



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Article

A Review on an overview on Pelargonium Endlicherianum

Pratik Bhaik*, Rutuja Bhaik, Pranay Pukle, Pranav Batwal, Priyanka Panmand

IVMs, Krishnarao Bhegade Institute of Pharmaceutical Education and Research Talegaon Dabhade.

ARTICLE INFO

Published: 19 Dec. 2024

Keywords:

Pelargonium genus, Folk
Medicine, germination,
rhizomes.

DOI:

10.5281/zenodo.14528027

ABSTRACT

Pelargonium genus (Geraniaceae) comprises about 750 species that are growing wild in temperate and subtropical climates. Pelargonium endlicherianum this species which grows on stony, rocky, and sloping land was collected in August 2012. Pelargonium Endlicherianum is the hardiest species of Pelargonium. It can withstand the winter climate in much of the UK, providing it is planted in a position that avoids heavy rainfall. This makes it a good species for the alpine house. Roots of Pelargonium endlicherianum Fenzl were collected from Kaledibi Village, Iskenderun, Hatay in Turkey, in May 2014. In Turkish Folk Medicine, the decoction prepared from the roots and fresh flowers of Pelargonium endlicherianum Fenzl., known as "solucanotu" by local people in Turkey, has been used for the treatment of gastrointestinal parasitism in small ruminants. Pelargonium endlicherianum growing in Turkey is completely natural and uncultivated. These species have a rhizome root structure. The probability of germination is weak. It is usually distributed by rhizomes. Pelargonium endlicherianum from this genus naturally grows in Turkey and N. Iraq. These species are perennial herbaceous or semi-woody bushes, have different colored flowers (red, fire red, orange-red, pink, and white-edged), and fruit beaked, splitting from base to apex into 5 mericarps. Pelargonium endlicherianum was collected from Hakkari in the C9 grid of Flora of Turkey.

INTRODUCTION

There are two recorded species of Pelargoniums (Pelargonium endlicherianum Fenzl. and Pelargonium quercetorum Agnew.) known in Turkish flora. Pelargonium endlicherianum is known by the common name solucanotu (tansy) in Turkey; the decoction prepared from its roots and the fresh flowers of the plant is traditionally used

to treat intestinal parasites [1]. Many Pelargonium species, hybrids, and cultures derived from them have fragrant leaves that produce Pelargonium endlicherianum essential oil (PEO). The geranium essential oil obtained from Pelargonium species is known to be significantly beneficial in the treatment of the skin for fungal and general infections, acne, burns, bruises shingles, eczema,

*Corresponding Author: Pratik Bhaik

Address: IVMs, Krishnarao Bhegade Institute of Pharmaceutical Education and Research Talegaon Dabhade.

Email : pratikbhaik240@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



and dermatitis. The flowers of *Pelargonium endlicherianum* Fenzl. (Geraniaceae) are used as a traditional medicine for intestinal parasites among people [2]. *Pelargonium endlicherianum* growing in Turkey is completely natural and uncultivated. These species have a rhizome root structure. The fruit is beaked and they have poured into the surroundings after maturity. The probability of germination is weak. It is usually distributed by rhizomes. *Pelargonium endlicherianum* from this genus naturally grows in Turkey and North Iraq. These species are perennial herbaceous or semi-woody bushes, have different colored flowers (red, fire red, orange-red, pink, and white-edged), and fruit beaked, splitting from base to apex into 5 mericarps. In a preliminary study of the family Geraniaceae, Bortenschlager (1967) demonstrated that, in the compound light microscope, pollen morphology among the different genera was heterogeneous. At the same time, *Pelargonium endlicherianum* was collected from Hakkari in the C9 grid of Flora of Turkey [3]. *Pelargonium* is a genus of plants in the family Geraniaceae and the order Geraniales which mostly occur in Africa and Australia. The genus consists of five main clades: A1, A2, B, C1, and C2, as shown in a phylogenetic tree constructed by Bakker et al (2004). In their study, Bakker et al (2004) have described the geographic distributions of these different *Pelargonium* clades. Clade A is the biggest, and all of its species are found in South Africa. Clade B contains mostly small annual weeds, and apart from the southern-African species it also contains species that are found in Australia, New Zealand, New Caledonia, and St. Helena. Dispersal events are likely to have happened within this clade. Clade C2, mostly distributed in southern and eastern Africa, has some disjunct distribution patterns. The species *Pelargonium endlicherianum* and *Pelargonium quercetorum* are found in Asia Minor, and their closest sister, *Pelargonium caylae*, is found in Madagascar. The sister to these

