

TARCHONANTHUS CAMPHORATUS HERBA

Definition

Tarchonanthus Camphoratus Herba consists of the fresh or dried leaves of *Tarchonanthus camphoratus* L. (Asteraceae)

Synonyms

T. abyssinicus Sch. Bip.
T. camphoratus var. *litakunensis* (DC.) Harv.
T. minor Less.

Vernacular names

Sagewood (E); kanferbos, vaalbos (A); mofahlana (S); mathola (X); mohattha (Ts); umnqebe (N); igqeba-elimhlope, isiduli-sehlathi (Z)

Description



Figure 1 – Live plant

Macroscopical¹

Dioecious shrub or small tree to 6m, with a moderate to strong odour of camphor; **leaves** alternate, borne on white-felted twigs, variable, 2 × 0.5 – 12 × 5 cm, obovate to lanceolate, upper surface smooth and finely reticulate with minute golden glands over the veinlets; lower surface white-felted, margin entire to denticulate; **flowers** (Dec-May) cream, borne on discoid heads in terminal or axillary panicles, female 1-3 flowered, male with numerous flowers; **fruit** a densely white-woolly achene.

¹ Hilliard, O. M. (1977). Compositae in Natal pp.110-112. University of Natal Press, Pietermaritzburg.



Figure 2 – line drawing

Microscopical

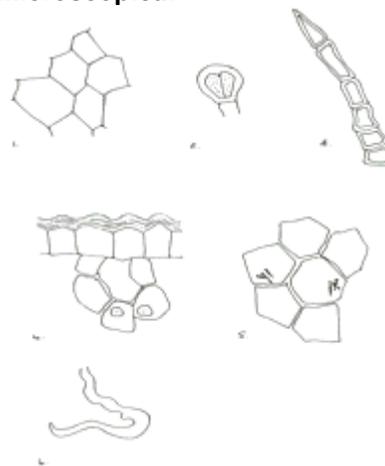


Figure 3 – microscopical features

Characteristic features are: the polygonal cells of the upper leaf epidermis (1); the very numerous clothing hairs of the lower leaf lamina, up to 4 cells long, thick walled, tapering to an acute apex, with 3-4 short basal cells and 2-3 longer apical cells (3); the glandular trichomes along the veins of the upper leaf surface, with bicellular heads up to 80µ in diameter and yellow-brown contents (2); the thick cuticle of the leaf epidermis (4), staining red with Soudan IV;

the parenchyma of the leaf mesophyll containing bundles of minute calcium oxalate raphides (5).

Crude drug

Bundles of fresh or dried material comprising leafy twigs; texture coarse-leathery, colour grey-green, odour faint camphoraceous.

Geographical distribution

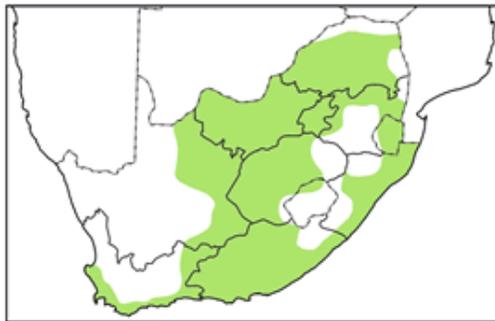


Figure 4 – distribution map

Widespread in all provinces of South Africa, in coastal forest, thornveld and thicket; also in Lesotho, Swaziland, Namibia, and north into tropical Africa.

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: 0.18 (indigo); 0.59 (grey-mauve); 0.72 (grey-mauve); 0.80 (grey); 0.95 (purple); cineole: 0.83 (purple)

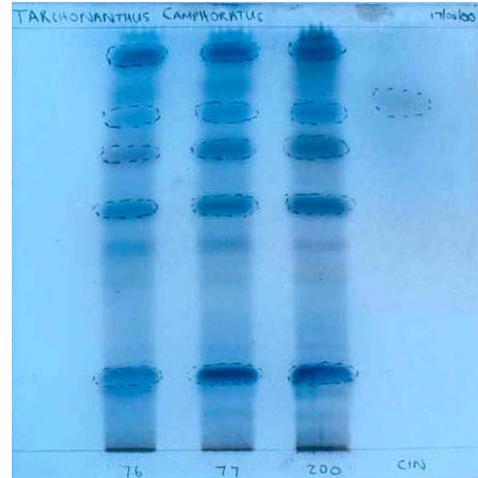


Figure 5 – TLC plate

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

Major compounds:

Methanol extract: (figure 6a)

