

## ANXIETY AND AROMATHERAPY

Essential Oils are produced from various parts of plants, including bark, flowers, seeds or leaves using steam-distillation, or via cold extraction in the case of citrus fruit peels.

In France, over ten thousand medical doctors are trained in aromatherapy, using essential oils for both acute and chronic conditions.

In other parts of Europe and North America, the inhalation of volatile essential oils is more common, to create ambient surroundings, and provide stress relief. The immediate benefits are due to the rapid absorption of molecules via the olfactory nerves and bulb of the nasal passage.

In turn, this large nerve transmits information to the hypothalamus, and in turn, influences the pituitary and limbic system, which has inputs to the amygdala and hippocampus. The pituitary produces hormones that influence endocrine glands, including the adrenals. Thus, both physiological and psychological influence, as well as emotional responses are recorded. Once experienced, the mind-body will respond in the same manner, when exposed to the same odor.

Various pathways have been identified, including the monoaminergic and serotonergic systems, and the induction of neurotrophic factor expression.

A vast number of human clinical trials have found essential oils help reduce anxiety disorders.

A recent systematic review and meta-analysis of 20 studies, comprising 1717 participants found aromatherapy significantly ameliorates anxiety (Guo et al., 2020).

Another study by Gong et al., (2020) found aromatherapy with various essential oils significantly decreased anxiety levels, no matter the reason of anxiety.

Aromatherapy and music therapy combine well in a randomized, double-blind study on reducing anxiety in clinical nurses. In this study a combination of lavender and chamomile essential oils, as well as music therapy showed the most significant intervention (Zamanifar et al., 2020).

Lavender essential oil produces anxiolytic benefit via inhibition of voltage-gated calcium channels, reduction of 5HT<sub>1a</sub> receptor activity, and increased parasympathetic tone (Malcolm & Tallian, 2018).

Linalool, found in lavender and numerous other essential oils, modulates the glutamate and GABA neurotransmitter systems, resulting in reduced anxiety and sedative activity (Agatonovic-Kustrin et al., 2020).

Bergamot, sweet and bitter orange, grapefruit, neroli and related citrus essential oils, all show benefit in reducing patient anxiety.

Bergamot (*Citrus bergamia*) peel essential oil shows significant benefit on mood, the parasympathetic nervous system and salivary cortisol levels in a short period of time (Watanabe et al., 2015).

Bergamot essential oil contains bergamottin with human MAO-B inhibitory activity (Catalano et al., 2022)

Sweet Orange (*C. sinensis*) and Bitter Orange (*C. aurantium*) exerts benefit on anxiety, in pre-clinical and clinical studies (Mannucci et al., 2018).

A combination of Sweet orange oil and Marjoram (*Origanum majorana*), combined with music therapy, reduced anxiety and stress in a DB, randomized, controlled trial of 98 nursing students (Son et al., 2019).

Geranium (*Pelargonium* sp.) oil has been found to reduce anxiety in various settings including first stage labour (Fakari et al., 2015); acute myocardial infarction (Shirzadegan et al., 2017), and when combined with music therapy in patients undergoing inguinal hernia surgery (Goli et al., 2020). Studies suggest the significant anxiolytic activity is due to serotonergic pathways.

Ylang Ylang (*Cananga odorata*) essential oil reduces anxiety via the serotonin system. In one study by Hongratanaworakit & Buchbauer (2004) the oil

decreased blood pressure and pulse rate, and significantly increased subjective attentiveness and alertness.

Vetiver essential oil may reduce anxiety due to altering neuronal activity in the central amygdaloid nucleus (Saiyuddthong et al., 2015). A study of children with ADHD found the inhaled oil improved brain wave patterns (EEG), as well as improved behavior and better classroom marks

Eastern cedarwood (*Juniperus virginiana*) may relax anxiety, due to the constituent cedrol, through the 5HT and dopamine pathways (Zhang & Yao, 2018).

