

# Research

## PAIN

- Modulate the nervous system: Essential oils can influence how the brain perceives and transmits pain signals.
  - They can interact with receptors like opioid, cannabinoid, and various TRP channels, which are involved in pain sensation.
  - Certain oils may also affect neurotransmitters like serotonin and dopamine, which are related to mood and pain perception.
- Reduce inflammation: Some essential oils have anti-inflammatory properties that can help manage pain associated with inflammation.
  - Studies on conditions like arthritis have shown essential oils can inhibit pro-inflammatory cytokines.
- Activate pain relief pathways: The scent of essential oils can trigger a psychological cascade that leads to the release of endorphins and other pain-modulating chemicals.
  - This can lead to a sense of well-being and a reduction in pain, especially when inhaled.

## HEADACHES + MIGRAINES

Scientific evidence suggests some essential oils can help with headaches, particularly migraines, by potentially easing pain and other symptoms through mechanisms like relaxing muscles and reducing neurogenic inflammation



“Essential oils are potent plant oils that, when inhaled, can immediately affect how we feel,” says Elizabeth Ko, MD, medical director of the UCLA Health Integrative Medicine Collaborative. Aromatherapy — the act of inhaling an essential oil — can be an effective complementary treatment for anyone. (1)

**Approximately 21% of adults in the USA experience chronic pain (50-60 million people annually) that affect mood + daily life.**

**Approximately 40 to 45 million Americans experience headaches each year. 1.5 million women and over half a million men experience chronic migraines, defined as 15 or more headache days per month.**

Some essential oils may work by inhibiting neurogenic inflammation, a key component of migraines, and by affecting vasorelaxation (the relaxation of blood vessels).

- Peppermint oil: Contains menthol, which can help relax muscles and ease pain. Applying diluted peppermint oil topically has been shown to relieve pain from tension headaches and migraines.
- Lavender oil: Has shown promise in reducing migraine severity and frequency. In one study, lavender aromatherapy significantly reduced both headache severity and frequency compared to a control group.
- Basil and anise oils: Studies have found that basil oil may decrease the intensity and frequency of migraines over time, and anise oil has shown similar results.
- Other oils: A blend of peppermint, chamomile, anise, basil, and rose essential oils has been shown to help with migraine pain and associated symptoms like photophobia (sensitivity to light) and phonophobia (sensitivity to sound).

## DIGESTIVE ISSUES

Science suggests certain essential oils, particularly peppermint, can help with digestive issues like IBS symptoms, bloating, and nausea due to their anti-inflammatory, antimicrobial, and smooth muscle-relaxing effects

. Other oils like fennel, chamomile, and oregano also show promise through mechanisms like modulating gut microbiota and reducing inflammation, though it is crucial to use essential oils safely by never ingesting them neat and using them diluted or in food flavoring only as directed, as concentrated forms can cause side effects.

**40% of Americans report that their daily lives are disrupted by digestive troubles. 60 to 70 million Americans are affected by gastrointestinal (GI) diseases each year. 20 million Americans suffer from chronic digestive diseases. Digestive issues are a major cause of hospitalizations this year, with 16 million hospital discharges, and are a leading cause of disability.**

**Peppermint oil can relax the smooth muscles of the gastrointestinal tract, which helps relieve cramping, bloating, and pain associated with IBS.**

**Many essential oils contain compounds that help reduce inflammation in the gut.**





Essential oils have neurochemical effects: affecting the nervous system by influencing enzymes like acetylcholinesterase, and neurotransmitters such as serotonin and GABA.



*Feel better.*

A majority of adults in the U.S. experience significant stress, with recent surveys showing 45% are stressed at least once a week and 75% experiencing moderate to high-stress levels each month.

**STRESS | ANXIETY | DEPRESSION | INSOMNIA | ADHD + MORE**

- *Impact on the brain: Inhaling essential oils can directly affect the limbic system, the brain's emotional center.*
- *Neurotransmitter effects: Some oils may trigger the release of "feel-good" neurotransmitters. For example, lavender is linked to increased serotonin, which promotes relaxation, and citrus scents may stimulate norepinephrine, which can improve alertness.*
- *Psychological and emotional benefits: Studies show aromatherapy can lower perceived stress, depression, and anxiety, leading to a more positive mood and improved sleep quality*

# SLEEP

- Improved sleep quality: Multiple studies and meta-analyses show that aromatherapy can significantly improve clinical insomnia symptoms and overall sleep quality.
- Stress and anxiety reduction: Essential oils can reduce anxiety and stress, which are often linked to sleep problems.
- Impact on brain activity: One pilot study found that lavender aroma, when inhaled during sleep, increased delta waves (associated with deep sleep) and alpha waves (associated with a relaxed wakeful state).
- Several studies have shown that lavender oil is frequently cited as having a significant effect, with some studies showing it can even help restore sleep to previous levels for those who have stopped taking sleep medication.
- Cognitive benefits: Aromatherapy during sleep has been linked to improved cognitive capacity in older adults.

