

BULBINE FRUTESCENS FOLIA

Definition

Bulbine Frutescens Folia consists of the fresh leaves of *Bulbine frutescens* (L.) Willd. (Asphodelaceae)

Synonyms

Bulbine caulescens L
Bulbine rostrata Willd.

Vernacular names

Rankkopiesa (A), ibhucu, ithethe elimpofu (Z)

Description

Macroscopical



Figure 1: Live plant

Spreading geophytic shrublet with rhizomatous rootstock and numerous wiry roots; **leaves** bright green, glabrous, succulent, subterete, to 150mm long and 4-8mm thick; **flowers** (Aug-Apr) in dense elongated racemes up to 30cm long, yellow, orange or white, with bearded stamens

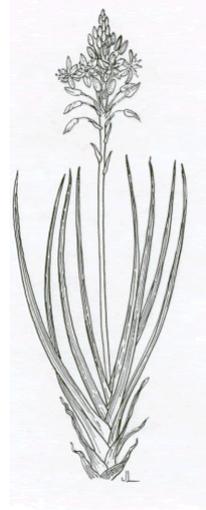


Figure 2: line drawing

Microscopical

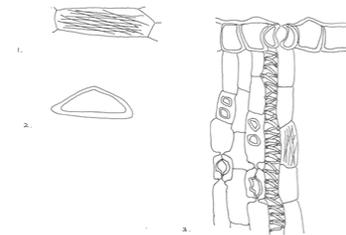


Figure 3: microscopical features

Characteristic features are: the leaf in T/S shows an epidermis of colourless, thick-walled, non-suberised cells, a band of photosynthetic and vascular tissue around the leaf perimeter (2+3), a central core of large thin-walled cells with contents staining pink-orange with KOH solution; yellow-green stomata and idioblasts containing bundles of calcium oxalate raphides (1), each up to 200µ long, in cells of the outer leaf perimeter; the absence of tannins.

Crude drug

Gathered as needed and used fresh; seldom seen in the marketplace

Geographical distribution

Sandy flats and slopes of Namaqualand and the Karoo, in dry areas throughout southern Africa: Northern, Western, Eastern Cape

and Free State Provinces, Lesotho, KwaZulu-Natal.

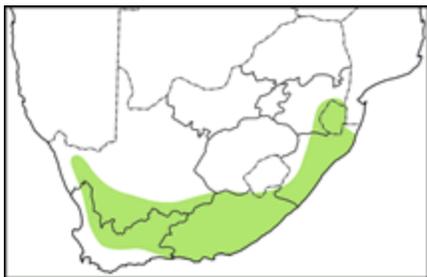


Figure 4: distribution map

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. (figure 5) R_f values of major compounds: 0.5 (orange); 0.55 (light purple); 0.67 (purple); 0.8 (pale green); 0.83 (light purple); cineole: 0.76 (blue-purple).

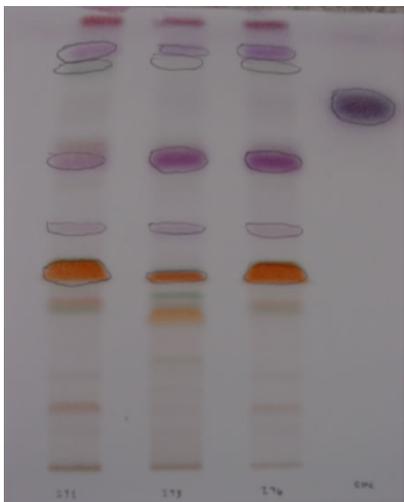


Figure 5: TLC plate

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

Major compounds:

Methanol extract: (figure 6)

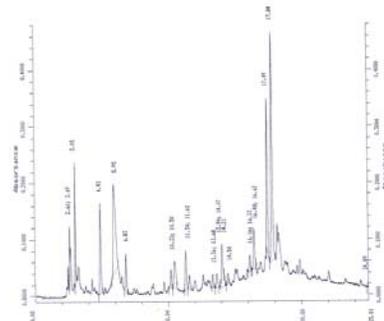


Figure 6: HPLC spectrum

Retention times (mins): 3.05 ; 5.95 ; 17.49; 17.84

Total ash: 9.32% (determined according to the BHP 1996 using 1.0g dried ground material; a pale grey-yellow residue remains after ignition in muffle furnace).

