

Geranium: A Botanical With Significant Potential

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Geranium genus

Pelargonian genus

Geranium is a botanical that seems to be appearing in more products in the natural products industry. However, there is some confusion as to which plant we are talking about when we say “geranium.” The reasons for this confusion is, not only are there a number of plant species referred to as geranium, but there are two different genera (i.e., the scientific level of plant classification right above species) as well: *Geranium* and *Pelargonium*. Furthermore, both of these genera are used in natural products. Therefore, this article will review research on plant species in both the *Geranium* genus and the *Pelargonium* genus.

Note: Some supplement companies have claimed that dimethylamylamine is a natural compound found in geranium oil. Nevertheless, this has not been verified by laboratory analysis. In fact, laboratory analyses have not been able to detect dimethylamylamine in geranium oil. There is concern, however, that some supplement manufacturers may have artificially spiked their supplements with this synthetic drug.^{1,2}

The Geranium Genus

With one exception and two possible exceptions, a comprehensive search of the literature did not reveal any published human clinical studies using any plants from the *Geranium* genus. The one exception was a clinical trial in which a combination of *Geranium robertianum* (aka, Herb Robert or Geranium Robert) with *Calendula officinalis*, *Arctium lappa* and acyclovir (i.e., a topical medication used to decrease pain and speed the healing of sores or blisters in herpes infections) was shown to be more effective for the treatment of herpetic keratitis (i.e., a viral infection of the eye caused by the herpes simplex virus) in 52 patients than the use of acyclovir alone.³

The two possible exceptions involved studies that did not reveal whether the geranium used was from a *Geranium* or *Pelargonium* species. One study compared four natural products (including germanium) and a synthetic one to determine their effectiveness as mosquito repellents. The results were that none of the natural products were found to effectively repel mosquitoes.⁴ The other study found that inhalation of

an aromatherapy mixture of vetiver, bergamot and geranium was no more effective than placebo in reducing anxiety.⁵

However, there has been *in-vitro* (i.e., “test-tube”) and animal research conducted on the *Geranium* genus:

- **Anti-acetylcholinesterase:**

Acetylcholinesterase is an enzyme that breaks down the neurotransmitter acetylcholine. *Geranium sylvaticum* (aka, wood crane’s bill or woodland geranium) inhibited acetylcholinesterase activity *in vitro*.⁶ Theoretically, inhibiting the breakdown of acetylcholine might improve memory.

- **Antibacterial:** Antibacterial activity was seen by *Geranium robertianum* oil *in vitro* against *Staphylococcus epidermidis* and *Escherichia coli*, and by geranium strictipes oil against *Staphylococcus aureus*.⁸

- **Anticancer:** A constituent of the *Geranium* genus, geraniin was shown to induce apoptosis (i.e., cell death) in melanoma cells *in vitro*.⁹ *Geranium sibiricum* (aka, Siberian crane’s bill or Siberian geranium) extract reduced tumor number and the weight of liver metastases in animal research.¹⁰

- **Antidiarrheal:** *Geranium incanum* (aka, carpet geranium) extract exhibited had antidiarrheal activity in animal research.¹¹

- **Antifungal:** *Geranium robertianum* has shown antifungal activity against *Saccharomyces cerevisiae* and other yeast strains *in vitro*.¹²

- **Antioxidant:** An extract of *Geranium sanguineum* (aka, bloody crane's bill or bloody geranium), rich in polyphenols, displayed antioxidant effects, reducing hydrogen peroxide-mediated effects and lipid peroxidation *in vitro* and in animal research.¹³ Likewise an extract of *Geranium robertianum* and *Geranium sibiricum* also displayed antioxidant effects *in vitro*.^{14,15}

- **Antiviral:** *Geranium sanguineum* extract protected mice from death caused by an experimental influenza virus infection.¹⁶ Selective anti-influenza effects were also seen *in vitro* with a polyphenolic complex isolated from *Geranium sanguineum*.¹⁷ In animal research, *Geranium sanguineum* extracts also delayed the development of small blisters following herpes simplex virus type 1 infection, and *in vitro* significantly inhibited herpes simplex virus types 1 and 2 replication.¹⁸ At higher concentrations, the extract showed strong extracellular virus-inactivating activity. In addition, *Geranium carolinianum* (aka, Carolina geranium) extract had anti-hepatitis B virus activity *in vitro*.^{19,20}

The Pelargonium Genus

Rose geranium (*Pelargonium graveolens*) oil that is distilled from the stem and leaf is the active material. The oil naturally occurring constituents include citronellol, citronellyl acetate, citronellyl formate and geraniol. These seem to exhibit marginal antitumor activity *in vitro*.²¹ The essential oil from rose geranium oil also has antibacterial and antifungal activity *in vitro*.^{22,23}

- **Postherpetic neuralgia:** Clinical research suggests that a single topical application of rose geranium oil can significantly reduce pain in patients with postherpetic neuralgia (i.e., pain that lasts for more than a month after a shingles infection) compared to placebo. Pain relief appears to be concentration-dependent, and rose geranium oil in a

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concentration of 100 percent appears to be about twice as effective as a 50 percent concentration.²⁴

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- **Bronchitis:** In a randomized, double-blind, placebo-controlled trial³¹, 124 adults with acute bronchitis were treated with South African geranium or placebo for seven days. The results were a statistically significant reduction in bronchitis symptoms with the South African geranium over placebo. Within the first four days, onset of treatment effect was recognized in 68.8 percent of patients in the South African geranium group compared with 33.3 percent of patients in the placebo group. Health-related quality of life also improved

more in patients treated with South African geranium compared with placebo-treated patients.

- **Tonsillopharyngitis:** In a randomized, double-blind, placebo-controlled trial, children aged 6 to 10 years with tonsillopharyngitis (i.e., inflammation of the tonsils and pharynx) who took South African geranium extract seem to have significantly reduced symptoms such as sore throat and difficulty swallowing compared to placebo after four days of treatment.³²

- **Common cold:** A randomized, placebo-controlled study³³ determined the efficacy of South African geranium extract or placebo for the treatment of the common cold in 103 adult patients (18 to 55 years old). From baseline to day five, improvement in the symptom score about doubled in the South African geranium extract group compared to placebo. After 10 days, 78.8 percent of the South African geranium extract group was clinically cured compared with 31.4 percent in the placebo group.

- **Sinusitis:** In a 21-day, multi-center, prospective, randomized, double-blind, placebo-controlled study³⁴, 103 adult patients (18 to 60 years of age) with acute sinusitis received South African geranium extract or placebo. By day seven there was almost double the decrease in the sinusitis symptom score in South African geranium extract group compared to placebo. By day 21, sinus X-rays were normal in more than 90 percent of the South African geranium extract group compared with 10 percent of the placebo group. By day seven, 63 percent of the South African geranium extract group were back to work compared with 37 percent in the placebo group. The investigators assessed the treatment outcome on day seven as "major improvement" in 30 percent of the South African geranium extract group compared with 5.8 percent in the placebo group.

Conclusion

Human clinical research is limited on plants of the *Geranium* genus. *In-vitro* and animal research does suggest that *Geranium sanguineum* extract may offer antiviral effects. More human clinical research exists on plants of the

Pelargonium genus. Specifically, South African geranium (*Pelargonium sidoides*) appears to have efficacy in the treatment of respiratory disorders, including bronchitis, the common cold and sinusitis (as well as offering relief for tonsillopharyngitis). Furthermore, rose geranium (*Pelargonium graveolens*) has been shown to significantly reduce pain in patients with postherpetic neuralgia. **VR**

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