Lemongrass (*Cymbopogon citratus*) reduced anxiety in a trial of 40 volunteers within five minutes (Goes et al, 2015). This essential oil likely contributes to its anxiolytic effect via the GABA(A) receptor (de Almeida Costa et al., 2011).

Frankincense has long been used in religious ritual, and the essential oil possesses anxiolytic and anti-neurotic benefit (Al-Yasiry & Kiczorowska, 2016).

Rose (*Rosa damascena*) has been studied in forty volunteers, and on the emotional level the group rated themselves more calm, and relaxed (Hongratanaworakit, 2009).

Alpha-pinene, found in various conifer needle essential oils of Pine and Fir, exhibits anti-anxiety benefit. Animal

studies suggest the expression of brain-derived neurotrophic factor in the olfactory bulb and hippocampus may be responsible (Kasuya et al., 2015). Other studies suggest Sandalwood (*Santalum album*), Lemon (*Citrus limon*), Clary Sage (*Salvia sclarea*) and Roman Chamomile (*Anthemis nobilis*) relieve anxiety, stress and depression (Setzer, 2009).

## BIBLIOGRAPHY

Agatonovic-Kustrin, S., E. Kustrin, V. Gegechkori, D. W. Morton. 2020. Anxiolytic Terpenoids and Aromatherapy for Anxiety and Depression. *Advances in Experimental Medicine and Biology* 1260: 283-96.

Al-Yasiry, A.R.M & B. Kiczorowska. 2016. Frankincense—therapeutic properties. *Postepy Higieny i Medycyny Doswiadczalnej* 70: 380-91.

Catalano, R., F. Procopio, D. Chavarria, S. Benfeito et al. 2022. Molecular Modeling and Experimental Evaluation of Non-Chiral Components of Bergamot Essential Oil with Inhibitory Activity against Human Monoamine Oxidases. *Molecules* 27(8): 2467.

De Almeida Costa, C.A.R, D.O. Kohn, V.M. de Lima, A.C. Gargano, J.C. Flório, M. Costa. 2011. The GABAergic system contributes to the anxiolytic-like effect of essential oil from *Cymbopogon citratus* (lemongrass). *Journal of Ethnopharmacology* 137(1): 828-36.

Fakari, F.R., M. Tabatabaeichehr, H. Kamili, F.R. Fakari, M. Naseri. 2015. Effect of Inhalation of Aroma of Geranium Essence on Anxiety and Physiological Parameters during First Stage of Labor in Nulliparous Women: A Randomized Clinical Trial. *Journal of Caring Sciences* 4(2): 135-141.

Goes, T.C., F.R.C. Ursulino, T.H. Ameida-Souza, P.B. Alves, F. Teixeira-Silva. 2015. Effect of Lemongrass Aroma on Experimental Anxiety in Humans. *Journal of Alternative and Complementary Medicine* 21(12): 766-73.

Goli, R. M. Arad, M. Mam-Qaderi, N. Parizad. 2020. Comparing the effects of geranium aromatherapy and music therapy on the anxiety level of patients undergoing inguinal hernia surgery: a clinical trial. *Explore (NY)* S1550-8307(20)30285-8.

Gong, M.M., H. Dong, Y.H. Tang, W.Y. Huang, F. Lu. 2020. Effects of aromatherapy on anxiety: A meta-analysis of

randomized controlled trials. *Journal of Affective Disorders* 274: 1028-40.

Guo, P.P., P. Li, X.H. Zhang, N. Liu, J. Wang, S. Yang, L. Yu, W. Zhang. 2020. The effectiveness of aromatherapy on preoperative anxiety in adults: A systematic review and meta-analysis of randomized controlled trials. *International Journal of Nursing Students* 111:103747.

Han, X.S., J. Gibson, D.L. Eggett, T.L. Parker. 2017. Bergamot (*Citrus bergamia*) Essential Oil Inhalation Improves Positive Feelings in the Waiting Room of a Mental Health Treatment Center: A Pilot Study. *Phytotherapy Research* 31(5): 812-6.

Hongratanaworakit, T. & G. Buchbauer. 2004. Evaluation of the harmonizing effect of ylang-ylang oil on humans after inhalation. *Planta Medica* 70(7): 632-6.