## MOOD + MENTAL HEALTH

Scientific evidence suggests essential oils can support mental health by influencing the brain's limbic system, which affects mood, stress, and cognition. Studies show inhalation of certain oils like lavender, citrus, and chamomile can reduce anxiety, stress, and depressive symptoms, with research indicating effects on neurotransmitters like serotonin.



According to the National Sleep Foundation, approximately 10-15% of adults in the United States experience chronic insomnia, defined as difficulty falling or staying asleep for at least three nights a week for three months or more. Additionally, up to 30-50% of adults report occasional insomnia symptoms.

**Research suggests that essential oils effect neuroinflammation: helping reduce neuroinflammation, which can play a role in sleep disorders + mental health**

According to the National Institute of Mental Health, approximately 19.1% of adults in the United States experienced an anxiety disorder in the past year. This translates to about 49.5 million people.

According to the National Institute of Mental Health, approximately 8.3% of American adults aged 18 or older experienced a major depressive episode in 2021. This translates to around 21 million individuals.

## ANXIETY + DEPRESSION

Studies have found that those who use aromatherapy to address their anxiety symptoms have experienced less pain and depression when compared to those who have not.

## STRESS

Lavender, in its oil form, is clinically proven to reduce stress when used properly. This essential oil is perfect to use in times of stress and uncertainty, because it calms the nervous system, lowers blood pressure and helps the body feel relaxed.

## INSOMINA

Quality sleep is essential to brain function and memory, and also lowers our risk of chronic diseases. Studies such as this one published by The Journal of Alternative and Complementary Medicine, found that participants who were given essential oils were able to fall asleep quicker and stay asleep longer than those who were given a placebo.

## ENHANCE MEMORY + COGNITION

Essential oils can support memory and cognitive function by influencing the brain's limbic system, the area responsible for emotion and memory

. Specific oils like rosemary, peppermint, and lemon are noted for boosting focus and concentration, while lavender can reduce stress and improve sleep, which aids memory consolidation. Studies suggest that using aromatherapy can improve memory recall and even strengthen the neural pathways involved in learning and memory.

How essential oils may help with memory

- **Strengthens neural pathways:** Research has shown that aromatherapy can strengthen the uncinate fasciculus, a brain pathway connecting the emotional center to the prefrontal cortex, which is crucial for memory.
- **Leverages the power of scent:** Scent has a direct link to the brain's memory centers, so certain aromas can instantly trigger memories and aid recall.
- **Improves cognitive performance:** Some oils may improve focus, concentration, and mental alertness, helping with learning and retaining information.
- **Reduces stress and anxiety:** By promoting relaxation, oils like lavender can reduce stress, which improves focus and mental clarity needed for memory consolidation.

# IMMUNE SYSTEM

Essential oils have shown activity against viruses in laboratory studies, including influenza, herpes viruses, and HIV.

- Most essential oils are antibacterial, anti-fungal, anti-bacterial , anti-inflammatory + anti-viral
- Most essential oils have immune cell interaction where research indicates that the chemical compounds in essential oils may interact with immune and inflammatory cells.
- Most essential oils are being lipophilic, which means they can potentially break down viral barriers.
- Most essential oils contain natural compounds that can inhibit or kill bacteria by disrupting their cell membranes. Research shows their effectiveness against various bacteria, including some multidrug-resistant strains. Common examples include tea tree oil, lavender oil, and oils containing components like thymol, carvacrol, and eugenol
- Most essential oils can disrupt cell membranes: The hydrophobic nature of some essential oil components allows them to penetrate and disrupt the lipid membranes of bacterial cells, causing them to leak important molecules and die.
- Some compounds can interfere with essential bacterial processes, such as enzymatic functions.
- Certain essential oils can prevent bacteria from forming protective biofilms
- Certain essential oils have been proven to boost immune functions.

## REFERENCES

UCLA HEALTH | NATIONAL INSTITUTE FOR HEALTH | SCIENCE DIRECT | EVERYDAY HEALTH | HEALTH LINE | JOHN HOPKINS MEDICINE | MAPLEWOOD HEALTH CARE | SLEEP FOUNDATION | MEDICAL NEWS TODAY | ACHS | MDPI | SCIENTIFIC AMERICAN

