

Medicinal Benefits of Geranial

Medicinal benefits of Geranial include relieving migraine headaches, being a very effective anti-inflammatory and anti-fungal agent, and stimulating the immune system.

Geranial is a chemical compound found with neral in essential oils. These compounds are very similar in effect but have slightly different structures. Combined, they are called citral. Geranial is often called citral-A.

Geranial has a stronger lemon aroma than neral.

Medicinal Benefits of Geranial

Scientific research has investigated geranial and found a number of healthful properties. Here are a sample of published research reports about the benefits of geranial.

Anti-inflammatory: Medicinal Benefits of Geranial

Excessive inflammation can cause several inflammatory diseases. These include chronic hepatitis, rheumatoid arthritis, atherosclerosis, and even inflammatory brain disease. So controlling inflammation is an important function of essential oils.

An article ([Suppression of allergic and inflammatory responses by essential oils derived from herbal plants and citrus fruits](#)) in the *International Journal of Molecular Medicine* described a study of the anti-inflammatory activities of 20 essential oils. The study then examined the components of the most effective anti-inflammatory oil.

The researchers examined the effects of each essential oil in both rats exposed to an irritant and in cultures grown in the laboratory. They found lemongrass essential oil to be the most

effects anti-inflammatory.

The major components of lemongrass essential oil are geranial (40.16%) and neral (34.24%). These two compounds differ in the 3-dimensional arrangement of their atoms, but otherwise are very similar. Together they are called citral.

Testing showed that geranial was the most effective anti-inflammatory compound in lemongrass essential oil. The authors conclude by indicating that citral and geranial are promising anti-inflammatory agents.

Antifungal: Medicinal Benefits of Geranial

An article ([Antifungal Activities of the Essential Oils in *Syzygium aromaticum* \(L.\) Merr. Et Perry and *Leptospermum petersonii* Bailey and their Constituents against Various Dermatophytes](#)) in *The Journal of Microbiology* shows the antifungal properties of geranial.

In this experiment 5 strains of fungal growths were incubated in Petri dishes. These growths were exposed to certain essential oils at concentrations of 0.05, 0.1, 0.15, and 0.2 mg/ml. In addition, components of the oils (citronellal, neral, and geranial) were applied to fungal growths.

The results showed that geranial had the most dramatic effect against fungal growths. The authors conclude that "the antifungal properties of LPO [lemon-scented teatree oil] against TM, MC, and MG [strains of fungi] may likely be attributed to the effects of geranial."

Immune System Stimulation: Medicinal Benefits of Geranial

An article ([Immunomodulatory activity of geranial, geranial acetate, gingerol, and eugenol essential oils: evidence for humoral and cell-mediated responses](#)) in the journal *Avicenna Journal of Phytomedicine* described the effects of geranial on

the formation of antibodies in rats.

In this study seven groups of rats were used. The rats were given various amounts of several compounds orally over a period of 15 days. One group received a placebo. Another group received a standard drug (Cyclophosphamide) that slows cell growth. The other groups receive 5 different dose levels (from 50 to 800 mg/kg) of the test substance (including geranial).

Researchers “challenged” the rats with red blood cells from sheep on day 7 by injection in the right hind foot pad. Injection of foreign red blood cells will cause inflammation. Researchers measured the thickness of the foot pad before the injection and on day 15. Blood from the rats was withdrawn on day 14 and analyzed for antibodies.

The results showed a significant dose related increase in response to the foreign sheep red blood cells for all test substances (including geranial). The authors concluded that the compounds from plant essential oils had “significant immunostimulant activity” because they were able to “enhance the proliferation of lymphocytes [which help fight diseases or foreign invaders].”

Migraine: Medicinal Benefits of Geranial

An article ([Lippia alba \(Mill.\) N. E. Brown hydroethanolic extract of the leaves is effective in the treatment of migraine in women](#)) in the journal *Phytomedicine* describes treating women with recurring migraine headaches. The authors previously showed that extracts of the plant *Lippia alba* (bushy matgrass) containing primarily geranial and carvenone were effective in reducing the intensity and frequency of headaches.

This study worked with 21 women with a clinical diagnosis of migraine. The researchers initially assessed the frequency and severity of the patients migraines. They used the [HIT-6](#) and [Migraine Disability Assessment Test](#) questionnaires.

