

# SUTHERLANDIA FRUTESCENS HERBA

## Definition

Sutherlandia Frutescens Herba consists of the fresh or dried above-ground parts of *Sutherlandia frutescens* (L.) R. Br. (Fabaceae).

## Synonyms

*Colutea frutescens* L.

### Vernacular names

kankerbos, gansies, Jantjie Berend, klappers, kalkoentjebos, keurtjies (A), cancer bush

## Description<sup>1, 2</sup>



Figure 1 – Live plant

### Macroscopical

Lax spreading shrubs to 1,2m high, with prostrate to erect stems; **leaves** compound pinnate with leaflets oblong to linear-elliptic, mostly 3 or more times longer than wide, slightly to densely hairy, the latter silvery in appearance; **flowers** (Jul-Dec) bright scarlet, borne in terminal racemes; **fruit** an inflated leathery pod, 1.3-2 times as long as wide, bearing a persistent upturned style; **seeds** black, flattened, ± 3mm in diameter.

*Sutherlandia frutescens* is one of five currently recognised *Sutherlandia* species, all of which are confined to Southern Africa.

<sup>1</sup> Phillips, E. P. and Dyer, R. A. (1934). The genus *Sutherlandia*. *Revista. Sudamericana de Botanica*. **1**: 69-80.

<sup>2</sup> Schrire, B. D. and Andrews, S. (1992). *Sutherlandia*: gansies or balloon peas: Part 1. *The Plantsman* **14**: 65-69.

The species are difficult to distinguish because they often grade into each other and some botanists consider them to be merely different forms of a single large and variable species. Three of the species, *Sutherlandia frutescens*, *S. microphylla* and *S. tomentosa* have overlapping distributions in the Western Cape Province and are probably used interchangeably in this area as kankerbos.

Recent taxonomic studies<sup>3</sup> have suggested that *Sutherlandia* be taken into synonymy in *Lessertia* on the grounds that there is insufficient basis for recognition of two separate genera. Following this treatment *Sutherlandia frutescens* is now *Lessertia frutescens* (L.) Goldblatt and J. C. Manning. The reader is referred to the relevant literature for details. For the purpose of the present work, the name *Sutherlandia frutescens* is retained to avoid possible confusion by non botanists.



Figure 2 – line drawing

<sup>3</sup> Goldblatt, P. and Manning, J. (2000). Cape plants: a conspectus of the Cape Flora of South Africa. *Strelitzia* **9**. National Botanical Institute.

## Microscopical

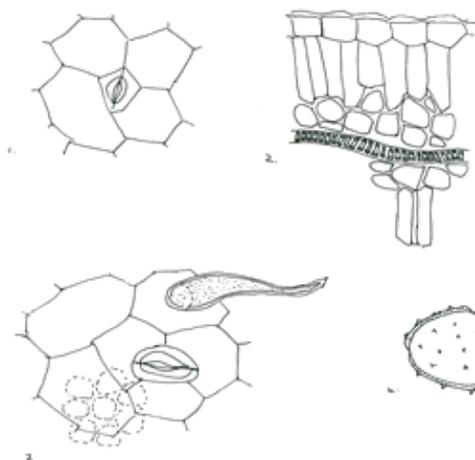


Figure 3 – microscopical features

Characteristic features are

The very numerous unicellular stiff clothing hairs, up to 200 microns in length, with warty walls, adpressed to the leaf surface and along leaf margins (3); the straight-walled, polygonal cells of both upper and lower leaf surfaces (1), papillate in sectional view; the small stomata ( $\pm 20$  microns in length); the bifacial structure of the leaf lamina (2); the absence of calcium oxalate crystals

## Crude drug

Supplied in bundles of fresh or dried material, consisting of leaf and stem only or including flowers and fruit. The foliage is grey-green in colour, the fruits green flushed with red; the herb has a characteristic bitter and slightly aromatic odour.

## Geographical distribution

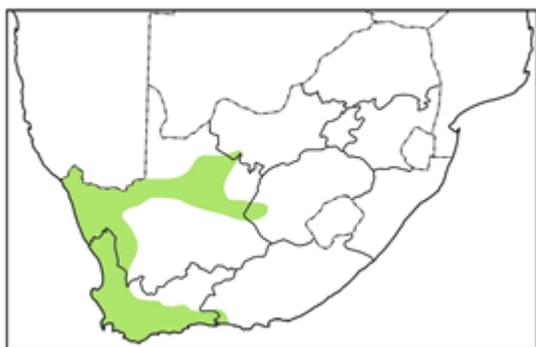


Figure 4 – distribution map

Widespread in drier areas of the South Western and Northern Cape Provinces; often as a weed of disturbed places e.g. road verges.

