TULBAGHIA RHIZOMA

Definition

Tulbaghia Rhizoma consists of the fresh or dried subterranean organs of *Tulbaghia alliacea* L.f. or *T. capensis* L. (Alliaceae).

Synonyms

Vernacular names

Wild garlic; wilde knoffel, knoflook (A); moelela, sefothafotha (S); ivimba-mpunzi (Xh); sikwa (Z)

Description

Macroscopical

*T. alliacea*: geophyte with rhizome up to 10cm long; leaves 15-25cm × 0.3-0.5cm, strap shaped, smelling of onion when bruised; flowers (Mar-May) borne in an umbrellate cluster of 6-10 individuals on a scape 15-30cm long; perianth tube and segments green; corona orange-brown; corona lobes fused into a 3-6 crenate fleshy collar, 4-8mm long, on which the upper anthers are inserted.

*T. capensis*: geophyte with fleshy rhizomatous rootstock, strong smelling; leaves linear, 10-45cm × 0.4-1.2cm, spreading; flowers (Apr-Oct) on pedicels up to 2cm long, 6-10 in umbellate inflorescence on a scape 15-30cm long, opening in succession; perianth segments purple brown to olive green, corona trifid fleshy, each lobe deeply bifid, to 5mm long, orange.

Microscopical

Characteristic features are: the thin walled parenchyma containing numerous ovoid to round starch grains (2); individual grains up

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to 14µ in diameter; the oil ducts, scattered throughout the matrix of parenchyma but particularly abundant in the central stele, bright yellow in fresh rhizomes, darker yellow-brown in dried material, up to 240µ in diameter (4); the thin layer of pale brown cork tissue (1); the collenchyma of the cortex (3) the absence of calcium oxalate crystals and tannins.

**Crude drug**

Cream-coloured globose to elongated rhizomes, up to 50mm in diameter, often with attached fleshy roots. Odour very strong sulphurous, texture crisp fleshy.

**Geographical distribution**

*T. alliacea*: Western and Eastern Cape Provinces, from Clanwilliam to the Cape Peninsula, eastwards to Port Elizabeth and north into KwaZulu-Natal, Mpumalanga and Gauteng (also Lesotho, Swaziland, Botswana and Zimbabwe), in clay or loam, in a variety of habitats.

*T. capensis*: Western Cape Province, on rocky slopes and rock crevices from 0-1000m; Cape Peninsula to Knysna.

![Figure 4: distribution map](image)

**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.

Rf values of major compounds: 0, 12 (blue); 0, 61 (light blue); 0, 72 (dark blue); 0, 8 (blue grey); 0, 80 cineole (blue grey).

![Figure 5: TLC plate](image)

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

**Major compounds:**

Methanol extract:
Retention times (mins): 11.38; 19.70; 24.21; 28.29.

![Figure 6: HPLC spectrum](image)

Ethanol (70%) soluble extractive value: not less than 13.15% determined using dried material (range: 13.15-23.82%)

**Purity tests**

**Assay**

Not yet available

**Major chemical constituents**

The secondary chemistry of *Tulbaghia* species is not well known. The related genus *Allium* is characterised by the presence, in most plant organs, of allyl sulphides e.g. the amino acid (+)-S-allyl-L-cysteine sulphoxide (alliin) and its by-product of enzymatic action, allicin. These
and related compounds account for the pungency of garlic, chives, onions and leeks (all *Allium* species). Similar compounds are probably present in *Tulbaghia* species.

**Figure 7: chemical constituents**

**Dosage forms**

Wild garlic is most commonly prepared as an infusion in water or milk, taken orally; less often used as an enema. In the Eastern Cape the bruised bulb is used to prepare a medicated bath.

**Medicinal uses**

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In the Western Cape, bulb preparations are taken orally to treat fever, as a remedy for tuberculosis and influenza, as an antihypertensive or to expel intestinal worms. As a medicated bath, wild garlic is used for the treatment of paralysis, rheumatism and to reduce the temperature in a feverish patient. A highly regarded medicinal herb, wild garlic is also taken in the Western Cape as a prophylactic against winter infections. The related *T. violacea* is often substituted in areas where *T. alliacea* and *T. capensis* are not available.

**Pharmacology/bioactivity**

There is little in the published literature concerning the bioactivity of *T. alliacea* or *T. capensis*. Reports of the inhibitory activity of hot water extracts of *T. violacea* against *Mycobacterium tuberculosis* and *Escherichia coli*, but not *Staphylococcus aureus*, have been noted. The results of disc assays in our laboratories indicated *in vitro* antimicrobial activity against *Mycobacterium smegmatis* and *Candida albicans* but not against *Pseudomonas aeruginosa* or *Staphylococcus aureus*.

The results of an investigation of cytotoxicity and antiviral activity of 16 South African plant species showed that aqueous extracts of *Tulbaghia alliacea* were not markedly cytotoxic, at any concentration used, to HeLa or Vero cells, but exhibited cytotoxicity at all dilutions used to Jurkat E6.1, AA-2 and CEM-SS cells. Possible toxicity to cattle of *Tulbaghia alliacea* extracts has been reported. In a direct *in vitro* cell culture antiviral assay, aqueous extracts were not found to inhibit replication of either Coxsackie B2 virus or HSV-1.

**Contraindications**

None known.

**Adverse reactions**

Individuals with known allergy to onions, garlic and other members of Alliaceae should use preparations of this herb with caution.

**Precautions**

No special precautions

**Dosage**

If fresh material is used, one large bulb is sliced and infused with 1 litre of boiling water in a closed vessel. When cool, the infusion is strained and kept in the refrigerator/cool place. If dried material is used, two level teaspoonfuls (± 7g) may be infused with 1 litre of boiling water.

**Adults:** one teacupful (180ml) twice daily

**Children:** half a teacupful (90ml) twice daily

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