In this experiment, the patients took one drop of tincture of *Lippia alba* per kilogram of body weight per day, twice a day. Then patients continued to take other medicines (such as analgesics or NSAIDs) when needed. The experimental treatment continued for 60 days.

After 60 day the researchers again assessed the frequency and severity of the patients migraines. The results showed:

- very significant ($p < 0.001$) reduction in the HIT-6 scores (from an average of 64 to 59)
- very significant ($p < 0.001$) reduction in missed days of work or school (from 19 to 5)
- significant ($p = 0.03$) reduction in perceived pain (from 7 out of 10 to 6 out of 10)

The authors conclude that the tincture of *Lippia alba* containing primarily geranial and carvenone “is effective in controlling both symptoms and impact of migraine in women.”

Summary

A number of essential oils contain citral which is a combination of Citral A (or Geranial) and Citral B (or Neral). Geranial has the stronger lemon aroma and has many medicinal benefits. You can find citral in several lemon-scented essential oils, especially litsea cubeba (mountain pepper), lemongrass, lemon myrtle, lemon teatree, and melissa (lemon balm).

Research studies have shown geranial is an effective anti-inflammatory and anti-fungal agent, it stimulates the immune system and can help relieve migraine headaches.

Medicinal Effects of Menthol

Medicinal effects of menthol, a natural plant-based compound, have been used for millennia for common health conditions. Today it is used in many antiseptic and analgesic compounds. Menthol's cooling effect helps relieve sore throat pain and other mouth irritation as well as respiratory ailments. It is helpful in relieving itching and has a cooling effect on the skin. Menthol also helps gastrointestinal problems such as gas and bloating.

Menthol is an important component of a number of essential oils. It is present in significant amounts in the following oils:

- [Peppermint](#) 33–60%
- Spearmint 16%

Here are a few research studies that confirm the medicinal effects of menthol.

Effects of Menthol on Coughing



Advertising For Spud Menthol Cigarettes, A Great New Product Of Philip Morris Inc., Life Magazine, January 28, 1957



This is one of the medicinal effects of menthol which is important to cigarette manufacturers. One of the important selling points for a cigarette is to reduce the amount of coughing a smoker does. This makes the cigarette seem more “healthful.”

A study ([Effect of inhaled menthol on citric acid induced cough in, normal subjects](#)) reported in the medical journal *Thorax* described a study in which twenty healthy people inhaled a spray intended to induce coughing. Five minutes before inhaling the cough inducing spray, the subjects were given an inhaler spray with wicks of either 75% menthol in eucalyptus oil or one of two placebos. Those receiving the menthol spray had a highly significant ($p < 0.0005$) reduction in cough frequency.

Effects of Menthol on Itching

An article in the *Singapore Medical Journal* ([Phenol and menthol in the treatment of chronic skin lesions following mustard gas exposure](#)) reported on how menthol helped Iranian soldiers affected by mustard gas.

About 10% of sulfur mustard or mustard gas is absorbed into the skin. This sulfur mustard is very difficult to remove. The most common complaint by those exposed to sulfur mustard is itching (pruritus).

Eighty subjects were selected for the study. Forty received an ointment with 1% phenol and 1% menthol while the others received a placebo ointment. The group receiving the phenol/menthol ointment experienced a significant ($p = 0.02$) reduction in itching while the placebo group did not see a statistically significant reduction.

Another article ([The Effect of Peppermint Oil on Symptomatic Treatment of Pruritus in Pregnant Women](#)) in the *Iranian Journal of Pharmaceutical Research* described a study of menthol for treatment of itching in pregnant women.

Pruritus gravidarum (generalized itchiness of late pregnancy) is present in 1-8% of women during the late second through third trimester of pregnancy. Itching starts in the abdomen and often expands to the chest and upper extremities.

A total of 96 women completed this study. 47 of the women received a 60mL bottle of sesame oil base with 0.5% peppermint oil. 49 women received a 60mL bottle of sesame oil (placebo). All patients applied the ointment twice a day to affected areas. Researchers evaluated the severity of itching before and after the two week study period.

Both groups experienced a very significant ($p < 0.001$) reduction in the severity of itchiness. However, after treatment the severity of itchiness was significantly lower ($p = 0.02$) for the peppermint group.

Effects of Menthol on Sufferers of Chemotherapy Induced Nerve Injury

Then journal *Supportive Care in Cancer* published an article ([Cancer treatment-related neuropathic pain: proof of concept study with menthol—a TRPM8 agonist](#)) showing how menthol reduced pain in patients suffering from chemotherapy-induced peripheral neuropathy (nerve injury).