three is *Pelargonium karooicum*, which occurs in Southern Africa. *Pelargonium insularis* is found on Socotra, and its close relatives *Pelargonium quinquelobatum* and *Pelargonium multibracteatum*, occur in Ethiopia, while most species in clade C remain in Africa. Some notable biological events are behind this distribution. Another phylogeny of *Pelargonium* was reconstructed in 2012 using five markers: *rbcL*, *matK*, *ndhF*, *rpoC1*, and *trnL-F*. It is similar to earlier reconstructions, except the modern methods have shown much better support for the clades. The newest *Pelargonium* phylogenetic tree was constructed by Kerke et al (2019). This phylogenetic tree still supports the five clades found by Bakker et al (2004) and does not contradict the clade C2 distributions[4]. *Pelargonium endlicherianum*, though it is a larger plant – the increase in size may come from *Pelargonium quercetorum*. Like both parents, it is quite cold and hardy. Its method of dormancy is inherited from *Pelargonium quercetorum* and hence it has no problem with warm spells in winter. It also appears to have inherited heat tolerance from *Pelargonium quercetorum* and does well in full sun or partial shade. Like *Pelargonium endlicherianum*, it flowers from late spring into July, and even more profusely than that parent[5]. Natural Flowering Period: June -August[6]. One of the wild species, *pelargonium endlicherianum* (local name "solucanotu"), and the decoction is prepared from the roots and fresh flowers. *Pelargonium endlicherianum* Fenzl. (Geraniaceae) belongs to the family Geraniaceae which has about 750 species scattered widely around the world growing as annuals. Members of the family occur mostly in temperate and subtropical climates and have many important medicinal features[7].

Morphology Description:

This hardy variety if kept in a crevice or on the drier side through winter has grown in our rock



garden retaining wall for a few years now. It is very reluctant to produce seed so we only have a few each year for sale. This is also a great addition to the alpine house. (Morphology of *Pelargonium Endlicherianum* is shown in Fig(1.1,1.2,1.3,1.4, 1.5).

Flowering time: Summer

Hardiness: Hardy – if kept as above

Height: 30cm

Spread: 20cm

Common Name: soluncanto ,*Geraniospermum endlicherianum*, Kuntze.

Life Cycle: Perennial

Family: Geraniaceae

Foliage: palmate

Basic Colour: (pink)

Flower Color: pink

Natural Flowering: May – July

Winter Hardiness: Fully Hardy

Height with Flowers: 35cm

Soil Requirements: Well-drained / average/dry

Soil pH: Acid/alkaline / neutral

Location: Mediterranean / container/rock garden

Usage: ornamental

Pruning: Cut back after flowering

Tolerates: Drought tolerant / deer resistance/rabbit resistance

Origin: Turkey, Armenia

Weight: 100 g

Climate: Fully hardy -12c

Flowering season - Summer

Height: 10-30cm

Planting area: Crevice / Walls, Drought / Sandy

Position - Full / midday sun, Morning/afternoon sun

Flower Colour-Pink [8].



Fig1.1: Young plant of Pelargonium Endlicherianum



Fig1.2: Older plants might lose the caudex



Fig1.3: Nice, little, and round caudex of a young seedling and the year after



Fig1.4: Large Plant of Pelargonium Endlicherianum



Fig1.5: Flower of Pelargonium Endlicherianum

These species are perennial herbaceous or semi-woody bushes, have different colored flowers (red, fire red, orange-red, pink, and white-edged), and fruit beaked, splitting from base to apex into 5 mericarps. Pelargonium endlicherianum was collected from Hakkari in the C9 grid of Flora of Turkey[9].

