aerial parts of *Leonotis leonurus* (L.) R. Br. (Lamiaceae).

Synonyms¹

Phlomis leonurus L.

Leonotis leonurus (L.) R. Br. var. *albiflora* Benth.

Vernacular names

wilde dagga (A), lion's ear, minaret flower (E), umfincafincane (X), lebake (S), umhlalampetu (Sh)

Description

Macroscopical



Figure 1a: Live plant



Figure 1b: T/S of leaf



Figure 2: Line drawing

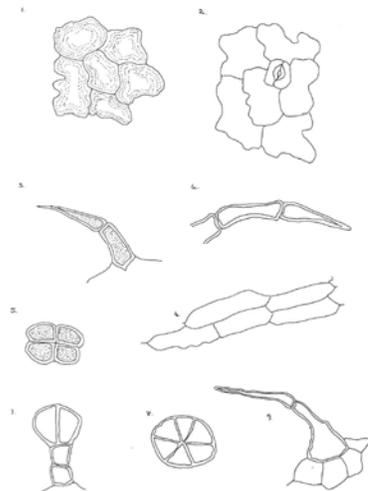


Figure 3: Diagnostic microscopic features

1. Cells of the lower epidermis with striated cuticle, stomata absent.
2. Cells of the upper epidermis with sinuous walls and anomocytic stomata.
3. and 4. Clothing hairs, more numerous on the lower leaf surface, margin and main veins.
5. Glandular trichome with 4-celled head, surface view.
6. Epidermal cells of the lower leaf surface over main vein.
7. Glandular trichome, particularly abundant on lower leaf surface, with 1-2 celled stalk and 4-celled head, lateral view.
8. Glandular trichome, 6-celled head, in surface view.
9. Clothing hair raised on papilla.

¹ Iwarsson, M. (1985). *Leonotis*, in Flora of Southern Africa **28(4)**: 31-37. Botanical Research Institute, Pretoria.

Shrub 2-5 m tall, branching from a thick woody base; stem pale brown and densely pubescent; **leaves** simple, opposite, petiolate, coriaceous, 50-100 × 10-20 mm, linear, acute at apex and base, serrate in the distal half; upper surface bright green, lower surface densely pubescent; inflorescence of 3-11 compact verticils; **calyx** 12-16 mm long, 4 mm in diameter, calyx teeth 10, subequal, spreading; **corolla** tubular, bright orange, 40-49 mm long, covered with orange hairs; **fruit** a nutlet 5-6 × 1.5-2 mm, brown.

Microscopical

Characteristic features are: the numerous uniseriate, curved, thick-walled, warty, 2-3 celled non-glandular trichomes of leaf and stem, 60-100 µm in length, particularly abundant on margin of lamina and main veins of lower leaf surface; the numerous glandular hairs of leaf and stem, with unicellular stalk and 4-celled head (up to 20 µm in diameter) and yellow-brown contents; the less numerous glandular trichomes of leaf lamina, with unicellular stalk and 6-8 celled head, thick-walled, head about 40 µm in diameter; cells of the lower epidermis with sinuous walls and striated cuticle, lacking stomata; cells of the upper epidermis with sinuous walls and numerous raised anomocytic stomata; single palisade layer; abundant crystal sand in cells of the mesophyll; occasional yellow hairs of the corolla.

Crude drug

Supplied in bundles comprising young leafy twigs, the leaves having a characteristic aromatic-pungent odour, bright yellow-green colour and rough texture; occasional flowers and fruits are present.

Geographical distribution

Locally common at forest margins, on rocky hillsides and river banks and in tall grassland of the Eastern and Western Cape Provinces, KwaZulu-Natal and Mpumalanga.

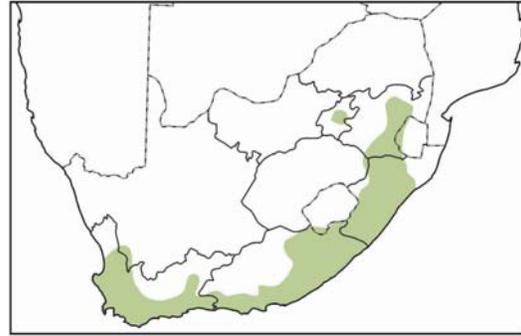


Figure 4: Distribution map

Quality standards

Identity test:

Thin layer chromatography on silica gel using as solvent a mixture of toluene:diethyl ether:1.75m acetic acid (1:1:1). Reference compound: thymol (0, 1% in chloroform). Method according to Appendix A.