Neuropathic pain resulting from cancer treatment is increasing because more people are getting cancer and survival rates are increasing. Certain chemotherapy drugs cause chemotherapy-induced peripheral neuropathy in up to 96% of patients. This study tested the pain relieving properties of menthol for neuropathic pain.

Researchers were able to evaluate pain levels in 38 patients after a 4-6 week trial. The patients treated the painful areas twice a day with a topical 1% menthol cream. Researchers interviewed patients to determine the level of pain before the trial, after at two weeks, and again at 4 to 6 weeks.

In this study 31 out of 38 patients had improvements in the pain scores. The pain level improved from an average of 47 to 34 (out of 70 pain points). This represented a highly significant ($p > 0.001$) reduction in pain. In addition to improvements in pain, there were improvements in walking velocity and cadence, mood, sensation, as well as overall increased functionality.

Effects of Menthol on Diaper Rash

An article ([Role of menthol in treatment of candidial napkin dermatitis](#)) in the *World Journal of Pediatrics* how menthol can help heal diaper rash (candidial napkin dermatitis).

In this report 70 patients completed the study. 35 received a common treatment (topical clotrimazole) plus menthol drops. 35 received the common treatment plus placebo drops. The menthol drops consists of 5% menthol in an ethanol and polyethylene glycol base. The placebo did not contain menthol. The menthol or placebo drops were applied twice daily and after 10 minutes the clotrimazole was applied.

The rash in patients using the menthol drops decreased significantly more rapidly and complete healing was shorter in the menthol group ($p = 0.0001$).

Medicinal Effects of Menthol Summary

Menthol has been studied extensively and the medicinal effects of menthol have positive, scientifically verified results. New studies of its medicinal effects are ongoing. At the time of this writing some upcoming studies include:

- [Topical Menthol +/- Mannitol for Painful Diabetic Peripheral Neuropathy](#)
- [L-Menthol Infusion as a Novel Technique During Colonoscopy \(MINT-C\)](#)
- [Effects of Flavors on Nicotine Reinforcement in Smokers](#)
- [Menthol for PDT Pain \(MentholPDT\)](#)

It's clear that menthol as contained in some essential oils has clear medicinal effects. Because it's a natural substance, it may be better for you than some pharmaceutical drugs that have negative side effects.

Benefits of Eucalyptol

Benefits of eucalyptol include preventing and healing ulcers, increases cerebral blood flow, reduces inflammation, inhibits tumor necrosis, helps treat bronchitis and sinusitis, and is antimicrobial and insecticidal.

Eucalyptol, also known by a chemical name of *1,8-cineole* or *1,8-cineol*, is found in a variety of essential oils, including:

- [Eucalyptus](#)
- Melaleuca
- Basil
- [Rosemary](#)
- Sage
- Peppermint

Eucalyptol is a colorless liquid with a mint-like aroma often found in mouthwashes and cough suppressants. It inhibits cytokines from causing inflammation which helps to reduce cold, flu and asthma symptoms.

Benefits of Eucalyptol

Scientists have performed many studies to verify the medicinal benefits of eucalyptol. Here are a few of studies that help show the effectiveness of eucalyptol.

Benefits of Eucalyptol in Asthma

An article ([Anti-inflammatory activity of 1.8 - cineol \(eucalyptol\) in bronchial asthma: a double-blind placebo-controlled trial](#)) in the journal *Respiratory Medicine* describes a study to determine the effectiveness of eucalyptol (1.8 -cineol) in helping to alleviate asthma symptoms.

Thirty-two bronchial asthma patients participated in a randomized, placebo controlled study to determine the usefulness of cineol therapy. The patients were taking between 5 and 24 mg prednisolone daily as a maintenance dose. These patients were randomly assigned to take 200 mg capsules of cineol three times a day, or placebo capsules.

All participants were monitored for their use of their maintenance prednisolone inhalers and short-acting bronchodilators. They were asked to reduce their prednisolone maintenance dose in small steps to determine a level of tolerance.

The results of the study showed clear benefits of those taking cineol.

- **Dose reduction.** Cineol users reduced their dose by an average of 3.75 mg per day compared to the placebo group of 0.91 mg per day.
- **Reduction steps.** The number of dose reduction steps among cineol users was 27 while placebo users only reduced their doses by 5 steps.
- **Days stable.** The average number of days cineol users were stable on their reduced dose was 36.6 while the placebo group was stable for only 8.3 days.