Geographic Distribution:

Nowadays we Roots of Pelargonium endlicherianum Fenzl. were collected from Kaledibi Village, Iskenderun, Hatay in Turkey, in May 2014. A voucher specimen (24520) authenticated by Prof. Dr. Hayri Dumani was

deposited at the Herbarium of the Faculty of Science, Gazi University, Ankara, Turkey. In Turkish Folk Medicine, the decoction is prepared from the roots and fresh flowers of Pelargonium endlicherianum(9). Pelargonium endlicherianum which is growing stony, rocky, and sloping land was collected in August 2012. Pelargonium endlicherianum is the hardiest species of Pelargonium. It can withstand the winter climate in much of the UK, providing it is planted in a position that avoids heavy rainfall. This makes it a good species for the alpine house. An ordinary, well-drained soil will suit. Ensure it receives

plenty of sun to allow the rhizome to ripen[10]Here Pelargonium Endlicherianum is planted in a raised border with a free-draining soil with other alpine plants such as Penstemon montanus, Parahebe lyallii, and Phlox douglasii. Protection is provided in winter as previously described[11]. The habitats of Pelargonium endlicherianum have yearly rainfalls ranging from almost twice to five times the amount of Los Lunas. Summers are warm. It remains dormant until spring, even through warm spells in winter against which it is probably protected by the deep snow prevalent in its region. Pelargonium endlicherianum, on the other hand, has a different strategy: with the first autumn frosts this species does not lose all its basal foliage; the leaves retained become thick and rugose, and will remain on the plant throughout the winter unless the air temperature drops below -13 C, at which point the plant drops all its leaves. But the crucial point with this species is that it is dormant only so long as the ambient temperature remains below the point at which vegetative growth is suspended – about 5 C – or at least does not rise and stay above that temperature long enough to induce the plant to break dormancy. In parts of its range, winter cold is not always accompanied by reliable snow cover. The lack of unbroken cold spells for the duration that Pelargonium endlicherianum needs to complete its dormancy requirement, and excessively high summertime heat[5]. These seeds germinate rapidly depending on species and origin. If germination does not occur after 3–4 weeks a cooling period of 2–4 weeks is recommended[6].

Cultivation :

Pelargonium Endlicherianum which is growing on stony, rocky, and sloping land was collected in August 2012. Pelargonium Endlicherianum is the hardiest species of Pelargonium. It can withstand the winter climate in much of the UK, providing it is planted in a position that avoids heavy rainfall.

This makes it a good species for the alpine house. An ordinary, well-drained soil will suit. Ensure it receives plenty of sun to allow the rhizome to ripen[10]. Here Pelargonium endlicherianum is planted in a raised border with a free-draining soil with other alpine plants such as Penstemon montanus, Parahebe lyallii, and Phlox douglasii. Protection is provided in winter as previously described[11].

Collection :

Roots of Pelargonium endlicherianum Fenzl. were collected from Kaledibi Village, Iskenderun, Hatay in Turkey, in May 2014. A voucher specimen (24520) authenticated by Prof. Dr. Hayri Duman is deposited at the Herbarium of the Faculty of Science, Gazi University, Ankara, Turkey. Pelargonium endlicherianum which is growing stony, rocky, and sloping land was collected in August 2012[9].

Extraction Method:

Preparation of the extracts:

The dried Pelargonium endlicherianum root (500 g) was powdered



250 g of plant material was extracted with 750 mL of 70% methanol (shown in table1.1)



The same amount of plant material was extracted with 750 mL of 11% ethanol (shown in table1.1)



For 24 h at 40 °C in a water bath with shaking



By using the same batch of starting material repeat this procedure 3 times



The resultant filtrates were combined and the solvent was removed under a vacuum (40 °C)



The 70% Methanol extract (53.44 g) was then fractionated with ethyl acetate and butanol



Both the ethyl acetate and butanol solvent were evaporated to dryness under a vacuum



All extracts were lyophilized and stored at -20°C until analysis [1].

