

PELARGONIUM GROSSULARIOIDES HERBA

Definition

Pelargonium Grossularioides Herba consists of the fresh or dried overground parts of *Pelargonium grossularioides* (L.) l'Hérit. (Geraniaceae).

Synonyms

Pelargonium anceps l'Hérit.

P. filicaule Knuth

Vernacular names

rooibeentjierabas, rooistingelhoutrabas, rabassam (A)

Description

Macroscopical¹



Figure 1 – Live plant

Low spreading aromatic herb reaching a height of 20cm, with furrowed trailing stems up to 50 cm long, flushed red; **leaves**, borne on long reddish petioles, glabrous to finely hairy, soft, up to 40mm long × 60mm wide, round to reniform, 3-5 palmate with incised margin; older foliage sometimes flushed with red; **flowers** (Jan-Dec) small, inconspicuous, pink to magenta, occasionally white, borne in an umbellate inflorescence of 3-50 blooms.



Figure 2 – line drawing

Microscopical

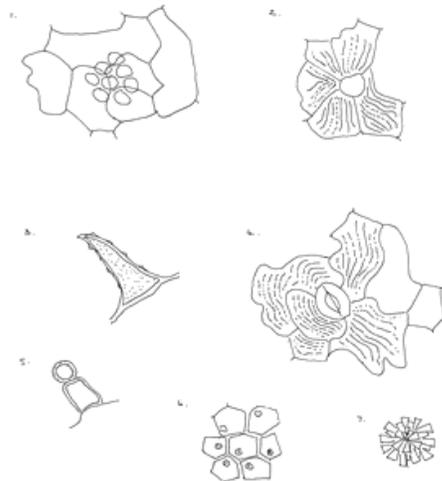


Figure 3 – microscopical features

Characteristic features are: the ± polygonal cells of the upper epidermis with striated cuticle, lacking stomata; the cells of the lower epidermis with sinuous walls,

¹ Van der Walt, J.J.A. (1977). *Pelargoniums of Southern Africa*. Purnell, Cape Town.

anomocytic stomata and striated cuticle; the calcium oxalate rosette aggregates of the mesophyll, up to 40µ in diameter; the curved unicellular clothing hairs of leaf and stem, up to 80µ long, with warty walls; the globoid bodies of the single palisade layer beneath the upper epidermis.

1. Cells of upper leaf epidermis with underlying palisade layer
2. Cells of lower leaf epidermis with striated cuticle and cicatrix at base of clothing hair
3. Unicellular clothing hair (up to 80µ long) of leaf and stem, with thickened warty walls
4. Cells of lower leaf epidermis with striated cuticle and anisocytic stomata
5. Glandular hair of leaf epidermis
6. Palisade layer below upper epidermis, with globoid inclusions
7. Calcium oxalate rosette aggregate from leaf mesophyll, up to 40µ in diameter

Crude drug

Occurs as bundles of fresh or dried material comprising leaf, stem and occasional flowers; odour characteristic aromatic, texture soft.

Geographical distribution

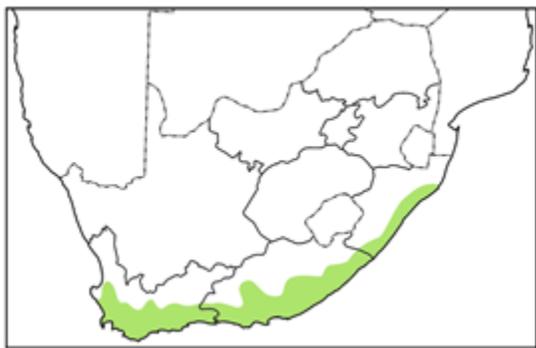


Figure 4 – distribution map

Widespread in damp or shady habitats, mainly in the coastal areas of the Western and Eastern Cape Provinces and KwaZulu-Natal.

Quality standards

Identity tests

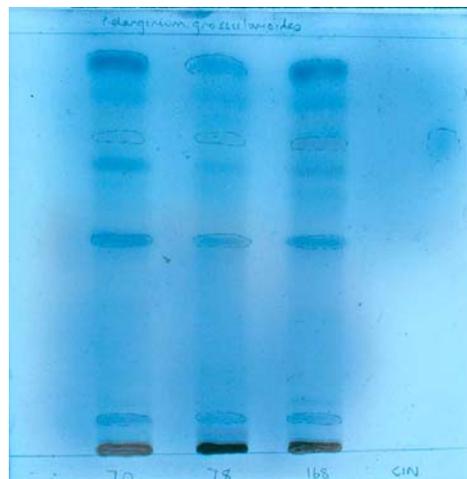


Figure 5 – TLC plate

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: 0,11 (pale grey); 0,51 (grey-blue); 0,74 (pale yellow-green); 0,92 (grey-blue); cineole 0,75 (purple-blue)