These differences were all highly significant ($p < 0.006$). The author concludes that the "clinically relevant anti-inflammatory activity of the terpenoid oxide 1,8-cineol and offers new perspectives for its long-term therapeutic use in airway diseases, such as asthma."

Benefits of Eucalyptol in Gastric Ulcer Prevention and Healing

An article ([Gastroprotective Mechanisms of the Monoterpene 1,8-Cineole \(Eucalyptol\)](#)) in the journal *PLoS|One* reported on a series of experiments to investigate the ulcer healing properties of 1,8-cineole (eucalyptol).

The researchers induced ulcers in male and female Wistar rats. They orally gave the rats ulcer inducing substances such as:

- Ethanol
- HCl/ethanol
- Nonsteroidal anti-inflammatory drug (NSAID)

In an experiment with HCl/ethanol, the rats fasted for 24 hours. Then the researchers gave the rats one of the following treatments:

- The placebo control group received a 1% Tween-80 aqueous solution.
- They gave another group pantoprazole (a standard medicine that helps prevent ulcers) at 40 mg/kg (i.e., 40 mg of pantoprazole per kg of body weight).
- The researchers gave three experimental groups varying doses of eucalyptol (50, 100 and 200 mg/kg).

An hour after these treatments, the researchers gave all the rats the HCl/ethanol solution (1 mL/150 g) to induce gastric lesions. Then after one hour the rats were humanely sacrificed and their stomachs were examined for ulcer lesions.

The results of this experiment showed that eucalyptol produced

a significant level of gastroprotection. The area of the lesions in the control group averaged $245.5 \pm 43.0 \text{ mm}^2$. The area of the lesions in the eucalyptol groups depended on the dose level. In the group receiving 50 mg/kg, the area was $28.2 \pm 12.8 \text{ mm}^2$. In the group receiving 100 mg/kg, the area was $11.8 \pm 5.4 \text{ mm}^2$. And in the group receiving 200 mg/kg, the area was $1.3 \pm 0.8 \text{ mm}^2$.

Eucalyptol resulted in a 88.5%, 95.2% and 99.4% reduction in lesion area, depending on the dose. The standard ulcer protective medicine, pantoprazole, resulted in a 91.5% protection.

The authors conclude that “pretreatment with CIN [eucalyptol] protected the rats’ gastric mucosa against ethanol- and acidified ethanol-induced ulcer.” In other experiments the results demonstrated that eucalyptol not only protected against developing ulcers, it also had a regenerative effect that helped speed healing of chronic ulcers. The authors describe 1,8-cineole as an important healing agent.

Benefits of Eucalyptol in Colorectal Cancer

An article ([Antitumor effect of 1, 8-cineole against colon cancer](#)) in the journal *Oncology Reports* describes a series of experiments on colon cancer. In this series of experiments the researchers used human colorectal cancer cell lines HCT116 and RK0.

Cell viability assay: In one of the experiments using cultured cells, the researchers placed cells on 96 plates and incubated the cells overnight. Then 1, 8-cineole or oxaliplatin (a chemotherapy drug) were added at various concentrations. After 24 hours the cells were examined for viability. The results showed that for both cancer cell lines the growth was significantly ($p < 0.01$) inhibited in a dose dependent manner by 1, 8-cineole.

Animal study: The experimenters separated mice into a control group and a 1, 8-cineole group. They injected all mice with RK0 cells in the right flank. One week after the RK0 injection the 1, 8-cineole group started receiving 1, 8-cineole at a rate of 50 mg/kg every three days. While tumors grew in both groups, the tumors in the 1, 8-cineole group were significantly ($p < 0.01$) smaller.

The authors conclude that “by triggering apoptosis in human colorectal cancer cells *in vitro* and *in vivo*. 1, 8-cineole shows promise as a strong and safe chemotherapeutic agent for colorectal cancer.”