Table 1.1: The yields and amount of total phenol of Pelargonium endlicherianum

Extract	Yield %	Amount of total phenol (reggae/texture)
11% ethanol	1.5	20.92 ± 2.42
70% methanol	7.2	130.50 ± 2.49

Phytoconstituents:

2, 3,5-dihydroxybenzoic acid, Caffeic acid, Homovanillic acid, Apocynin, 1, 2, 3, 4, 6-Pentagalloyl glucose, Vanillic acid, Ferulic acid, Quercetin, Gallic acid [1].

Uses:

The presence of phenols and the methanol extract of Pelargonium endlicherianum displayed a higher antimicrobial activity against some microorganisms. The reason for this activity could be due to the presence of large amounts of phenolic compounds in 70% methanol extract Pelargonium endlicherianum. The presence of phenols and the methanol extract of Pelargonium endlicherianum displayed a higher antimicrobial activity against some microorganisms. The reason for this activity could be due to the presence of large amounts of phenolic compounds in 70% methanol extract Pelargonium endlicherianum[7]. Pelargonium endlicherianum is rich in apocynin and probably exerts its anti-inflammatory effects via the suppression of LPS-induced activation MAP kinase signaling pathways over apocynin[12].

Pelargonium endlicherianum might be a useful herbal medicine for dissecting inflammation-related pathologies. Pelargonium endlicherianum might be a useful herbal medicine for dissecting inflammation-related pathologies[13]. Pelargonium endlicherianum is used as an ornamental plant in gardens due to its attractive foliage and flowers. It is also used in traditional medicine to treat various ailments such as fever, headache, and stomachache[14].

Adverse Effect:

There is no Adverse Effect of Pelargonium Endlicherianum.

Marketed Formulation:

Marketed formulations of Pelargonium Endlicherianum. To date not available.

Homemade Remedies:

A member of the geranium family, pelargonium is native to South Africa and grows throughout the Eastern Cape. Pelargonium has scented, green leaves and is easy to grow, being popular with gardeners in hanging baskets! Pelargonium (or Umckaloabo) has long been used by Zulu tribes for a variety of illnesses and ailments. It first made its appearance in the UK in the 1920's when an Englishman Charles Stevens who was suffering from tuberculosis made a trip to South Africa in search of a cure. He returned home fully recovered after taking pelargonium. By 1931 he had employed people to manufacture his remedy as lozenges and capsules. Today pelargonium is used as a natural alternative to antibiotics for treating symptoms of upper respiratory tract infections. This includes colds, coughs, and sore throats as well as helping to prevent secondary infections such as bronchitis[15].

CONCLUSION:

Pelargonium Endlicherianum is the hardiest species of Pelargonium. Roots of Pelargonium endlicherianum Fenzl. were collected from Kaledibi Village, Iskenderun, Hatay in Turkey, in May 2014. In Turkish Folk Medicine, the



decoction prepared from the roots and fresh flowers of *Pelargonium endlicherianum* Fenzl., known as "solucanotu" by local people in Turkey, has been used for the treatment of gastrointestinal parasitism in small ruminants. *Pelargonium endlicherianum* is planted in a raised border with free-draining soil with other alpine plants. Protection is provided in winter as previously described. The habitats of *Pelargonium endlicherianum* have yearly rainfalls ranging from almost twice to five times the amount of Los Lunas. Summers are warm. It remains dormant until spring, even though warm spells in winter against which it is probably protected by the deep snow prevalent in its region. *Pelargonium endlicherianum* this species which grows on stony, rocky, and sloping land was collected in August 2012. Phytoconstituents of this plant are Gallic acid, 2,3,5-dihydroxybenzoic acid, Caffeic acid, Homovanillic acid, Apocynin, 1,2,3,4,6-Pentagalloyl, glucose, Vanillic acid, Ferulic acid, Quercetin. Marketed formulations of this plant are to date not available. There is no Adverse Effect of *Pelargonium Endlicherianum*. Today *pelargonium* is used as a natural alternative to antibiotics for treating symptoms of upper respiratory tract infections. This includes colds, coughs, and sore throats as well as helping to prevent secondary infections such as bronchitis.