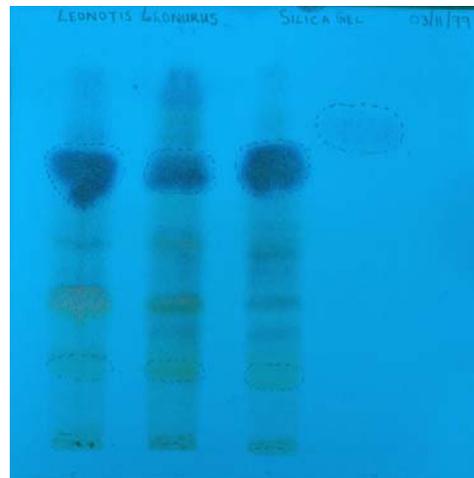


Figure 5: TLC plate

Major compounds:

yellow-mustard (Rf :0,19); yellow-mustard (Rf: 0,38); blue-mauve (Rf: 0,4); thymol (pink): Rf:0,8.

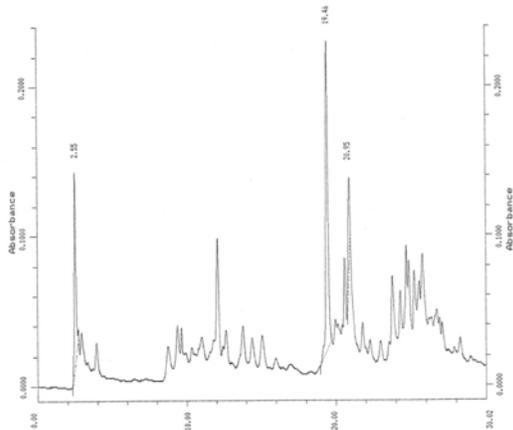


Figure 6a: MeOH HPLC Spectrum

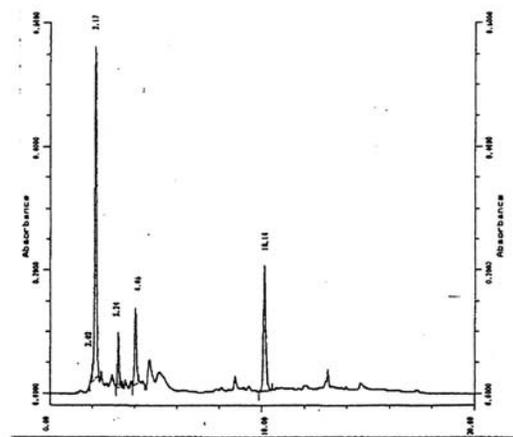


Figure 6b: DCM HPLC Spectrum

HPLC on C₁₈ column, method according to Appendix 2b.

Major compounds:

Methanol extract: (figure 6a)
Retention times (mins): 2,56; 19,46; 20,64;
23,83; 24,92.

DCM Extract: (figure 6b)
Retention times (mins): 2,17; 3,24; 4,06;
10,14.

Ethanol (70%) extractive value: not less than 22%.

Volatile oil content: not less than 0, 15%
(0, 15-0, 18%).

Purity tests

Assay

Major chemical constituents²

1. Diterpenoid labdane lactones: premarrubiin 0.00933-0.01567%, marrubiin (possibly an artifact derived from premarrubiin during extraction)
2. Tannins, quinones, saponins, alkaloids and triterpene steroids were detected in preliminary tests in our laboratories; iridoids were not detected.

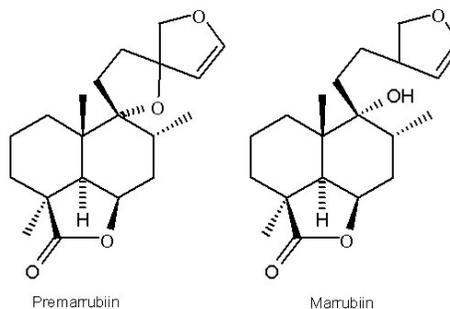


Figure 6: chemical constituents

Dosage forms

Used mainly in the form of an aqueous decoction, orally, per rectum and as a topical application.

Medicinal uses (traditional)

Internal

For the treatment of cough, cold, influenza, chest infections, diabetes, hypertension, eczema, epilepsy, delayed menstruation, intestinal worms, constipation, spider bites and scorpion stings and as an antidote for snakebite.

External

For the relief of haemorrhoids, eczema, skin rashes and boils.