Retention times (mins): 10.72; 18.17; 18.93; 20.54; 20.78; 26.15; 26.66

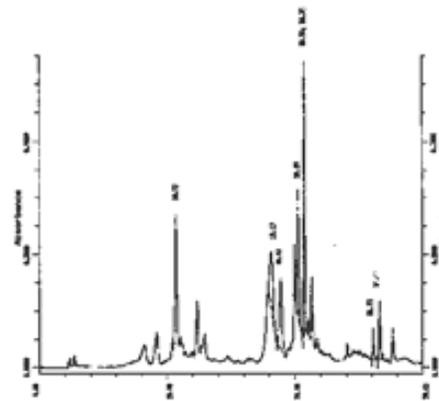


Figure 6 a – MeOH HPLC spectrum

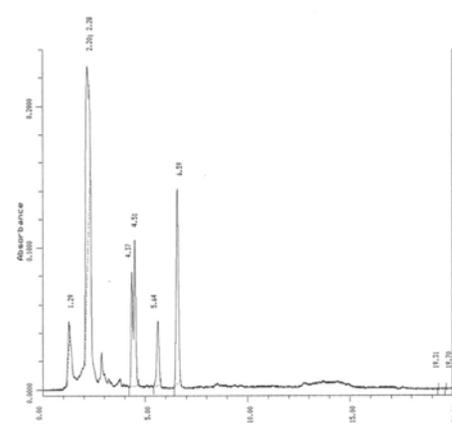


Figure 6 b – DCM HPLC spectrum

DCM extract: (figure 6b)

Retention times (mins): 1.29; 2.20; 4.37; 4.51; 5.64

Ethanol (70%) soluble extractive value: not less than 21.7% (range: 21.74-29.82%)

Purity tests

Assay

Not yet available

Major chemical constituents

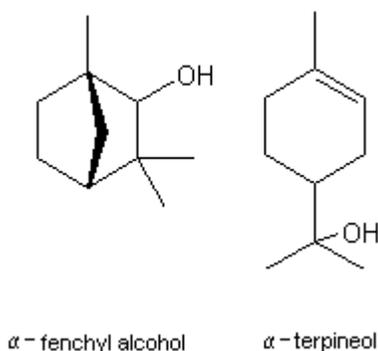


Figure 7 – chemical constituents

Phytochemical tests in our laboratories indicated the presence of tannins, saponins (2/3 collections) and reducing sugars (2/3 collections), but not of alkaloids, nor of cardiac or anthraquinone glycosides.

Analyses of the leaf oil (yield: 0.76%V/W) of Kenyan plants identified α -fenchyl alcohol (29.1%), 1,8-cineole (eucalyptol: 16.5%) and α -terpineol (8.5%) as the major constituents. Camphor was present in only minor quantity (0.4%)². Various flavones (e.g. luteolin, apigenin, nepetin and hispidulin) have been identified in Egyptian collections of this species, as has the sesquiterpene lactone parthenolide as well as a quaternary alkaloid, tarchonanthaline.³

² Mwangi, J.W., Achola, K.J. *et al.* (1994). Volatile constituents of the essential oil of *Tarchonanthus camphoratus* L. *Journal of Essential Oil Research* **6**: 183-185.

³ Bishay, D.W., Attia, A.A. and Fayed, M.A. (2002). Flavones and a quaternary alkaloid from *Tarchonanthus camphoratus* L. *Bull. Pharm. Sci. Assiut Univ.* **25(1)**: 1-6.

Dosage forms

The leaves of *Tarchonanthus camphoratus* are utilised in a number of ways: infusions, tinctures or decoctions are taken orally and the vapours from burning green material either inhaled or directed as a fumigant to inflamed joints; fresh leaf may be chewed or smoked; a leaf poultice may be applied to the chest and an ointment to affected areas.

Medicinal uses

Despite its wide geographical distribution, the medicinal uses to which this species is put are remarkably similar throughout its range. It is taken orally or applied externally to relieve bronchitis, asthma, headache, inflammation, chilblains or abdominal pains. Leaf infusions have also been reported to be diaphoretic.

Pharmacology/bioactivity

No *in vitro* activity against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans* or *Mycobacterium smegmatis* was shown by aqueous leaf extracts used in preliminary assays for antimicrobial activity in our laboratories.

A more recent investigation of antimicrobial activity of aqueous, ethanolic and hexane extracts of dried leaf did not demonstrate *in vitro* inhibitory effects against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* or *Klebsiella pneumoniae*.⁴

Aqueous leaf extracts administered *i. p.* to mice at a dose of 50-100mg/kg were shown to significantly attenuate pain in the acetic acid writhing test. At a dose of 100mg/kg, pain was significantly antagonised in the hot plate test. The same study was able to demonstrate that an aqueous extract (100mg/kg) significantly reduced fever induced in the rat by bacterial endotoxin.⁵

⁴ 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.

⁵ Amabeoku, G.J., Green, I., Eagles, P. and Benjeddou, M. (2000). Effects of *Tarchonanthus camphoratus* and *Erioccephalus africanus* on

Contraindications

None known

Adverse reactions

None recorded

Precautions

No special precautions

Dosage

To be determined