Hongratanaworakit, T. 2009. Relaxing effect of rose oil on humans. *Natural Product Communications* 4(2): 291-6.

Jafarzadeh, M., S. Arman, F.F. Pour. 2013. Effect of aromatherapy with orange essential oil on salivary cortisol and pulse rate in children during dental treatment: A randomized controlled clinical trial.

*Advanced Biomedical Research* 2:10. doi:10.4103/2297-9175.107968.

Kerr, D., M. Hegg, M. Mohebbi. 2021. Effects of diffused essential oils for reducing stress and improving mood for clinical nurses: An interventional times series study. *Nursing Forum* 56(2): 305-312.

Lehrner, J. C. Eckersberger, P. Walla, G. Pötsch, L. Deecke. 2000. Ambient odor of orange in a dental office reduces anxiety and improves mood in female patients. *Physiology and Behavior* 71(1-2): 83-6.

Malcom, B.J., K. Tallian. 2018. Essential oil of lavender in anxiety disorders: Ready for prime time? *Mental Health Clinician* 7(4): 147-155.

Mannucci, C., F. Calapai, L. Cardia, G. Inferrera, G. D'Arena, M. di Pietro et al. 2018. Clinical Pharmacology of *Citrus aurantium* and *Citrus sinensis* for the Treatment of Anxiety. *Evidence-Based Complementary and Alternative Medicine* 2018:3624094.

Pasyar, N., M. Rambod, F. Araghi. 2020. The effect of bergamot orange essence on anxiety, salivary cortisol, and alpha amylase in patients prior to laparoscopic



cholecystectomy: A controlled trial study.  
*Complementary Therapies in Clinical Practice* 39: 101153.

Rombolà, L., D. Scuteri, C. Watanabe, S. Sakurada, K. Hamamura et al. 2020. Role of 5-HT<sub>1A</sub> Receptor in the Anxiolytic-Relaxant Effects of Bergamot Essential Oil in Rodent. *International Journal of Molecular Sciences* 21(7): 2597.

Saiyudthong, S., S. Pongmayteegul, C.A. Marsden, P. Phansuwan-Pujito. 2015. Anxiety-like behaviour and c-fos expression in rats that inhaled vetiver essential oil. *Natural Product Research* 29(22): 2141-4.

Setzer, W.N. 2009. Essential oils and anxiolytic aromatherapy. *Natural Product Communications* 4(9): 1305-16.

Shirzadegan, R. M. Gholami, S. Hasanvand, M. Birjandi, A. Beiranvand. 2017. Effects of geranium aroma on anxiety among patients with acute myocardial infarction: A triple-blind randomized clinical trial. *Complementary Therapies in Clinical Practice* 29: 201-6.

Son, H.KY., W.Y So, M. Kim. 2019. Effects of Aromatherapy Combined with Music Therapy on Anxiety,

Stress and Fundamental Nursing Skills in Nursing Students: A Randomized Controlled Study. *International Journal of Environmental Research and Public Health* 16(21): 4185.

Watanabe, E., K. Kuchta, M. Kimura, H.W. Rauwald, T. Kamei, J. Imanishi. 2015. Effects of bergamot (*Citrus bergamia* (Risso) Wright & Arn.) essential oil aromatherapy on mood states, parasympathetic nervous activity and salivary cortisol levels in 41 healthy females. *Forschende Komplementarmedizin* 22(1): 43-9.

Zamanifar, S., M.I. Bagheri-Saveh, A. Nezakati, R. Mohammadi, J. Seidi. 2020. The Effect of Music Therapy and Aromatherapy with Chamomile-Lavender Essential Oil on Anxiety of Clinical Nurses: A Randomized and Double-Blind Clinical Trial. *Journal of Medicine and Life* 13(1): 87-93.

Zhang, K. & L. Yao. 2018. The anxiolytic effect of *Juniperus virginiana* L. essential oil and determination of its active constituents. *Physiology & Behavior* 189:50-8.