Pharmacology/bioactivity

Anti-nematodal activity has been demonstrated *in vitro* against *Caenorhabditis elegans* for aqueous and

² Laonigro, G., Lanzetta, R., Parrilli, M., Adolfini, M. and Mangoni, L. (1979). The configuration of the diterpene spiroethers from *Marrubium vulgare* and from *Leonotis leonurus*. *Gazzetta Chimica Italia* **109** (3/4): 145-150.

100% ethanol extracts of the dried aerial parts of South African plants, at concentrations of 1.0mg/ml. A hexane extract proved inactive at a concentration of 2.0mg/ml.³ The same study found water and ethanol extracts to be inactive in an *in vitro* assay for anti-amoebic activity.

Molluscicidal activity of 80% ethanolic extracts of dried leaf, stem and fruits of Sudanese plants against *Biomphalaria pfeifferi* and *Bulinus truncatus* could not be demonstrated *in vitro* (concentration 200mg/litre)⁴.

Anticonvulsant activity of an aqueous extract of dried leaf has been demonstrated *in vivo* in the mouse (dose: 200.0mg/kg IP)⁵. In an *in vitro* assay for antiphage activity of aqueous fresh leaf+stem extracts of Greek plants, no activity was demonstrated against Bacteriophages MS2, PHI-CHI-174, T-7, T2, T4 or Bacteriophage-OPS7⁶. Extracts of shade-dried roots of Ethiopian plants were examined for anti-fertility activity in the rat, both *in vitro* (uterine stimulant activity) and *in vivo* (anti-implantation effects). Weak uterine stimulant activity was shown for 95% ethanol extracts but not for aqueous or n-butanol extracts (conc. 2.0%). Anti-implantation activity was shown by both n-butanol and ethanolic extracts but not by aqueous extracts (dose: 0,93g/kg intragastrically)⁷.

³ McGaw, L.J., Jager, A.K. and van Staden, J.V. (2000). Antibacterial, anthelmintic and anti-amoebic activity of South African medicinal plants. *Journal of Ethnopharmacology* **72**(1/2): 247-263.

⁴ Abdel-Aziz, A., Brain, K. and Bashir, A.K. (1990). Screening of Sudanese plants for molluscicidal activity and identification of leaves of *Tacca leontopetaloides* (L.) O. Ktze (Taccaceae) as a potential new exploitable resource. *Phytotherapy Research* **4**(2): 62-65.

⁵ Bienvenu, E., Amabeoku, G.J., Eagles, P., Scott, G. and Springfield, E.P. (2002). Anticonvulsant activity of aqueous extract of *Leonotis leonurus* (Lamiaceae). *Phytomedicine* **217**(2): 217-223.

⁶ Yannitsaros, A. (1996). Screening for antiphage activity of plants growing in Greece. *Fitoterapia* **67**(3): 205-214.

⁷ Desta, B. (1994). Ethiopian traditional herbal drugs. Part III: anti-fertility activity of 70

Brine shrimp lethality assay: preliminary results showed no effect on brine shrimps in the concentrations tested.

Antimicrobial activity assay

No *in vitro* antimicrobial activity of aqueous extracts of South African collections of *L. leonurus* against *Pseudomonas aeruginosa*, *Candida albicans*, *Staphylococcus aureus* or *Mycobacterium smegmatis* was observed, in the concentrations used for disc assays in our laboratories.

Contraindications

Not recommended for use by pregnant women.

Adverse reactions

First time users may experience dizziness, nausea or sweating.

Precautions

Treatment should be continued for one week. If symptoms persist, additional or alternative therapy should be sought. The use of this herb to treat diabetes, hypertension epilepsy or snakebite cannot at this stage be recommended, owing to lack of clinical data.

Dosage

1 tablespoonful of chopped dried herb ($\pm 10,0g$) added to 3 cupfuls ($\pm 500ml$) of boiling water, boil for 10 minutes, allow to cool, strain and use clear liquid for both internal and external use. If fresh material is used, 3-4 young twigs ($\pm 20g$) are infused with one litre of boiling water, cooled and strained.

Dosage: (internal use)

Adults: Half a cupful ($\pm 90ml$)

Elderly patients: One quarter of a cupful ($\pm 45ml$)

Children 6-12 yrs: One quarter of a cupful ($\pm 45ml$)

Children 2-6 yrs: Two teaspoonsful ($\pm 8ml$)

To be taken two to three times daily.

medicinal plants. *Journal of Ethnopharmacology* **44**(3): 199-209.

For external use, the decoction may be applied to the affected area using cotton wool or a clean cloth.

References

1. Iwarsson, M. (1985). *Leonotis*, in Flora of Southern Africa **28,4**: 31-37. Botanical Research Institute, Pretoria.