Further Research

Research into the benefits of eucalyptol continues. A few of the ongoing studies include:

- [Clinical and Microbiological Effects of an Essential Oils Solution Used as an Adjunct to Daily Oral Hygiene Practices in Chronic Periodontitis Patients in Supportive Care \(Listerine\)](#) This study's goal is to thoroughly document the clinical and microbiological effects of an essential oils solution used on a daily basis for 3 months as an adjunct to mechanical plaque control measures in a large number of chronic periodontitis patients in supportive care.
- [Clinical Evaluation of Some Local Antimicrobial Agents' Adjunctive Effects On Periodontal Parameters and Halitosis](#) This study is to establish the clinical efficacy of Listerine and chlorhexidine (CHX) when used as a cooling agent with ultrasonic instrumentation, on periodontal parameters and halitosis.
- [Chemotherapy-Induced Peripheral Neuropathy-Essential Oil Intervention \(CIPN-EOI\)](#) This study will evaluate an oil blend with active ingredients [including cineole] for the reduction in chemotherapy-induced peripheral neuropathy in people with breast cancer.

Scientific research has shown and continues to show the benefits of eucalyptol for a variety of medical conditions. This component of various essential oils has proven its usefulness.

Medicinal Effects of Eugenol

Medicinal effects of eugenol are wide ranging and include being a powerful antioxidant with antiseptic, antibacterial, analgesic and disinfectant properties. Eugenol is used in dental and oral hygiene preparations including mouthwashes. It has a pleasant scent and spicy taste and is used in perfumes and cooking.

Eugenol has been shown to moderate blood sugar and lower triglyceride and cholesterol levels. As a vasodilator it helps reduce blood pressure.

Eugenol is found in plants, especially those of the clove family. Nearly 50% of clove essential oil is comprised of eugenol.

Eugenol, is found in several essential oils including:

- [Clove](#)
- Nutmeg
- Cinnamon
- Basil
- Bay leaf

Scientific Research on the Medicinal Effects of Eugenol

Eugenol has been studied extensively and has many beneficial

properties. Here are a small sampling of the medical research that has been done on eugenol.

Antimicrobial Medicinal Effects of Eugenol

An article ([Activity of thymol, carvacrol, cinnamaldehyde and eugenol on oral bacteria](#)) in the European journal of pharmaceutical sciences, *Pharmaceutica Acta Helvetiae*, reported on the antimicrobial activity of several natural compounds including eugenol (alone and in combination). These compounds were tested against bacteria associated with dental caries.

The results showed that “eugenol shows the best antimicrobial properties when combined with thymol or carvacrol.” The authors concluded that these combinations would be appropriate to fight oral infectious diseases.

Analgesic Medicinal Effects of Eugenol

A article ([The Analgesic Effects and Mechanisms of Orally Administered Eugenol](#)) in the *Archives of Pharmacal Research* reported on the antinociceptive (pain blocking) properties of eugenol. The investigators looked at both models of nerve pain and pain caused by inflammation.

The results showed that “eugenol administered orally produces antinociception [pain blockage] in various pain models.”

Antioxidant Medicinal Effects of Eugenol

An article ([Identification of volatile components in basil \(*Ocimum basilicum* L.\) and thyme leaves \(*Thymus vulgaris* L.\) and their antioxidant properties](#)) in the journal *Food Chemistry* describes tests of antioxidant activity in several compounds. The study determined the concentrations of the chemical components of thyme were required to suppress organic oxidation.

The results show that Eugenol suppressed more than twice as

much organic oxidation as Thymol, Carvacrol or 4-Allylphenol at a concentration of 1 µg/mL. And, at 5 µg/mL the suppression rates for Eugenol, Thymol, Carvacrol and 4-Allylphenol were nearly identical. **In fact, eugenol showed superior suppression over vitamin E (α-tocopherol) at all analyzed concentrations.** The authors concluded that “Major aroma compounds found in volatile extracts of basil and thyme exhibited varying amounts of anti-oxidative activity. In particular, eugenol, thymol, carvacrol and 4-allylphenol, found in basil and thyme, exhibited potent antioxidant activity, comparable to the known antioxidants, BHT and α-tocopherol.”

Ongoing Studies of the Medicinal Effects of Eugenol

Most current studies center around dental research. As of this writing, here are several proposed studies.

- [Endodontic Medications for Irreversible Pulpitis: Articaïne or Eugenol?](#) [Pulpitis is an inflammation of dental pulp tissue.]
- [Root Canal Treatment in Primary Molars With Necrotic Pulp Using Two Different Pulp Therapies](#) [In this study eugenol is a component of both pulp therapies.]
- [Influence of the Composition of Temporary Restorative Material in Vital Teeth](#)

The medicinal effects of eugenol are well documented and further research will show additional medical benefits.