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

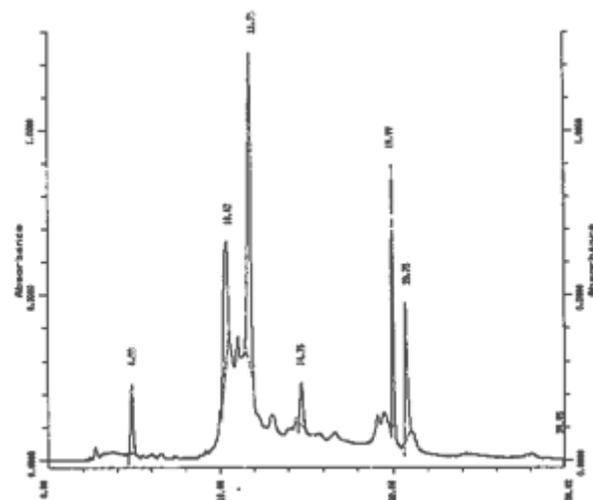


Figure 6 – HPLC spectrum

Major compounds:

Methanol extract: (Figure 6)

Retention times (mins): 4.88; 10.42; 11.76; 14.76; 19.99; 20.75

Ethanol (70%) soluble extractive value:
not less than 32.0% (range: 28.5-33.24%)

Purity tests

Assay

Major chemical constituents

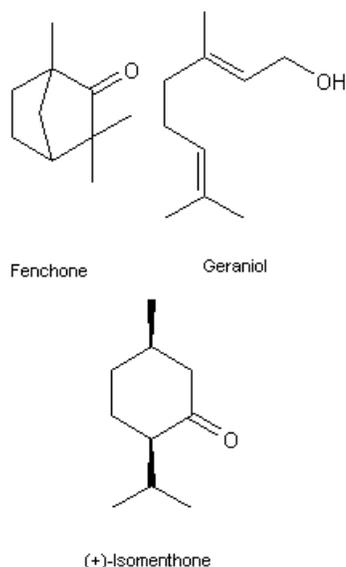


Figure 7 – chemical constituents

Microchemical tests in our laboratories indicated the presence of tannins and saponins (1/3 collections) but not of alkaloids, nor of cardiac, cyanogenic or anthraquinone glycosides. The percentage composition of the volatile oil obtained from one collection of this species was as follows²:

myrcene 1.8%; p-cymene 3.0%; limonene 1.0%; fenchone 8.2%; isomenthone 12.8%, geraniol 15.9% (figure 7), linalool 5.4%; menthone 1.8%; α -terpineol 0.7%; citronellol 11.6%; neral 1.2%; geranial 3.7%; methyl eugenol 11.2%; phenylethyl isobutyrate 0.5%; geranylbutyrate 0.7%; phenylethyl tiglate 0.8%; caryophyllene oxide 1.8%; geranyl tiglate 1.1% and an unidentified sesquiterpene.

(See *Pelargonium betulinum* for summary of genus secondary chemistry)

² Lis-Balchin, M. (1993). The essential oils of *Pelargonium grossularioides* and *Erodium cicutarium* (Geraniaceae). *Journal of Essential Oil Research* **5**: 317-318.

Dosage forms

Used mainly as an aqueous infusion, taken orally or externally applied.

Medicinal uses

This species is used traditionally to treat kidney and bladder disorders, menstrual problems, jaundice, tuberculosis and eczema. It is reputed to have both abortifacient and oxytocic properties.

Pharmacology/bioactivity

Preliminary assays in our laboratories indicated no *in vitro* antimicrobial activity against *Pseudomonas aeruginosa* or *Candida albicans* in the concentrations used. Some activity was recorded against *Staphylococcus aureus* and *Mycobacterium smegmatis*.

An *in vitro* investigation of the action of hexane, methanol and water extracts of *Pelargonium grossularioides* on smooth, skeletal and cardiac muscle³ showed most extracts to promote contraction or increase muscle tone of isolated guinea pig ileum, rat uterus and rat diaphragm. Hexane and methanol extracts had greater activity than aqueous extracts. A negative inotropic effect was observed on the rabbit heart. The spasmogenic action on isolated rat uterus is consistent with the use of this species as an oxytocic and abortifacient.

Contraindications

In view of its effects on uterine muscle, the use of this herb during pregnancy is contraindicated.

Adverse reactions

None reported.

Precautions

No special precautions.

³ Lis-Balchin, M.T. and Hart, S.L. (1994). A pharmacological appraisal of the folk medicinal usage of *Pelargonium grossularioides* and *Erodium cicutarium*. *Journal of Herbs, Spices and Medicinal Plants* **2** (3): 41-48.

Dosage

One tablespoonful (3.5g) of dried powdered herb is infused with one litre of boiling water and strained when cold.

Adults: Half a teacupful (90ml) three times daily. For urinary tract disorders, this herb may be mixed with an equal quantity of buchu (*Agathosma betulina*) before preparing an infusion.

The use of this herb to treat jaundice and tuberculosis should only be made on the advice of a competent traditional practitioner.

