PELARGONIUM BETULINUM HERBA

Definition

Pelargonium Betulinum Herba consists of the fresh or dried leaves, smaller stems and flowers of Pelargonium betulinum (L.) l’Hér. (Geraniaceae).

Synonyms

P. georgense Knuth

Vernacular names

maagpynbossie, kanferblaar (A)

Description

Macroscopical

Small erect to sprawling semi-woody shrub, 0.3-1.3 metres in height; leaves ovate, soft to slightly leathery, 1-3 cm long x 0.7-2.5 cm wide with dentate margin and aromatic camphoraceous odour, glabrous to finely hairy; flowers (Aug-Oct) pink to purple, occasionally white, streaked with darker purple, borne in umbels of usually 3-4 flowers; stamens 7, with orange anthers.¹

Microscopical

Characteristic features are: the unicellular clothing hairs, abundant along the leaf margin in some collections, 20-30µ long, with slightly thickened warty walls; the more numerous longer unicellular clothing hairs, up to 600µ long, of lower leaf surface, particularly over the main veins; the

glandular hairs with multicellular stalks and unicellular heads ±20µ in diameter, with red-brown contents; the abundant rosette aggregates of calcium oxalate, 40-50µ in diameter, forming a crystal layer in the leaf mesophyll or occurring loose in the powdered drug; the fairly abundant triaperturate yellow-brown pollen grains, up to 80µ in diameter; the papillate cells of the corolla epidermis; the polygonal to slightly wavy walled cells of upper and lower leaf epidermis; the cells of the palisade layer with red-brown contents.

1. Calcium oxalate rosette aggregate (40-50µ diameter)
2. Glandular trichome with unicellular head ±20µ in diameter, with red-brown contents
3. Leaf epidermis with anomocytic stomata
4. Papillate cells of leaf epidermis
5. Papillate cells of corolla epidermis (lateral view)
6. T/S leaf showing clothing hair and calcium oxalate rosette aggregate in cell of mesophyll

**Crude drug**

Supplied in bundles comprising young leaf and stem, sometimes together with flowers; odour pleasantly aromatic and camphor-like; dried powdered drug distinctly red brown in colour.

**Geographical distribution**

Sandy dunes and coastal flats of the Western Cape Province.

**Quality standards**

**Identity tests**

![TLC plate](image)

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: 0.48 (lilac); 0.63 (light sage green); 0.69 (sage green); 0.74 (sage green); 0.85 (lilac); cineole: 0.69 (blue-purple)

![HPLC spectrum](image)

HPLC on C18 column, method according to Appendix 2b.
Major compounds:
Methanol extract: (Figure 6)
Retention times (mins): 19.81; 20.22; 20.73; 21.27

Ethanol (70%) soluble extractive value:
not less than 28% (range: 28.27-31.34%)

Purity tests

Assay
Not yet available

Major chemical constituents

![Chemical structure of scopoletin](image)

**Figure 7 – chemical constituents**

Microchemical tests in our laboratories indicated the presence in this species of saponins and tannins but not alkaloids, cardiac glycosides, cyanogens or anthraquinone derivatives.

Coumarins e.g. 7-hydroxy-5, 6-dimethoxycoumarin (umckalin), its 7-glucoside and scopoletin have been identified as major constituents of root extracts of *P. betulinum* as well as of 11 other *Pelargonium* species but do not appear to characterise the above-ground organs of the genus. Tannins (hydrolysable + condensed) and flavonoids, rather than coumarins, appear to be the major secondary constituents of leaf, flower and stem. The indole alkaloids elaeocarpidine and its 20-H isomer epielaeocarpidine have been identified in leaves of 8 *Pelargonium* species but not in those of *P. betulinum*.

Essential oils characterise species of *Pelargonium* Section Pelargonium, to which *Pelargonium betulinum* belongs, but little is known at present of the composition of *P. betulinum* oil, or of other constituents of this species.

Dosage forms

Used mainly in the form of an aqueous infusion, taken internally. The vapours obtained from steaming the leaves in boiling water may be inhaled.

Medicinal uses

As the vernacular name suggests, infusions of this herb are used to treat colic and gastric disorders; inhalation of the vapours obtained from steaming the leaf is considered beneficial for cough and bronchial congestion.

Pharmacology/bioactivity

Little is known of the pharmacology of this species. Preliminary assays indicated no *in vitro* antimicrobial activity of aqueous extracts against *Pseudomonas aeruginosa*, *Candida albicans* or *Mycobacterium smegmatis* in the concentrations used in our laboratories. Some activity was recorded against *Staphylococcus aureus*.

Scientific interest in the bioactivity of the genus *Pelargonium* has focused mainly on *P. reniforme* and *P. sidoides*, the roots of which are used traditionally to treat diarrhoea. Under the vernacular name umkaloabo, their recommended use as a specific for tuberculosis, bronchitis and other pulmonary disorders attracted the attention of the German pharmaceutical industry and a herbal preparation known as Umckaloabo ® (ISO, Regensberg) has been available for some years. Antibacterial, anti-mycobacterial, and immunomodulatory

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activity of whole plant extracts and of isolates has been investigated.

**Contraindications**

None known.

**Adverse reactions**

None reported.

**Precautions**

No special precautions.

**Dosage**

Eight tablespoonsful (±20g) of dried powdered herb is infused until cold in one litre (± 6 teacupfuls) of boiling water. The mixture is strained and taken in half teacupful (90ml) doses three times daily. For nasal or bronchial congestion, fresh leaf should be added to a basin of boiling water and the vapours inhaled.