## Quality standards

## Identity tests

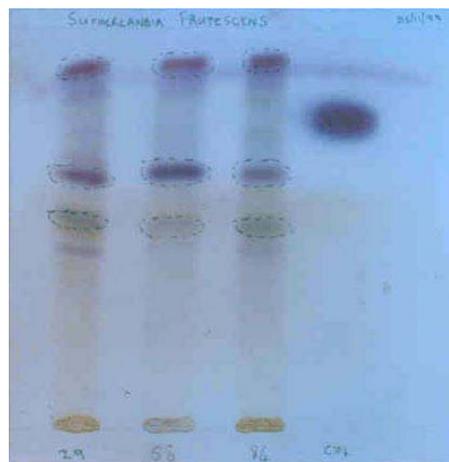


Figure 5 – TLC plate

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, 50 (yellow-green); 0, 63 (purple); 0, 91 (purple); cineole: 0, 81 (blue-purple)

HPLC on  $C_{18}$  column, method according to Appendix 2b.

## Major compounds:

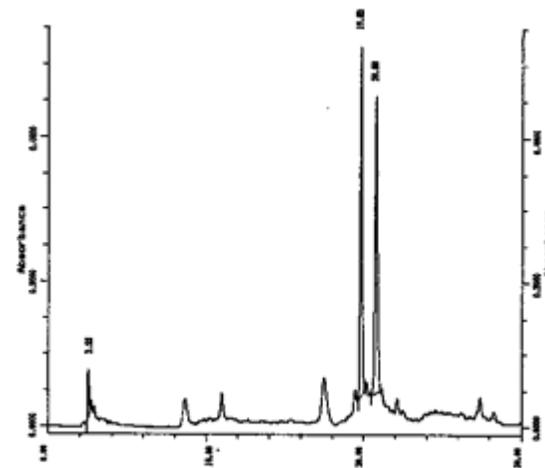


Figure 6 – HPLC spectrum

Methanol extract: (Figure 6)  
Retention times (mins): 19.88; 20.68

**Ethanol (70%) soluble extractive value:**  
not less than 27% (range: 27.22-38.90%)

### Purity tests

### Assay

Not yet available

### Major chemical constituents

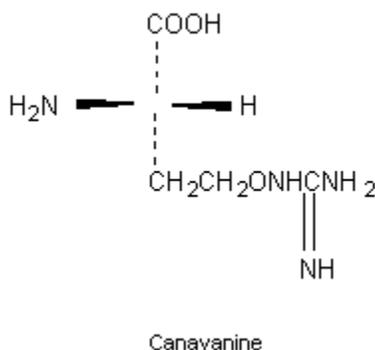


Figure 7 – chemical constituents

Microchemical tests in our laboratories indicated the presence of tannins but no alkaloids, cardiac glycosides, saponins or anthraquinone derivatives. The non-protein  $\alpha$ -amino acid canavanine has been detected in the seeds of this species but not in other organs<sup>4</sup>. Free amino acids are reported as common constituents of *Sutherlandia frutescens*.<sup>5</sup>

### Dosage forms

Used mainly as an aqueous infusion or decoction, either internally or externally as an antiseptic wash, eye lotion or douche. Whole fruits may be chewed for the relief of stomach pains.

<sup>4</sup> Bell, E.A. *et al.* (1978). The systematic significance of canavanine in the Papilionoideae. *Biochemical Systematics and Ecology* **6**: 201-212.

<sup>5</sup> Van Wyk, B-E., Gericke, N.P. and van Oudtshoorn, B. (1997). *Medicinal plants of South Africa*. Briza Publications, Pretoria.

### Medicinal uses

#### Internal

For the treatment of cancer, gastric ailments, gynaecological problems, backache, rheumatism, oedema and fevers; also as a bitter tonic or blood purifier.

#### External

For the treatment of eye infections and wounds; as a douche for prolapse of the uterus.

### Pharmacology/bioactivity

Studies using 50% ethanol extracts of fresh flowers of *Sutherlandia frutescens* found no antitumour activity against CA-Lewis lung, Leuk-L1210 or Sarcoma 180 (solid) tumours in the mouse. Similar extracts, assayed for cytotoxicity against CA-9KB cell lines, at a concentration of 20.0 mcg/ml, proved inactive.<sup>6</sup>

No *in vitro* antimicrobial activity against *Pseudomonas aeruginosa*, *Candida albicans* or *Mycobacterium smegmatis* was observed in the concentrations used for disc assays in our laboratories. Some activity was recorded against *Staphylococcus aureus*.

Research into anticancer and immunomodulatory activity of this species is currently in progress. The results appear promising.

### Contraindications

The use of this herb is not recommended during pregnancy.

### Adverse reactions

The use of excessive amounts of this herb are reputed to cause emesis. Side effects of moderate use include sweating and mild purgation.

### Precautions

<sup>6</sup> Charlson, A.J. (1980). Antineoplastic constituents of some Southern African plants. *Journal of Ethnopharmacology* **2(4)**: 323-335.

Investigations in our laboratories of different collections of this herb suggests that it is biochemically variable and that distinct chemical races of the species may exist in different parts of its distribution range. These may vary in potency and bioactivity.

### Dosage

Half a bunch ( $\pm 10\text{g} = 3$  tablespoonsful) of dried ground herb is infused until cold with one litre of boiling water, then strained and taken in half teacupful doses (90ml) three times daily. Children 6 –12 years: one quarter teacupful (45ml).