Loss on drying: loses not less than 94% (range: 94.3-95.66%) of its weight on drying in an oven at 105°C for three days.

Purity tests

Assay

Not yet available

Major chemical constituents¹

The biaryl anthraquinones knipholone and isoknipholone, based on a chrysophanol skeleton (see figure 7), have been isolated from the roots of *Bulbine frutescens* as well as from other *Bulbine* species². These differ from the anthraquinones of the related genus *Aloe* (subfamily Alooidae) in that the latter are mainly aloe-emodin derivatives. Knipholone, together with two new phenylanthraquinones (Gaboroquinones A and B) and a demethylknipholone glucoside,

¹ Van Staden, L.F. and Drewes, S.E. (1994). Knipholone from *Bulbine latifolia* and *Bulbine frutescens*. *Phytochemistry* **35**(3): 685-686.

² Van Wyk, B-E., Yenesew, A. and Dagne, E. (1995). Chemotaxonomic significance of anthraquinones in the roots of Asphodeloideae (Asphodelaceae). *Biochemical Systematics and Ecology* **23**(3): 277-281.

have been isolated from the roots of plants growing in Botswana³.

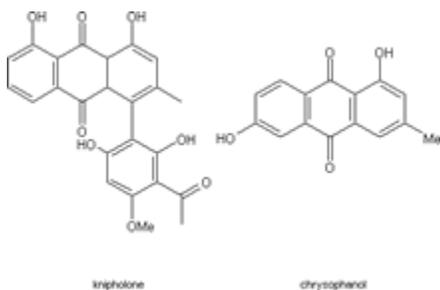


Figure 7: chemical constituents

Dosage forms

Fresh leaf juice is usually applied directly to the skin.

Medicinal uses ^{GR1, 12, 20}

Some 41 *Bulbine* species occur in South Africa and 6-7 are used medicinally; the leaf gel of most of these is used, the species possibly interchangeably, as an external application for the treatment of sores, wounds, skin rashes, cracked lips, eczema and ringworm; less often also to relieve sciatica. Whereas the underground parts of the other 6-7 species are used to prepare enemata or infusions for oral administration to treat diarrhoea, colic, urinary tract infections and venereal diseases, only the leaf juice of *B. frutescens* appears to have found a place in traditional medical practice.

Pharmacology/bioactivity

Aqueous and methanolic extracts of dried leaf, investigated for *in vitro* antimicrobial activity against *Staphylococcus aureus*, *S. epidermidis* and *Bacillus subtilis*, were found to be inactive (conc. 1mg/ml)⁴ Knipholone has been tested for *in vitro* antimicrobial activity against *Escherichia*

coli, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus subtilis*, *Micrococcus luteus* and *Candida albicans*¹, but was found to be inactive. No other information is available regarding the bioactivity of *B. frutescens*.

Contraindications

None known

Adverse reactions

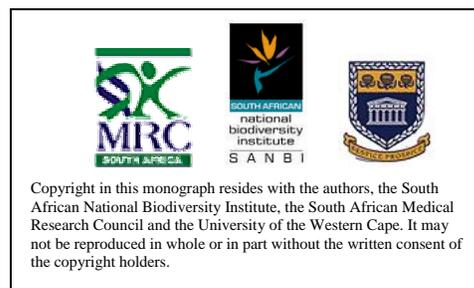
Brown staining of the skin after using the leaf gel is reported ^{GR1}

Precautions

No special precautions

Dosage

To be applied frequently to the affected parts for 7 days. If symptoms persist, alternative therapy should be sought.



³ Abegaz, B. *et al.* (2002). Gaboroquinones A and B and 4'-O-demethylknipholone-4'-O-β-D-glucopyranoside, phenylanthraquinones from the roots of *Bulbine frutescens*. *Journal of Natural Products* **65**(8): 1117-1121.

⁴ Rabe, T. and van Staden, J. (1997). Antibacterial activity of South African plants used for medicinal purposes. *Journal of Ethnopharmacology* **56**: 81-87.