REFERENCES

1. Agbabiaka TB, Guo R, Ernst E *Pelargonium sidoides* for acute bronchitis: A systematic review and meta-analysis. *Phytomedicine*, 2008. 15: 378-385.
2. Ahmad I, Mehmood Z, Mohammad F Screening of some Indian medicinal plants for their antimicrobial properties. *J Ethnopharmacol.*, 1998, 62: 183-193.
3. Bachert C, Schapowal A, Funk P, Kieser M Treatment of acute rhinosinusitis with the preparation from *Pelargonium sidoides* EPs 7630: A randomized, double-blind, placebo-controlled trial. *Rhinology*, 2009, 47: 51-58.
4. Şeker Karatoprak G, Göger F, Yerer MB, Koşar M. Chemical composition and biological investigation of *Pelargonium endlicherianum* root extracts. *Pharmaceutical biology*. 2017, 1;55(1):1608-18.
5. Başer B, Fırat M, Aziret A. The pollen morphology of *Pelargonium endlicherianum* and *Pelargonium quercetorum* (Geraniaceae) in Turkey. *Phyto Keys*. 2016,75:153
6. Ozbilge H, Kaya EG, Taskin OM, Kosar M. Antimicrobial activity of *Pelargonium endlicherianum* Fenzl.(Geraniaceae) roots against some microorganisms. *J Med Plant Res*. 2010 Dec 18;4:2647-50.
7. Kozan E, Akkol EK, Süntar İ. Potential anthelmintic activity of *Pelargonium endlicherianum* Fenzl. *Journal of ethnopharmacology*. 2016, 1;187:183-6.
8. Karatoprak GŞ, Aydın G, Altinsoy B, Altinkaynak C, Koşar M, Ocoşoy I. The Effect of *Pelargonium endlicherianum* Fenzl. root extracts on formation of nanoparticles and their antimicrobial activities. *Enzyme and microbial technology*. 2017 1;97:21-6.
9. Hughes K. Cultivation of the genus *Pelargonium* under glass. *Sibbaldia: the International Journal of Botanic Garden Horticulture*. 2009 Oct 31(7):99-119.
10. Janecki AJ, Kiderlen AF, Kolodziej H. NO-, TNF-, and IL-12- inducing Activity of Fractions of EPs® 7630. 55th International Congress and Annual Meeting of the Society for Medicinal Plant Research, Abstracts. *Planta Medica*, 2007, 73.
11. Singleton VL, Orthofer R, Lamuela-Raventó's RM Analysis of total phenols and other oxidation substrates and antioxidants by means of Folin-Ciocalteu reagent. In *Methods in Enzymology*; Packer, L., Ed.; Academic Press: San Diego, CA, 1999, 299: 152-315.



12. Aedo C, Garcia M, Maria AL, Aldasoro J, Navarro CTaxonomic revision of Geranium Subsect. Mediterranea (Geraniaceae). Systematic Botany. 2007, 32(1): 93–128.
13. Boukhris M, Nasri-Ayachi MB, Mezghani I, Bouaziz M, Boukhris M, Sayadi S. Trichomes morphology, structure and essential oils of Pelargonium graveolens L. (Geraniaceae). Industrial Crops and Products2013 ,50: 604–610.
14. The Plant List (2013) The Plant List. Version 1.1.
15. Sezik E, Yeşilada E, Honda G, Takaishi Y, Takeda Y, Tanaka T. Traditional Medicine in Turkey X. Folk Medicine in Central Anatolia. J. Ethnopharmacol., 2001, 75: 95-115.

HOW TO CITE: Pratik Bhaik*, Rutuja Bhaik, Pranay Pukle, Pranav Batwal, Priyanka Panmand, A Review on an overview on Pelargonium Endlicherianum, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 12, 2525-2532. <https://doi.org/10.5281/zenodo.14528027>